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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 1. PHILADELPHIA AND NEW YORK JULY 1, 1907

June Edition, 20,377

18,253	Copies mailed.
5,500	Copies delivered to News Company.
795	Copies to Philadelphia and foreign under stamps.
20	Copies held in reserve.
24,568	
4,191	Back numbers sent out.
20,377	Total copies June edition.
	Of these
12,926	Were paid subscriptions.
5,500	Delivered to News Co.
18,426	
1,822	Returned by News Co., to June 22, 1907.
16,604	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the June issue was 20,377.

Of these, 26,810 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 23½ ounces, representing 18,253 copies, and 4,191 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Races at Reading, July 4th

Berkshire Automobile Racing Association has been formed in Reading, Pa., with O. Koller, of the Reading Automobile Company, president and secretary, and E. S. Youse, treasurer. This association has been formed for the purpose of promoting race meets, and on July 4th will hold a race meet at Shillington track. There will be ten events on the program.

On August 9 and 10 the United States Motor Racing Association will conduct a 24-hour race at Brighton Beach track, New York.

Coming Events

July 2—Grand Prix, Automobile Club of France.
July 4—Harrisburg Pa., Peter's Mountain Hill Climb, Motor Club of Harrisburg.
July 4—Race Meet, Houston (Texas) Automobile Club.
July 5-14—National Motor Car Show, Bergen, Norway.
July 10—Start of Fourth Annual Tour of the American Automobile Association, for the Glidden trophy; start at Cleveland, Ohio, and finish at New York on or about July 23.
July 13—Chicago Race Meet for the Entertainment of the Glidden Tourists, Chicago Automobile Club.
July 15-18—Ostend Week, Record Trials, Automobile Club of Belgium.
July 22—Ardennes Circuit (Belgium).
July 31—Leiderkerke Cup for Touring Cars, Ardennes Circuit (Belgium).
July 31-August 8th—Belgium Regularity Contest for Touring Cars, A. C., of Belgium.
August 1—Hill Climb, Algonquin Hill, Chicago Motor Club and Chicago Auto Trade Association.
Aug. 1-4—Providence, R. I., Federation of American Motor Cyclists, National Meet.
Aug. 1-7—Criterium of France, 1750 miles touring competition and 250 mile race for the press cup. (Exact dates to be fixed). A. C., of France.
August 5-10—Automobile Carnival (Races and Show), Atlantic City, N. J.
Aug. 8—International Relability Contest, Belgium.
Aug. 9-10—New York City Brighton Beach Track, 24-hour automobile race, U. S. Motor Racing Association.
Aug. 11-20—Auvergne Cup Competition, France.
Sep. 1—Italy, Brescia Circuit, Florio Cup, A. C., of Italy.
Sep. 2—Labor Day Hill Climb, Sport Hill, Bridgeport (Conn.) Automobile Club.
Sep 5—Cedar Lake Economy Run, Chicago Motor Club and Chicago Auto Trade Association.
Sep. 9—Commercial Vehicle Trials of English Royal, A. C.
Sep. 14— 95-mile road race, Albany Automobile Club, of Albany, N. Y.
Sep. 14-15—Mont Ventoux Hill-Climb.
Sep. 15—Semmering Hill-Climb.
Oct. 1-15—Contest of Electric Vehicles, Automobile Club, of France.
Oct. 6—Cup of L'Auto Maisons-Laffitte.
Oct. 19—St. Louis (Mo.) International Aerial Race for the Gordon-Bennett Prize.
Oct.20—Galion Hill-Climb.
Oct. 31-Nov. 7—A. L. A. A. M. Show, Madison Square Garden, N. Y.
Nov. 12-Dec. 1—Paris Show, Grand Palais and Place Des Invalides, A. C., of F.
Nov. 30-Dec. 7—Chicago National Automobile Show, S. A. Miles, Mgr., No. 7 E. 42nd St., N. Y. City.
Dec.14-21—Local Show, St. Louis, Mo., Auto Manufacturers' and Dealers' Association.
July 14, 1908—Aerial Race, Paris to London.

S. A. Miles, manager of the N. A. A. M., has been sending a last call to applicants for space in the Chicago shows—pleasure and commercial—both of which will be held November 30 to December 7, one in the First Regiment Armory and the other in the Seventh Regiment Armory. Space allotments are to be made July 1, and as usual the indications are that the applications for space will exceed the supply.

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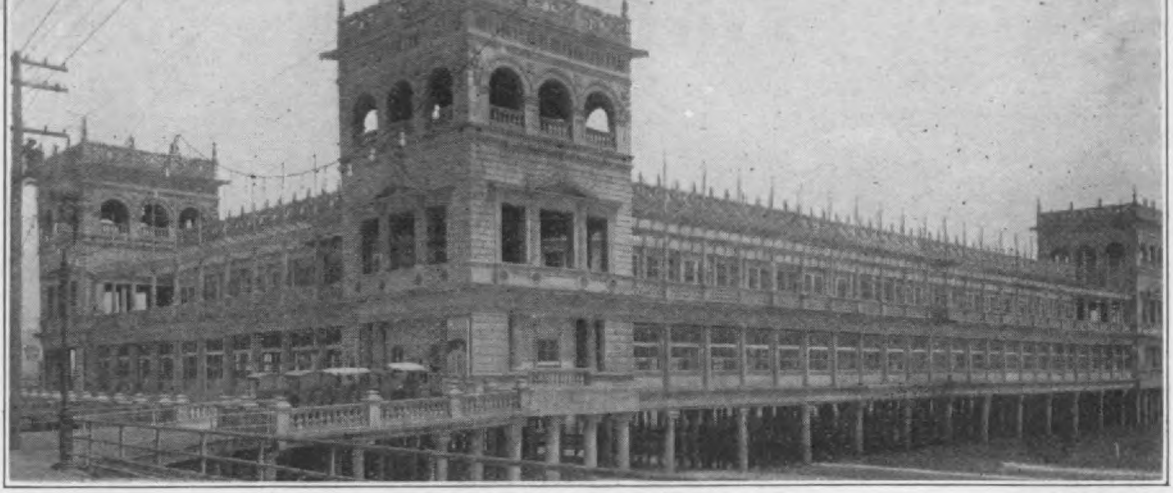

Exhibition Hall on Young's New Million Dollar Pier, in which the Atlantic City Automobile Sh
vill be held August 8, 9 and 10.

Atlantic City Automobile Carnival

An automobile carnival, including three ys' racing, a floral parade and a three ys' show, will be held at Atlantic City, J., the famous seaside resort, during the ek of August 5 to 10. The races will be ld on Monday and Tuesday, under the spices of the Atlantic City Automobile ub, on the beach at Ventnor, just south Atlantic City. The floral parade will take ce on Wednesday over a five-mile route asphalt streets, passing before a grand nd seating 5000 persons. The Show, ich will take place on the remaining three ys of the week, will be held on Young's ew Million Dollar Pier, the exhibition hall ving an unbroken floor space of 150 by feet. This is the first automobile show ld during the summer months, altho rail-y and street carmakers and others have ld shows at Atlantic City several times in past. During the month of August there fully 250,000 visitors in the city, includ-g prominent men from all parts of the untry. Applications for space should be nt to C. Wood Tatham, Boardwalk and uth Carolina avenue, Atlantic City, N. J.

American Society of Mechanical Engineers Meet

At the sessions of the recent meeting of American Society of Mechanical Engi-ers at Indianapolis, Ind., important ques-ns pertaining to automobile construction re discussed. The society for the first ne in its history has recognized the auto-bile as a legitimate subject for engineer-g study.

Ind., was laid on June 22. The guest honor was Vice President Charles W. F banks. E. H. Bundy made the opening dress, after which Mr. Fairbanks mad characteristic address. Speeches were a made by Charles S. Hornley and Mark Forkner. The main building will be feet by 310, the power house being 200 by

Glidden Tour Schedule with Additio Entries

The schedule for the fourth annual t for the Glidden trophy has been announc The tour will cover a total distance of 1, miles and take 15 days elapsed time. actual running time will be twelve days, others being spent for stopovers. The lo est day's run will be 174 miles and shortest 97.

As heretofore all cars will be prohibi from carrying signs or advertising ca but each car will be supplied with two p nants with the name of the car on then

The schedule is as follows:

	M
July 10, Cleveland to Toledo, Ohio	
July 11, Toledo to South Bend, Ind	
July 12, South Bend to Chicago, Ill	
July 13-14, spent in Chicago	
July 15, Chicago to South Bend	
July 16, South Bend to Indianapolis	
July 17, Indianapolis to Columbus, Ohio	
July 18, Columbus to Canton, Ohio	
July 19, Canton to Pittsburg, Pa	
July 20, Pittsburg to Bedford Springs, Pa	
July 21, spent at Bedford Springs	
July 22, Bedford Springs to Baltimore, Md	
July 23, Baltimore to Philadelphia	
July 24, Philadelphia to New York	
Total	

The total number of entries at the time going to press was 26. The last entries as follows:

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Entrant.	Club.	H.-P.

Three-Day Endurance Test of the New Jersey Automobile and Motor Club

The three days' endurance test of the New Jersey Automobile and Motor Club, held on May 30-31 and June 1, proved too easy to eliminate the up-to-date cars of today. Of the 26 contestants only 3 were obliged to drop out, and at least 12 came thru with perfect scores. In the touring car class there were 14 contestants for the William C. Shanley trophy. Fifty per cent. of the cars in this class obtained perfect scores.

Among the runabouts, 12 of which competed for the Angus Sinclair trophy, 5 finished with perfect scores. The circuit for the first day measured 121.9 miles, and included Schooley's Mountain, but with the exception of a few short stretches the roads were excellent. The second day's run of 154 miles from Newark to Atlantic City via Trenton, was very easy, the roads being fine, and the same was true for the 139.5 miles on the return to Newark via Thomas River, Freehold and New Brunswick. The total mileage was 415.4, and the schedule kept the pace well within the speed limits. The disposition to be made of the cups, which cannot well be divided among the numerous perfect score cars was not yet decided at the time of this writing.

TOURING CAR CLASS.

Car.	Driver.	Points Lost.
Matheson	James Ferero	0
Stoddard-Dayton	J. W. Mason	0
Oldsmobile	Ralph Owen	0
Grout	J. H. Johnston	0
National	F. E. Boland	0
Knox	C. H. Peckworth	0
Winton	C. S. Calvert	0
Maxwell	Arthur Durham	3
Autocar	Clarence Fisher	10
Thomas Forty	Geo. Paddock	15
Dragon	Henry Setlow	50
Cadillac	James Ward	193
Dolson	W. H. Fuller	D.O.
Corbin	F. L. Apgar	D.O.
RUNABOUT CLASS FOR ANGUS SINCLAIR TROPHY.		
Stoddard-Dayton	R. T. Newton	0
Corbin	J. F. Corbett	0
Buick	M. F. Atgar	0
Jackson	C. W. Oathout	0
Dragon	John Haynes	0
Knox	W. H. Ellis	3
Maxwell	L. R. Hunt	7
Hewitt	Dr. J. F. Bell	21
Matheson	W. D. Gifford	48
Holsman	S. W. Case	56
Reo	Fred Stowers	84
Rambler	C. E. Beach	D.O.

A. L. A. M. Managers Meet

The semi-annual meeting of the Board of Managers of the Association of Licensed Automobile Manufacturers, was held June 4 in the association rooms, New York, all members of the association being present. The morning session was given over to a discussion of the litigation now pending against the manufacturers and dealers of unlicensed cars, suits of which were filed during the month of May.

The afternoon session was occupied with matters pertaining to the forthcoming show in Madison Square Garden. The show committee recommended to the Board the selection of the decoration scheme for the Garden offered by S. R. Ball. The Board unanimously sanctioned the selection of this scheme, and practical work on the decorations will begin at once.

Marcus I. Brock, assistant general manager of the association, who resigned from the show committee last year, was reappointed a member of the committee, to take the place of Carlton R. Mabley, who resigned. One of the features recommended by the show committee and adopted by the Board, was the elimination of any demonstrations at the show.

Owing to the number of applications for space from manufacturers of motorcycles, the recommendation by the show committee that an exhibit of motorcycles be given was approved. Space will be given and a complete exhibit of motorcycles be had in connection with a full line of commercial vehicles which have been promised by members of the association.

The question of good roads was also taken up and $5000 appropriated to be used at the discretion of a good roads committee, which will be appointed later. This committee will work in connection with the good roads committees of the National and other associations.

After the regular session of the Board the handbook committee, consisting of L. H. Kittredge, M. E. Metzger and Thomas Henderson held a meeting to discuss the 1908 handbook, which they hope to have ready by the time of the New York show in Madison Square Garden.

Connecticut Hill-Climb

With weather of the made-to-order sort, and Joe Tracy as a drawing card, the success of the Bridgeport Automobile Club's hill-climb, at Sport Hill, near Bridgeport, on Decoration Day, was assured. The course was on the Easton road, one mile in length, with a grade of from 8 to 10 per cent., and having several dangerous curves.

The fastest time of the day was made by Tracy and C. S. Bragg, in a tie. Time, 1.24 4-5. Summary:

CARS COSTING UNDER $1000.

1. Maxwell, 12-h. p.; driver, Mr. Watson.....2:06
2. Ford, 15-h. p.; driver, Ralph Sperry.....2:18

CARS COSTING $1000 TO $2000.

1. Reo, 16-h. p.; driver, Harry D. Gates.....2:19
2. Reo, 16-h. p.; driver.....2:27
3. Jackson, 20-h. p.; driver, Arthur W. Bell..2:30

CARS COSTING $2000 TO $3000.

1. Pope-Hartford, 30-h. p.; driver, Herbert Seymour 1:49
2. Oldsmobile, 40-h. p.; driver, Mr. Lyford...2:12
3. Continental, 30-h. p.; driver, Mr. Johnson..2.12

CARS COSTING OVER $3000.

1. Simplex, 50-h. p.; driver, John Woods...1.37 3-5
2. Packard, 30-h. p.; driver 1:41 3-5
3. Packard, 30-h. p.; driver, John Woods..1:46

FREE-FOR-ALL AND RUNABOUTS TO $5000.

1. Stanley, 20-h. p.; driver, C. S. Bragg....1:24 2-5
2. Locomobile, 40-h. p.; driver, Joe Tracy....1.24 2-5
3. Thomas, 60-h. p.; driver, George Townsend.1:30 1-5
4. Stevens-Duryea, 50-h. p.; driver, R. B. Crawford (protested) 1:32 3-5
5. Stearns, 60-h. p.; driver, W. I. Fickling (protested) 1:25
6. Oldsmobile, 40-h. p.; driver, J. W. Burrall.1:36 2-5

MOTOR CYCLES.

1. Indian, 2¼-h. p.; ridden by Peter H. Cox.1:30
2. Curtiss, 5-h. p.; ridden by C. Edward Clark.1:31 1-5

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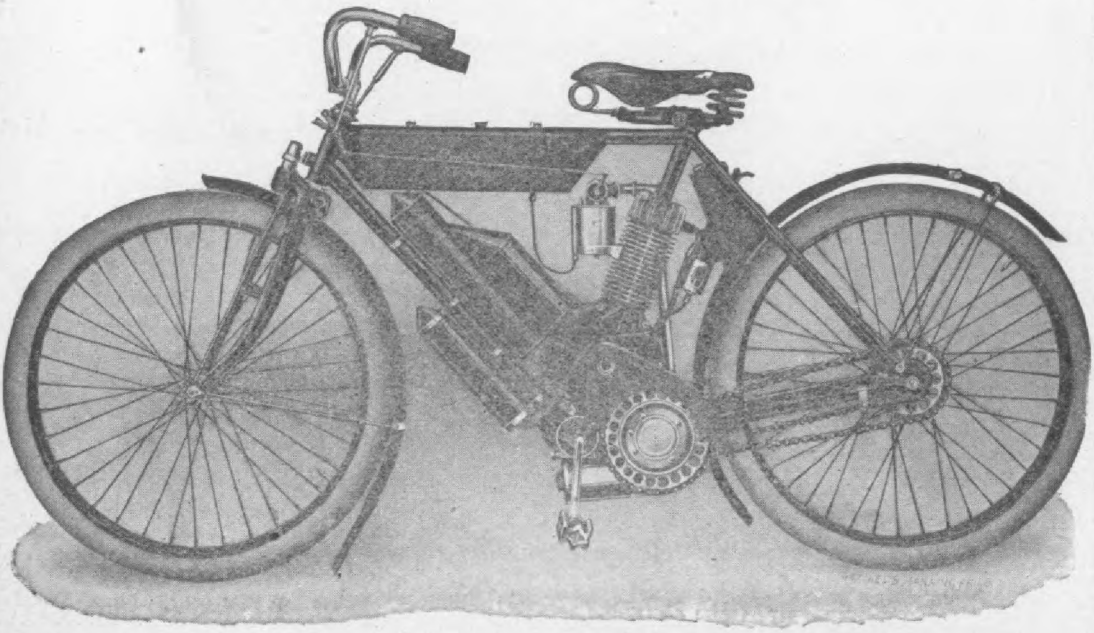

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CYCLE AND AUTOMOBILE TRADE JOURNAL

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JAMES ARTMAN - - - - - EDITOR

Philadelphia, July 1st, 1907

Interchangeability of Auto Parts and the Low-Priced American Car

The improvement of the American-built automobile has been so rapid that it might be considered almost phenomenal. This sudden development is not alone in design, but in workmanship as well, rapid advances have been made.

The factors which have made possible this "Alladin"-like appearance of the almost perfect car are varied in the extreme, for as usual with the growth of most mechanical products, the prominent and tangible results are effected not only by such major factors as materials, design and workmanship, but just as surely only in a less degree by such minor influences as the circumstances and surroundings of the workmen. The American workmen as a class are without question in better circumstances and surrounded by more comforts than are the same class in Europe, and the Americans seem to be natural adapts in the handling of machine tools. They may not display the painstaking care of minute details shown in the hard work of many of the artisans of Europe, but give them intricate and complicated machines, and they are as a rule very competent to produce accurate and interchangeable parts.

Here we touch the "needle adjustment" of the entire automobile industry in this country "interchangeability." Without this one pertinent feature, the phenomenal growth of the manufacture of the American high-grade moderately-priced automobile could not have been possible. To produce comparatively low-priced, well-built machines with interchangeable parts requires highly specialized machines, and these have been developed to a marked degree of perfection, and are now so universally used that hand-made parts have practically been eliminated.

During the formative period, of course, very few parts were duplicates, and a large part of the work was hand-produced, and even at the present time there are still many more machines on the market containing hand-made parts than is good for the industry. Nevertheless, the American automobile manufacturers to-day doubtless excel all other nations in the production of small, medium-priced but accurately made automobiles. This fact is attested by the large number of such machines now being exported and these little cars with interchangeable parts have been made possible only by the use of accurate American machine tools, replete with ingenious labor and time saving devices.

Some of the French papers seemed to be considerably wrought up over the gold cup tour or so-called "American Invasion," but the real danger of an invasion lies in the growing popularity of the American small car in France, whose manufacturers are extremely weak in this type, the majority of their plants being equipt apparently exclusively for the production of large high-priced touring cars. The present outlook would indicate that the exclusive production of these very well made, but large and expensive touring cars, which unquestionably has given the French their high reputation as automobile builders is likely to prove, if the American manufacturers avail themselves of the present opportunity, a decided stumbling block in the way of their successfully supplying their home demand for well-built, medium and low-priced cars.

Department Store Cut-Price Methods

The automobile business thus far has been fortunate enough to escape the cut-price methods which have in so many other industries proved disastrous. The prices of automobiles and accessories have, by many, been considered unnecessarily high, but when the fact is considered that the business is to a large extent experimental, that new equipments were required, and even new types of machines designed for the work, and that the models rapidly changed, doing away with the possibility of using old machines and parts, it will be seen that the margin of profit is not as large as might be imagined, in fact, it is generally known that in proportion to the amount invested, comparatively few automobile manufacturers have become independently wealthy.

There will naturally be, as the industry assumes a fixt form, and the models reach a standard design, a time when the cost of production will be reduced, and prices will probably be somewhat lowered. But already the pernicious effects of the sale of accessories and parts as leaders, particularly by

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department stores and so-called cut-price jobbers, are making themselves felt, and if continued, will ultimately work considerable damage not only to the legitimate dealers, but to the purchasers as well, as the usual result of the continuance of such conditions is a general deterioration in the quality of the goods.

It would seem that manufacturers and others would realize the importance of the situation sufficiently to refrain from selling large quantities of accessories and parts to department houses at a very small margin, simply for the sake of small present profits. It must be clear to them that the practice of these retailers of selling popular accessories at extremely low margins of profit or even advertising at cut rates certain articles which it is found when inquired for are not even in stock, something just as good usually being offered the unsuspecting customer, will eventually make it impossible for the dealers to remain in the field. An absolute refusal to supply goods to such firms seems to be the only means of protecting the legitimate trade from being undersold.

Most manufacturers are perfectly willing to protect dealers who act as their agents, but these manufacturers are powerless to cope with such a situation when the dealers themselves do not co-operate with them, and it is hoped that the urgency of the situation will be realized by both the dealer and the manufacturer. The conditions here pointed out show clearly the growing necessity for the formation of some kind of manufacturers' organization, which will be in a position to put a stop to such demoralizing practices.

Endurance Contests

The automobile manufacturers seem to be waking up to the fact that speed and endurance contests between stock cars are much more valuable and mean more to the permanent advancement of the industry than any contest of freak cars can possibly mean.

At last we are having real contests of actual stock cars, and the results cannot help but be beneficial to the entire automobile interests if the contests are scientifically conducted and entered into by all the manufacturers.

Beyond question many points about steering gears, tires, frames, carburetors, etc., have been learned in the past from contests of even freak machines, how much more, then, is brought out by a contest of regular stock models on ordinary roads.

The recent endurance run from New York to Albany proved the mechanical capabilities of American cars, and the remarkable showing of the cars entered in the A. C. A. "sealed bonnet" contest has opened the eyes not only of our own country, but of all Europe to the fact that the American automobile is no longer a thing of experiment, but a sound mechanical unit practically fool proof and under any ordinary conditions capable of running hundreds of miles with absolutely no repairs, adjustments or even attention. Reliability! the one feature which has so long been sought and so few years ago the lack of which has given rise to so many jests about the under side of the machines has at last been demonstrated beyond a shadow of a doubt to be possest not alone by the high-priced palatially-equipt touring car, but also by the small and inexpensive, but well-built American machines.

This contest was a surprise not only to the general public, but to the dealers, manufacturers and even those most familiar with the up-to-date car. It has shown that at any reasonable speed such as sane men care to drive on ordinary roads over 80 per cent. of the cars entered are capable of covering 150 miles a day for four days, and even longer without so much as cleaning a spark plug.

There are, of course, many things which can be criticised, and it is to be regretted that some of our manufacturers of so-called high-grade cars do not enter them in such competitions, and it is well understood that such a refusal always lays the manufacturer open to the remarks of those who may justly or unjustly believe that such a course is prompted by cowardice. It was a noticeable fact that only two makes of foreign cars entered the A. C. A. contest, and it is not to be wondered at if some attributed this to the reluctance of foreign makers to enter into competition over our, at best, poor roads.

Undoubtedly every car in the sealed bonnet contest will be taken down and closely examined, and it is much to be regretted that the club did not go a step further and have this done officially under the supervision of a competent corps of engineers, and then give penalizations according to the findings of such a body. To have known accurately the amount of gasoline and oil used by each contestant would also under the conditions have been a simple matter and would doubtless have thrown many side lights on the actual performance of the competing cars, and it is herewith suggested that in the future such contests be not shorn of part of the good they can accomplish, but be carried out to a logical and extremely beneficial completion by every reasonable means.

An international exposition of automobiles, motorcycles and motor boats will be held at Copenhagen, Denmark, Sept. 29 to Oct. 7, under the joint auspices of the Danish Automobile Club and the Society of Motor Manufacturers and Agents. An elaborate booklet, printed in English, has been issued to advertise the exposition in English speaking countries and copies can be obtained by addressing L. Bendixen, Copenhagen, Denmark.

The proposed 5000-mile tire trials in England and France have been postponed until the spring of 1908.

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Saturday, June 22, witnessed the finish of robably the most uneventful yet most imortant automobile contest ever held in merica. The four-day "sealed bonnet" ontest proved a great surprise to everyody, as out of the 47 participants 41 finished

Cars in Sealed Bonnet Contest in front of the club house before the start.

he entire 600 miles on schedule time and vith perfect scores, not even the slightest djustment having been made. Not only lid the cars run perfectly but at the close of the fourth day's run, as the machines drove into the control at Newtown on the Long Island course, all the motors seemed o be purring as sweetly as could be desired by the most fastidious, and it is the firm conviction of the writer that a large part of the cars could easily have contin under the existing favorable conditions many days to come, without even so m as touching a spark plug, or tightenin nut. The committee in charge, consis of Robert Lee Morrell, chairman; John Hill, A. L. Ricker, S. M. Butler and Whiting, were evidently not prepared any such showing of cars at the finish were probably counting on having bad weather, which would undoub have eliminated some, or certainly a cup would not have been offered to car finishing with a perfect score. It now as tho the A. C. A. will have to s about 41 silver cups. Certificates, st

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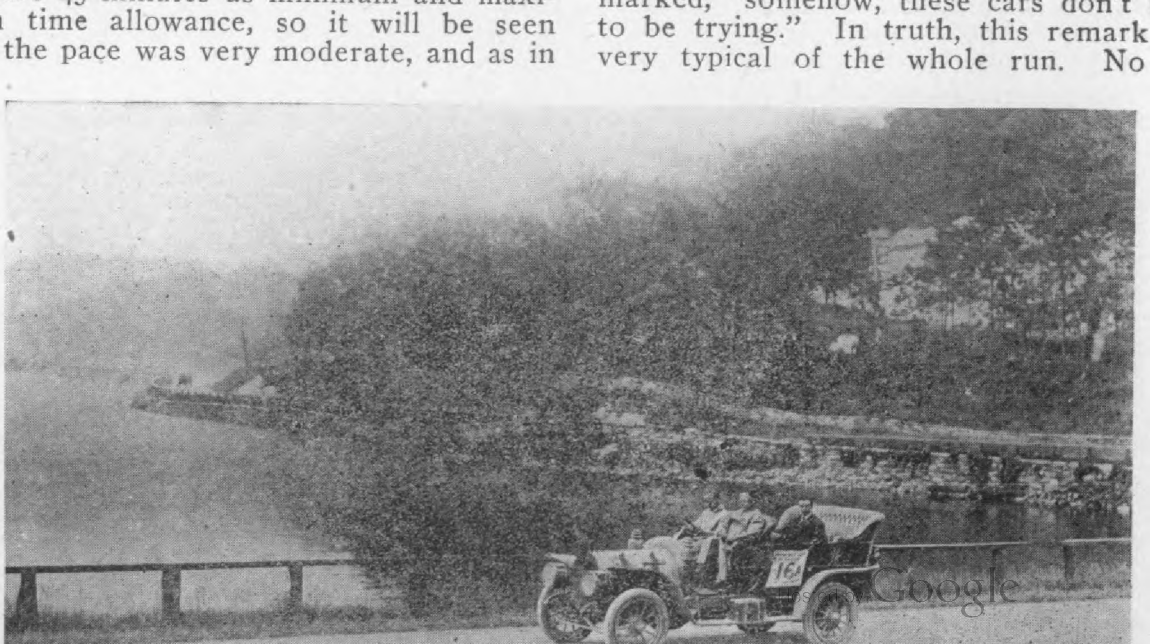
Cars at Maplewood Inn,

distance completed successfully under rules will be given to those who did not h. Much to the surprise of every one, weather was practically ideal all four s, the blinding rays of the sun being htly obscured by light clouds—one can- help speculating upon what the results ld have been had the cars encountered roads as were met with in the recent urance run to Albany.

ccording to the schedule, all the cars, ept the two high-powered runabouts in s A, had a minimum of 7 hours 45 min- and a maximum of 8 hours 15 minutes hich to complete the 150 miles each day, n average of about 17 miles an hour required. One hour for lunch and taken in repairing tires was not count- n the running time. The Class A run- ts, two of which were entered, the six- der Darracq, driven by S. B. Stevens, the 40 H. P. Matheson, of R. G. Kel- were required to cover 170 miles each but were given 9 hours 15 minutes and urs 45 minutes as minimum and maxi- time allowance, so it will be seen the pace was very moderate, and as in open country and on good stretches of ro a higher speed was indulged in there w necessarily considerable loafing thru t villages and speed-restricted neighbo hoods. At all such places a man waving green flag gave notice to the drivers, and second man with a green flag indicat that that particular trap had been passe

Perhaps to the moderate pace can credited the almost remarkable absence tire troubles, as only about five cars we detained for this cause thruout the enti four days. The inhabitants of Long Islar and the occupants of passing touring ca were much surprised at the sight of many high-powered machines evidently a contest but yet driving at so moderate rate of speed. In Long Island it seems ne to impossible to make the people, who a used to the Vanderbilt Cup races, unde stand that there can be such a thing as contest with automobiles without racin and one old farmer very tritely voiced th feelings of many an observer when he re marked, "somehow, these cars don't see to be trying." In truth, this remark wa very typical of the whole run. No on



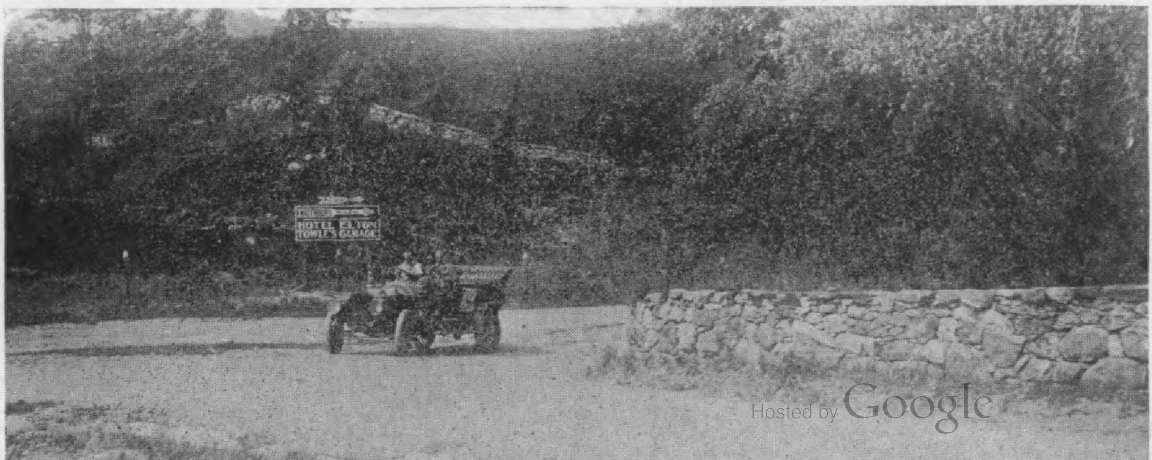
Maxwell Runabout, the smallest and lowest-priced machine in the contest, on the road, near Darien.

med to be very strenuous, the cars roll- along easily and the fact that the tool xes were sealed apparently caused no rry, all the drivers seeming to have the nost confidence that their engines would ep right on running without attention, l the fact that the engines did, speaks umes for the mechanical perfection of mechanism of the up-to-date machine. ry few cars emitted more than a slight ish haze from the exhaust, showing that lubricators were also working properly. attempt seemed to be made by the op- tors to favor the engines by stopping m when waiting at controls or outside of club house, and this was true also of the -cooled cars, the engines of which were en left running.

DETAILS OF THE FIRST DAY'S RUN.

'he course for the first and fourth day s the same, being for a large part over famous oiled roads of the Vanderbilt ırse, the route beginning officially at wtown, the first control, where the cars eived their official starting time. The s left the club house promptly at 8 lock, all getting away within a space of minutes. An amusing incident occurred the start when it came time for a car bearing the number 23 to be sent aw the driver had some slight difficulty starting, and grew very red ,and somew exasperated as all the small urchins yel "skiddoo," "23 for yours," etc. There w no car numbered 13, for altho we are su posed to be living in the enlightened tw tieth century, it is nevertheless true th many still cling to the old superstition regard to this much-abused number.

From Newtown the cars were sent aw at one minute intervals, the route bei over the Queen's Road to the well-kno Jericho Turnpike, turning at Krug's C ners over to the Hempstead Turnpike, th Bull's Head Corners, passing Jerich Hicksville and Amityville. At the la named point the club's men with gre flags were stationed to notify the drivers go slowly, as the speed regulations rigidly enforced in this village. The tu ing point, markt by a yellow flag with gre letters, was nine-tenths of a mile beyo Patchogue; at the latter place most of cars stopped and their occupants rega themselves with sandwiches, which for most part were eaten while in the cars visiting a neighbor's machine, while son who preferred to finish earlier, ate lunch



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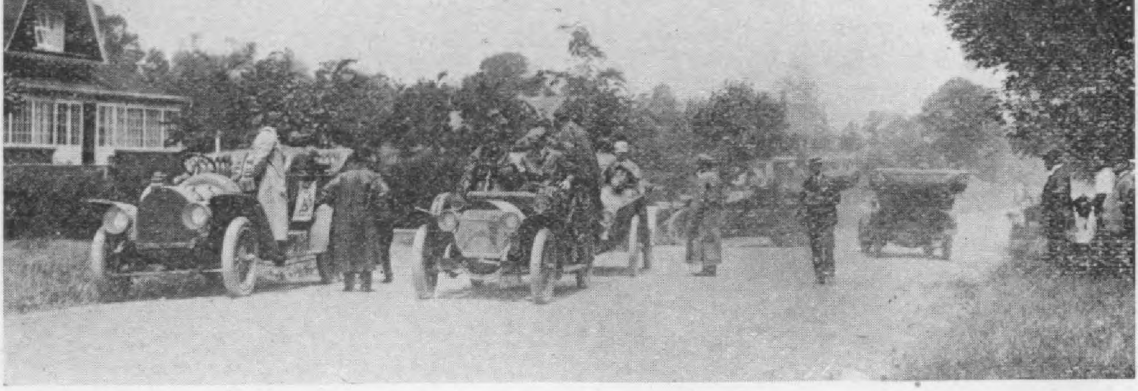

Cars at Woodmont, third day.

e car on the return trip, which was a re-
rsal of the outward route.

At all the dangerous grade crossings flag-
en, who displayed the usual white or red
gs, were stationed by the club. Some of
e roads had recently been oiled, which
pt down the dust and made it possible to
joy to the full the delightful scenery.
owever, there was a tendency the first day
r the cars to bunch up, which made it
mewhat dustier than over the same
urse on the fourth day, when, except for
occasional bunching of the cars for a
tle brush, the contestants were content
jog along at a comfortable speed just out
reach of the preceding car's dust.

All returned within schedule time, the
st to reach the club house being the Olds
unabout, which had also been the first to
art. Only three of the cars had tire trou-
es. The Maxwell runabout and Stevens
arracq were slightly delayed and the Glide
rived with a flat front tire which had
one down just before reaching the club.

After the odometer readings and time of
ch car were reported to the committee by
e official observer, the seals of each car
were inspected and "gas" and oil taken
and the cars were then run onto one of
spacious garage floors and left over n
under the committee's supervision.
Mathison cars were allowed to raise t
hoods and oil the overhead cam shafts.
driver inquired if he could put a little
on the magneto, but this privilege was
granted, and the thought flashed thru
mind of the writer as to what the op
tor's feelings would be if by chance
should get a glimpse of some part wh
was working loose, knowing that he co
not apply the "ounce of prevention,"
that in this contest there would be
"pound of cure."

The six-cylinder Darracq, driven by S
Stevens, was reported as out of the
ning, but came in later well within the t
allowed, having been delayed by slight
troubles. At the end of this first day th
was much surprise that all the cars finis
the predictions being many that the t
and fourth days would see a large num
drop out, but it seems the American car
better piece of mechanism than even th
best acquainted with it were aware.

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Filling the tanks, the only care the cars received.

THE SECOND DAY'S RUN.

The second day's run was somewhat ore difficult, as the course lay over much llier roads to Danbury, Conn., and return y way of Bedford, Kensico, White Plains nd Hartsdale to the starting control at uber's Hotel, on Jerome avenue. Forty-x cars started on the second day, being l but No. 28, a Stoddard-Dayton runabout, hich was disqualified over night by the ommittee for having placed a nut on the eering wheel the previous day. To have ontinued without the nut would have been angerous. A protest was also entered gainst the 50 H. P. Pope-Toledo, driven y Joe Judge, for using a pair of pliers on e foot throttle.

At Newcastle Corners the men with reen flags were met and the pace was ackened; however, F. Offenhauser, driver the Maxwell touring car, and F. Cimiotti, iver of a 24 H. P. Mora runabout, found emselves confronting a rope stretched

mines an hour, but the Judge fined each $10. F. Offenhauser paid the under protest and gave notice that he tended to appeal the case, but Cimiotti, was evidently a good talker, persuaded Judge to remit his fine. Both cars ceeded, and the observers deducted time from the running time.

The first car to be eliminated by bre ing the seals on the bonnet was the 45 P. Columbia, with electrical transmiss driven by C. F. Barrett. An inlet v spring broke and after running a while three cylinders it was decided to stop put in a new spring, which, of course, them out of the contest, altho they con ued the run.

There were many sharp S turns, but route in every case was clearly defined large yellow arrow heads nailed to fence telegraph poles, and no difficulty was perienced in following the course. A passing Salem Center, the cars followed north shore of Titus Reservoir to the tu ing point, and then retraced their route about 3½ miles before turning off to No Salem. The portion of the road retra was very narrow, and about five inches d with fine dust, which, continually stir up by the passing and repassing cars, almost suffocating, and the drivers w compelled to run very slowly, as it was possible to see any distance ahead.

On our return trip the Glide touring was noted at Peach Lake, 64 miles from starting point, hung up by trouble wit tire rim. The time was deducted, howe and the committee classed the delay as trouble. The car did not reach the until after 11 that night.

THE THIRD DAY'S RUN.

The conditions for the third day's over the Boston Post Road to Bridgep Milford, Woodmont and return, were

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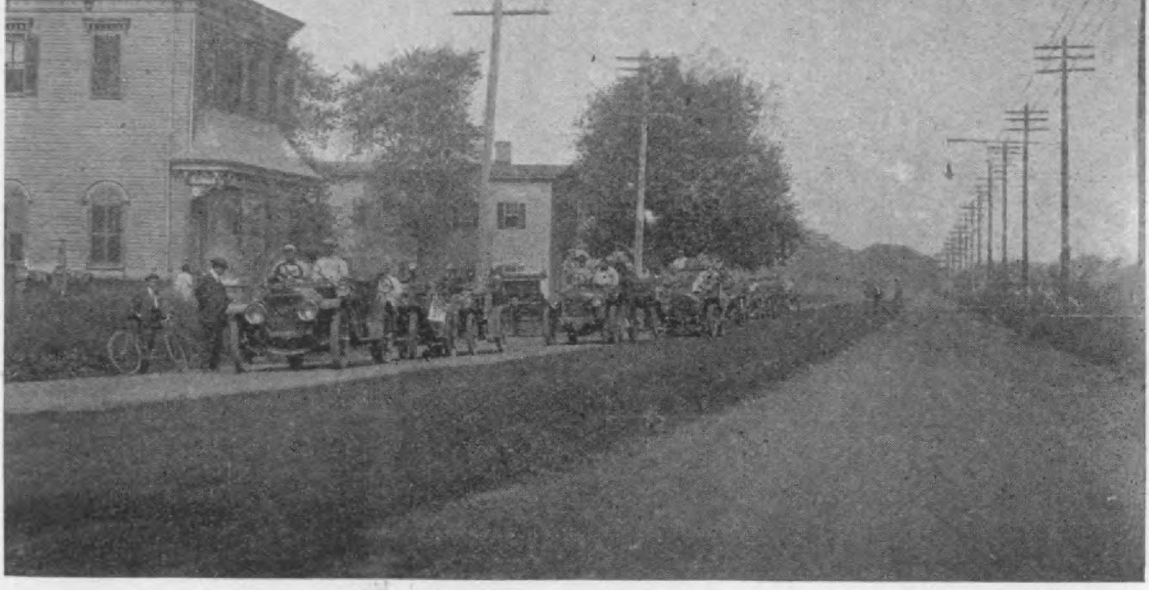

Cars finishing fourth day's run, at the Newtown Central.

ost ideal, as a slight rain the previous ght had laid the dust, and the sky was t clouded enough to ameliorate the heat the sun. However, the roads are not of e best and cannot be compared to those Long Island. The official time was taken the start, as on the second day's run, the control at Huber's Hotel on Jerome enue.

Forty-five cars started, as so far only two rs had been eliminated. As on the preous day, the Glide had tire troubles and l not return until late. The De Luxe d ignition troubles near Barstow, and had break a seal in order to make adjustents, but continued the run as a nontestant.

THE LAST DAY'S RUN.

On the fourth day 44 started the run, beg over the first day's course. The weather ntinued ideal and all seemed to enjoy to e full the beautiful roads and scenery. ear Hicksville the official car was met d we were informed that word had been ceived that the six-cylinder Darracq runout, driven by S. B. Stevens, had stopt th engine troubles and had to break a l.

At one point a group of children were hted playing in the road, and it would pear to the uninitiated as tho they might t get out of the way in time, but at the st "honk" of the horn, these children, o are used to the Vanderbilt Cup races, ed up on the curb with the precision of military company doing a wheel into line, d saluted us with cheers as we went by. erywhere on the Island the friendly feel- of the people toward the automobile is making considerable noise for the last t days, was seen on Roslyn Hill apparen out of the running.

On the whole, the performance of cars was remarkable and proves conc sively the fact that the automobile to- is practically fool proof and a perfec piece of mechanism. The competing c were without exception stock models, a some of them had already done many th sands of miles.

The contest was well planned and s tematically conducted. The bad turns w all indicated on the route cards, and all d gerous grade crossings were well guard

The following are the cars which entitled to cups:

H. P. of Car.	Make of Car.	Driver.
40 H.P.	Berliet	P. J. Johnson
30-35 H.P.	Stoddart-Dayton	E. C. J. McShan
30-35 H.P.	"	R. Newton
40 H.P.	Lozier	H. Michener
40 H.P.	"	R. Mulford
35 H.P.	Elmore	A. M. Day
30-35 H.P.	Locomobile	H. Mitchell
15-20 H.P.	"	J. Florida
40 H.P.	"	A. J. Bants
15-20 H.P.	"	T. Beck
60 H.P.	Thomas Flyer	M. Roberts
45 H.P.	Pierce Arrow	J. S. Williams
40 H.P.	Aerocar	A. M. Robbins
45 H.P.	Royal Tourist	R. Tucker
40 H.P.	Continental	C. S. Johnston
25-30 H.P.	Pope-Hartford	P. Hines
50 H.P.	Pope-Toledo	Joe Judge
35-40 H.P.	Oldsmobile	W. Folberth
30 H.P.	Knox	A. E. Dennison
30 H.P.	"	W. A. Bourque
40 H.P.	Berliet	H. C. Townsend
30 H.P.	White	W. C. White
30 H.P.	"	H. K. Sheridan
24 H.P.	Corbin	J. Corbett
24 H.P.	"	H. Trecker
24 H.P.	"	A. Bailey
24 H.P.	Racytype	W. H. Birdsall
30-35 H.P.	Studebaker	J. A. Holm
30 H.P.	Amer. Mors	N. M. Varney
50 H.P.	"	L. Potter
24-32 H.P.	Matheson	F. Lescault
30 H.P.	Haynes	C. B. Warren
	Darracq	E. Griffith

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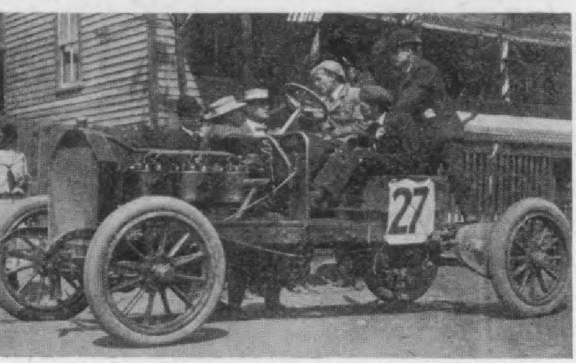
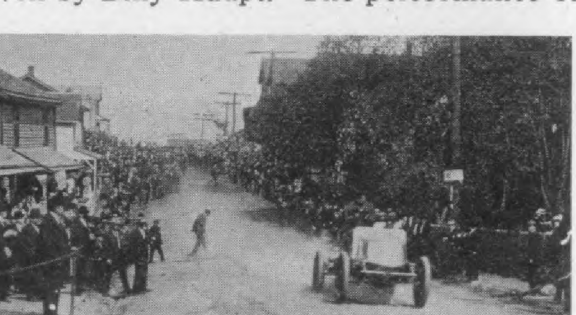
held their annual hill-climb up Giants' spair. This well-known hill was the ne of what is spoken of as "the most suc-sful hill-climb." There were 10 events, l no less than 37 contestants finished the rd and seventh events being reserved ex-sively for the members of the Quaker City



50 H. P. Great Chadwick "6," Winner of Both the Events for Stock Cars Over $5000 and Under $5500.

otor Club. Several "black horses" were veloped, the enormous crowd, variously imated at from 30,000 to 50,000, was well ndled and there were no accidents to mar pleasure of the day.

One of the surprises was the winning of th the events for stock cars over $5000 l for stock cars under $5500 by H. B. rzelere's 50 H. P. Great Chadwick "6," ven by Billy Haupt. The performance of



White Steamer Making the Record Time 1.49 4-5.

25 H. P. Pope-Hartford, which made climb in 2.05 4-5, winning the $4000 l under class and beating many cars of ch larger power, was also unexpected. wever, this car performed consistently in the events in which it was entered.

The event of the day was the 10th, or ee for all" for racing and stript cars, ich was won in 1.59 2-5 by the 60 H. P. theson, driven by J. B. Ryall.

STEAMERS DEBARRED.

Valter C. White, vice president of the ite Company, who had entered two cars

than the time of the 60 H. P. Mathes which won that event.

SUMMARY OF RESULTS.

Record time trial for Course, 2.11 1-5, held English Daimler.

White, 30 H. P., Walter C. White.....1.49

FREE-FOR-ALL, STRIPT AND RACING CARS

1. Matheson, 60 H. P., J. B. Ryall.....1.59
2. Thomas Flyer, 60 H. P., M. Roberts.....2.01
3. Great Chadwick "6," 50 H. P., Wm. Haupt.2.05
4. Pope-Hartford, 25 H. P., J. P. Grady.....2.06
5. Matheson, 60 H. P., Chas. Ward.....2.18
6. Matheson, 60 H. P., Ross Anderson.....2.28
7. Maxwell, 22 H. P., F. Offenhauser.....2.53
8. Maxwell, 14 H. P., Chas. Fleming.....3.03

STOCK TOURING CARS, ALL PRICES AND H. COMPLETELY EQUIPT AS CATALOGED.

1. Stearns, 50 H. P., C. W. Hoffman.....2.16
2. Stearns, 30 H. P., Guy Vaughn.....2.19
3. Pope-Hartford, 25 H. P., J. P. Grady.....2.39

STOCK CARS COSTING OVER $5000.

1. Great Chadwick "6," 50 H. P., Wm. Haupt.2.07
2. Matheson, 60 H. P., Chas. Ward.....2.19
3. Matheson, 45-50 H. P., Ross Anderson....2.24
4. Fiat, 35-H. P., Geo. Kessler.....2.35

STOCK CARS COSTING $5500 AND UNDER.

1. Great Chadwick "6," 50 H. P., Wm. Haupt.2.02
2. Thomas Flyer, 60 H. P., M. Roberts.....2.05
3. Stearns, 45 H. P., Guy Vaughn..... sta

STOCK CARS COSTING $4000 AND UNDER.

1. Pope-Hartford, 25 H. P., J. P. Hardy.....2.05
2. Thomas Flyer, 60 H. P., M. Roberts.....2.06
3. Knox, 30 H. P., Wm. Bourque.....2.37

STOCK CARS COSTING $2500 AND UNDER.

1. Corbin, 24 H. P., Guy Hutchinson.....2.31
2. Maxwell, 14 H. P., C. A. Fleming.....2.38
3. Knox, 30 H. P., Wm. Bourque.....2.41

STOCK CARS COSTING $1000 AND UNDER.

Maxwell, 22 H.P., H. A. Grant (disqualified)2.47
1. Maxwell, 14 H. P., Chas. Fleming.....3.07
2. Buick (1906 G), 22 H. P., H. J. Koehler...3.18

QUAKER CITY TOURING CAR CLASS (FOR MI BERS OF QUAKER CITY MOTOR CLUB ONLY

1. Stearns, 30 H. P., C. W. Hoffman.....2.13
2. Stanley touring car, 20 H.P., D. W. Harper 2.31
3. Autocar, 30 H. P., J. F. Brown.....3.10

QUAKER CITY RUNABOUT CLASS (FOR MI BERS OF QUAKER CITY MOTOR CLUB ONLY

1. Stanley runabout, 20 H. P., D. Walter Harper 1.56
2. Oldsmobile, 35-40 H. P., T. W. Berger....2.47
3. Stoddard-Dayton, 30-35 H. P., E. L. Leinbach 2.52

MOTORCYCLES, FREE-FOR-ALL.

1. Simplex-Peugeot, 6 H. P., Bill Wray.....1.40
2. Indian (twin-cyl.), 5 H. P., Oscar Hedstrom 2.01
3. Indian, 4 H. P., Jos. McLaughlin.....3.18

Fast Time at Cleveland Hill Climb

The first annual hill climb of the Clev land Automobile Club, held on Stucky H 20 miles east of Cleveland, on June proved a success. Walter White, driving white steamer, covered the three-fifths a mile up the 20 per cent. grade in 47 seconds or at the rate of a little more th 53 miles per hour. The Mora car ent ed in the contest was followed by hard lu it having covered the course with two f tires, only losing by 10 seconds.

Summaries:

AMATEUR CHAMPIONSHIP.

	Car. Driver.	Tim
1	Stearns, W. F. Hart	1:20
2.	Reo, Al. Engle	1:39
3.	Reo, Fred Gehring	1:55 1

STOCK RUNABOUTS UNDER $850.

1.	Reo, McGinnis	*1:36 1
2.	Ford, A. B. Manley	1:49 2

*Protested. Decided in favor of Ford.

STOCK RUNABOUTS UNDER $1500.

1.	Jackson, Robert Burman	1:38 3
2.	Reo, C. R. Thomas	1:44
3.	Jackson, C. D. Paxson	1:49

STOCK TOURING CARS UNDER $2000.

1. Jackson, Robert Burman 1:34 1-5
2. Reo, McGinnis 1:37 7-10
3. Reo, C. R. Thomas 1:48 1-5

STOCK RUNABOUTS UNDER $3000.

1. Ford, M. J. Roseboro 1:13 1-5
2. Stoddard-Dayton, Ireland 1:32 1-5
3. Jackson, R. Burman 1:37 3-10

STOCK TOURING CARS UNDER $3000.

1. Ford, Kubeck 1:27 7-10
2. White, A. Scuife 1:27 9-10
3. Pope-Hartford, J. Grady 1:29

STOCK RUNABOUTS UNDER $5000.

1. Stearns, F. Leland 1:03 3-10
2. Stearns, W. F. Hart 1:13 1-5

STOCK TOURING CARS UNDER $5000.

1. Stearns, C. Schilpp ..... :57 1-10
2. Pope-Toledo, H. Lytle ..... :58 9-10

STOCK CARS OVER $5000.

1. Stearns, F. Leland 1:11 1-10

PISTON DISPLACEMENT, TWO-CYLINDER.

Jackson, R. Burman 2:33
Jackson, C. D. Paxson 2:33

PISTON DISPLACEMENT, FOUR-CYLINDER.

Darracq, A. L. Campbell ..... :54 4-5
Stearns, C. Schilpp ..... :56

PISTON DISPLACEMENT, SIX-CYLINDER.

Stearns, F. Leland 1:14

CARS FROM 851 TO 1432 POUNDS.

1. Stoddard-Dayton, A. Brooks 1:28 7-10
2. Reo, J. McGinnis 1:36 1-5
3. Reo, C. R. Thomas 1:37 1-5

CARS FROM 1432 TO 2204 POUNDS.

1. White, Walter White..... .... :47 2-5
2. Darracq, Campbell ..... :51
3. Pope-Toledo, H. Lytle ..... :59 3-5

FREE FOR ALL.

1. White, Walter White..... .... :48 7-10
2. Stearns, F. Leland ..... :52 9-10
3. Stearns, C. Schilpp ..... :57 3-10
4. White, Walter White ..... :58 1-2
5. Pope-Toledo, H. Lytle ..... :59 9-10

SPECIAL FOR ELECTRICS.

1. Baker, Greenfeld 1:41 1-2

Endurance Run of the New York Motor Club a Mud Contest

Probably the most strenuous endurance contest ever held in this country was the 208.1-mile test of the New York Motor Club. The course led thru Tarrytown, Cold Springs, Poughkeepsie, Amenia, Great Barrington, Pittsfield, Chatham, and finished at Albany. This is certainly the longest route ever laid out for a one-day endurance contest over public roads, and to add to the rigors of the situation, the roads were wet and in fearful condition.

The start was made from Columbus Circle, New York City, early Thursday morning, 27 of the 29 entrants being sent off at 1 minute intervals, only two failing to make an appearance. All of the cars arrived at the first control without penalization, at the second station four had marks against them, and the perfect scores of eight more were spoiled by the time Poughkeepsie, the third station, was reached. At Amenia, the half-way station, 102.2 miles, nine cars still had perfect scores, but by the time Chatham, 183.9 miles, was reached every car had been penalized.

The Corbin, driven by James Corbett, finished with the best score for touring cars, having only nine points against it, but was disqualified on protest of E. L. De Camp, it being claimed that only three instead of four passengers were carried by it from Great Barrington to Albany. The committee declared the Corbin ineligible and the trophy in this class was awarded to the Lozier, driven by H. Michener, who had the second best score. The runabout class trophy was won by C. B. Warren in a Haynes.

The contest was well conducted, but there was a fatal accident which cast a gloom over the whole affair. James Swan was driving his Corbin runabout at good speed in making up lost time, and in crossing a trolley track at the foot of a hill near Albany, the automobile was struck by a trolley car running at top speed. The machine was completely wrecked. Clarence McKenzie, observer, who occupied the rumble seat, was instantly killed. Warren E. Mosher, who occupied the front seat, was badly injured, but Swan was only slightly bruised.

The following is the order of penalization of the 18 finishing cars and their mechanical score:

Car.	Driver.	Penalized.	Mech. Score.
Corbin,	Jas. Corbett	9	Perfect
Lozier,	H. Michener	18	Perfect
Haynes,	H. M. Vanderbilt	20	Perfect
Welch,	E. L. De Camp	24	
Reo,	R. L. Lockwood	48	
Stoddard-Dayton,	R. L. Newton	50	Perfect
Berliet,	P. J. Johnson	79	Perfect
Mitchell,	E. W. Hudson	103	
Premier,	C. O. Singer	106	
Continental,	C. S. Johnson	182	Perfect
Pope-Hartford,	Phil Hines	131	Perfect
Frayer-Miller,	H. H. Knepper	300	Perfect

The Long Island Automobile Club's Endurance Run

The two days' run of the Long Island A. C. proved that harder tasks must be set the modern automobile if it is not intended to present prizes to all the entrants. Out of the 20 starters in the run of 139 miles the first day and 154.6 miles the second day, 18 finished at the Brooklyn club house before their scheduled time limit.

There were ten cars that covered the 193.6 miles without stops except at controls, and without attention other than filling the oil and gasoline tanks.

The results are as follows:

CLASS A MACHINES COSTING UP TO $1500.

Cadillac, J. D. Ronk, clean score, tied.
Cadillac, J. D. Rouk, clean score, tied.
Holsman lost nine minutes on carbureter adjustments.

CLASS B, MACHINES COSTING FROM $1500 TO $3000.

Columbia, E. H. Barnum, clean score, tied.
Oldsmobile, R. E. Pardee, clean score, tied.
Pope-Hartford, C. G. Arnold, clean score, tied.
Queen, carbureter adjustments; Thomas, loose connecting rod; Franklin, broken fan; Haynes, disabled; Aerocar, damaged in avoiding a collision with a carriage.

CLASS C, MACHINES COSTING $3000 AND UPWARDS.

Matheson, R. G. Kelsey, clean score, tied.
Packard, S. H. Burns, clean score, tied.
Pope-Toledo, A. N. Wilcox, clean score, tied.
Pierce Arrow, A. B. Coles, clean score, tied.
Winton, C. A. Carlson, clean score, tied.
De Luxe and Dolson had carburetor adjustments; Welch broke pin in oiler.

It was finally decided to run a supplementary endurance run for the tied cars, but this simply resulted in reducing the number from 10 to 7, and ties still exist as follows: Class A, Cadillac and Maxwell; Class B, Columbia and Pope-Hartford; Class C, Winton, Pierce and Packard. It is probable the names of the tied drivers will be engraved on the different trophies, which will be held by the clubs, and certificates awarded to the cars.

It is a noteworthy fact that in this second trial of 200 miles all of the resulting seven that tied reached all the controls on time and did not make a single replacement, and even the three that lost their perfect score record were penalized owing to trifling mishaps which in no way reflected on the quality of the cars.

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Aluminum Alloys

Syracuse, N. Y., June 11, 1907.

Referring to your June issue, page 65, the article under the head of "Aluminum Castings."

There is a great deal of information in this article which is of value, and there is considerable which is worse than useless because it is false. But before we attempt to correct any of the statements, we wish to say we believe that Mr. Dolnar never intended to write anything which was not correct, but feel that he has been led into this by reason of using statements given to him from sources which would naturally be considered correct, but unfortunately where there are "axes to grind."

The part of the article to which we take exception commences with the second paragraph in reference to Zinc Alloys as compared with Copper Alloys. The impression that Mr. Dolnar gives is that aluminum-zinc alloys are inferior to copper alloys as far as resistance to vibration is concerned, although he admits that zinc alloys are the strongest.

Our position in the automobile casting field, namely, that of being the largest producers of zinc-aluminum castings in the business, makes it necessary for us to take some action to correct the impression which is being so industriously circulated by some of "our friends, the enemy," that zinc alloys are inferior to copper alloys.

The aluminum foundry business at the present time is divided into two camps, on the one hand those who use the Aluminum Company of America's No. 12 alloy, which was formerly known as nickel-aluminum, and which is 93 per cent. aluminum and 7 per cent. copper, and those who use zinc-aluminum alloys of various kinds, running from the Aluminum Company of America's No. 31, which contains 82 per cent. aluminum, 14 per cent. zinc, the balance copper and manganese, to those who use an alloy of nothing but zinc and aluminum. There is also a dividing line among the automobile manufacturers along the same lines.

There is a vast difference between the positions taken by the two foundry factions. The zinc-aluminum people concede that No. 12 is a good alloy, but claim that the zinc-aluminum alloy is better. On the other hand, the No. 12 foundry people take the stand that there is absolutely nothing to it but No. 12; that all the rest of the foundrymen do not know what they are doing; that their metal is no good, never was and never can be made good.

Now let us look into this proposition. No. 12 has an average tensile strength of about 16,000 pounds per square inch, and none of the samples we have submitted for tests have ever shown any elastic limit. The gravity of this metal is about 2.87.

No. 31 alloy has an average tensile strength of about 30,000 pounds, with no elastic limit and with a gravity of about 3.05. These are the two standard alloys produced by the Aluminum Company of America and sold generally. So far as we know, neither of these alloys, when properly handled, have ever given any trouble.

However, we were not content to sit down and take the results of other people's experiments and say that was all that could be done with aluminum. So we started out to develop, for the benefit of ourselves and our customers, a better mixture than any one had produced.

We experimented along the lines of the use of copper and aluminum, zinc and aluminum, manganese and aluminum, and a combination of same. We are now experimenting with other metals which we do not yet feel disposed to announce. The results of these tests showed us very conclusively that in order to get the best results there was only one thing to use—ZINC.

We therefore began to develop a system of foundry practice which would enable us to get the benefit of all the strength of this alloy, and the results have been very, very satisfactory.

We have arrived at a point where we can produce an alloy of zinc and aluminum, with a tensile strength of 20,000 pounds, an elastic limit of 15,000 pounds per square inch, and a gravity of 2.95. We have another zinc-aluminum alloy having a tensile strength of over 26,000 pounds, and an elastic limit of 22,000 pounds per square inch, with a gravity of 3.00.

These results were all right as far as they went, and there was no question but what we had the best material on the market, but still there was this continual talk about the crystalization of zinc-aluminum alloys, and while we did not think there was anything to it, at the same time we considered it wise to make sure of the facts, so we had tests made and were able to demonstrate that zinc-aluminum alloys are infinitively superior to No. 12, as far as resistance to vibration is concerned.

For instance, the E. R. Thomas Motor Company, Buffalo, New York, raised this question of crystallization. They have an endurance testing machine at their plant, and we submitted to them a sample of our zinc-aluminum alloy and one of No. 12, both bars made under identically the same conditions. These bars were turned down to ½-inch diameter at the ends, which were 4½ inches from the ends of the grip. On this ½-inch diameter bar a 25-pound weight was suspended at each end. The machine was started running at 1200 revolutions per minute. The results, taken at the first break in each instance, were: The zinc-aluminum alloy ran 1,016,700 revolutions; the No. 12 alloy ran 214,000 revolutions, and a sample bar, alloy unknown,

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submitted by a competitor, who probably does the most talking about the crystallization of zinc alloys, ran 100 revolutions.

The H. H. Franklin Manufacturing Company, of Syracuse, N. Y., have also made some very interesting tests along the lines of crystallization. Their apparatus is entirely different from the E. R. Thomas Company's, or the Henry Souther machines, in that theirs is an impact machine—that is, the aluminum is subjected to shocks similar to those actually received in automobile service. The Franklin people have found that No. 31 alloy will stand before breaking ten times as much vibration as No. 12. They are now testing our alloy under the same conditions, but the results are not yet at hand. They have tested our alloy on their endurance machine under the same conditions as the E. R. Thomas Company, and obtained about 900,000 revolutions. They have not tested No. 12 on their endurance machine.

We also sent sample bars to Mr. Henry Souther, of the Henry Souther Engineering Company, of Hartford, Conn., and requested him to make an endurance test, and inasmuch as we submitted the sample bar of No. 12 we asked him to make an analysis of both mixtures.

Under date of June 5th, he reports as follows:

"Syracuse Aluminum and Bronze Co.,
"Syracuse, N. Y.

"Gentlemen: Referring to your letter of May 18, the test specimens you sent for our endurance machine show the following results:

ANALYSIS.

Sample.	Mark.			Manganese. P.C.	Copper. P.C.	Aluminum. P.C.	Zinc. P.C.
37,261	3-70	End'r.	Spec.....	0.11	7.84	92.05	None
37,262	7-800	End'r.	Spec.....	Trace	0.34	83.42	16.24

ENDURANCE.

Sample.	Mark.			Revolutions. No. 1 end.	Revolutions. No. 2 end.
37,261	3-70	Endurance	Specimen.	558,600	816,500
37,262	7,800	Endurance	Specimen.	1,550,400	1,618,300

"Referring to the above results: To properly understand them, it must be understood that the load was exactly the same in both cases—30 pounds—and that it produced a fibre stress of 10,600 pounds per square inch, and a deflection of .06 inch on a .500-inch diameter specimen over a distance of 4.50 inches—that is, the load was applied at a distance of 4.50 inches from the support.

"It is apparent that the alloy containing zinc has double the endurance of the one containing copper. I will further state that these are most excellent results for aluminum alloys, as compared with others tested by us.

"Very respectfully,
"THE HENRY SOUTHER ENG. CO.,
"(Signed) Henry Souther."

The sample 37,261 is No. 12 alloy, received from the Aluminum Company of America. Sample 37,262 is our own alloy, and you will note that it stood nearly three times as much as No. 12, and also that the load in this instance was five pounds heavier than that used by the E. R. Thomas Company or the H. H. Franklin Company.

We are also in receipt of a letter from Mr. Souther in which he states that he has reported to the A. L. A. M. that zinc alloys are decidedly better than No. 12.

We think the above submitted facts show, without a question of doubt, that zinc alloys are better than No. 12, and that our own alloy is way beyond anything heretofore produced for the reason that in addition to obtaining a metal with a very low specific gravity we have succeeded in raising the tensile strength to a considerable degree. Further that we are able to produce a guaranteed elastic limit nearly equal to the tensile strength of No. 12, which is a very great advantage.

We do not know of anything we can add to the above, and we feel certain that if this information is placed before the automobile manufacturers of the country, who are, without exception, looking for something better all the time, it will dispose of the crystallization argument. This being disposed of, and with the additional tensile strength and the elastic limit shown by the zinc-aluminum alloys, the No. 12 alloy will soon be a matter of the past for automobile use.

Yours very truly,

SYRACUSE ALUMINUM & B. CO.
(Signed), Chas. L. Ackerson, Mgr.

[The information obtained from the Allyne Foundries was correctly given. It is also true, as claimed in this letter, that aluminum-zinc alloys have their users who prefer them, and that some large makers of motor cars who have used zinc alloy have abandoned it. The question as to whether zinc or copper alloys are the more suitable for motor car castings is as yet not decisively answered. There is no test for motor-car materials so convincing as that of actual work on the road, and nothing else will finally decide what shall be used.—Hugh Dolnar.]

Oldsmobile Stars at Readville

The races at Readville race track, Boston, Mass. on May 30, were witnessed by a large crowd. The Oldsmobile carried off the honors in both the 50 and 100-mile events in which a number of cars were entered. The first event was for 100 miles, in which the following cars started: 24-H. P. Dragon, 30-H. P. Stearns, 35-H. P. Oldsmobile, 20-H. P. Jackson, 30-H. P. Moon, 35-H. P. Grout, 50-H. P. Frayer-Miller, 30-H. P. Cadillac.

In the 50-mile event the starters were Royal Tourist, Jackson, American, Knox, Logan, Grout, Corbin, Oldsmobile, Dragon and Stanley Steamer.

The summaries follow:

100-mile event—Oldsmobile, 2.10.30; Cadillac, 2.16.35 1-5; Frayer-Miller, 2.38.16 1-5; Dragon, fourth, and Stearns, fifth.

50-mile event—Oldsmobile, 1.03.24; American, 1.04.45 1-5, and Royal Tourist. 1.05.55 1-5.

The German American Social Club, of Cleveland, O., changed its name and purpose at their annual meeting and will hereafter be known as the Country Auto Club.

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Trade Changes and Removals

American Lamp Company of Detroit, Mich., recently increased its capital stock to $50,000.

Broadway Auto Co., of Somerville, Mass., has been succeeded by The Boulevard Auto Co., of that city.

Bellknap Motor Co. of Detroit, now known as the Michigan Steam Motor Company, has recently located in their new factory at Pontiac, Mich.

Brown Auto Top Company of Philadelphia, Pa., has recently removed from 1327 Buttonwood street, to 437-439 N. Broad street.

Buick Motor Co., Flint, Mich., has absorbed the Whitney Motor Car Co., of Jackson, and the Janney Motor Car Co. of Flint.

Dodd Motor Co., The, heretofore located at Grinnell, Iowa, has reorganized and leased a building at Third and Vine streets, Des Moines, where the manufacture of its motor will be continued.

Ideal Plating Company, 3 Appleton street, Boston, Mass., have been succeeded by the Ideal Plating Co., Inc.

Jeffery Co.'s, Thos. B., Chicago branch will be moved to 1462-4 Michigan ave.

Kimball, E. T. Company, Motor Mart, Boston, has been purchased by the Corbin Motor Vehicle Corporation, who will continue this agency as the Corbin Car Company of Boston.

Logan Construction Co., of Chillicothe, O., has increased its capital stock to $250,000.

Mitchell Motor Company, of New York, has moved to new quarters at 1876 Broadway, corner of Sixty-second street.

Muller Porous Plate Accumulator Co., The, 205 West 41st street, New York, N. Y., have been succeeded by Albert Muller.

New York-Broadway Rubber Tire Company, 1186 Bedford avenue, Brooklyn, N. Y., have been succeeded by the Martin-Evans Company.

Nicholsburg, H., Mfg. Co., 68 Dey street, New York, have been succeeded by the J. W. Fiske Iron Works.

Splitdorf, C. F., manufacturers of electrical specialties, have removed their factory from 17-27 Vandewater street, to 261-265 Walton avenue, corner 138th street, Bronx, New York.

Shearer Automobile Co., S. C., 1650-54 Glenarm street, Denver, Col., garage business succeeded by Michaelis-Middlekauff Automobile Co.

Submerged Exhaust Co., 149 Water street, Newburyport, Mass., have been succeeded by the American Submerged Exhaust Company.

Schultz, Co., G. J., of Yonkers, N. Y., manufacturers of spark plugs, have been succeeded by Willyoung Appliance Co., of that city.

Turner & Fish Company, of Chicago, Ill., have changed their style to Indestructible Steel Wheel Company, and established new offices at 1303 Michigan avenue.

Wolverine Motor Company recently removed from Grand Rapids, Mich., to Bridgeport, Conn.

Williams Electric Vehicle Company's plant on East 55th street, Cleveland, O., has been purchased by John Byrider, of Akron. The company will be known as the Byrider Electric Auto Company.

Fires, Judgments and Failures

Anderson Automobile Co., Aurora, Ill., a copartnership has been dissolved.

Back Bay Garage, Boston, Mass., destroyed by fire on June 17.

Defender Cycle Company, West 125th street, New York City, on May 25, damaged by fire.

Duquesne Construction Co., Jamestown, N. Y., defunct; creditors will receive 10 per cent. dividend.

Eisenhuth Horseless Vehicle Co., Middletown, Conn., receiver in bankruptcy, George T. Scull, has filed his account.

Franklin Garage, 347 Franklin street, Buffalo, N. Y., damaged by fire to the extent of several hundred dollars.

Fay, Owen H., garage at 243 Michigan avenue, slightly damaged by fire.

Jones, T. W. Motor Car and Storage Warehouse Company, 428 Twenty-ninth street, Chicago, Ill., on night of May 30, was damaged by fire to the extent of $100,000.

Motor Components Manufacturing Company's property sold by R. R. McCutchen, receiver, to F. E. Goodwin, for $2,555.61.

Mercedes Importing Co., and the Pennant Automobile Company, at 1459 Michigan avenue, Chicago, damaged by fire on May 20.

Newark Motor Car Co., 126 Fourteenth street, Newark, N. J., damaged by fire caused by the explosion of gasoline. Damaged aggregates about $15,000.

National Oil Tank Company, of Dayton, Ohio, suit for infringement of patent has been entered by S. F. Bowser & Co., of Fort Wayne, Ind.

Polson's, William F., automobile garage, at 22-24 W. Utica street, Buffalo, N. Y., burned on May 20.

Paxson Motor Co., 911-913 Huron road, S. E., Cleveland, Ohio, practically destroyed by fire on May 21.

Skinner, Kenneth A., 179 Clarendon street, Boston, Mass., damaged by fire on June 18.

Stamford Motor Company's factory, Stamford, Conn., damaged by fire. Estimated damage to machinery and building, $10,000.

Shaw, Walden W., automobile plant, 1532 Michigan avenue, Chicago, damaged to the extent of $70,000.

Schraeder's, Charles, garage, 2534 N. Broad street, Philadelphia, Pa., damaged by fire, to the extent of $1500.

Studebaker Bros., San Francisco, Cal., wagon, carriage and automobile store, destroyed by fire on June 10.

Union Automobile Co.'s garage, 521 to 525 Homewood avenue, Homewood, Beaver county, Pa., destroyed by fire. Loss will run well toward $30,000.

Willard Co., H. J., of Portland, Me., dealer, has been petitioned in involuntary bankruptcy.

Legislation

CALIFORNIA.

Autoists have been barred from the Yosemite Valley.

NEW YORK.

Buffalo.—The corporation counsel interpreting that city's new automobile ordinance, holds that cars sent out by manufacturers to prospective purchasers on approval are not subject to taxation and that manufacturers have the right to shift their registration numbers around from one car to another, paying a tax only for the car carrying the number.

OHIO.

Toledo.—Council has reduced the speed limit to ten miles per hour and have organized a motor cycle police corps.

WASHINGTON.

Centralia.—Council has passed an ordinance regulating the speed of automobiles and motor cycles. The speed limit is eight miles per hour and must be reduced to four per hour when passing other vehicles.

Warner Instrument Co. Showing-up Speed Laws

The Warner Instrument Company, of Beloit, Wis., has made numerous tests in New York and Philadelphia under widely varying conditions for the purpose of demonstrating the absurdity of the existing laws regulating the speed of automobiles and other vehicles. The tests were made with an automobile, on the back of which is mounted a monster Auto Meter, standing at least 10 feet high and with the figures on the dial about 12 inches in heighth. The car was run thru the streets at the speed limit of 10 miles per hour, with the meter registering the exact speed and showing to the public the ridiculousness of the 10-mile-an-hour speed law and also that horse-drawn vehicles, trolley cars and other vehicles were exceeding the speed limit in passing the test car. Further tests will be made in other cities thruout the country for the same purpose.

Exports Still on the Increase

During the month of April, 1907, the exports of American automobiles and parts reached $686,144, as against $408,333 for April, 1906, which shows an increase of $277,811. The report also shows an increase of $140,797 over that of March, 1907.

	April.	
Exported to—	1906.	1907.
United Kingdom	$74,746	$174,277
France	31,375	81,230
Germany	11,517	17,048
Italy	55,960	79,392
Other Europe	20,774	50,658
British North America	82,133	174,448
Mexico	91,881	64,409
West Indies and Bermuda	4,252	11,752
South America	9,748	11,214
British East Indies	2,313	7,003
British Australasia	18,504	3,511
Other Asia and Oceania	3,329	7,264
Africa	831	.....
Other countries	970	3,938
Total automobiles, and parts of	$408,333	$686,144

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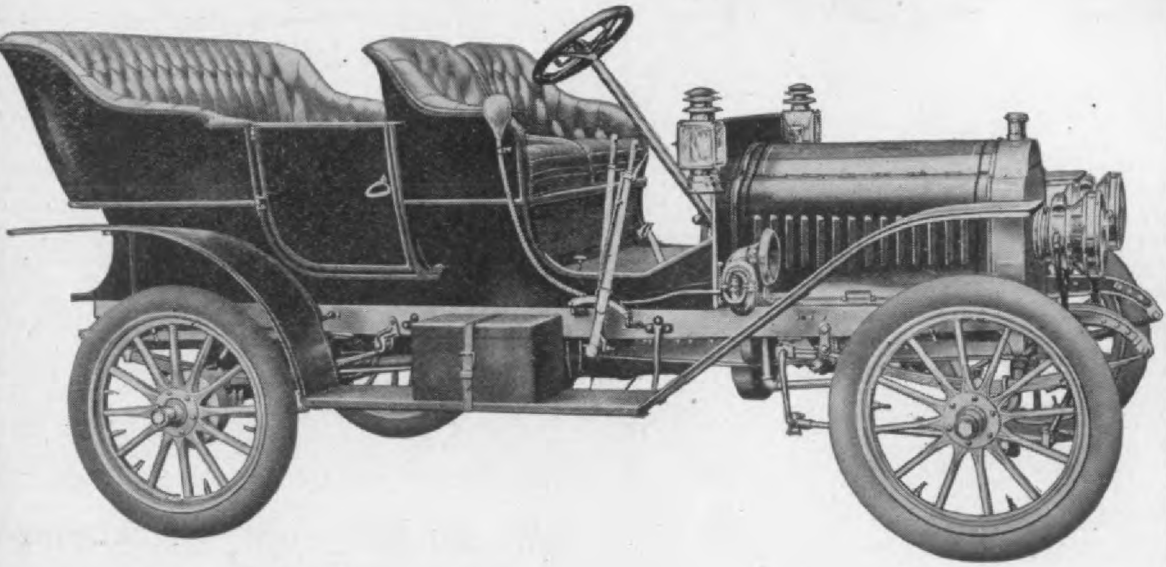
Valveless 2-Cycle



As Usual—
Something Unusual

Only 3 seconds variation per mile in a race of 50 miles.

"What!" you'll say, "only 3 seconds in 50 miles?" Yes indeed—and better than that—the two-cycle **Elmore** won the event hands down, beating a number of cars of much greater horse-power.

Yes indeed—and better than this, the **Elmore** jumped right from this first fifty-mile race into another five-mile race with a 50-60 H. P. car and won the second, hands down.

Yes indeed—and better than **ALL** this too—the victorious **Elmore** was just a demonstrating car which had just passed through one of the most trying trips imaginable over the worst roads and fords of California. All this, mind you, without a stop for overhauling or a halt for breath.

It's the evenness of the performance, of course, that's remarkable—and directly due, of course, to the valveless two-cycle construction and its resultant continuous flow of power.

Our interesting literature, called "Our Daily Mail," will furnish you with further facts.

Will you write for it.

The Elmore Mfg. Co.
1004 Amanda St., Clyde, Ohio

MEMBERS A. L. A. M.

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MECHANICAL AND TECHNICAL Department

EDITORS

Gasoline vehicles—Chas. E. Duryea, Duryea Power Co , Reading, Pa.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our dedartment editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

PROPOSED GASOLINE-ELECTRIC POWER PLANT.

Baltimore, Md., June 7, 1907.

I have under consideration the design and construction of an internal combustion motor to drive an electric generator, the combination constituting the power plant for the operation of an electric truck of large capacity. (What the British trade calls the "Petrol Electric System.")

The motor should develop 40 H. P. The generator will be wound for 125 volts. To secure the minimum weight in the generator the speed of the motor should be as high as possible. The motor presumably will have three or four cylinders. A speed of 3000 R. P. M., or more would be desirable. The control will be through a variation of speed and variation of the field strength of the generator. I presume that such speeds are rather freakish in engine design and I have no knowledge of the practical limits of decrease of stroke and increase of piston area that may be safely adopted.

Will you kindly inform me as to the following points:

1. What do you consider the maximum speed in r. p. m., that may be practicable, with due regard to depreciation and maintenance and vibration, and with reasonable regard to efficiency?
2. Assuming a maximum speed of 3600 r. p. m. what would probably be the lowest speed at which the motor would operate reliably at its pro rata load corresponding to that speed?
3. What bore and stroke would you suggest for a 40-H. P., 4-cycle motor (3 cylinders or 4 cylinders), at the maximum speed you consider practicable?
4. I would like very much to have your opinion of the design of a motor to the same specifications, substituting 2 cycles for four cycles?
5. Authors of articles on automobile engines frequently state as obvious the greater prospects of success with air-cooling as applied to the 2-cycle motor, as compared with the 4-cycle. Why is this so obvious? C. G. E.

The conservative engineer sticks closely to things that have been tried and proved good. Engines have been made that would run up to 300 revolutions per minute, but this is so far above standard practice that I cannot advise working for such speeds. 1000 feet piston speed per minute is considered fast enuf. Short strokes throw more strain on the bearings, and coupled with high shaft revolutions make much bearing friction. At high speeds the poppet valve is not satisfactory, and the rotary valve is regarded as an experiment, altho I believe from my experience with them that they are all right if carefully made. The Lamberts are using motors of 6-inch bore by 4-inch stroke, and I have not heard of any trouble from these proportions. Such motors can turn 1500 r. p. m. without exceeding accepted safe piston speeds. You can probably fit the pistons loosely and by proper lubrication get up to 2000 r. p. m., with fairly good efficiency. I cannot advise trying for higher speeds for your purpose with the usual types of gas engines.

If you wish to try for higher speeds I would advise a 2-cycle motor with a compression chamber or cylinder so arranged that the new charge when drawn in is completely expelled into an intermediate chamber, so the next new charge may be a full one. The usual forms of 2 and 4-cycle engines simply do not get full charges at high speeds, and so fail to develop power anywhere nearly proportionate to the speed. One form of 2-cycle uses a long cylinder with stuffing box at lower end, and a hollow double-headed piston. The new charge is drawn into the space between the piston and stuffing box, and then forced by the downward motion of the piston into the interior of the piston From here it escapes into the upper end of the cylinder as soon as the exhaust pressure is low enuf to permit the check valve to open. Three valves are used and if the one into the cylinder is mechanically operated a larger new charge can get in.

High speeds contribute to smooth running if the parts are properly balanced for the impulses cannot overcome the inertia of the vehicle body in the short time allowed.

If you adopt such a 2-cycle with 4-inch stroke and run it at 2000 r. p. m., you ought to get the h. p. indicated by the formula. Diam. squared times number of cylinders divided by two. I would use 3 cylinders parallel or 4 cylinders on a 2 throw shaft placed horizontally double opposed.

I do not think there is much differenece in the matter of cooling. Engines up to 4½-inch bore can be cooled by air, whether 2 or 4-cycle. The 2-cycle has no exhaust valve to give trouble and only retains the hot gases about 150 degrees out of a total of 360; while the 4-cycle retains some of the hot gases to the end of the exhaust stroke or a full half of the time.

Increasing the maximum speed will not effect the minimum speed, if your carburetor is of as wide range as it should be. A carburetor properly should be adjustable at each end of its limit and automatically vary between. Double jet carburetors are supposed to permit double adjustment, but they do not appeal to me as the true solution of the problem. C. E. D.

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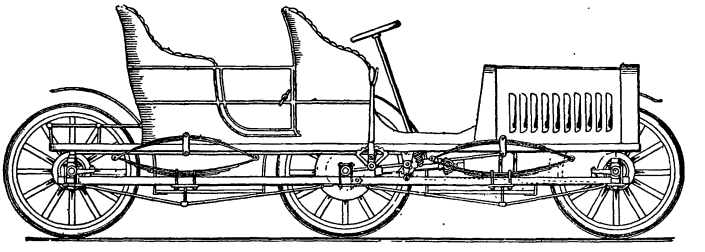
TIRES FOR 6-WHEEL CAR.

Exeter, Me., May 4, 1907.

I am sending you sketch of my new automobile gear, specially constructed for use of steel tires, although drawing enclosed shows rubber tires, using front and rear wheels for steering, center wheels for driving. Which is preferable in your estimation for this particular gear, rubber or steel tires. Steel tires ride easier on this vehicle than any rubber tired car of the four



wheel type, manufactured at the present time, as I can get over rough roads, crossings and water-bars at high speed without the throw or bound of the four-wheel car. H. H. LINN.

The kind of tire is a matter of choice for the purchaser. I believe there will be many solid rubber, or even steel, tired vehicles used in future and your six-wheeler is a move in the direction of easy riding without pneumatics. I have often wondered that six wheels have not been used before this because of their smoothing effect on the road. Six wheel trucks are used on Pullman cars and the difference is very noticeable compared with four wheel trucks. If this is true on steel tracks surely the gain will be many times greater on rough roads. The public prefer air tires, because they have been educated to them on the best goods. Give them other tires at a lower price if ordered. C. E. D.

A QUESTION OF FLYWHEEL WEIGHT.

New York, May 25, 1907.

I have a De Diòn engine, weight 100 pounds, cylinder 3 3-16-inch diameter and 3 3-16-inch stroke; the flywheel weighs 60 pounds. I expect to use a ¾-inch flat belt, and am going to put it in a two-cylinder Curtiss frame. Don't you think the flywheel is much too heavy? What would you advise as a suitable gear ratio and what H. P. would this engine develop?—GEORGE ZOGG.

How heavy the flywheel must be is a matter to be considered with relation to the speed of your engine and cycle. If you can keep the engine turning rapidly you will be able to get along with very little flywheel, probably 40 pounds; but if you wish to run the engine slowly, no weight can be spared. The makers of that engine cut the weight pretty low for a single cylinder when they made it, and it seems unlikely that you can do much better without sacrificing something. Because of the necessity for high engine speed I would gear low; at least one-third lower than with a 2-cylinder engine of same power. You should get over 3 H. P. Better take off 5 pounds weight at a time and try in actual use. Also try several sizes of driving pulleys, until you get results that please you. —C. E. D.

CORRECT DARRACQ POWER RATING.

New York, June 1, 1907.

We note your response to "Subscriber," your issue of May 1, in re, the horse power of the largest six cylinder car the Darracq Company make, and your further answer as to what horse power the six-cylinder engine of 112x120 m. m. will develop at 1200 R. P. M.

The six cylinder Darracq cars are made in two sizes. The 40-H. P. model having 100 m. m. bore and 120 m. m. stroke, and the 50-H. P. model having 112 m. m. bore and 120 m. m. stroke.

Both of these ratings are figured on the abnormally low French rating, and are so placed in order to avoid the onerous French taxation on the cylinder size and capacity, so that both of these models might be conservatively rated at least 10-H. P. higher under our American practice and rating.—DARRACQ MOTOR CAR COMPANY, Alex. Schwalbach.

I thank you for the correction and regret that my reply was erroneous. I relied for my information upon a French chauffeur who seemed well informed as to the various sizes and ratings of foreign cars. C. E. D.

READJUSTING WORN CAMS, ETC.

June 2, 1907.

I own a 16-20 Locomobile car, 1904 model, and am not satisfied with the way the engine operates, although it is comparatively an old model. I don't see why it can't be made to "purr" like the newer engines.

I am going to thoroughly overhaul all mechanical parts such as bearings, brasses, wrist pins, rings, etc. Then will come the tuning up. The engine has automatic inlet valves. Now, what I would like to know is this: How would I go to work to secure the perfect operation of all four cylinders? Is it first necessary to have equal compression in all four cylinders? Is it accurate enuf to set one exhaust valve to open at 25 degrees, and in this way secure the distance from the top of the piston to top of cylinder head, and using this measurement as a check on the other valve openings? Of course, the commutator must make contact on each quarter of its revolution to secure balanced explosion. But what I am after is the "purr," and if you can suggest any method to be followed you would greatly oblige. F. A. C.

There would seem to be no reason apparent from your letter why your motor may not run smoothly. Measure present opening point of all the exhausts. I think you will find it earlier than 25 degrees. Adopt the one you think right as a standard and adjust the others to it. This may not be an easy task, for you will probably find the cams, rollers, etc., worn. Larger rollers may serve instead of new cams and larger push rods may also help. See that the valve lifts are to the same height as well as in the same time. Also that the valve springs are equally strong. I prefer marking the valve movements on the fly-wheel where each can be seen and compared with the next. The timer contacts, vibrators, inlet and exhaust pipes as well as the compressions should be all alike. Regard nothing as too insignificant. "Details make perfection and perfection is no detail." C. E. D.

HARDENING STEEL.

St. Louis, Mo., June 2, 1907.

I have trouble in case hardening soft steel. As a subscriber of your Journal I would be pleased if you will give me a quick method on same. GEO. L. WACHTER.

Case hardening consists in so treating the soft steel that its surface is converted into a carbon steel which will harden. The method to be used depends on the steel, the size and number of pieces and the results wanted. If a slight hardening of the surface of a single piece or of a few pieces will suffice, use cyanide of potassium or ferro-cyanide of potassium, which is cheaper and just as good except that it does not leave the metal quite so clean. Heat the steel cherry red and wet it with the potassium, which melts and becomes a liquid at such temperatures. Heat and wet alternately two or more times and dip red hot into water. Cold water will harden more than warm water and brine or a solution of sulphuric acid still hard-

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er. Move the steel about in the water, for if you hold it still the steam bubbles will form a coating over its surface and prevent the water cooling it quick enuf. Small articles can be boiled in the potassium in an iron ladle or even sheet iron pan, and when they have had time to be penetrated to a sufficient depth can be picked out and dropt in the water. The fumes of cyanide are poisonous so do not breathe them.

For larger articles or greater depth of hardening granulated bone is used and commonly in a special oven. The steel pieces are packed in the granulated bone in cast iron boxes and kept red hot for several hours, often over night. When in the opinion of the workman they are properly converted, they are hardened in brine, water, or oil as may be preferred. I see no reason why the potassium will not also harden deeply if the red hot steel is exposed to it long enuf. Most soft steels will harden slightly by heating and quickly cooling without any chemical. C. E. D.

GASOLINE TURBINE.

73 Forsyth St., Detroit, Mich.
June 1, 1907.

Being a constant reader of the Journal, I take advantage of your department by asking your advice in regards to a gasoline turbine composed of four chambers. Would it be practical to have 75 lbs. compression in the intake pipe, and would the area of intake pipe have to equal the area of chamber in piston? How many strokes would it require to attain said compression, with compressor having a 3-in. bore, 4-in. piston travel? W. A. BLACKBURN.

You do not give enuf detail concerning your device to enable me to understand what you wish to accomplish, so my advice will aid you little, if any. Read Cassier's Magazine, January, 1907, for description of a practical gas and steam turbine. The number of compressor strokes required depends on the container you wish to fill. A single stroke of a good pump will give a pressure of 75 lbs. as you may readily determine by attaching a gage to a pump. Five strokes will be required to fill a container as large as the pump. A piston compressor uses more power than a turbine fed by it will usually give, so most of these attempts have been failures. Read everything you can get on the subject before spending any money and you will thus learn what has been done and avoid mistakes. Detroit's public library is well stocked with books as I know by personal use; or call on Parker & Burton, patent attorneys, who have a complete classified list of all U. S. Patents, and for a small fee can show you all the turbine drawings. C. E. D.

CLEANING CYLINDER WITH KEROSENE.

Toledo, Ohio, May 17, 1907.

Every one of my friends who runs on automobile tells me that about once a week he puts from half a cup to a cup of kerosene in each of his cylinders and then runs the engine until it has burned out for the purpose of cleaning the cylinders, and yet I cannot find in any books any advice or recommendation to do this. Will you kindly advise me whether you consider it good or desirable practice?

F. M. BRIGHAM.

Kerosene cuts the lubricating oil and loosens much of the dirt and carbon on the cylinder walls. It is good practice to use it, and it is recommended by many foreign writers. Water fed into a hot engine also serves to clean out the carbon but it may interfere with the next start. C. E. D.

CAUSES OF DETERIORATION IN RUBBER.

"How long will rubber retain its life?" is a question recently asked me by a prominent automobilist. I cited a number of samples of rubber that were in apparently as good condition at the end of six or eight years as at the beginning, and then went to my tool chest (a valuable asset in other days, but now a catch-all), and fisht from among the sundry articles in it several pieces of rubber that have been in my possession for 17 years. They are as soft and flexible as if new and do not even show air cracks on the surface, as old rubber often does. I have also in service as erasing rubber parts of solid tires of small diameter such as were used before pneumatics came in. These tires were made about 1889 and are therefore 18 years old. I understand that rubber does not deteriorate with age necessarily, and that the deterioration, if any, is due to causes usually preventable, and that one of these causes is over vulcanization. The rubber manufacturer lives by his trade, and in order to save time in vulcanizing, he is tempted to compound with the rubber more sulphur than is needed to properly vulcanize the crude material. Thus, for example, where two or three per cent. of sulphur is sufficient, provided the vulcanizing heat is continued for half a day, he will mix with the rubber 10 or 15 per cent. of sulphur and expose the mixture to the vulcanizing heat for half an hour. In this time enuf of the surphur has united with the rubber to properly vulcanize it, rendering it tough, elastic and all that good rubber should be. Unfortunately the remainder of the sulphur is still in the rubber and the vulcanizing process slowly continues, faster in hot weather, but a continuous process in all weathers. The result is that sooner or later the rubber becomes hard, brittle and "rotten." I have had pure gum tubes for delicate work, presumably the best that could be made, get brittle as sticks of wood in three months; while the tires mentioned, and a number of others, have remained in my possession for years without any apparent deterioration. It would seem probable that if users will insist on quality the rubber makers will furnish it.

The fabric employed in connection with rubber is supposed to lose its life after a time. This is undoubtedly true, not because of association with the rubber, but rather because of the moisture which, getting into the fabric, cannot dry out; so the fabric quickly rots. Care should be taken to protect the fabric from moisture to the fullest extent. If tires are known to be wet inside they should be removed from the rim and allowed to dry, for there is but little rubber inside to protect the fabric from this moisture. Small holes or punctures reaching into the fabric from the outside should be closed by vulcanizing at the first opportunity and for this purpose small portable vulcanizers are undoubtedly valuable.—C. E. D.

2 Cycle Engines

SHORT OR LONG STROKE?

I have devoted quite a little time on the figuring and thought of the 2-cycle type of motor, but before I proceed with expensive patterns, would like an experienced one to encourage me. I would like to know why nearly all two-cycle engines are designed with the stroke short. Would it not be practical to make one with 3½-inch bore and 5¼-inch stroke? The ports to extend all around the cylinder intake 11-16 inches and exhaust 15-16 inches. This, I think, running at 1000 R. P. M., ought to develop 8-H. P.

I would like to know the height of intake deflector, and distance from cylinder wall. Would it not be a good idea to shoot the incoming charge up and against the cylinder wall? Would 8 or 9 pound crank box pressure be swift enough for this speed? In designing the passage from crank box to cylinder, would you keep the cross section of port the same throughout the length? I have an idea that the velocity would be increased by making the port small at the crank box end, and tapering it slightly at the cylinder port end, but at the big end, have it slightly smaller than the cylinder port.

I will thank you in advance for this information, which will greatly help me.

ROBERT H. PYLE.

Probably, if you call on Mr. E. J. Gulick, Simplex Auto, Mishawaka, Ind., 5 cents per

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trolley from you, and see what Mr. Gulick is building you will be the gainer. I regard the Gulick 2-cycle motor as about the best that can be done with crank-box pressure. Study the large 2-cycle motors, double acting, which do not use crank-box pressure. Consider this plan. Set a supply cylinder parallel to your working cylinder, capacity or piston displacement of supply cylinder same as working cylinder, cubic contents from top of exhaust port to cylinder head. The supply piston can be very light and packed with one felt ring. Drive this supply cylinder trunk piston with an outside crank set so as to end the supply piston compression stroke when your intake port closes. Your working piston stroke and supply piston stroke will of course have 180 degrees of crank shaft time, and you can have your intake port open from 70 to 90 degrees of crank-shaft angular advance. This will give you considerable compression before your intake port opens, so you will have a good initial charge velocity, but will make your charge compression stroke end at atmospheric pressure, and will make your motor more than twice the power of a 4-cycle motor same bore and piston speed.

All gas engines are made short stroke to save space and cost. I have seen a 2x12 gas engine give an almost ideal card, but the car-driving motor cannot have much more than 5-inch stroke in the room there is for it. Besides room considerations, there is not so much to gain by charge expansion with the gas engine as with the steam engine, and the trunk piston works out badly for length with a long stroke. The deflector is better, in my opinion, when formed by cutting into the piston sides than when projecting above the piston head, as the inside of the piston is cool. If you scoop out the piston wall for deflecting surface you can have your piston head stand one inch above the bottom line of your intake port when the piston working stroke ends. Eight or nine pounds crank-box pressure is twice usual 2-cycle practice.

Study the Gulick practice, if you are bent on using crank box supply, or the Reliance Truck practice. The Reliance motor is giving excellent results.

See also the shape of the trunk-piston and deflecting surface in the Du Brie small marine motor.

I think you intend to ask. Would it not be good practice to shoot the charge up against the piston wall, instead of the "cylinder wall," as you write. It is best, in my opinion, to make the piston wall the deflector. The applied deflector on top of the piston gets hot and causes self-ignition.

HUGH DOLNAR.

EXTRAORDINARY POWER DEVELOPMENT QUESTIONED.

In the May issue of the "Trade Journal," I noticed an obituary notice of Mr. C. P. Malcolm and a statement that he had built a two-cycle engine which developed 10-H. P. for 24 hours, with a total cost of 18 cents. This test was spoken of as a miracle. It certainly is a miracle or mistake. Assuming that the cost, 9 cents per gallon, which is a very low price, and that the cost of the lubricating oil was not considered, and that the engine developed 240-H. P., hrs., or its equivalent in heating effect, 615,600 British thermal units it has consumed per H. P. hour only 1-20 pound of fuel.

Then if the fuel was gasoline, carrying say 22,000 B. T. U. per pound, which is certainly a liberal figure in the two gallons consumed, there would have been 264,000 B. T. U., and as the engine developed 615,600 B. T. U., it operated at an efficiency of 233 per cent. Evidently there is a mistake either in my assumption or the stated economy of the engine, or all generally accepted thermo-dynamic concepts are wrong.

In my own experience with much larger gasoline engines, the best economy I have ever observed has been ¾-pound fuel per H. P hour and that only under exceptional circumstances. It was evident from Mr. C. P. Malcolm's writings that he was far in advance of most two-cycle designers, and everyone who could appreciate his work must feel a sincere regret for his death and a hope that someone will be able to carry out his plans. No one before has described two-cycle phenomena as Mr. Malcolm and I suggest that the "Trade Journal" might well collect and publish his work on the subject. Trusting that you may be able to explain Mr. Malcolm's engine test in more detail, and thanking you for 2-cycle motor information which I have read with much pleasure and profit, I am

P. L. HOAG, New York City.

Replying to Mr. Hoag, I would say that my notice of C. P. Malcolm's 2-cycle motor distinctly states that the cost of fuel and lubricating oil was 18 cents.

Circumstances alter cases. The fuel used was not gasoline, and cost only a small fraction of 9 cents per gallon. The actual costs were, fuel 12 cents, lubricating oil 6 cents.

The conditions were, motor locked up in a room by itself, with no attendance, for the entire 24-hour run. The work done was supplying electric current to a bank of electric light bulbs.

Mr. Malcolm's death notice was written by me, and I have Mr. Malcolm's motors in my control. HUGH DOLNAR.

BACKFIRING WHEN LOAD IS OFF.

Being a subscriber to your paper I would like a little information in regard to a gasoline engine which I have built. It is a two-cycle 3-port 4-inch bore, 4-inch stroke exhaust port, measures 1-inch x 3-inch intake port; is ½x3 inches. It seems to run all right when the load is on, but if load is thrown off it fires back in crank case and then stops. Have filled the passage from crank case to inlet port with woven wire cloth, but this does not help it any. Am using a Lunkenheimer generator valve which I have also tried on the crank-case, with no better results. F. W. BEEKE.

There is nothing about your motor, so far as your description goes, to hinder it from running, and one sheet of wire gauze, properly placed in the side-pipe from the crank-box to the intake port, should prevent crank-box firing. You probably have applied your wire gauze in such a way as to leave an open fire passage between the cylinder and the crank-box. If you have a deflector separate from the piston and screwed on the piston perhaps the deflector gets hot and fires the charge. Have you a throttle in the side pipe to throttle the charge when running with no load? HUGH DOLNAR.

MALCOLM ENGINES.

Brooklyn, N. Y.

I notice with great interest your item regarding the death of Mr. Charles P. Malcolm, on page 84 of the "Trade Journal," and the appreciation there contained.

I had written Mr. Malcolm before the May number came, but of course may not expect an answer now.

Will you kindly let me know whether the engine of which you speak as invented by Mr. Malcolm—viz., two-cycle, 10 H. P., running 24 hours at a cost of 18 cents, is now on the market or can be procured?

I am about installing a new engine in my motor boat and if I could procure one of these I should like to do so.

Are there any made on his lines with two cylinders?—R. W. KENYON.

I do not think Mr. Malcolm's engines are on the market, a thing much to be regretted. I feel that he, like many advance agents in the mechanical line, was more devoted to perfecting than to producing. The 2-cycle problem has been a difficult one and I think it is not fully solved yet, but progress is being made and there will be described in these columns in the near future a motor giving an impulse every revolution, without several of the disadvantages of the common 2-cycle. Fixt size ports and variable speeds have not permitted decent economy in the past, but this may be provided for in future.—C. E. D.

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Steam Vehicles

J. A. KINGMAN

ACETYLENE GENERATOR FOR BURNER.

Plattsburg, N. Y.

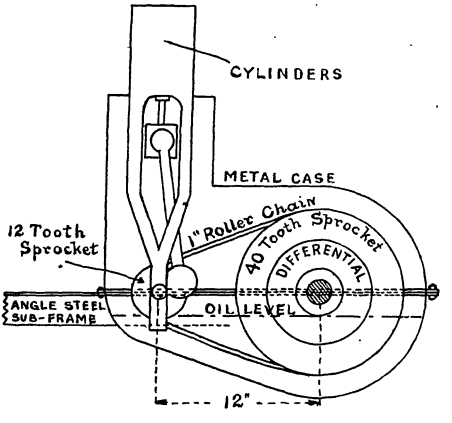
The following will interest H. S. F. (page 135, June issue.)

I was in Burlington, Vt., a few days ago, where I saw two Stanley steamers fired up without torch, the burner being heated by an acetylene jet permanently attached to the car. Mr. E. A. Brodie, 105 Church street, Burlington, Vt., can give name of parties from whom attachment can be bought. I did not myself ascertain where the contrivance is to be had, as I do not use this gas for lighting up lamps on my car. The whole trouble of heating torch is avoided, and it takes not more than ten seconds to heat burner ready to light pilot and main fire. I had seen the contrivance advertised before, but this is the first time I ever saw it in use. It appears to save much trouble in firing up, though one must be careful not to melt burner tips with intense heat of the acetylene gas.—A. N. HENSHAW.

DRIVE FOR STEAM RUNABOUT.

San Bernardino, Cal.

I would like to ask you through the "Cycle and Auto Trade Journal" your opinion of the inclosed sketch for a drive for a steam runabout. Engine to be of the "Mason" type and drive by roller chain to sprocket on live rear axle. Engine to be placed only 12 inches from rear axle, so that all moving parts, engine, chain, sprocket and differential can be inclosed in one metal case and be splash lubricated. Entire power plant—flash boiler and engine—to be hung on a triangular angle steel sub frame to give three-



Proposed Drive for Light Steam Cars.

point suspension; two corners of frame to be pivoted to rear axle spring boxes and the third point pivoted to cross member of body frame under dashboard. Will the engine shaft and rear axle be far enough apart to give an efficient drive with chains of this type? Would a short chain like this one stretch enough in use to require some means of adjustment of shaft distances?

In general, between what limits can a chain drive be economically employed? Would 10 inches be too close for the shaft with above drive, and will a 1-inch pitch roller chain work satisfactory if shafts are 48 inches apart? In considering the above questions, it is understood that an efficient transmission that will give little trouble is desired.—CHAS. BRADSHAW.

Generally speaking, the larger the sprockets and the shorter the chains in any system of chain drive, the better. A very long chain drive has been found in practice to be undesirable, and all chainmakers are opposed to the use of sprockets having less than a certain number of teeth. It would seem, therefore, that the number of teeth on the sprockets would be a more important matter for consideration than the distance between sprocket centers.

The 1 inch pitch chain seems a little coarse. Should think smaller pitch would be more desirable. Of course, some methods of adjusting the chains should be provided for, but if the case inclosing the mechanism is oil-tight so that the lubricant does not leak out and dust does not work in, the need for adjustment should be very slight and infrequent.—J. A. K.

TROUBLE WITH PILOT LIGHT.

Walton, N. Y., June 7, 1907.

The letter from Mr. C. S. Lawton, of Woonsocket, R. I. (20 Bill street), received, and would like very much to hear his experience, and any suggestion he might make. He says his burner is a two-part burner, and my burner is also a two-part burner. I have been driving along the street and all at once the pilot light would go out and when the steam drops 5 or 10 pounds then the main burner vaporizes the oil but there would be no pilot light to ignite the gas—then, oh, what a smoke! I would stop and shut off the kerosene and wait a little and then light the pilot by using wood alcohol, but first would have to push the pin in the pilot vaporizer to clean out the carbon, then it would sometimes run an hour or two and sometimes not more than from 10 to 20 minutes. Now as to the burner, when it is working hard it will sometimes make a roaring noise that you can hear for half a mile (some call it whistling). Now if anyone can give me a remedy for these troubles I would be very much obliged to them.—E. P. RANDALL.

Would suggest that you clean the pilot light orifice regularly at some stated interval, not merely making an opening, but cleaning all metal parts thoroughly. The deposit of carbon is unavoidable, but if you will consider this carbonization as a perfectly natural process and look out for it regularly you ought not to ever have it bother you on the road.

As to the noise of the burner, alteration of the air adjustment ought to correct this.—J. A. K.

Natoma, Kansas, May 23, 1907.

I have a Locomobile steam runabout, and as rain water is scarce, I should like to know if I can use hard water successfully without ruining the boiler. How can I remove the scale from the boiler if it is already limed? Would it be more economical to move the regular gasolene burner and replace it with a kerosene burner, if gasolene is 17 cts. and kerosene 8 cts. per gallon? Will I be able to keep steam on as low pressure of air as with gasolene? I use more fuel than I think I should—how far should I get on a tank of five gallons on ordinary roads? What is likely to be the cause of my using so much oil? I keep my engine hooked up so as not to use much steam. Can I fit the regular "Loco" burner to burn kerosene? R. A. M.

Use rain water whenever you can and when you are compelled to use hard water blow off the boiler after the car has been used. Fire tube automobile boilers have never given very much trouble from scale, owing to the fact that the motion of the body on the springs gives a continual vertical washing of the tubes and about the only deposit which has ever been noticed has been on the lower ground sheet and this in the form of mud rather than scale, and which can be avoided by regular blowing off of the boiler. Dirty water is about as bad as hard water.

Certainly it would be more economical to use a kerosene burner than a gasolene burner so far as consumption goes, and if you make a change you will find it necessary to remove your present burner and install a complete kerosene outfit. This, of course, would involve considerable expense. It might be some little time before you had run the car far enough on kerosene to have saved enough to have paid for the cost of making a change. Trust the foregoing is clear. It might be well worth your while to make the change not on the grounds of saving a few cents every day in the cost of fuel, but on the grounds of convenience, as it is sometimes very difficult to obtain good gasolene when kerosene of uniform quality is everywhere available.

You ought to be able to run the car 8 to 10 miles on a gallon of gasolene—40 to 50 on one filling. J. A. K.

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odel a year and that model a develop-
nt of, rather than a departure from, the
eceding model. In producing its new
ckard "Thirty," the Packard Motor Car
mpany, of Detroit, Michigan, has retained
se features of design and construction
ich have become recognized as thoro
"Packard," and has changed detail as ex-
rience has taught and as dictated by a
en study of refinement.

The new "Thirty" has a slightly longer
eel base and 36-inch wheels. The body
ts low on the frame, plenty of allowance
spring action being obtained by recessed
nels in the sides of the tonneau, which
o allow an extremely wide and comforta-
rear seat. This 1908 Packard, while
st notably a touring car for general serv-
is supplied as a limousine, landaulet and
nabout, or is equipt with cape cart or
ctoria top.

bearings bushed with Parsons white bron
The connecting rods are drop forgings. T
crank pin bearings are bushed with Parso
white bronze, and the piston pins with ha
bearing bronze.

The inlet and exhaust valves are on opp
site sides of the cylinders; they are all m
chanically operated and interchangeal
The cam shafts are enclosed within the cra
case and are hence fully protected from d
and certain of ample lubrication. T
cam shaft drive gears, as well as those
the magneto and water pump, are contain
in a separate, but integrally cast, oil-tig
extension of the crank case.

CRANK CASE.

The crank case is cast of a special alu
inum alloy in three horizontal sections. T
uppermost section forms the engine base a
is supported directly on the side memb
of the main frame of the car. On each si

1908 Packard "Thirty." Note the arched indentation in the side panels of the rear seats, thus pro
ding clearance for the wheels while allowing the use of a wider and more comfortable seat. Th
heel-base is 123½ inches, and 36-inch wheels are used. Price, with standard finish and equipment
200 f. o. b. factory.

THE MOTOR.

he 4-cylinder, vertical, water-cooled mo-
is of 5-inch bore by 5½-inch stroke. The
ropean rating is 30 horse-power at 650
olutions per minute. The actual brake
se-power by the American system exceeds
figure. The cylinders are cast in pairs,
h water jackets and valve chambers in-
ral. The castings for cylinders, exhaust
nifolds, pistons, and piston ring blanks are
de in France, from a gray iron especially
pted to the construction of such parts.
pistons are ground and are fitted with
r ground rings, the cylinders, pistons and
gs being "lapt" together with a suitable

between the transverse supporting arms,
a horizontal, integrally-cast web which e
tirely encloses the space between the mot
and frame, affording complete protection
the motor, magneto, and other parts abo
it. The crank-shaft bearings are held b
tween the uppermost and middle sectio
while the bottom section is simply an
well, easily removable for inspection
adjustment of the connecting rods, ca
shafts, etc., without disturbing the cran
shaft bearings. The crank case is divid
into front and rear compartments by a tran
verse central partition which supports t
middle crank-shaft bearings. The cra

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ecured to the intake pipe by four bolts. The uxiliary air inlet is a poppet valve under ontrol of a coil spring. It automatically overns the intake of air to keep the mixure of the correct proportion at all engine

bayonet locks instead of screw threads.

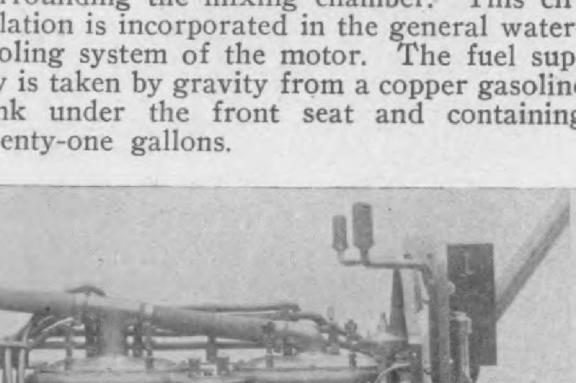
IGNITION.

Ignition is by jump spark, the current ing obtained from an imported Eisen low-tension magneto. This is mounted the motor bed on the left side and is di

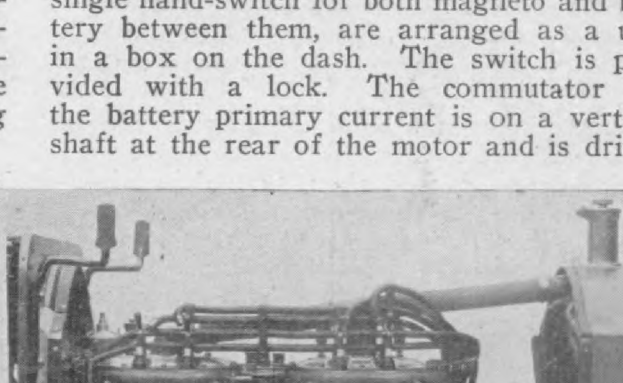
1908 Packard "Thirty" Runabout. The motor and driver's seat are placed further back than on touring car, and the wheel-base is 108 inches, while the seats are lower. The gasoline tank has 27 ons capacity.

eeds. Its tension, to suit different atmosheric conditions, may be regulated by a ding wedge, which is actuated by a small ver on the dashboard of the car. The rburetor is kept at a uniform temperature warm water circulating thru a jacket rrounding the mixing chamber. This cirlation is incorporated in the general waterooling system of the motor. The fuel supy is taken by gravity from a copper gasoline nk under the front seat and containing enty-one gallons.

gear-driven by enclosed gears. A Ful imported storage battery, used primarily starting the motor from the seat, is alw in reserve. There is a transformer coil the magneto current, and a vibrator coil the battery current. The two coils, wit single hand-switch for both magneto and tery between them, are arranged as a in a box on the dash. The switch is vided with a lock. The commutator the battery primary current is on a vert shaft at the rear of the motor and is dri



Left side of 1908 Packard Motor, showing the oil p, oil tank, magneto, timer and wiring.



Right Side of 1908 Packard Motor, showing mounting and adjustment, water governor, carbur and individual knife switches at the spark plugs

WATER CIRCULATION.

The water circulation for cooling the mo is positive by means of a gear-driven r pump. The radiator is of the ribbed

from the cam shaft by enclosed bevel gea There is but one set of secondary, or hig tension, wires, the same spark plugs bei used for both magneto and battery syste

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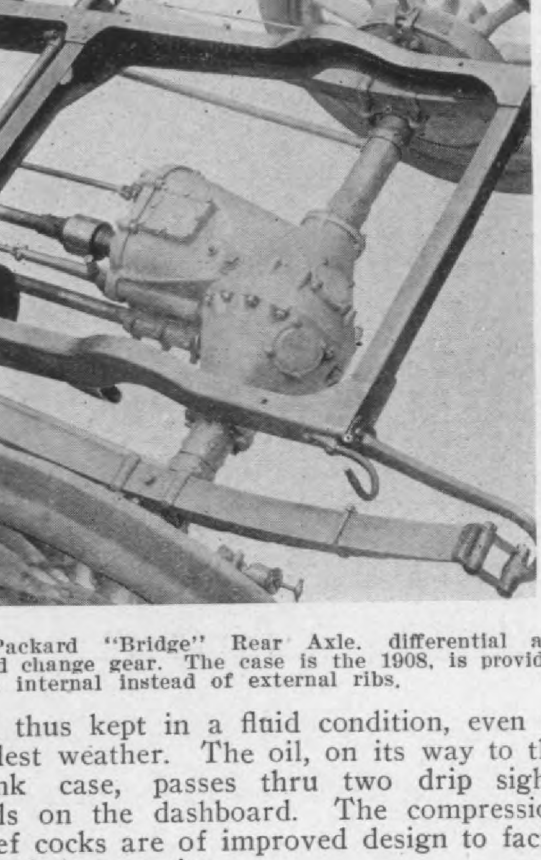
k case. The transverse central partition ntains an independent level of oil below pair of cylinders, regardless of the in- tion of the car on grades. The double ger pump is accessibly located at the of the motor and is driven by a worm the exhaust valve cam shaft. It takes from a vertical copper reservoir close to between the pairs of cylinders, this loca- insuring that the oil will be warmed



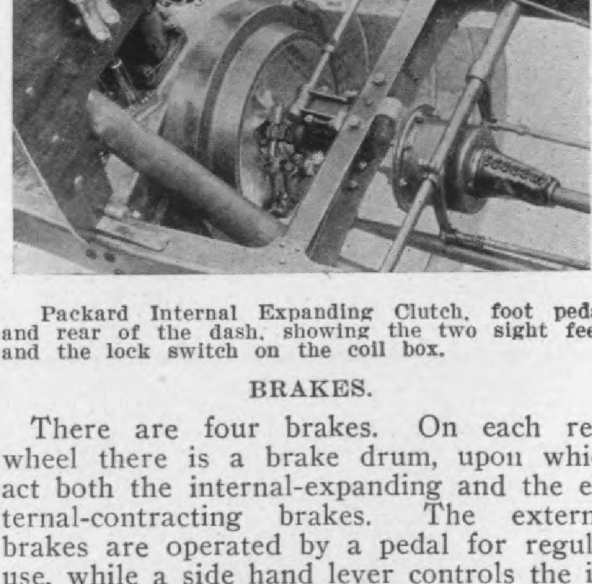
Packard "Bridge" Rear Axle. differential and l change gear. The case is the 1908, is provided internal instead of external ribs.

thus kept in a fluid condition, even in lest weather. The oil, on its way to the nk case, passes thru two drip sight- ls on the dashboard. The compression ef cocks are of improved design to facil- e their operation.

ENGINE CONTROL.

he engine speed is under the control of ydraulic governor. This is a diaphragm aratus incorporated in the water-circula- system. It acts directly on the butterfly ottle above the carburetor, and tends to vent the motor from racing when the car standing with the motor running idly. limitations are adjustable and, by a al, it may be cut out of action for in- taneous acceleration. The throttle is also er the control of the hand lever on the ring wheel, while another manual lever the wheel advances or retards the spark. he Packard type internal expanding ch is retained, with improved construction nsure gradual engagement. The expand- ring within the fly wheel rim is actuated a screw-and-nut device and is provided

joint. Both joints are effectively encase The speed-changing set, final drive and di ferential gears are all contained within rigid aluminum housing, as in the 1907 moc els, thus forming a unit. In the new desig the casting is internally ribbed, while th outside is smooth. Independently of the liv rear axle, the differential unit is supporte on its own bearings. Thus the live axl may be withdrawn without disturbing th gears. Three forward speeds and a revers are obtained by the sliding gears of th speed-changing set. The third speed forwar is by direct drive. That the shifting c the sliding gears for different speeds ma be easily and progressively accomplished, th actuating slide rod is annularly grooved t correspond with spring-retained spacing dog which determine the respective correct po sitions of gear engagement. The reverse obtained by a separate lever. All gear in the transmission, final drive and differen tial, as well as the rear axle, run on in ported annular ball bearings.



Packard Internal Expanding Clutch, foot peda and rear of the dash, showing the two sight fee and the lock switch on the coil box.

BRAKES.

There are four brakes. On each re wheel there is a brake drum, upon whi act both the internal-expanding and the e ternal-contracting brakes. The extern brakes are operated by a pedal for regul use, while a side hand lever controls the i ternal or emergency brakes. A drum di entirely encloses and protects each intern brake. This system of brakes obviates t use of braking power thru the chan gears and insures quick, positive applicati of both foot and hand brakes. A new pec design obtains a much shorter travel a greatly decreases the length of slots in t foot board.

Steering is by the usual hand whe

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Architects and Engineers

design and supervise the erection of modern

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for you that will cost less than you would otherwise have to pay.

We are not financially interested in any "system" of concrete or reinforcement. Ha used most of them and understand them all.

We have as Architects and Engineers designed and supervised the construction of

- The FIRST factory building of reinforced concr in Philadelphia.
- The HIGHEST reinforced concrete building in Phi delphia and in Pittsburg.
- The LARGEST reinforced concrete building in Phi delphia and vicinity.
- The LARGEST NUMBER of reinforced concrete bui ings in Philadelphia.
- Have had eleven successive orders from o company, the last six buildings being of rei forced concrete.

We design all the engineering features in addition to the architectural, showing on o drawings the exact sizes and areas of concrete and reinforcement, leaving no option to the co tractor but to "fill the prescription."

This method is the most Fair, Economical and Safe:

- Fair, because all contractors bid on the same bas
- Economical, permitting bids from those who c construct but not design.
- Safe, insuring care in design and eliminating u certainties or temptation to skimping.

We Have Had No Failures

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umn. The steering spindles and yokes are drop forgings forming jaw, or what is known as Elliot type steering knuckles. To obtain greater ease of steering the length of the knuckle spindles has been increased. Imported ball thrust bearings are used in the knuckles, and all steering connections have provision for lubrication.

FRAME.

The running gear frame is of channel section prest steel, arched above the rear axle to provide increased spring action without raising the body. The top and bottom flanges of the side bars extend inwardly at certain points to form integral gussets for the reception of the four respective cross members. The frame is cold-riveted thruout. There is no sub-frame. The frame is suspended upon four unusually wide, semi-elliptical springs. The rear ones are 56 inches long and the front ones 40 inches long. The front axle is of steel tubing of large diameter and heavy gage. The stationary sleeves of the rear axle are steel tubes prest into and riveted within flanged collars that are bolted to the differential and driving gear housing.

The wheel base is 123½ inches and the tread is 56½ inches. The wheels have been increased in diameter to 36 inches. They are of wood, of the artillery pattern. The front wheels have each ten spokes and the rear wheels twelve spokes. All wheels run on imported annular ball bearings of increased size. The front tires are 36 by 4 inches and the rear tires 36 by 4½ inches.

BODY.

The touring body, in its new combination with 36-inch wheels, has a longer and more stable appearance and obtains individually by arched recesses in the rear seat panels to provide clearance for the rear wheels. The body is made of aluminum over wood framework. The seats are upholstered in black straight-grain leather, over curled hair and with spiral spring backing thruout. To provide greater comfort, the rear seat cushions have been increased in thickness, lowered and are differently sloped. The standard finish is Richelieu blue and cream yellow. The price, with standard finish and equipment, is $4200, f. o. b. factory.

As a limousine or landaulet, the chassis is identical with that of the touring car. In the case of the runabout, however, there are several differences in keeping with requirements. The wheel base is 108 instead of 123½ inches. The motor and driver's seat are placed farther back on the frame than in the touring car, thus making the bonnet longer and properly distributing the weight. The divided front seat is lower, relative to the floor. The gasoline tank holds 27 instead of 21 gallons and is placed at the rear of the frame. The gasoline feed to the carburetor is by simple, automatic pressure system. Above the gasoline tank is a rumble seat. The standard tire equipment is 36 by 3½ inches in front and 36 by 4 inches in the rear. There are no other notable differences between the runabout and the touring car.

The "U. S." Model A, Gasoline Runabout

U. S. Motor Car Co., Upper Sandusky, Ohio, have just placed on the market a runabout propelled by a 12-H. P. gasoline, air-cooled, 3¼x3, 4-cylinder motor and are cataloging their first car as Model A. Ignition is by jump spark and a float feed carburetor is used. Oiling is by splash. The crank shaft is provided with 5 babbitted bearings. Speed changing is thru a sliding type speed change gear, which is ball bearing. Three forward and one reverse speed changes are provided. On the high speed the drive is direct with no gears in mesh. A double disk clutch of their own design is used which they claim starts the car smoothly without jerk and does not stick. Shaft drive is employed and a foot-operated service brake acts on the driving pinion shaft. Emergency brakes of the constricting band type operate on the rear hubs.

Four full elliptic springs support the body, each 40 inches long. The wheel base is 90 inches and the tread 56 inches. Wheels are 32 inches in diameter and the tires 3 inches cross section. A light, strong frame of selected hickory is used. Large wood fenders give ample protection from flying mud and do not rattle. The seats are of the individual type and are large and roomy and are fitted with soft edge cushions. A quick acting steering device is employed, operated by a hand wheel with throttle and spark levers on the steering post close to the driver's hand.

A roomy platform is provided in the rear of the body fitted with a double brass rail making it safe and convenient to carry parcels or a small trunk and thus adapting the car to light delivery service if desired.

The equipment consists of two oil side lamps, tool box on running board and full kit of tools. Price is $750.

It has been the aim of the makers to produce a light, easy riding car which would be economical of tire expense and they have also aimed to use the best possible material. Drop forgings are used wherever possible.

Charles E. Duryea, pioneer automobile builder, has become engineer of the Corbin Motor Vehicle Corporation, New Britain, Conn.

According to the reports issued by Colonel E. S. Fowler, appraiser of the port at New York, there was a falling off in the importation of foreign cars during the period from January 1 to May 1, as compared with the previous year. The total during the past four months was 384 automobiles, valued at $1,261,296.52, compared with 452 automobiles during the same period last year, with a valuation of $1,464,862.13. During the month of April 108 machines were brought in in comparison with 152 during 1906.

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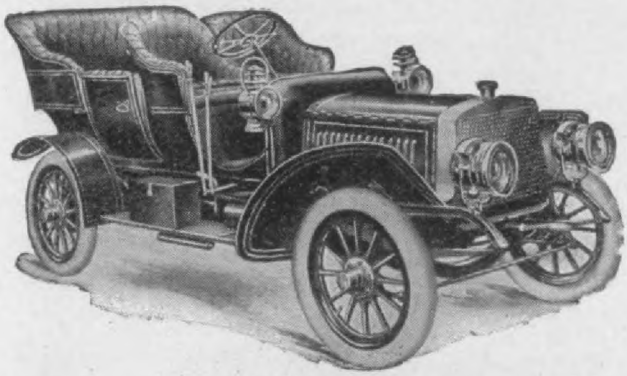

Let the man who is in doubt make a 50 or 500 mile test

in a Mitchell

Are you in doubt as to what car you want? Well, telephone any of our Mitchell agents and say, "Show me a Mitchell, and if I'm satisfied I'll buy." Then he'll come around with a 30-35 H. P. $2000 Mitchell and take you and the doubt for a spin of 150 miles—any time you say—and again next day—and again the next, so that you will cover some 500 miles and run up against every test an automobile will ever encounter. If you will do this, we can convince you that the *Mitchell* is the car you want.

We do not send a *salesman* with you—the car speaks for itself. All we ask is that you constantly remember the *price* of the Mitchell while you ride, and when you get back, that you talk to yourself *seriously* and say: "Can I, a business man, with business judgment, afford to pay from $1000 to $2000 more for any other car—could I get a better looking, a better furnished or more efficient car for the extra thousands? In fact, what *can* I get in any other car for the extra amount which *this* car hasn't 'shown me?'"

The Mitchell will answer those questions for you if you will let it, for it is the "show me" car.

If you will call up our agent and arrange a demonstration, the Mitchell will change your indecision into decision. It will convince you that it is the car you want by doing the things you want your car to do.

The Mitchell Motor Car Co., 30 Mitchell St., Racine, Wis., makers

Mitchell

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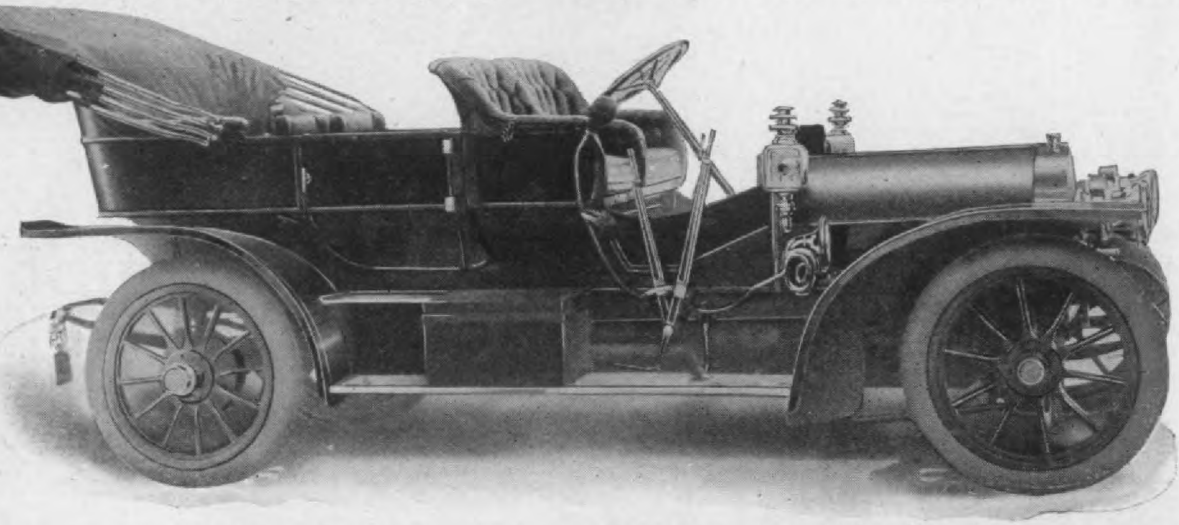
Bay State Auto Company, 112 Nor-
street, Boston, Mass., U. S. A., a Massa-
ts corporation, organized in January,
had its first car on the road in Janu-
907.

Bay State Company was promoted by
esent General Manager, Rossell Dris-
ho has been prominent in the Boston
obile trade for the past six years.



. 1. The Bay State 40, wheel base, 122 ins.; gage, 56 ins.; tires, 34x4½ rear, 34x4 front; motor, vertical, 4-cycle, water-cooled cylinders, 4¾x5ins. and can give 40 H. P. on the road. The pro-ive sliding change gear gives three forward speeds and a reverse, with bevel gear drive to the ng divided rear axle. Tonneau body, side doors swinging to front, two folding seats to face all seven engers forward. Weight, 2900 lbs.; price, $3750.00, including mats, horn, tools and 5 lamps, all ready extended touring. Cape top is $175.00 extra.

s new car, the "Bay State 40," was
ned by Mr. George Temple, of Boston,
has had an extensive experience in prac-
motor car work, and has shown in this
car of his own production that he is
aware of the importance of supporting
chassis loads in the very best manner,
both strength and stability, and has
a full three-point support of the long

much greater distance had the weather per-
mitted. The car has always carried heavy
loads and been driven without mercy with
absolutely no repairs and only one substitu-
tion, that of a steel drop forged front axle
for the Parsons bronze casting first used.
Mr. Drisko is an expert driver, and the
control of the Bay State 40 was designed in
accordance with his suggestions, and as
might be expected, is very simple, conveni-
ent and wholly reliable.

It is not an extremely light car, its weight
being 2900 pounds empty, and about 3100
pounds with everything on. The first car
was geared 3½ to 1, and has more than
enough hill climbing capacity for Boston
service, hence the regular Bay State 40 gear
will be 3 to 1, giving plenty of speed and

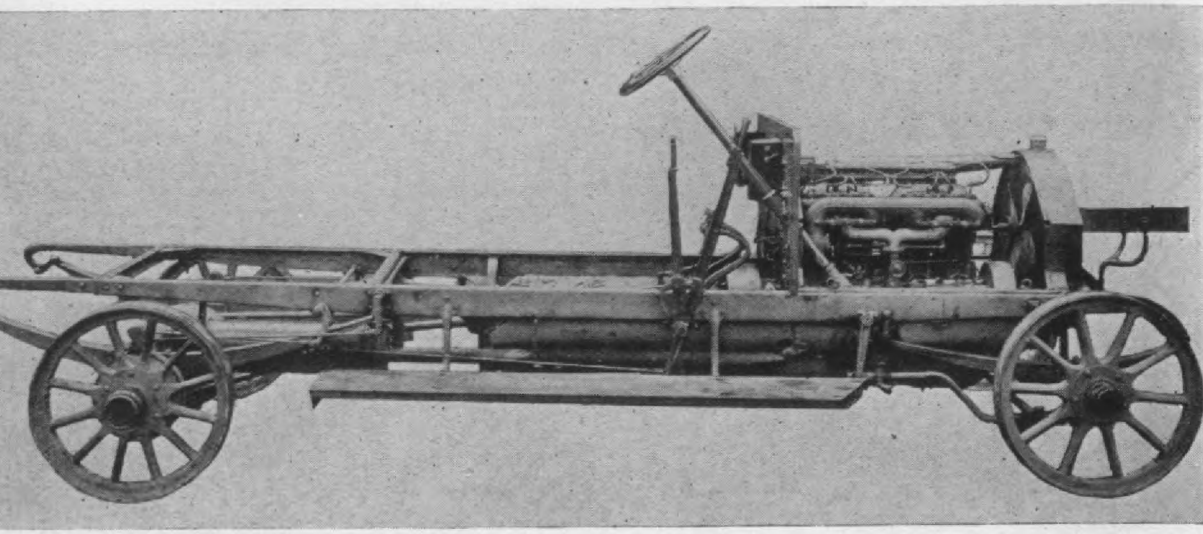


Fig. 2. Bay State 40 chassis, right side elevation.

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Patented Snap-off
Contact.

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HERZ-TIMER-TANGEN
20 Different Models, to fit an
Sticking of Vibrators imp

Forget Your Ignition Troubles

No Better Automobile Materials Made

Absolutely Necessary If You Want Best Results

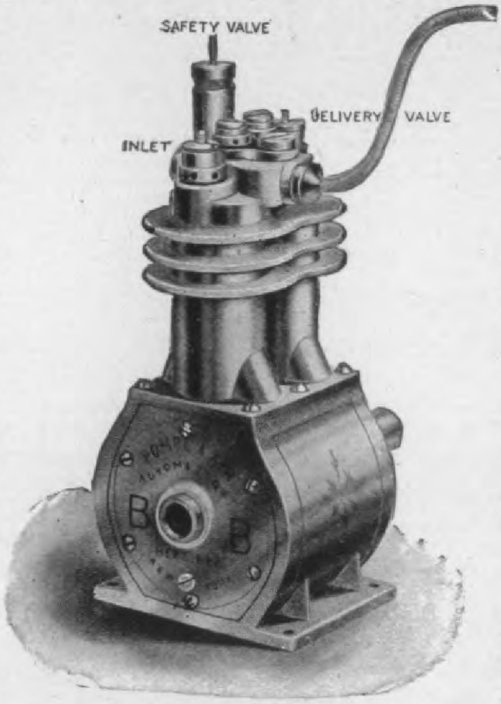
"Pater-Noster" The Ideal Shock Absorber, fully maintains our reputation on two hemispheres

Moto-Whistle—Petticoat Double Chime. Complete with pump and whistle tank.

Herz Coil—The Cream of the European Market. Current consumption one-half that of any other coil. Enormous efficiency.

Wire Terminals—with groove. A necessity for proper wiring.

Detachable Terminals—3 sizes, ⅜ in., ½ in, ⅝ in.



B. B. PUMP

To Pump up Tires or Pressure Tank, Blow Whistle or Horn, etc.

A double-Piston Power Pump driven by gear, belt or chain. Equipped with Metal Piston Rings, Positive Lock Washers and Steel Crank Shaft. Guaranteed Pressure 100 lbs. Price o Pump $30.

We also furnish a special Cut-out Clutch, for turning on or shutting off the power at will. Price of Clutch $15.

Para-Gum Tire—Made in Austria. 99 9/10 per cent. of good pure rubber. Will outlast any 3 other tires on the market.

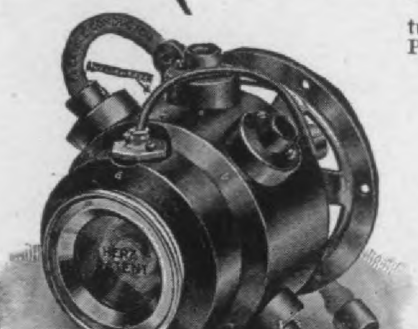
Oscillum—A spark gap; a spark intensifier. Makes any spark plug spark.

Battery Connections—Rubber and Copper.

Hagen Storage Batteries—the best ever made

Switches—A select line; unequalled

BOUGIE MERCEDES
The World's Best Spark Plug



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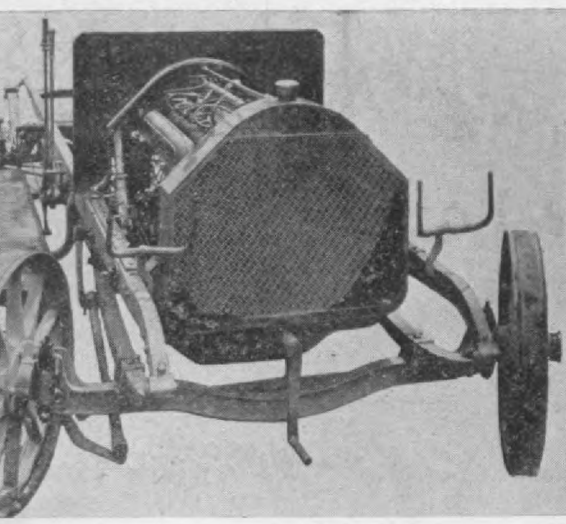
NOTABLE FEATURES.

first and most important variation ordinary construction is the three- support of the sub-frame, which is orward to the front cross-girt of the

coacts with a cam-constricted, leather-lined, steel brake-band. The end-cam which applies this brake is mounted on a rocker which is linkt to the clutch disengaging fork rocker, so that after the clutch is disen-



3. Bay State 40, front elevation, showing axle form and front spring placing.

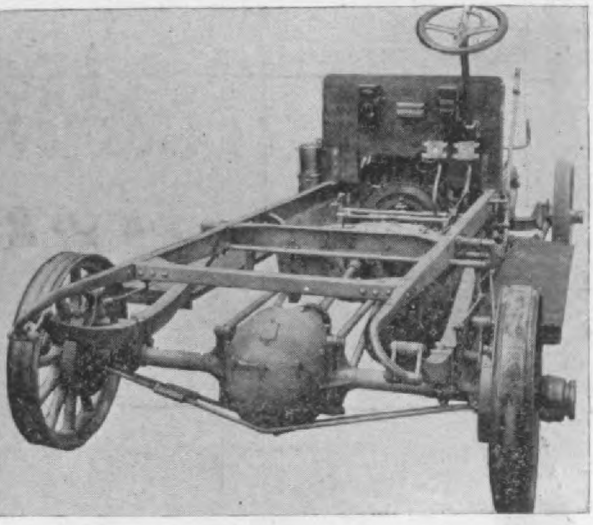
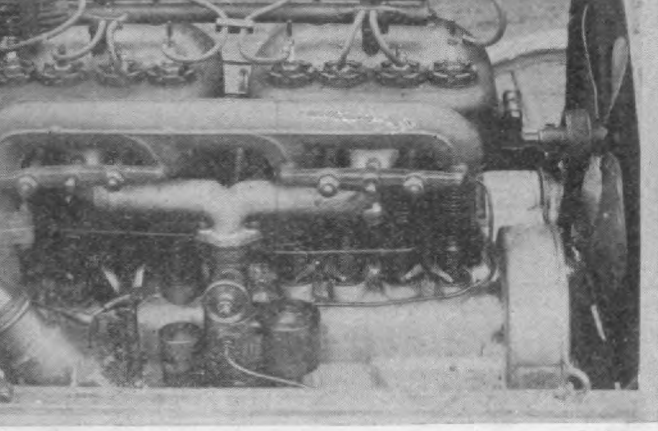


Fig. 4. Bay State 40, rear axle, and rear spring placing, and rear support of the two tubular torsion resisting arms, trusses and brake levers. All brakes are Gandy belting faced.

s frame, 2 ins. in rear of the front The sub-frame sides are an inverted tion, 2⅞ ins. deep by 1½ ins. wide. motor and gear-box sit on top of the ame sides, which are placed 17¾ ins. and 20¾ ins. over all. The sub- top is dropt 6 ins. below the top of hassis-frame. This sub-frame is about

gaged by pedal action continued pedal movement applies the band to this small diameter line-shaft brake and so stops the change-gears at once.

The motor-base lugs and the gear-box rest on top of the sub-frame, and are bolted



5. Bay State 40, right side of motor in chassis, wn special "3-air port" carburetor.

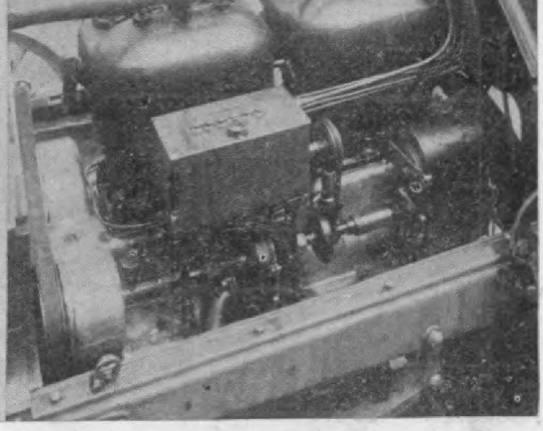


Fig. 6. Left hand side of Bay State 40 motor in chassis, showing mechanical oiler placing, and gear driven pump and magneto shaft, plug wire casing and water delivery to the radiator.

. long, and its rear end is supported on be joint, composed of a globe end stud o the top of a chassis frame cross-girt, 11 ins. below the chassis frame top, capt globe box with an oiler, fixt to

down thru blocks finished to fit the insides of the sub-frame members.

CHANGE GEAR.

The change gear is of the progressive

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If you are very particular and want

STYLE
SERVICE

and most important,

PERFECTION

in detail and lighting efficiency

Be sure and demand of your dealer or Manufacturer

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with the line shaft, have 4 segments of rubber between the arms to cushion the e from the motor to the line-shaft.

CARBURETOR.

ne carburetor is a special design by Temple, and has a float chamber and nd pipe which is surrounded by a sleeve xt diameter and having air ports out- of it, which can be opened more or less votating sleeve-valve, so as to admit to intake air which does not touch the l pipe. An automatic valve is opened ne piston suction against spring tension, has a sleeve-valve which can be made dmit more or less air to the automatic e intake; this adjustment is made by and permanently retained by a screw.

o struts are fitted, but two double torsion s are placed, one at each end of the gear ing, the front ends of each arm are ght together, with globe ends between washers and coiled springs in the cross brackets. The universal joints are by Hartford Company.

THE AXLES.

ese are by the Standard Roller Bearing Philadelphia, and all wheels are on lar ball bearings. The rear axle gear ing is a steel casting made of sufficient to take a large bevel gear to give a reduction ratio without change of gear The gear box has two substantial truss underneath, and a triangular torsion ting arm fitted to each end of the gear ing. The torsion arm is very often

The front springs have 8 leaves 40 ins. long tongued and grooved, not banded, and a leaves polished all over, and perched 16 in ches, front spring eye to middle of fron axle.

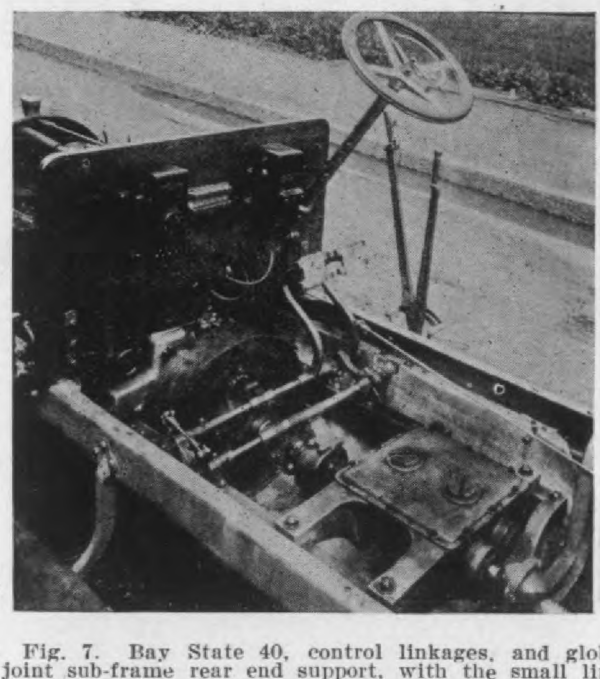

Fig. 7. Bay State 40, control linkages, and glob joint sub-frame rear end support, with the small lin shaft stopping brake and the cushioned line shaf **drive.**

The rear springs are 56 ins. long, 1 leaves, not banded, the top leaf and nex one below being bent over together to form the pin eyes. The rear springs are perche

Fig. 8. Bay State 40, details of globe-joint support of the rear end of the sub-frame.

ted entirely, and this is the first in- e noted by the writer in which two on arms are fitted, and perhaps these something to do with the very smooth

26 ins. from the forward spring eye to the middle of the rear axle. Both the front and rear springs are perched out of the middle the front ones 4 ins. and the rear ones

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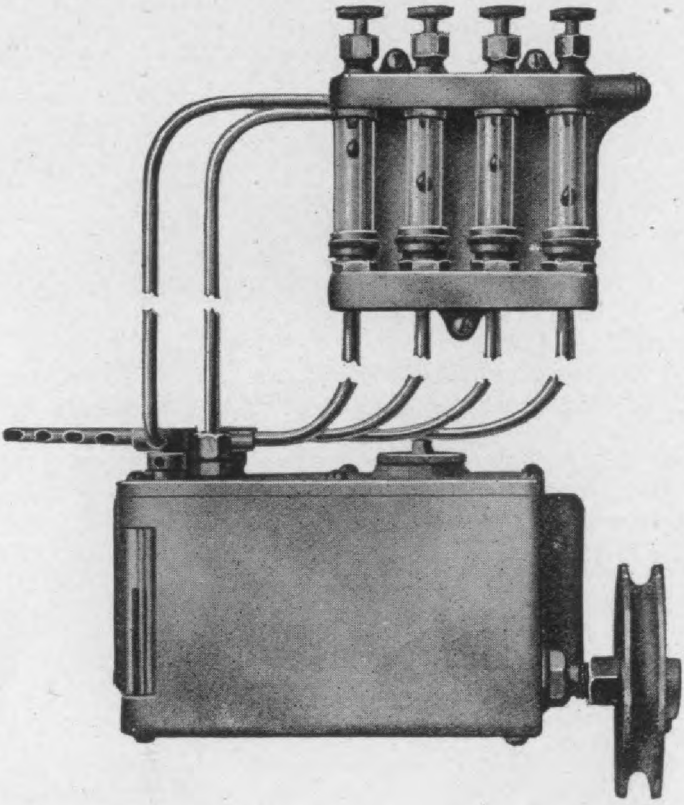
Force Sight Feed Mechanical Oile

The correct and most satisfactory method of lubricating

For All Style Gasoline Engines



Set of Sight Feeds and Pump Reservoir separate so that each can be located at most convenient point. Can be furnished with any number of feeds required.

Simple in construction—Feed Positive, Uniform and Reliable.

In All Respects the Best

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the sub-frame and the sub frame rear globe-joint are all hung low, thus plac- the center of gravity low, and beyond stion this low weight placing and the frame 3-point support affect the be- or of the car on the road in a highly ortant manner, making the body move- ts on rough roads extremely easy to the engers.

BAY STATE 40 CONTROL.

he spark and throttle control are by het retained levers on top of the hand- el.

teering is by Gemmer gear. There is throttle pedal, and no governor is used. latched outside hand-lever stands idle in ward position, is not linked to the clutch r, and when pulled to the rear applies the rior shoes to the rear hub drums, for

to the Boston factory of the Hartford Rubber Works, where our solitary tonneau passenger was taken aboard, and the machine was headed to all points of the compass Boston fashion.

Rossell Drisko is not a stranger in Boston, having been born and bred in that renowned labyrinth, and he drove with entire confidence, headed a different way every hundred feet or so, it is true, but without asking directions until a straight street, such as the writer did not dream existed in Boston, actually opened into another direct thorofare, and then we were done with straightaway work, and went winding over Milton Hill, thru Quincy, and Weymouth all the way over smooth macadam at a pace which was a very liberal construing of the 15-mile Boston legal speed regulation, until

Fig. 9. Bay State 40, rear of chassis with one wheel lifted 20 inches above the plane of the other ee wheels, with no twisting of the sub-frame, which stand perfectly normal, save for a slight lift at rear end.

rgency service. The inside hand lever, latched, is not interlinked with the clutch r, and shifts the gears progressively. left-hand pedal when pushed forward disengages the clutch and then applies band to the small brake drum on the line t forward of the gear box.

he right-hand pedal takes a rod to an lizer between two brake rocker arms, applies the exterior rear hub brake s for ordinary service.

he only interlinking is that which applies gear brake after the clutch is disengaged he action of the clutch pedal, and the shift is progressive, not selective. Gear ing can be attempted while the clutch

brakes were in order as we entered the classic boundaries of Hingham, where a 8-mile speed limit for Autos, is enforced by relentless cops in plain clothes hidden behind stone walls or clumps of shrubbery.

We drove very slowly thru Hingham, beguiling the tedium of our crawl by pointing out various points of concealment whence sundry minions of the law had swooped down upon the present driver on previous occasions. But Hingham is not so very extensive, and we hastened blythely forward at the town line of Hull, and with the salt air in our faces we sped by winding way towards Nantasket. It had taken but a very short time in the narrow footh-paths which

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¶ The light producing value of your lamp is not a mechanical question, but a scientific one.

¶ Our Mangin Lens Mirrors have been scientifically worked out to produce a certain result, and they do it, and the best result—the best light, is what you want on a dark night.

IT ALL depends upon the mirror—whether the light generated in your lamp serves to properly light the road, or is radiated in all directions and rendered ineffectual.

Bausch & Lomb Searchlight Mirrors

are constructed on scientific lines. They concentrate all the light rays into a solid beam, and just as a solid stream of water will carry a greater distance than a stream that is scattered, so will a solid stream of light. These mirrors will add about 50 per cent. light efficiency to your lamp and are made to withstand the heat.

¶ Insist on having a lamp fitted with the Bausch & Lomb Searchlight Mirror and *SEE* the difference. Every mirror is stamped B. & L. on its face.

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altogether from the regulation large car
ıalf-elliptics.

crowded streets. Upon our return the ca
bore us by a winding way to Blue Hill ave

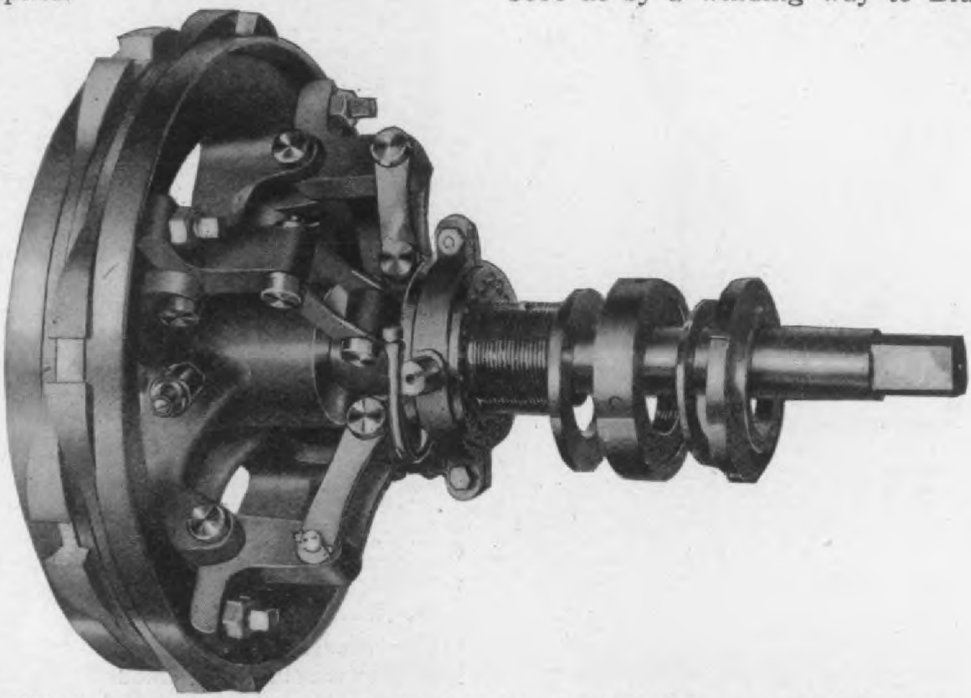

Fig. 10. Bay State 40 clutch, 5 disks, large diameter, 3 steel disks separated by two bronze disks
d with cork inserts, toggle joint engagement thru bell cranks with temper screws in their free ends.
s is among the very best clutches made.

ıe writer was forced to the conviction
the three-point suspension sub frame
really a dominant factor in the remark-
smooth and comfortable riding of this
car. Of course the ample piston area
3½ to 1 gear reduction were plenty to
l the car on any incline we met in this
e on high gear.

nue into the Parkway to Forrest Hills an
Jamaica Plain, and so back to 112 Norwa
street, about 28 miles, at 2.55 P. M., no
quite three hours for our 52 miles' run an
leisurely recuperation. The smooth windin
roads and the strong, silent and luxuriou
car made this 50 mile or more run one o
the incidents to be remembered with joy.

he "Traveller" 28-32 H. P. Car

is car was recently placed on the market
ellefontaine Automobile Mfg. Co., Bel-
ıtaine, Ohio. The maker's aim has been
ırnish a medium power, light weight,
car of ample passenger capacity and to
l freakish and extreme features. This

5-passenger, 28-32 H. P., 2350 lb. car is th
result of their efforts along these lines an
it contains no experimental features, th
originality is evident in various parts, de
veloped, however, on well tried principles

The motor cylinders are cast in pairs wit
heads and water jackets integral; bore 4½

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has been to find a speed and distance indicator that possessed *every* desirable feature at a price that *every* motorist could afford.

The Solution

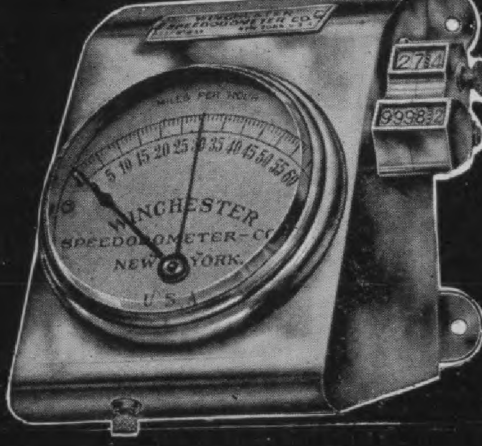
is found in the

New Winchester

The new model (Model "H") possesses the same mechanism that gave its predecessor the reputation of being the one "dependable" indicator; the same patented application of the only correct principle of construction that makes the indicating hand absolutely steady under all conditions of the road and at any speed; the same strength of parts that makes it durable beyond the life of several automobiles, and the same workmanship that has made it known as "A Fine Instrument for a Fine Car." Add to this, that it has the High-Speed-Record-Hand which indicates the maximum speed attained. Now add the facts that shaft breakage is prevented by our new re-enforced case, and that we have perfected an attaching bracket that fits 90% of the cars.

The Sum Total of These Facts Equals Speedodometer Perfection.

WRITE FOR OUR NEW BOOK



SIZE, 4¾ in. x 3⅝ in. x3¾ in.

The New WINCHESTER Speedodometer

SOLVES THE PROBLEM!

It records the mileage for the trip and the year. Indicates speed up to 60 miles per hour. Has the High-Speed - Record - Hand showing the maximum speed attained. Price

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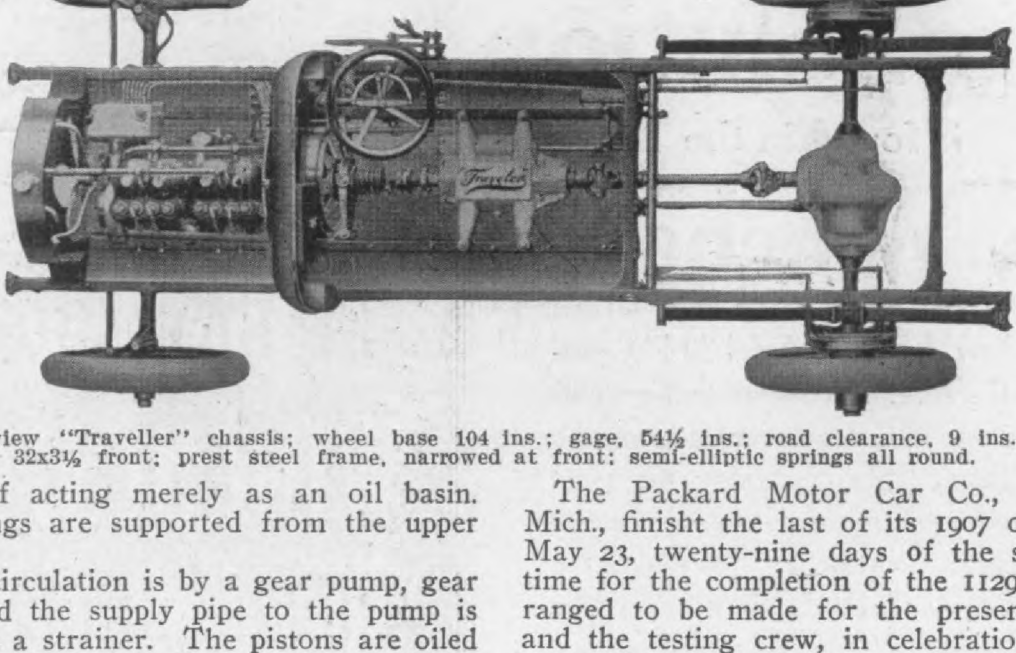
$5.0

, case hardened. The steel forged k shaft turns in large white bronze ings, which are divided in half to facil- removal and replacement if necessary. gears of the motor are housed and run il. The valves are interchangeable and all on the same side of the motor. The s and cam rollers are hardened steel. ne aluminum crank case is divided, the

take straight line or King of Belgium touring bodies or limousine or roadster type.

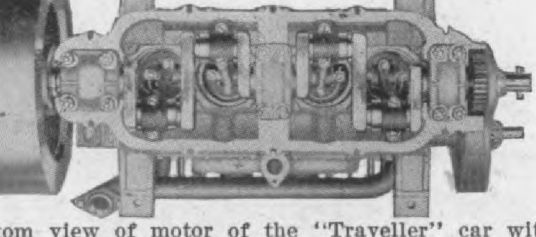
Plans have been filed by the E. R. Thomas Co., for the erection of a new addition to its big plant on Niagara street, near Ferry Buffalo, N. Y. The building is to be of fire proof construction, four stories high and will cost $40,000.



Plan view "Traveller" chassis; wheel base 104 ins.; gage, 54½ ins.; road clearance, 9 ins.; wheels, 4 rear; 32x3½ front; prest steel frame, narrowed at front; semi-elliptic springs all round.

r half acting merely as an oil basin. bearings are supported from the upper

ater circulation is by a gear pump, gear en and the supply pipe to the pump is with a strainer. The pistons are oiled tubes from the oiler and the crank pin ngs, cam shaft, cams and all gears are



om view of motor of the "Traveller" car with shaft and bearings exposed.

by splash. Ignition is by dry cell cur- but a magneto can be fitted if desired torage batteries will be furnished if rred.

wer is transmitted to the rear axle by ckel steel shaft with sliding universal s at both ends. These joints are void rews and nuts that might become loos- and are housed in dust proof cases grease packing. The driving pinion, h revolves on ball bearings, is housed n a cage and can be bodily removed the housing. The bevel gears and diff- ial gears are likewise easily removable.

The Packard Motor Car Co., Detroit Mich., finisht the last of its 1907 output on May 23, twenty-nine days of the schedule time for the completion of the 1129 cars ar ranged to be made for the present season and the testing crew, in celebration of th event, decorated the last car in the nationa colors, rigged two large American flags in front and paraded the car around the street of Detroit.

Thomas B. Jeffery & Co., Kenosha, Wis. have laid foundations for a new building covering about thirty-five thousand square feet and ten acres of land adjoining the north of the present factory has just been pur chased, on which new buildings will be pu up during the present summer. This ground extension makes a total area of forty-five acres owned by the Rambler people. The new buildings will all be of concrete con struction, both floors and walls, with stee saw-tooth roofs and skylights in the north exposures.

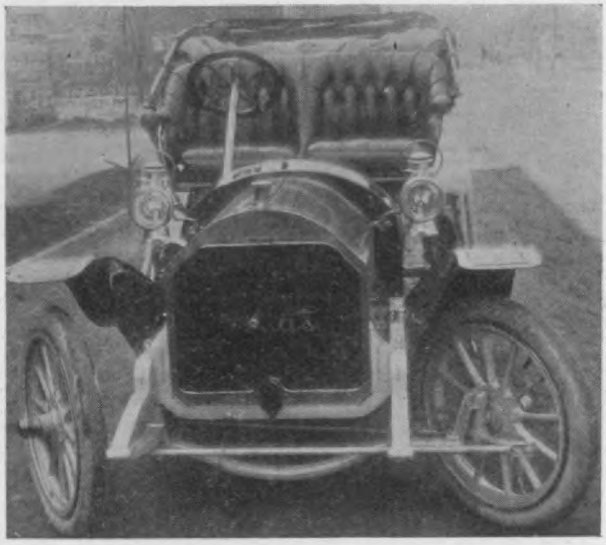
The erection of the Pennsylvania Auto Motor Company's factory at Bryn Mawr Pa., is progressing nicely. The plant will be so arranged that the raw stock will be taken in at one end from a railroad siding and the finished product coursing thru the building returning to the same siding. They will install a unique device for testing out the cars, to save them from the usual road

the Knox Motor Truck Company, Harry . Knox, president, Springfield, Mass., U. A., is now producing one per day of the tlas Runabouts, driven by a new 2-cylinder, cycle, water-cooled motor which is rated at H. P. This motor has important new atures for which applications for patents

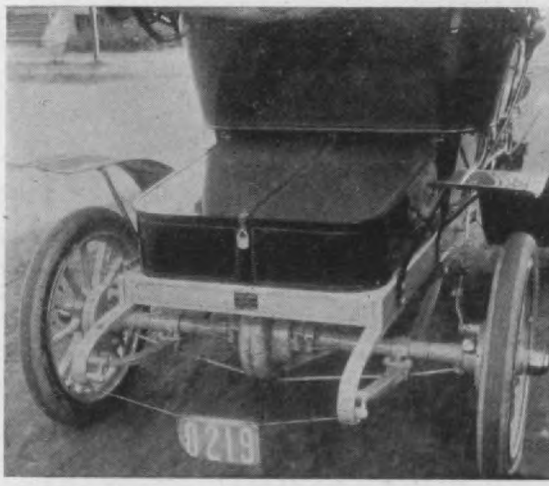
JOURNAL. As will be seen, the present motor and car are very different.

PECULIARITIES OF THE MOTOR.

The Atlas Runabout Motor was desig by Mr. Dorville Libby, Jr., formerly of Francisco, Cal., now supervising engineer



Atlas 2-cycle Runabout, front. Front axle by the andard Roller Bearing Co., Philadelphia. Front heels on non-adjustable roller bearings, with ball rust bearings. Radiator, long, vertical tubes.



Atlas 2-cycle Runabout, rear view. Rear axle the Standard Roller Bearing Co., Philadelphia. B gear, hardened, 3½ to 1 reduction, spur balance g Rear wheels on tapered axle ends, key and nu tention. Axle bearings all hard rollers in hard and on hard sleeves, non-adjustable, ball thrust ings.

Wheel base, 90 ins.; gage, 56 ins.; tires, 30x3½ ins.; motor, 2, water-cooled, 4½x4 vertical cylinders, placed under the hood in front. Thermal circulation, no fan front, no wa pump and fan-armed fly-wheel. Planetary speed change, two forward speeds and a reverse, be gear to divided rear axles. Weight about 1500 lbs. Price $1400.00, including mat, horn, tools and t oil lamps. Folding top $75.00 extra. Cover for folded top $12.00 extra, making $87.00 for the compl folding top equipment. The top cover is not indispensable to the top, but is neat, cleanly and sa wear of the folded top.

ve been made, and was put into its present rm, as here described in detail since the ecember, 1906, New York Show. The At- s car shown in December last was driven

the Atlas Company. The first approxima to this motor design was made by Mr. Li in 1902, patent applied for. Broadly, Libby's improvement in 2-cycle gas eng

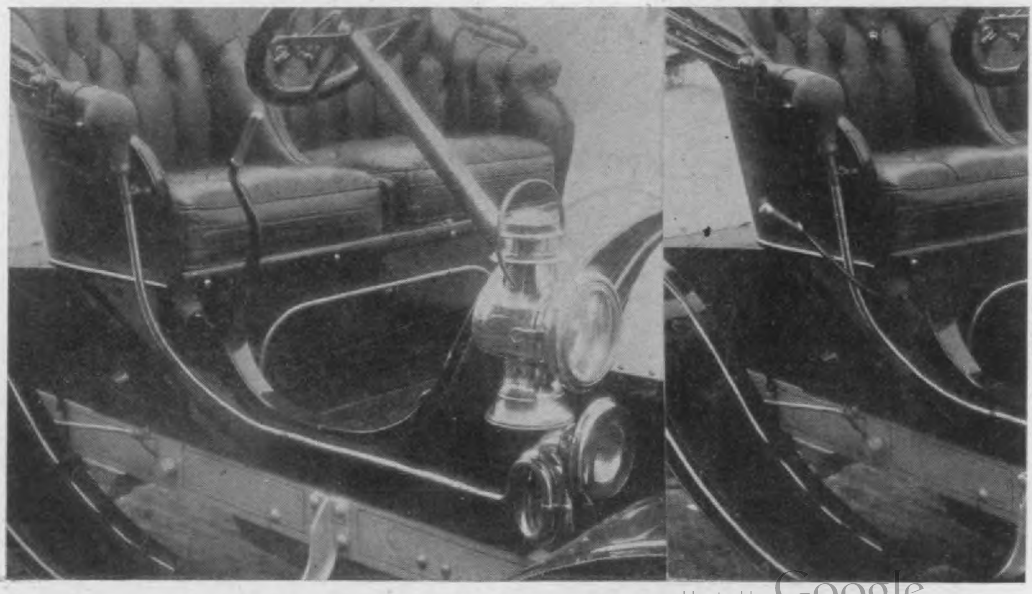


Fig. 3. Atlas 2-cycle Runabout, showing the hinged high-and-low gear-lever, the only one on the c pushed forward this lever gives high speed and pulled back gives low speed. This lever hinders entr

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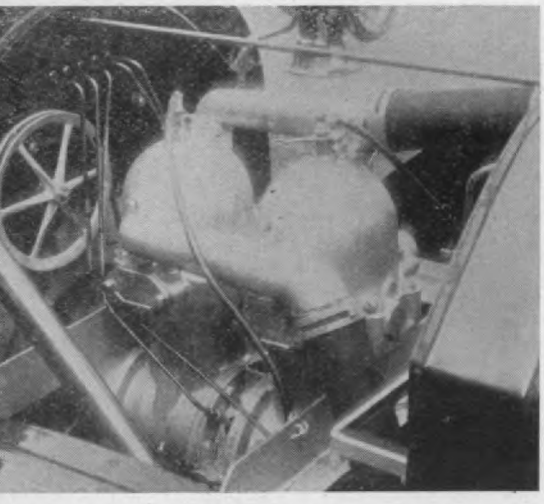
ed upwards toward the cylinder head, tends to clear the cylinders of the pre-



5. Atlas 2-cycle Runabout. Left hand side or in car, hood removed. See elevation of motor. picture well shows the simplicity of the 2-cycle These two cylinders, without valves, pump or ve same torque as a 4-cylinder, 4-cycle motor.

ly burned charge residue, and place the ge in the cylinder in a superior manner, y conducive to certain ignition of par-charges and complete combustion.

ese features give the Atlas 2-cycle mo-great probability of prompt starting, as as great flexibility of motor power. In of fact the Libby motors invariably, so

In 1904 Mr. Libby built cars driven by

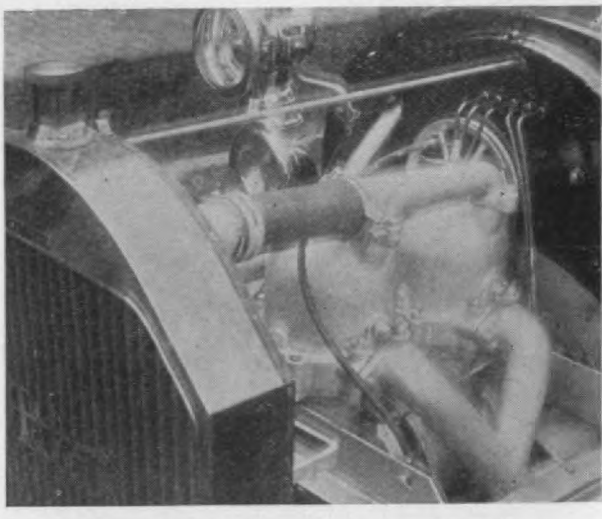


Fig. 4. Atlas 2-cycle Runabout, right side o motor, hood removed. The shive on front of front board drives the mechanical oiler, 5 leads. The moto is water cooled, thermal circulation, tapering deliver pipe from tops of jackets to radiator. Fan fly-wheel no fan in front.

two 2-cycle cylinders, and in 1905 one of these cars came into the hands of Harry A. Knox of Springfield, well known as one of the early designers of American cars driven by air-cooled 4-cycle motors. Mr. Knox made many different designs of small gas-engines and was early impressed by the obvious generic advantages of the 2-stroke cycle, and

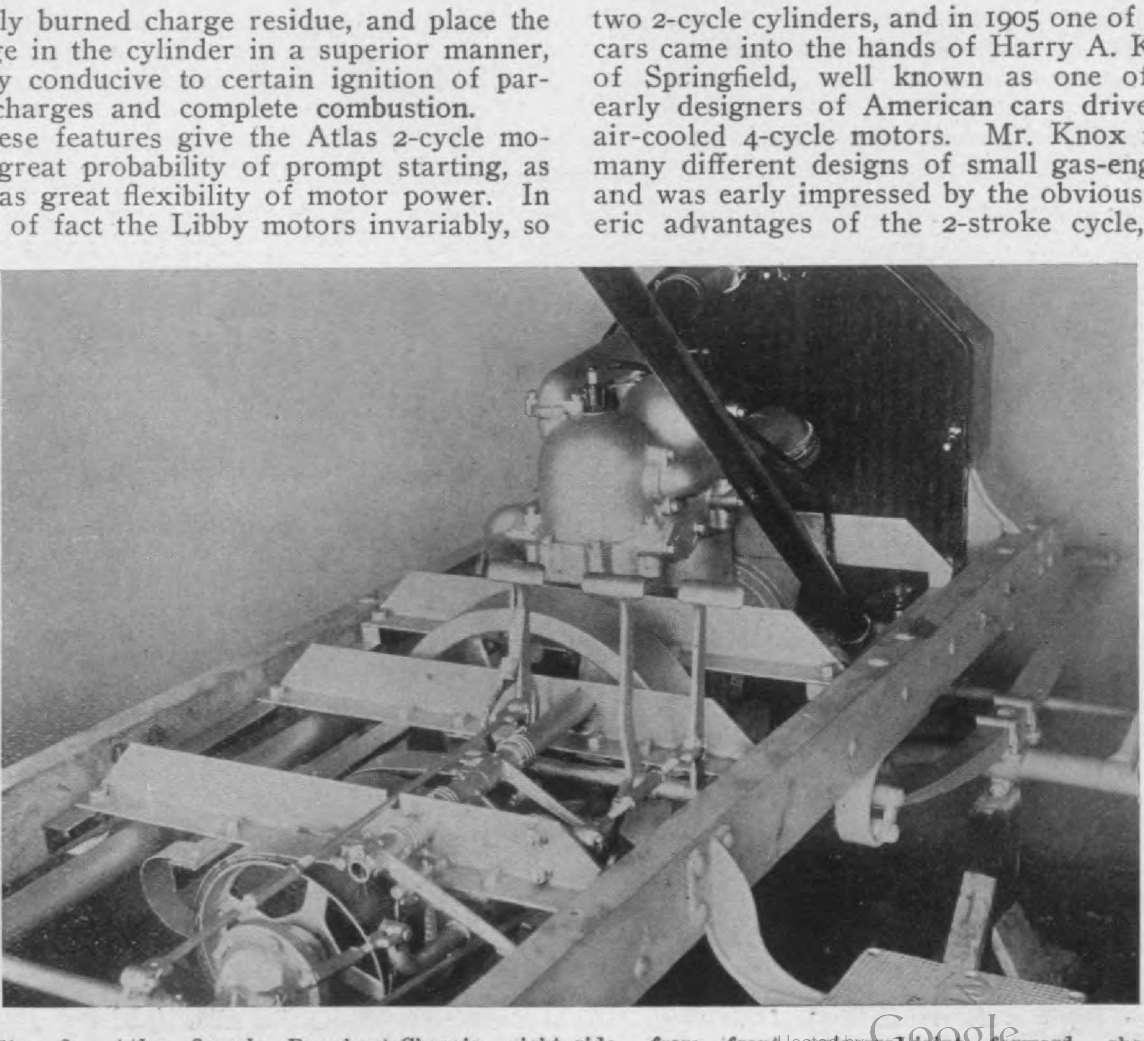


Fig. 6. Atlas 2-cycle Runabout-Chassis, right side, from front universal joint forward, showing nary brake 9¾ dia. x 2 ins., on line-shaft. This brake is pedal actuated and is fitted with an integral band, lined with Gandy belting and applied by a 3-hole lever. The chassis frame-sides are of ash

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went so far as to build a 2-cycle motor in 1896, but was deterred by opinions of experts of that early motor-car day from proceeding with the 2-stroke cycle. When Mr. Knox began to run a car driven by a Libby 2-cycle motor he was impressed with its all-round superiority from first to last, and after driving this 2-cycle motor for more than a year he induced the designer to come to Springfield.

The cylinders have no valves, but there is one mechanically-operated crank-box valve, which, however, merely goes round and round with the crank-shaft, opening the crank-box to the carburetor when either piston goes up, if turned the right way, so the motor cannot be started nor run the wrong way.

This motor handles the charge and exhaust on a concentric plan, so that the charge comes in from four sides of the cylinder and

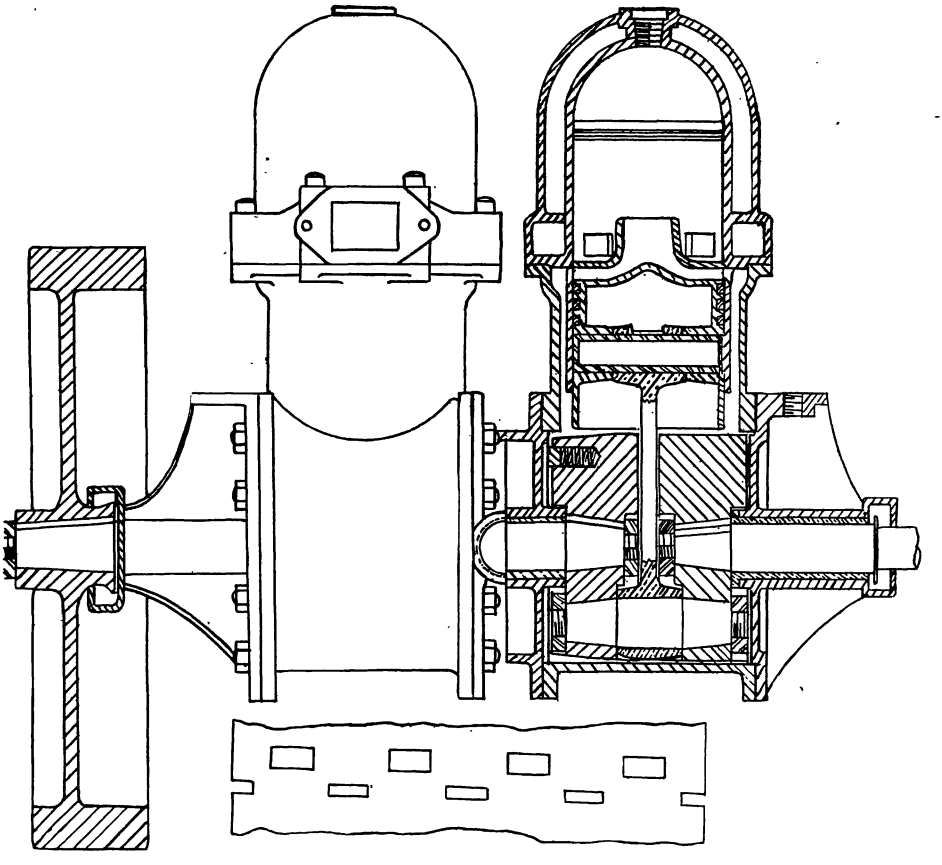

Fig. 7. The Dorville Libby 2-cycle motor. The crank-case intake port is covered by a plain disk-valve having a port, which is driven even turns with the crank-shaft, and prest against the carburetor delivery port face by light coiled-springs. This disk-valve has one port thru it, so located as to take mixture into the crank-case only when the motor runs in one direction. This intake-valve replaces the automatic valve between the carburetor and crank-box.

NOTABLE FEATURES.

This smart little Atlas roadster is a car for every-day service, moderate size, with power enough to be mighty busy week-days, good looking enough to go on the road Sundays and easy riding enough for moonlight wanderings.

Its wheels are on roller bearings, springs better than half-elliptics, a wooden chassis-frame and a 2-cylinder, 2-cycle motor that starts when the crank is pulled, and is flexible enough and strong enough to give from three and a half or four miles, a smart walking pace only, to 35 miles or more on high gear, which is 3½ to 1, making frequent speed-changes needless.

shoots up the middle of the cylinder and down next to the cylinder walls, giving an ideal charge entrance and charge placing in the cylinder for ignition. The exhaust goes out of the cylinder in four directions and is collected in an annular exhaust passage, opening to the muffler.

The chassis frame is of ash, light, stiff, strong, elastic with no sub-frame, and the motor and planetary, 2 forward speeds and a reverse change-gear are hung on 6 pieces of plain, straight angle-steel, two pieces bolted to the insides of the chassis frame-sides and four other straight pieces, two bolted to the motor and two to the transmission, go cross-wise of the chassis frame with

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their ends resting on the angle-steel pieces bolted to the insides of the frame-sides on the slant, so that the line-shaft and propeller-shaft are straight with each other at normal spring-deflection.

The Atlas springs are all ¾ elliptics. Front springs 43x1¾ inches, 5 leaves in bottom and four leaves in top half member, jointed in

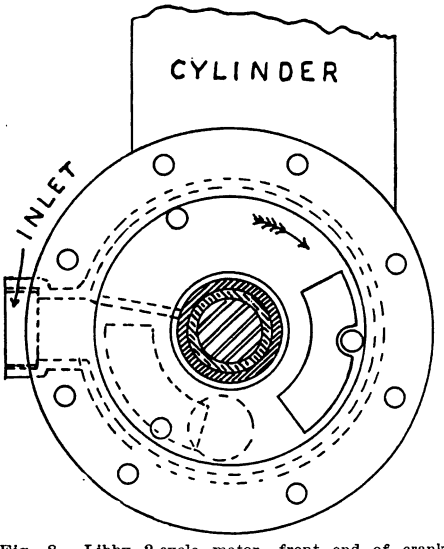

Fig. 8. Libby 2-cycle motor, front end of crank-box connection, showing the crank-box intake port. The cylinders are off-set ¾ of an inch. See Fig. 7 and caption.

front, tongued and grooved, perched 20½ inches front eye to middle of axle. The rear springs are 43x1¾ inches, 4 leaves in top half and 5 leaves in bottom member, tongued and grooved and perched 22½ inches from the front eye under the axle.

The Kingston carburetor is used, and the motor starts promptly and is always ready to work at any speed. A rectangular, galvan-

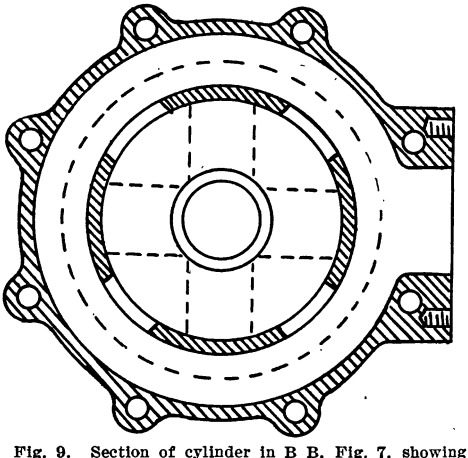

Fig. 9. Section of cylinder in B B, Fig. 7, showing exhaust ports, bridges between the exhaust ports, and the annular exhaust passage to the muffler.

ized-iron fuel-tank is placed under the driver's seat. The control is simple, and access to the driver's seat is made easy by jointing the one and only hand-lever, which is worked to give high and low speeds, so that it can be moved out of the way when the driver wants to enter the car.

BODY AND MUD GUARDS.

The car-body is of sheet aluminum, and the mud guards are carried down inside in front, and are continuous with the side footboards, so that the car is well protected. The inside mud-guards are rather short in front, but nearly all the 1907 cars are that way, and

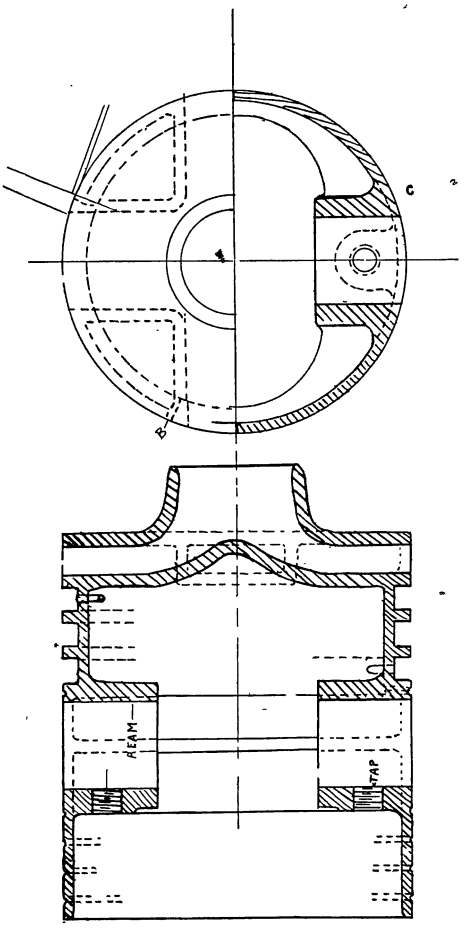

Fig. 10. Libby 2-cycle Motor, piston construction. The intake is thru four ports open to the crank case at low point of stroke. These ports open freely to the central intake nozzle, directed straight upward. The charge rushes up to the cylinder head in a central column, and then spreads out to fill the cylinder much as may be, with the certainty of clean mixture on top when the charge is comprest. The exhaust is all round the cylinder, so the whole of the exhaust and intake volume movements are concentric and symmetrical. This engine is prompt starting, probably because of these new features of concentric intake and exhaust.

one might as well be dead as be out of fashion. With all seriousness, all the 1907 inside mud-guards seen by the writer are a little too short in front, and the right kind of a puddle goes to the front-seat passengers' faces with certainty and dispatch, tho not exactly with neatness, same as of yore, before the inside mud-guards were placed at all.

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ON THE ROAD.

Wednesday, May 15, was a bright, clear ay, for a wonder, not so very cold, and an tlas runabout, fuel-tank full, with Frank I. Fowler driving and the writer as passen-er, hustled out of Springfield soon after

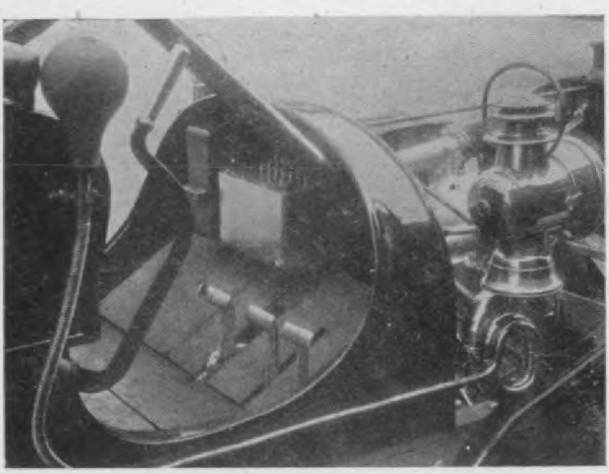

Fig. 11. The Atlas 2-cycle Runabout Control. The park and throttle are controlled by ratchet-retained evers on top of the hand-wheel. The steering is a orm and sector, hardened, worm end-shake adjust-ent, by Warner, Muncie. The high and low gears re had by the single hand lever, which is pusht orward for high gear and pulled back for low gear, nd is hinged to swing outward to give access to the river's seat. The ignition is dry cells to one coil a box inside the front board, with high tension istributor and jump spark plugs. The Lavigne me-hanical oiler, 5 leads, is on the inside of the front oard, and is round-belt driven. The left hand pedal pplies the rear-hub, internal, emergency brakes. The iddle pedal gives the reverse. The right hand pedal pplies the ordinary brake band on the line-shaft rake-drum. No muffler cut-out is fitted.

reakfast for a run to West Warren and re-urn, this route being selected because it as a lot of good macadam surface, plenty of ills and some of the worse surface of any ain road in New England, rough, sandy, rooked, stony and abominable in every par-icular. One notable point, known rightly as Mud Hill," has two living springs in the oadways, which keep it wet the year round nd give this hill the unique distinction of eing a steeply inclined and deeply rutted lay, sand and stone mud surface, absolutely actively improved, steam-rollers and s crushers and gangs of road-makers at w so that we had all sorts of hindrances sides the bad old-road surface. Time taken at known points, but no attemp speed was made, about 25 miles being maximum estimate of high rate. The had no speedometer, but had a mile reco so that total travel for the trip was kn Except up and down Mud Hill, and in place where roadmakers disputed our of way with a four-horse team and a p the car made the entire run on high gear, was all alive, courageous and able ev where, up hill and down hill, in deep and picking its way thru ruts and holes, over bumps and around big st with plenty of power, and unexpectedly e riding. The springs seem a bit stiff on sm road, but were just right for rough w and the wheel base is long enough to steadiness, and yet short enough to make machine handy in difficult places. Our mishap was the loss of a lamp, that on driver's side. The lamp brackets were too light discarded pattern in brass, and broke and the lamp got away without tice. The lamp brackets were change present regulars when the car reached factory at 11.50 A. M., having made miles round-trip, and taking four gallon gasoline to fill the tank full again, al exactly 14 miles to the gallon of fuel sumed.

There was no course open for speed, a short run was made later in the da which the Atlas showed 36 or 37 miles ily, and this runabout can probably mak miles on a good road surface. It is n noiseless and has almost no vibration.

The performance of the motor was fect, prompt start and plenty of power o high-gear for all sand and mud, and fo hills except the never-to-be-forgotten Hill, where the deep ruts and high b made a low-gear crawl the only pace p ble for any car.

England Leads in Isle of Man Races

The third annual contest for the interna-ional tourist trophy race on the Isle of Man, May 30, was won by E. Courtis, in a o-horse power Rover. The first contest or the international heavy car trophy was von by G. P. Mills, driving a 30-horse pow-r Beeston Humber.

A. A. A. Good Roads Board

mittee will be to secure federal aid to the improvement of at least the trunk r in the various States.

Connecticut Contemplates Abolishi Speed Limits

A bill is before the Connecticut Leg ture which provides for the abolition of s limits, the section referring to speed li reading: "No person shall operate a tor vehicle on the public highways of

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and two years later made an entry for Cosmopolitan, New York, Ardsley Ca- event, the second American public or car competition. Mr. Smith did not plete his car in time to appear in this ley run, but did show the car, a 700- d runabout, driven by a single vertical der De Dion motor under the hood in

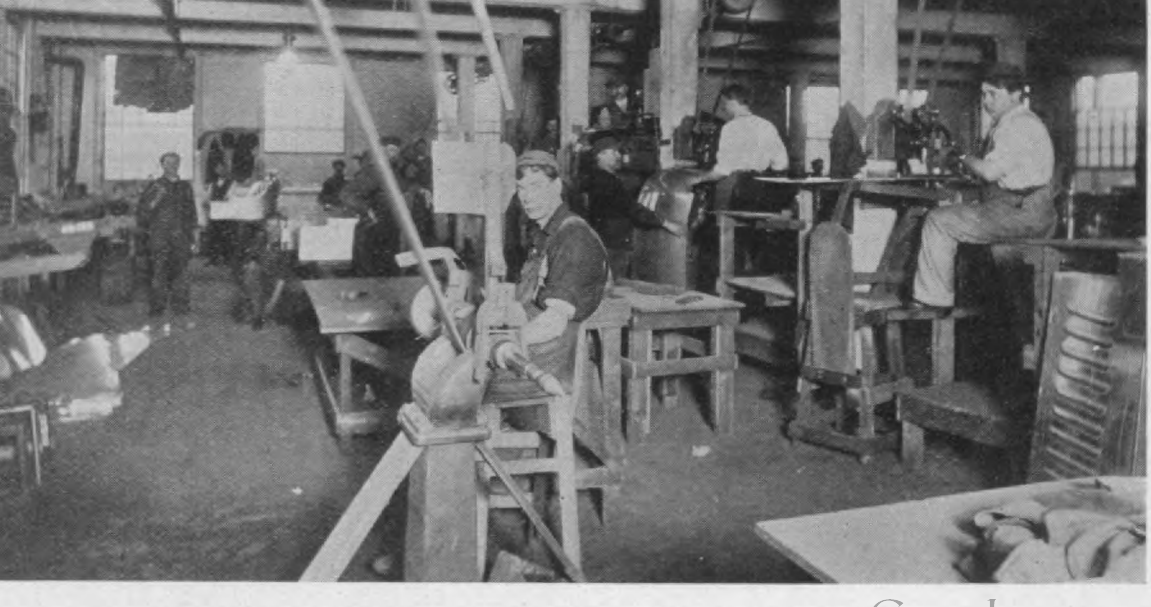
$750 each, and filled these two orders in June of the Show year, at a cost of some thing like $5000 to himself. This was no so very profitable, but the next step wa yet more discouraging, as it included th building of ten of the new runabouts, read for the motors, and then finding it impossi ble to obtain De Dion motors at any price

Springfield Metal Body Co.'s Factory. Over 2 acres of floor space.

, wheel-steering, and about 72 inches l-base, a very advanced design of r-car for that early day, at the first York Automobile Club of America ex- on. This first Smith car had a sheet- body, with wooden sills and floor and onstruction of this first Smith runabout was generically the same as the Smith

owing to the failure of the American agents for the sale of De Dion engines.

But at this time Mr. Hinsdale Smith, who had become associated with his brother, Mr Arthur Parks Smith, had learned how to make a sheet metal car body, and had some orders for bodies on the books, and Smith Brothers turned to, tooth and nail, hammer



Springfield Metal Body Co.'s factory. Body Plate Forming.

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-Aluminum and Sheet-Steel car-bodies

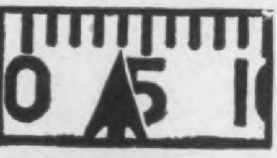
and tongs, to snatch victory from the jaws

See

the New Pinion and Leather-Bound Flexible Driving Shaft of the

Warner Auto-Meter Right Away

Actual Size



We couldn't improve the ***perfect*** working mechanism of ***Warner Auto-Meter*** or its absolute accuracy as a ***Speed*** and ***tance Indicator.***

—So we have improved our ***Pinion*** to make it ***infallible*** in ing the shaft in spite of ***mud*** ice, rough roads or the pulsating o engine.

—And we have shrunken the finest heavy leather onto the ***ible Driving Shaft,*** so it is bound to protect the shaft from ru and to protect the side of your car from marring. ***The Extra S*** —buckled to the dashboard—also steadies the shaft and protec instrument as well as your car.

These two added improvements are to be found ***exclusively*** on ***Auto-Meter***—

No other manufacturer can ***imitate*** or ***follow us*** in this, our ***ion,*** because we have ***patented*** it, and ***own*** it exclusively.

Remember that ***The Auto-Meter*** Shaft runs ***directly*** fro instrument on your dashboard to the front wheel ***Pinion*** attachment—***along on*** of your car. No necessity here of risking broken or cut shafts from ***bumping*** roa cause you don't ***have*** to run our shaft ***under*** your car like others.

Let us tell you all about why The Auto-Meter is on the ***Cream*** of all cars.

Warner Instrument Co., 643 Roosevelt St., Beloit, W

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ts now on the books call for a produc-
valued at $1,000,000 for 1907.

of time, wood does not take and retain pai
so well as metal does, so that it is more di

Springfield Metal Body Co.'s factory. Making mud guards.

wooden bodies the natural grain of
d makes it strong in some directions
weak in others, so that any curved and
y-angled shape produced in wood must
nade of a great many separate pieces,
h must be first carefully fitted together,

ficult to finish a coach body of wood tha
one of metal, where the finest appearanc
obtainable is demanded.

Sheet metal has no grain, is as strong i
one direction as in another, and can b
bent, folded and formed into all manner o

Springfield Metal Body Co.'s factory. Smith shop.

then fixt to each other with glue, screws
bolts, and must also be strengthened in
ous directions with metal braces at

shapes rapidly and easily, without a loss o
strength, so that metal car-bodies can b
given any desired form without menace t
durability.

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where absolute satisfaction is desired.
by all who have tried it.
Where greatest power is wanted.
where all others have failed.
five thousand miles.
ten thousand miles.
thousands upon thousands of miles.
by thousands of wise automobilists.

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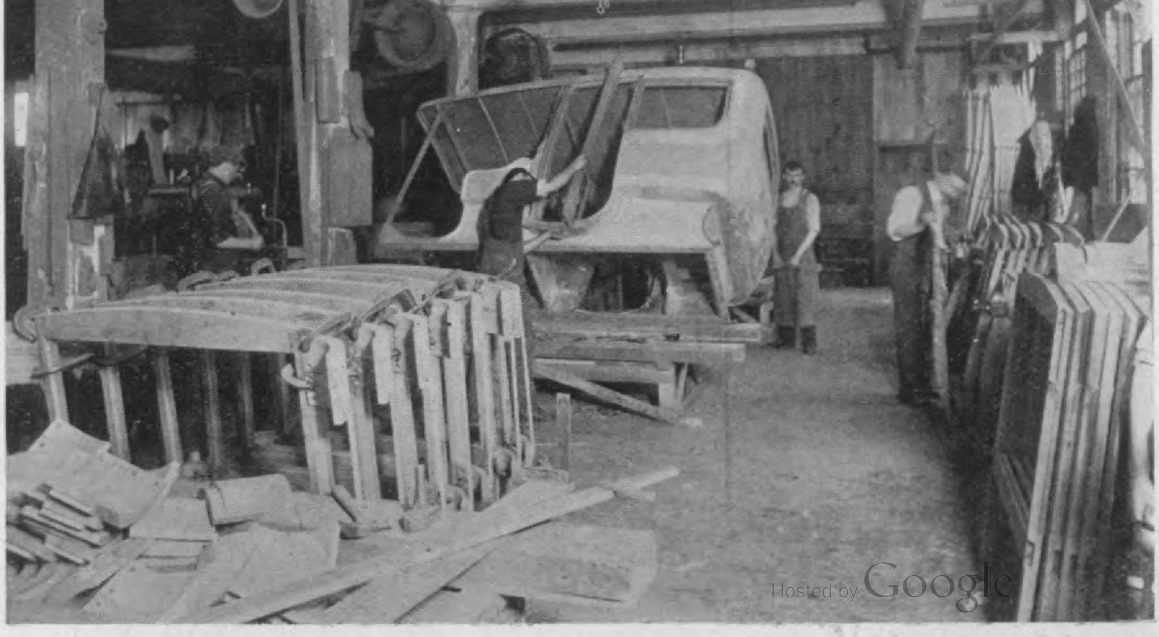
mpt has been made to substitute metal wood in horse-drawn vehicle bodies, but e of these efforts had scored anything very few special tools being used, as almo all the machine operations are general an applicable to varying forms and sizes

Springfield Metal Body Co's factory. Body assembling floor.

roaching a permanent success, and even there are many wooden motor-car-ies made, in the cheaper as well as in more costly forms, but the metal body ow used principally for the middle class automobiles in sheet metal, while cast minum alloy bodies are fitted to some of metal body productions.

The very cheapest forms of car-bodi can be made for least money of wood, s long as not very many of any one patter are wanted, but whenever it becomes ce tain that a low-priced body form is require in large numbers continuously, then speci



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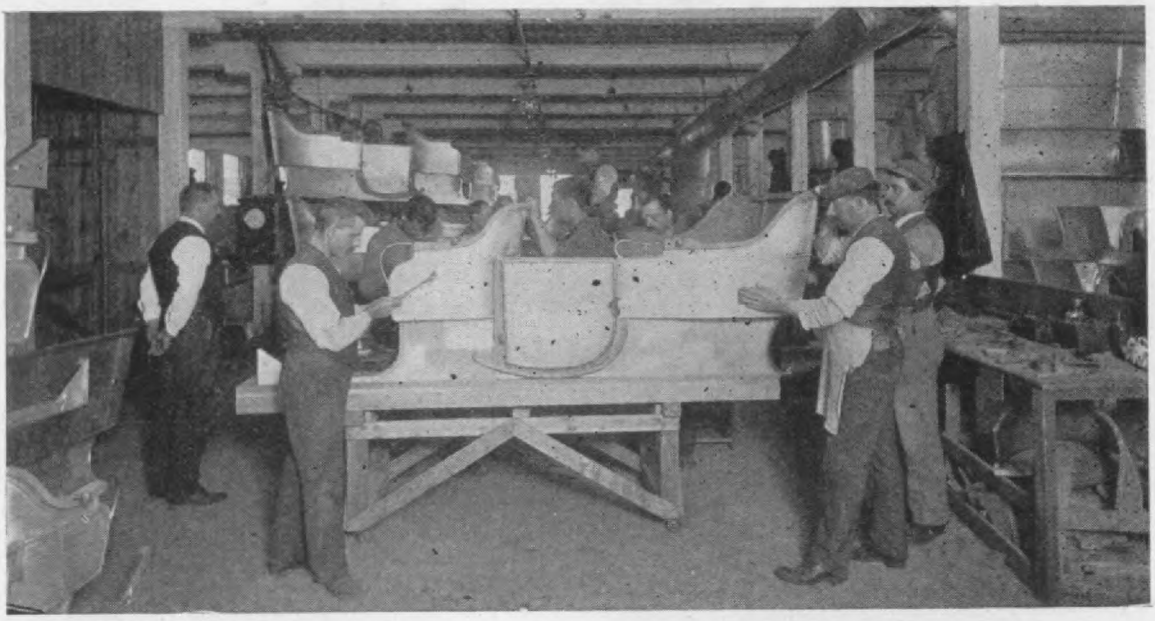
of wooden motor-car-bodies used will bably constantly decrease.

side lights for vise benches and hand work generally and the less well lighted midd

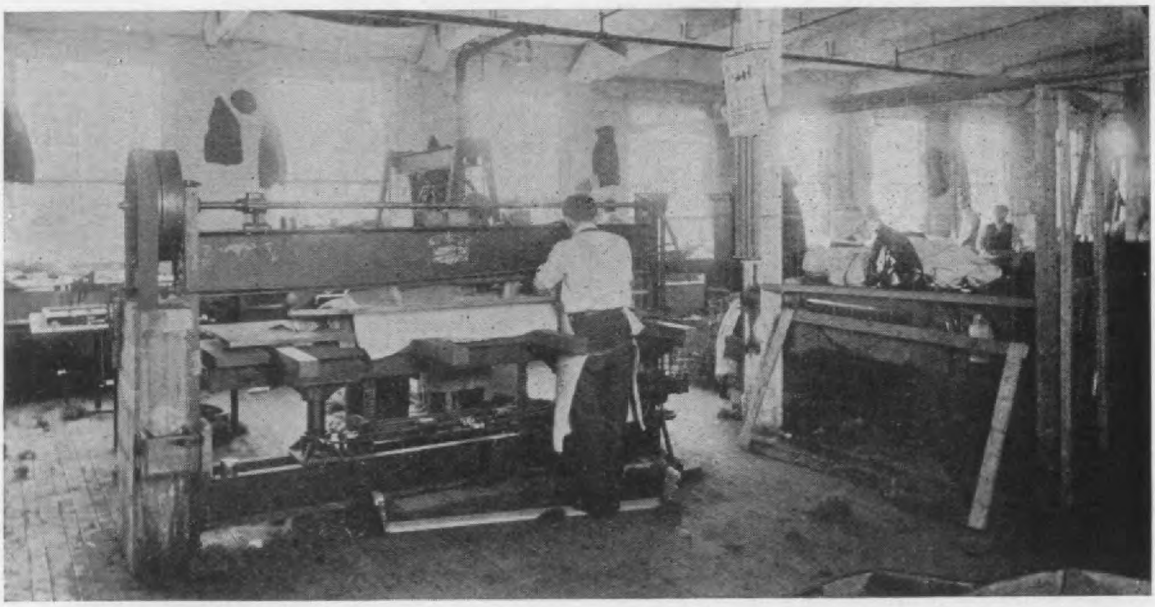


Springfield Metal Body Co.'s factory. Finishing completely assembled bodies.

'he Springfield Metal Body Company is v making single sheet-steel or sheet-minum bodies to special designs of indi-ual customers, thus invading the high-ss territory hitherto occupied almost ex-sively by the high-priced wooden car-ly makers, and it seems very clear that

floor space is used for piling bulky mater and partly finished product. The pictur given show this large factory as well ligh ed, and full of work, its more than two acr of floor space being filled to the utmost c pacity.

As to materials, pretty nearly everythi



Springfield Metal Body Co.'s factory. Upholstering Machine.

metal motor-car body is to come into re universal use.

'he Springfield Metal Body Co.'s factory ding is 3 stories and basement, brick, h a front of 174 feet, and two buildings

goes into a carriage body, the products the animal, vegetable and mineral kingdo being liberally represented in the forms various woods, almost all the industrial m als, and animal hides and hair, while t

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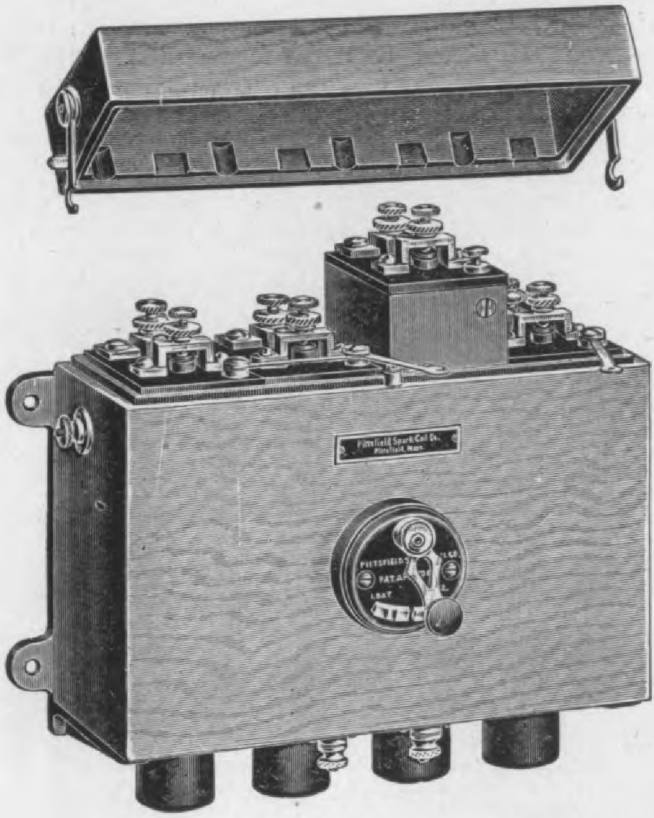
Merit Alone Has Made

PITTSFIELD IGNITION

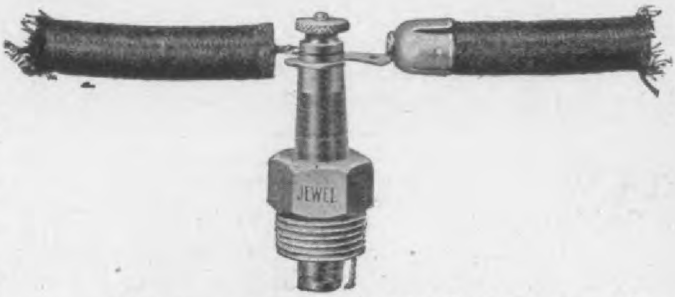


Popular.

Its success is not the result of a lucky chance; did not come from trading on an old established name; nor from cut-price methods (since it is more expensive than other makes). It is the favorite with experienced buyers because of

MERIT

and merit alone.



One trial will convince you that our claims are true. Don't let a few dollars stand between you and satisfaction. The slightly higher cost is more than compensated for in the increased service and freedom from ignition troubles.

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Pittsfield Spark Coil Co.

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ng of many different kinds.

'he workmen are of all nationalities and reat many of them are very highly skill- specialists and include carriage and cab- makers, wood carvers and upholsterers ong the regular tradesmen, as well as nters who are real artists, and plate form- who produce curved and swelled shapes car-bodies by hand work with hammers mallets, or by machine forging with y small power hammers of the well known stice" type.

ut machinery does not cut much of a re in metal body making. Ordinary od working machinery, sawing and shap machines are used as far as they will and the band saw cuts out many shapes oth wood and sheet aluminum, but body king is mostly hand work, with machines nere adjuncts.

hammered in hundreds of different wa from the time the pannels are taken up flat sheets until they are assembled with the wood-work frames into complete bodi which appear perfect to the mere onlooke but yet have hosts of faults and imperfe tions when scrutinized by the trained e of the expert. All of these defects must removed by hand-work with mallets, litt hand-hammers, files and abrasive papers.

In the first shaping a large component li a seat back and sides, it is bent and hamme ed to shape as indicated by wooden temple then fitted to a large wooden form, som times its own frame, to which it is to be fi ally fixt, and sometimes to a shop for ing block. It is clamped with hand scre and is then tested with woden templets f its curves in detail, marked with pen where it must be brought out or carried

Springfield Metal Body Co.'s factory. Upholstering floor.

he Smith Brothers were pioneers in met- ody building for motor cars, and invent- and patented a great number of their struction methods and details as they w in size and experience, and a large of their effort was expended in train- laborers of aptitude into highly skilled sans for carrying out new methods of oing and joining and strengthening their liar product, which were not before wn in any of the mechanic arts.

he most difficult operation in the whole tine of sheet metal car-body production e uniform shaping of the large pieces of

removed from the form and taken back the power or hand-hammers. Here, as m be required, it is shaped afresh and again a again tried on the form and with the tem lets, until its difficult curvatures are final not only obtained so as to look right to t eye, but in such close repetitions as to a most exactly fit the templet curves. Th precise uniformity of shape in bodies of t same pattern is obtained. After this, t plates or pannels are fastened to their fram and then follows another long series of te tative operations in applying the metal bea and outside pieces in the forms of door ca

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Manufacturin
Company's produc

whether

Gas Lamps—Oil Lamps—Generators

are the

Highest grade made in America.
There is nothing better at any price.

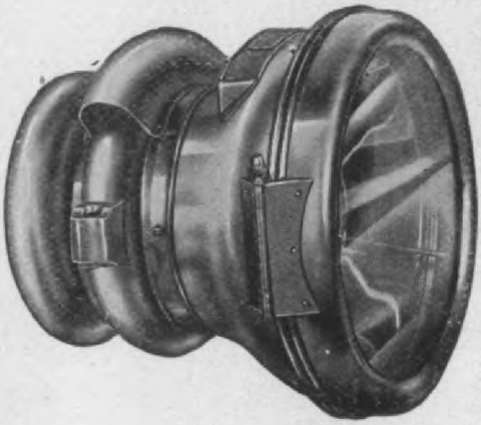
Strength in construction is the key-note of successful lamp building. Atwood Lamps are built of the BEST material procurable, are stylish and graceful and aristocratic in appearance.

Lamp difficulties and troubles eliminated by using

Atwood Seamless Generator No. 42

Has no wick. Water feed kept perfectly uniform with the Atwood Water Valve. Does away with annoyances and constant adjustment; is unquestionably the

Best Generator in the World



ATWOOD

Quality the highest.
Prices moderate for the highest grade of Goods.

Immediate Deliveries Guaranteed, because of unequalled manufacturing facilities, this company having one of the largest plants devoted to the manufacture of automobile lamp equipment.

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ATWOOD MANUFACTURING COMPANY

od and metal parts go, every part of the side surface must be worked over with hand-hammer, the file and abrasive paper il the curves are perfect from all points observation, and the templets show no iation from standard shapes and the sur- e is everywhere perfectly smooth and pared to take paint. The body is now dy for the upholsterers, whose work de- nds the best of materials and the most hly skilled handicraft, as well as large and borate special machines. The completely embled and upholstered body then goes the painters, who give it the final finish colors and varnish, again demanding both terials and skill of the highest quality.

This mere sketch of the operations of sheet tal car body manufacture, in connection h the illustrations made from photographs en expressly for this story, will give the der a faint idea of what it takes to pro- e that composite assemblage of metals, ods and animal products which very few

perfection, but the Smith Brothers, both y young men, say that there is as much roo to-day for body making improvement there ever was, and are busy now with n designs and details as they have been, co stantly, ever since they made their first lit car body in a tin shop, and undoubtedly w be until they turn their metal body busin over to their successors.

What the proportions of the Springfi Metal Body Factory will be when these t Smith Brothers who founded it are ready abdicate, is something not easy to foreca From $56,000.00 in 1903, to a round milli value of product in 1907, is a rapid grov for a new industry, but as yet there are o a few motor cars and a great many hor drawn vehicles in evidence. What will motor car body business be when the ho as a tractive agent is looked upon as most obvious reminder of former barb ism in modern civilization?

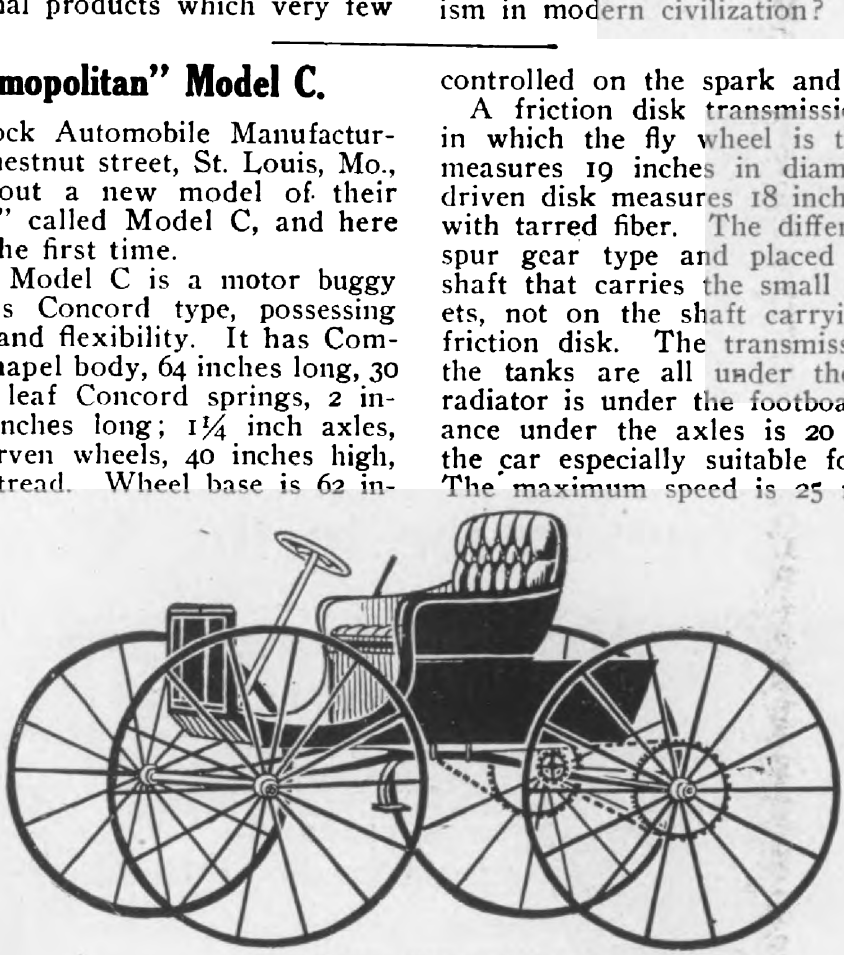
The "Cosmopolitan" Model C.

D. W. Haydock Automobile Manufactur- Co., 1930 Chestnut street, St. Louis, Mo., ve brought out a new model of their osmopolitan," called Model C, and here ustrated for the first time.

Cosmopolitan Model C is a motor buggy the reachless Concord type, possessing eat strength and flexibility. It has Com- or White Chapel body, 64 inches long, 30 hes wide; 5 leaf Concord springs, 2 in- es wide, 64 inches long; 1¼ inch axles, uare bed; Sarven wheels, 40 inches high, spoke, 1⅛ tread. Wheel base is 62 in-

controlled on the spark and throttle.

A friction disk transmission is emplo in which the fly wheel is the driver measures 19 inches in diameter, while driven disk measures 18 inches and is fa with tarred fiber. The differential is of spur gear type and placed on a count shaft that carries the small driving spro ets, not on the shaft carrying the shift friction disk. The transmission device the tanks are all under the seat and radiator is under the footboard. The cle ance under the axles is 20 inches, mak the car especially suitable for rough roa The maximum speed is 25 miles per ho



The "Cosmopolitan" Model C.

es; track 56 inches. Double chain drive employed and the rear sprockets are fas- ed to the spokes of the wheels. The en- e is a single 4½x4 cylinder, operating on two-cycle principle, placed vertically in

Brake is applied by pedal to the differen drum. The method of clipping the lon tudinal side springs causes the front a to act as an equalizer.

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Motor Cars. Gasoline and Electri

Can be depended upon for consistent and satisfactory performance at all times. This with their unusually low cost of maintenance makes them the most desirable cars in the 1907 market.

Mark XLIX

Mark XLVIII, 24-28 H. P., Touring Car $3000, Limousine $4200, is the most complete and perfect medium powered car to be had.

Mark XLIX, 40-45 H. P., Touring Car $4500, Limousine or Landaulet $5500, presents an unrivalled combination of speed, power and luxury.

Mark LXIX, Electric Victoria-Ph ton, $1600, is unapproached in its cl for radius of reliable action, safety, co fort, smartness of style and superb finis

Mark LXVIII, Electric Brougha Landaulet, Hansom and Victoria, ea $4000, are universally acknowledg to be the ideal town carriages private service.

Separate catalogues of gasoline and electric models will be sent on request.

ELECTRIC VEHICLE COMPAN

HARTFORD, CONN.

NEW YORK BRANCH - - - - - - Electric Vehicle Company, 134-136-138 West 39th St
CHICAGO BRANCH - - - - - - - Electric Vehicle Company, 1332-1334 Michigan Ave
BOSTON - - - - The Columbia Motor Vehicle Company, Trinity Place and Stanhope St

Member A. L. A. M.

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, New York City. This Company was ized in 1904, and owes it inception to Henri de Buren, who has been identified gas engine construction for more than ars, and who installed some of the first ngine plants in Europe for electric ng. Mr. de Buren has attentively fol- the development of the automobile h Europe and America from the begin-

stroke. The guarantee refers to continuous runs of some length, and on several tours the mileage per gallon of gasolene has greatly exceeded the above figures. It is well known that from 10 to 12 miles is the maximum claimed for 3000-lb. cars driven by 4 cylinder motors of ordinary construction.

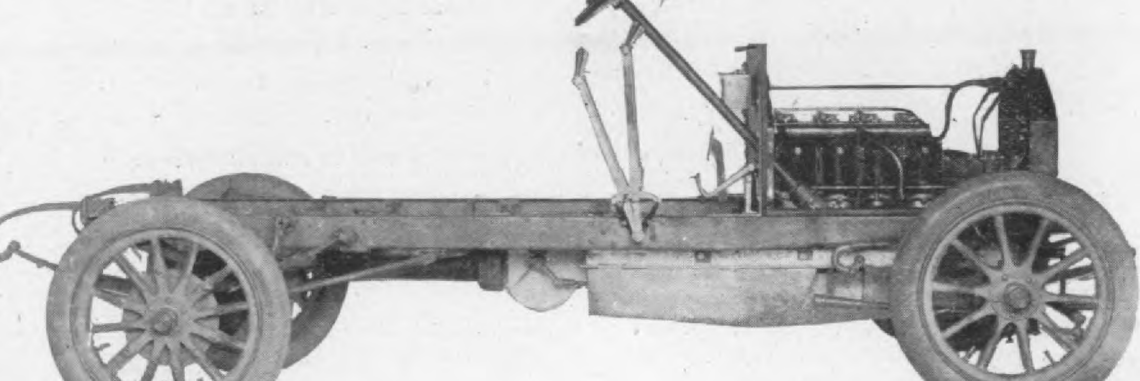
The Sultan Automobile has never been extensively advertised, but it has a reputation in France second to none, and has a

ultan 24-32 H. P., 5-passenger Touring Car. Springs half-elliptic in front, ¾-elliptic in rear. Motor 4, cal, 4-cycle, water-cooled, 4⅛x5⅛ ins. Cylinders, nominal 24-32 H. P. Sliding gear, speed-change, pro- ive, 3 forward speeds and a reverse, with bevel-gear to floating rear axles. Wheel base, 116¼ ins. all 880x120 m. m. Weight, 2850 pounds. Price, $4000. Cape top extra.

ieving in the superiority of the gas e as developed and constructed by h engineers, Mr. de Buren promoted American Sultan Motor Company for urpose of placing Sultan Motors and n Motor Cars built under license from ociete Anonyme Des Moteurs Thermi- Paris, France, on the market in the d States. This French Company con-

large factory in Paris. The Company is filling extensive orders for complete cars and for motors, and a strong Italian Company for making Sultan motors and cars was organized in 1906, showing that Mr. de Buren is not alone in his high estimate of the Sultan motor and Sultan car merits.

The Parent Company, in Paris, is now working on an order of five hundred taxi-



Right Side View, Sultan Chassis.

the patented inventions of Martin and monnier who are widely known as en- rs and builders of automobile motors.

meter cabs and the American Company will shortly begin the manufacture of this model. They have a sample cab in New York at

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HAYNES

FOR A LONG TOUR

in foreign lands—along the Riviera or the Valley of the Rhine or through the far West—your car must be one you can trust. Examination is not surety enough—you can't see the quality of steel. Practical tests are not severe enough. The only test you can rely on is the reputation of the **makers** and the **car.** Here are two significant facts:

The Makers of the Haynes Automobile built the first American gasolene car, erected the first American automobile factory, and have been making Haynes cars for **thirteen years.**

A regular **stock model** won its place on the American team in the Vanderbilt Cup Race against special cars of double its power, and in the Cup Race itself, its perfect regularity and wonderful endurance were the feature of the day. No harder test of a car has been given. It proved beyond question the Haynes quality and reliability. For long or short tours, abroad or at home, the Haynes is the car you can trust.

Remember, when you buy a Haynes you buy America's best.

MODEL S.

30-H. P.:simplified control, exclusive transmission and rear-axle construction that makes possible shaft drive despite the high power. Roller bearings throughout.

Price $2,500

Other models of 50-H. P., $3,500.

For catalogue address desk G 16.

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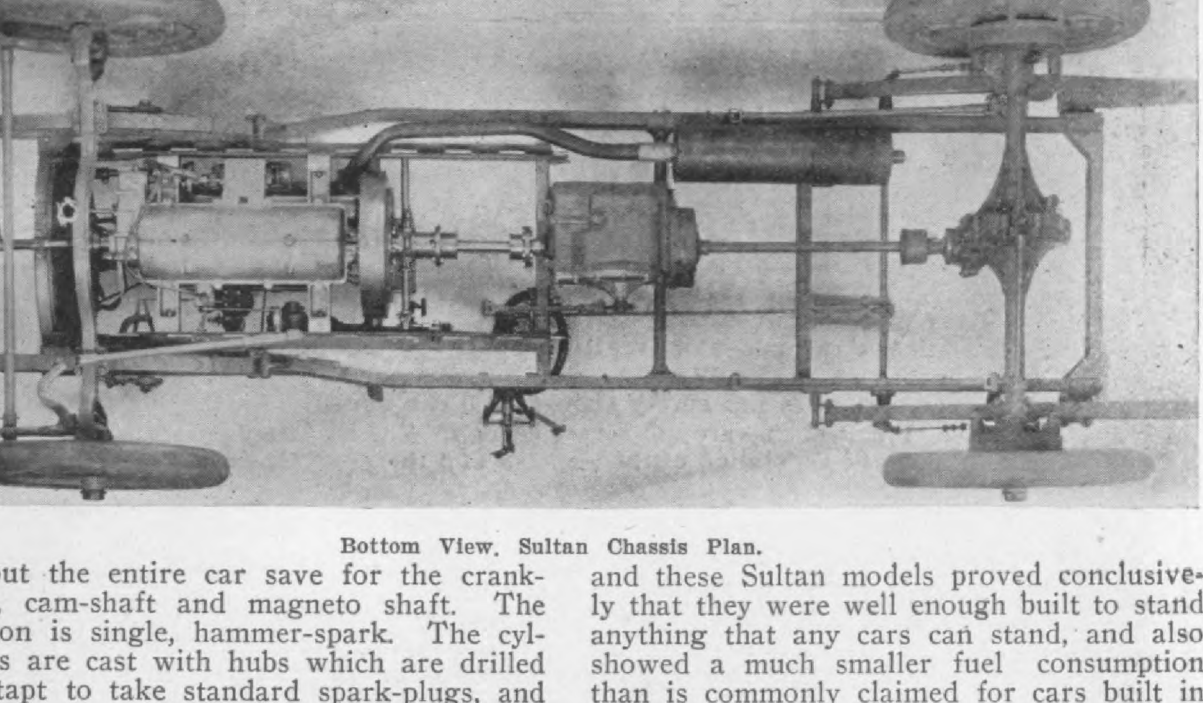
HAYNES AUTOMOBILE CO., Kokomo, Ind.

al construction, which make the car running thruout.

e "Sultan" journals are on "M. A. B." ch annular ball-bearings exclusively, have shown themselves perfectly adapted to all conditions of American service. The road clearances are from 9 to 10 inches, fully as much as in ordinary American cars,



Bottom View. Sultan Chassis Plan.

ut the entire car save for the crank- cam-shaft and magneto shaft. The on is single, hammer-spark. The cyl- s are cast with hubs which are drilled tapt to take standard spark-plugs, and hen fitted with plain plugs only, which e readily removed to take spark-plugs mp spark ignition is wanted.

e valves are all on one side of the der, worked from one cam-shaft, cams and these Sultan models proved conclusively that they were well enough built to stand anything that any cars can stand, and also showed a much smaller fuel consumption than is commonly claimed for cars built in the United States. The performance of the Sultan models was so good that manufacture was begun at the shops formerly occupied by the Elektron Mfg. Co., Springfield, Mass., now owned by the Otis Eleva-

Sultan Chassis Plan.

d, and retained by keys and pins. The st valves are lifted direct, and the in- valves are worked thru vertical lifting and horizontal beams. The hammer- is worked from the vertical intake rod, which permits the placing of an mely simple spark-time regulating me-

tor Company, in April, 1906, and the factory is now turning out one 24 32 H. P., 5-passenger touring car each week. This output is constantly increasing, and will be kept up to the demand. This Company has been occupied up to the present time in filling orders of those who became aware of the

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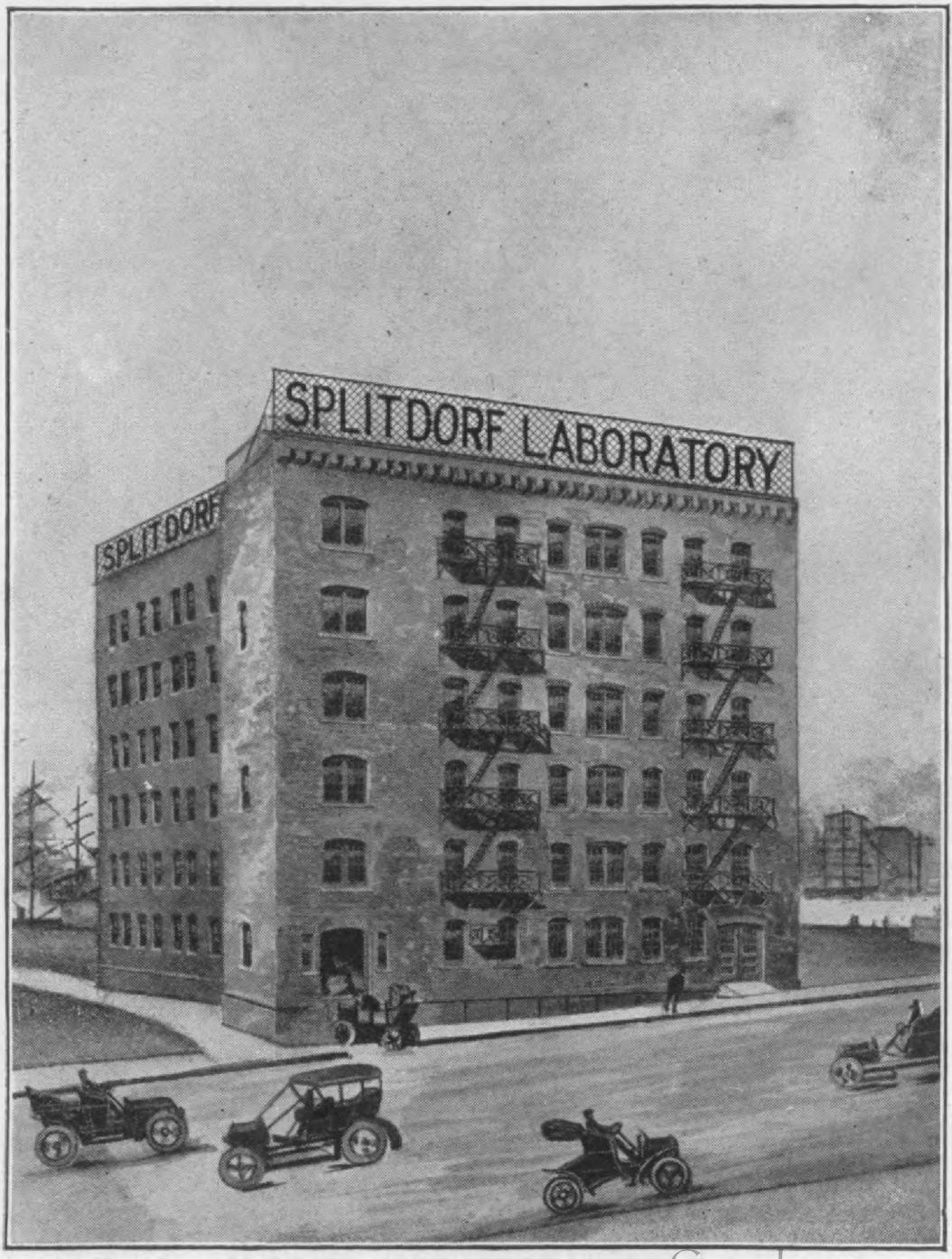
Our New Home

The Most Complete of its Kind in the World.

We have removed to our new factory, built especially for us, containing ov
50,000 square feet of floor space, and equipped with every modern appliance f
the production of the famous SPLITDORF PRODUCT on a larger scale than eve



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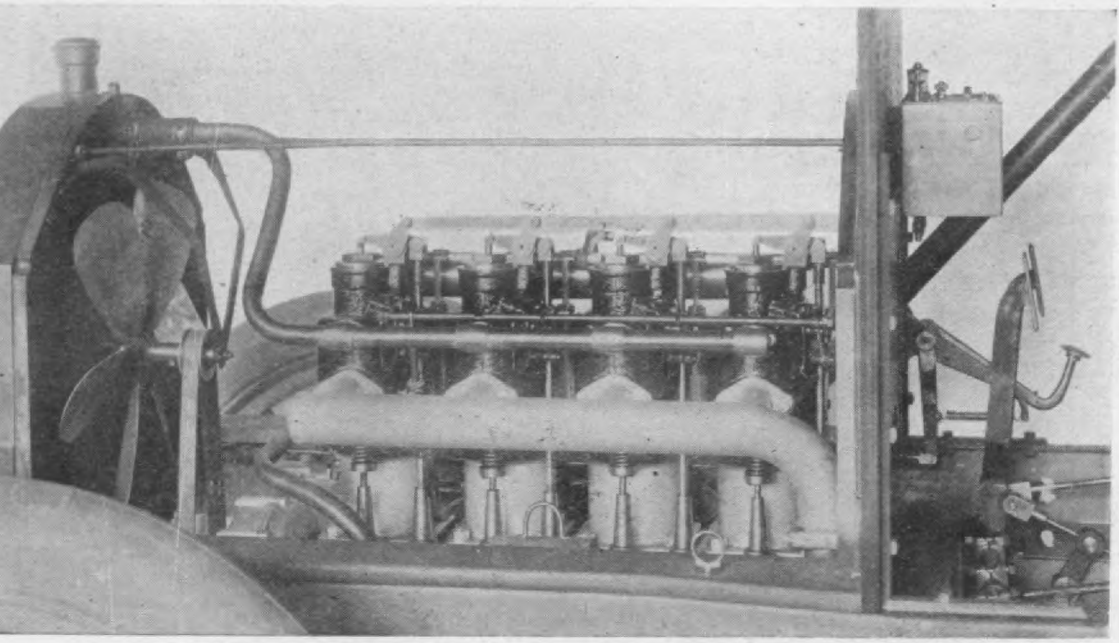
C. F. SPLITDORF.

ercial cars department of this issue of urnal.

much more need be said of the Sultan l designing than that it is simply a substantial, common-sense job of ma- construction, with ample strength vhere and a judicious distribution of thruout. The materials selected are of st and, in most instances of the most kinds. One notable exception in the of materials cost is, however, to be in the gear-box, which is a strong asting, comparatively low-cost, instead ordinary aluminum alloy, at 75 cents nd.

of the pistons and rods, which must be started, accelerated and stopt eight times during each revolution, or at 1000 R. P. M., 8000 times per minute. In a steam engine compression gained by admission-lead reduces this work, but the 4-cycle motor has no compression at the beginning of the return stroke nor at either end of the exhaust stroke nor at the beginning of the intake stroke, so that the large amount of work done is starting and stopping the piston and connecting rod is almost all lost, and the less the weight of the rod and piston the less this loss is, and it is always considerable. The actual weight of the Sultan piston and



Left Side of Sultan Motor, in Car.

Sultan materials are almost wholly ed from France, including the cylind- onnecting-rod forgings and chassis- . The connecting-rod bodies are steel forgings and are case-hardened and ed in something besides water, speci- "composition," ingredients refused for tion. The springs half-elliptics in and ¾ elliptics in the rear, are im- The ¾ elliptics are said to be as s platform springs, and it is claimed he ¾ form gives less side-sway and likely to cause sea-sickness than the m rear springs, tho the writer has known of a case af nausea produced tor-car movement.

y joint on the car except in the paral- ering rod and some very small parts control, has one forked member, so thing which carries any notable load hung, or supported on one side only.

rod as shown is less than that for any cylinder of equal bore and stroke seen by the writer.

Mr. de Buren has the common European secretiveness as to details of construction, and refused a sectional illustration and detailed description of the Martin and Lethimonnier carburetor, and was loath to give dimensions generally. The carburetor is patented in this country, has a float feed placed to one side of the carburetor, and a spring and diaphragm controlled auxiliary air-intake valve, and throttle valve controlled by the governor built into the cam-shaft gear, and by a bell-crank pedal, all costly and elaborate and well built, but showing no generic novelty.

The illustrations given will enable expert readers to note the excellent construction details of this car, which is the work of really good machine designers, fully aware of

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EVERY STUDEBAKER CAR IS CAREFULLY TESTED BY ROAD EXPERTS, AND MUST PROVE ITS EFFICIENCY UNDER HARDER USAGE THAN THE AVERAGE CAR IS EVER CALLED UPON TO ENDURE

The road tests through which every

Studebaker

car is put, before it is ready for shipment, are indisputable evidence of the thorough manner in which Studebaker automobiles are constructed, and explain why they give such uniformly satisfactory service when touring over rough and difficult roads.

Studebaker automobiles are not tested on a smooth race track, but on a seven-mile course over rough and hilly roads. As shown in the illustration, a seat is attached to the chassis, the rear of which is weighted down with sand bags weighing 1,000 pounds, to give a maximum load. The car is then taken out upon the course and every detail of its construction is thoroughly tested.

After a Studebaker car has been passed by our road experts the only thing remaining for the purchaser to consider is the style of the car desired and the price

Studebaker Automobile Co., South Bend, Ind.

BRANCHES

CHICAGO, ILL., Studebaker Bros. Mfg. Co.
DENVER, COL., Studebaker Bros. Mfg. Co.
DALLAS, TEX., Studebaker Bros. Mfg. Co.
KANSAS CITY, MO., Studebaker Bros. Mfg. Co.
NEW YORK CITY, Studebaker Bros. Co. of New York.

SELLING AGENTS

BALTIMORE, MD., Auto Supply and Storage Co.
BOSTON, MASS., Prentiss Motor Car and Supply Co.
CHARLESTON, S. C., Citizens Electric Co.
CLEVELAND, O., Central Automobile Co.
PHILADELPHIA, PA., Titman, Leeds & Co.

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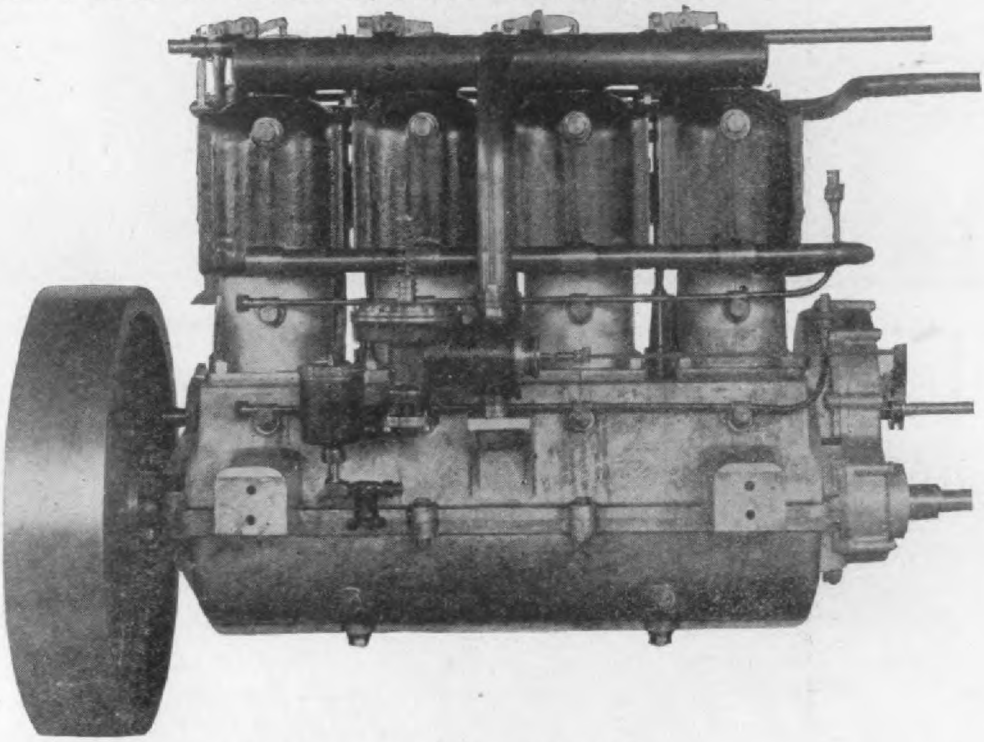
at each end, which take globed studs
e steering arm ends. The stub axles
xle pins are large, and the load is car-
n circles of balls.

e drive is hardened bevel pinion and
and a four bevel pinion balance gear
hat are really "floating" rear axles,
are not free to be withdrawn, altho

Valves and stems all nickel steel. Whole cam-shaft assembly will interchange.

Own centrifugal pump, gear driven from the cam-shaft; the Eiseman or Sims Bosch magneto is gear driven from the centrifugal pump shaft.

Carburetor, Martin and Lethimonnier, not described.



Right Side of Sultan Motor.

re not in bearings and carry no weight
The rear wheels are on M. A. B. ball
gs, an annular type with full circles of
forced into place, Martin and Lethi-
ier patent, no weight carried by the
d axles which are drivers only.

e bevel balance gears and four bevel
ce pinions are all steel and are all
ned.

e rear axle gear housing, brake-drums
rake covers are all steel castings. The
nediate lengths of steel tube are united
e castings by five screw threads, close
etained by cross-rivets.

SULTAN 4-CYLINDER MOTOR.

e cylinder castings, piston and ring
gs, valve forgings, and the crank-shaft
onnecting rod forgings are all im-
l. The wrist boxes and crank-shaft
are of what is described as "lead
e," a dark colored brass, composition
d, said to be better than any other
n metal for plain bearings.

e, 4⅛x5⅛ stroke. Gears bronze, spur
One cam-shaft, cams applied, pinned

Cylinder and water-jackets gray iron, integral, with large cove openings on the sides, and brass or aluminum covering plates, fixt with countersunk screws, packed with special imported sheet packing, very thin. Spark plug hubs on carburetor side.

Engine base and oil basin are aluminum castings, no packing at juncture. Exhaust is a welded steel pipe, no brazing. Fly-wheel for disk clutch shown in motor illustrations. Cone clutch shown in chassis illustrations. Female member in flywheel, aluminum male member, leather faced cone, leather copper riveted to cone all over. Cone held up by one coiled spring, ball thrust bearing for spring abutment.

Valve seats integral with cylinder, inlet valves directly above exhaust valves.

Copper pipe from pump to water jackets, and from water jackets to radiator. Honeycomb radiator. No water tank. Governor built into the cam-shaft gear.

LUBRICATION.

The oil basin is divided into two crank-pits, both supplied from one oil lead, American mechanical oiler, two oil leads only,

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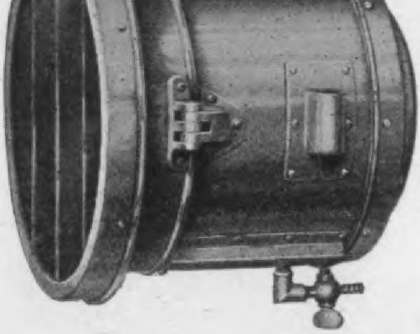

Rushmores Abroad

The phenomenal popularity of the Rushmore Searchlight at home is not more remarkable than its rapid rise in favor abroad. A year ago we thought our exports worth talking about (and they were), but they have increased four-fold since then. In England Rushmores are the standard equipment on Mercedes and Fiat cars, and are furnished as an option on most of the high class cars. In France their sale has advanced by leaps and bounds, and cheap "imitation Rushmores" are becoming as common as nearer home. In Berlin and Milan new branches have lately opened with large orders already placed. In every European country and in the British Colonies leading personages among royalty and the nobility can be counted among Rushmore owners. Every motorist who tries a Rushmore admits its tremendous superiority over every European type of lamp, and to own one is even more a mark of sporting distinction than here. When a record run is to be made, Rushmores are more and more frequently selected, no matter what the stock equipment may be. The 45 h. p. Mercedes with which the London-Monte Carlo record was lately cut to 29 hours 20 minutes carried Rushmore Headlights and Searchlight, and much of its success was credited to the high speed thereby made possible through a stormy night. The Gobron Brillié cars in the London-Paris **"Entente Cordiale"** motor service are similarly equipped.

And RUSHMORES are the only American gas lamps sold in Europe. Is not this fact suggestive?

Rushmore Dynamo Works

PLAINFIELD, N. J.

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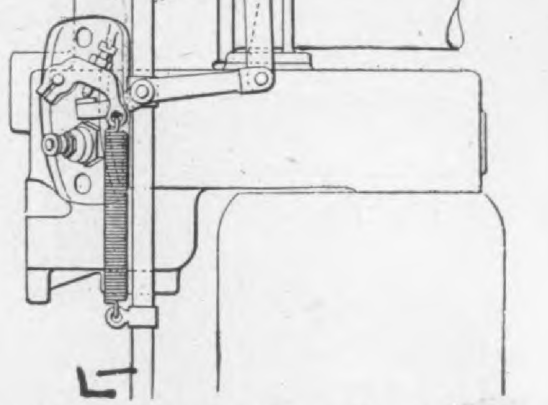
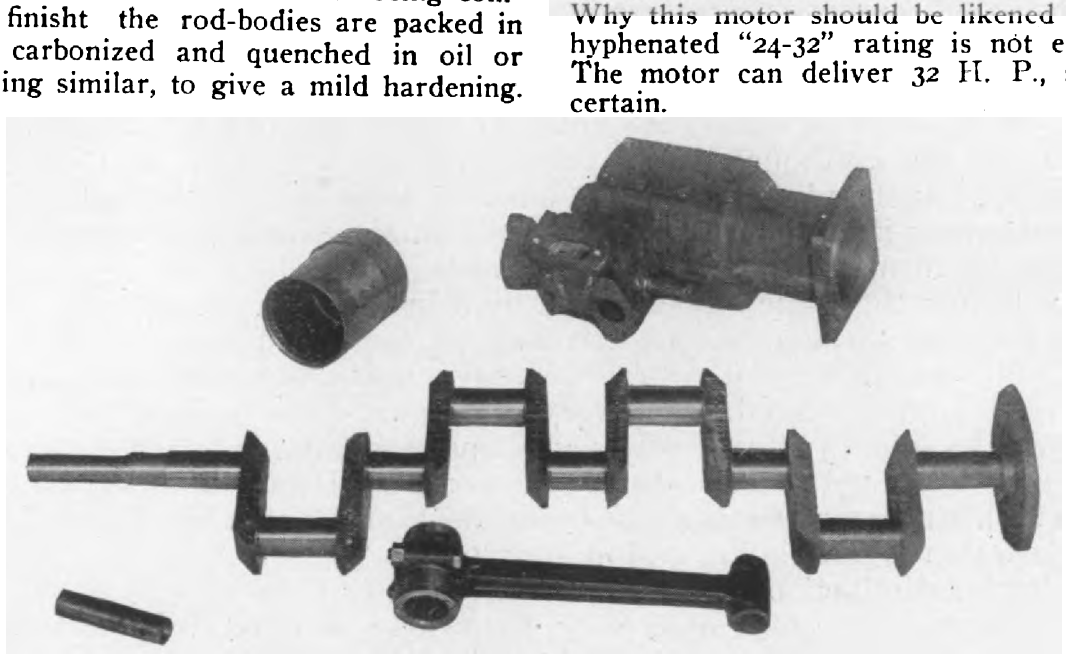
k contacts about the same distance of ration at all adjustments of spark time. ne pistons have 3 eccentric rings, all e the pin, which are ground on the face edges, and are free in the piston grooves. piston pins are about 1 in. dia., 3-16 hole from end to end, and are retained in pistons by one tit-setscrew, and have cross oil holes.

ne rods are steel drop forgings, very , no bushes in top ends, two oil holes p end. The wrist ends are marine, body od in middle of wrist bearing, lead ze wrist boxes, cylindrical, flanged, fin- all over, split and soft soldered to- er for finishing, and put up metal to l, no levers. See illustration. The rods about 12 ins. c. to c. After being com- ly finisht the rod-bodies are packed in es, carbonized and quenched in oil or ething similar, to give a mild hardening.



Sultan hammer spark action. The hand-adjuste rock-shaft, R, has four arms which take vertical link to the right hand ends of the horizontal levers pivote to the valve beam rods, L. The outer ends of thes levers take hardened steel studs which impinge th contact rocker-arm temper screws sooner or later, ac cording to the position of the rocker, R.

Why this motor should be likened with th hyphenated "24-32" rating is not explained The motor can deliver 32 H. P., sure an certain.



Sultan Motor Details.

THE CRANK-SHAFT.

ee illustration. This is a French steel froging, 5 bearings, wrists and journals ame diameter, very small, about 1⅝ in. neter, finisht by turning and grinding. fly-wheel flange is integral and the pin- is bronze, keyed and pinned to the shaft. wrists dip into the splash pool, and the k-arms are drilled with oblique holes ch meet holes thru the crank wrists, and cross oil holes are drilled in each wrist; of these oil holes are about 3-16 in. dia. he motor base and oil basin are alum- n, base lugs reaching across to separate g blocks for each bolted thru from out- of chassis frames.

THE SULTAN MOTOR TESTING.

he Sultan motors are "run in" and test-

DUST SHIELD.

A sheet-steel dust shield is applied to pro tect the under side of the motor and chang gear, by hinging both sides of the shield t the chassis frame. The hinge rods can b pulled out, one or both, so as to drop eithe side of the shield down, or to remove th shield altogether. The placing of the du shield is a difficult problem, met by variou means; this Sultan method of hinging bot edges is very good, is convenient, and is ne to the writer.

The chassis frame, nickel steel-pres 3-16 ins. thick. Sides greatest depth, 4¾ ins width, 1½ ins.

Frame in two widths, 35½ ins. in rea 31½ ins. front part. Long straight inclin no reinforcing.

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Thomas Flyer

Hundreds of cars in daily use for months. Some have traversed thousands of miles over roughest kind of roads. One made over 8000 miles. Another 10,000 miles. **Not one complaint** of tire trouble.

REASON found in splendid policy of providing 1500 pounds surplus tire capacity by equipping cars with larger tires and wheels at additional cost to us of over $100. Front tires 36 x 4 inches. Rear tires 36 x 5 inches.

PROVES again that we will not only eliminate all structural troubles but eliminate practically all operating troubles such as tire troubles by use of big tough tires and ignition troubles by the use of a double ignition system.

All this is submitted for the cool and critical buyer—the conservative business man. Regardless of price no other large car can present such a grand record.

60 H. P. Thomas Flyer, $4000, f. o. b. factory
40 H. P. Thomas Forty, $2750, f. o. b. factory

E. R. THOMAS MOTOR COMPANY

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ces, lower member only, no top member

THE STRUTS.

'hese are steel tube bodies, forks applied each end, flat joints at each end, no length ustment. No torsion arm is fitted.

'he propeller shaft has universal joints each end, not the same, no construction ails given.

'he gear box is a steel casting with an minum plate applied to the right-hand side. e change gears, 3 forward speeds and a erse, are steel and hardened. The en- ement is progressive, and the control tage permits attempted gear shifting with clutch engaged.

BRAKES.

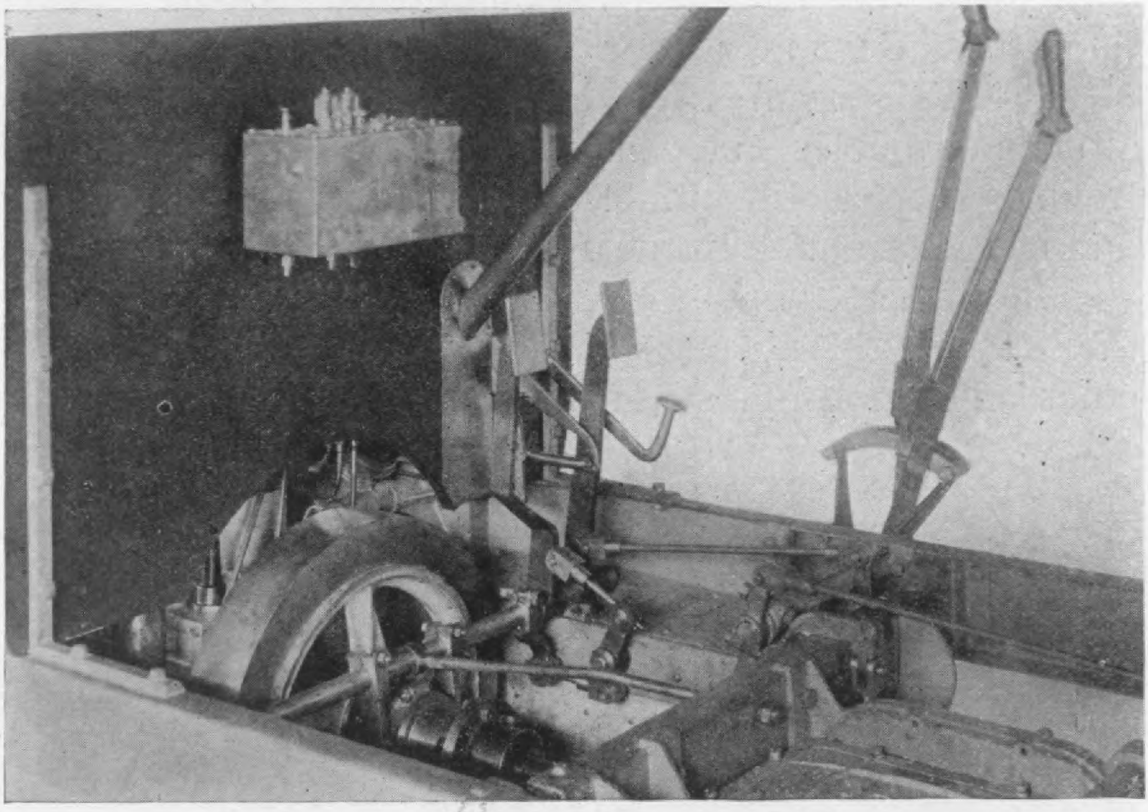
'here are internal shoes in the rear-hub ms and in a line shaft drum at the rear of the gear box. No exterior brake ds. The internal brake shoes are all

hand and left-hand screw is engaged by ha nuts on each side, one right- hand, the oth left-hand, these half nuts being prolong downward to push against the bell-cra arms of the globe ended steering arm.

The steering-wheel moves only thre quarters of one turn to give the full swe of the front wheels. This is common Fren touring car practice. The French race have, commonly, one full turn of the stee ing wheel for full sweep of front whee and 1907 American touring practice giv 1½ hand wheel turns for full sweep of fro wheels.

The outside hand lever is latched, a when pulled backward first disengages t clutch and then applies the emergency rea hub brakes.

The inside lever is latched, and is n



Sultan Control.

n-rocker expended, are all bronze and nted, and all have applied, hard-bronze aring shoes, which can be replaced. All brake drums are steel castings.

CONTROL.

'he clutch is disengaged by a pedal, a mpound lever linkage and a rocker and k. The clutch rocker is not interlinkt h anything except the outside hand lever, ich applies the emergency internal hub- m brake-shoes.

'he line shaft member from the clutch to

linkt to the clutch rocker, and shifts t change gear only.

There are two large pedals, the left-ha one disengaging the clutch only, right-ha one applying the line-shaft ordinary bra only.

The rear brake action is a hollow roc shaft, with pierced rocker arms and wi cable loop to the cam-ended brake shoe e panding rockers; all the cable stresses tak on hard steel blocks and bushes, fitted to the cable slide easily, so that the brake

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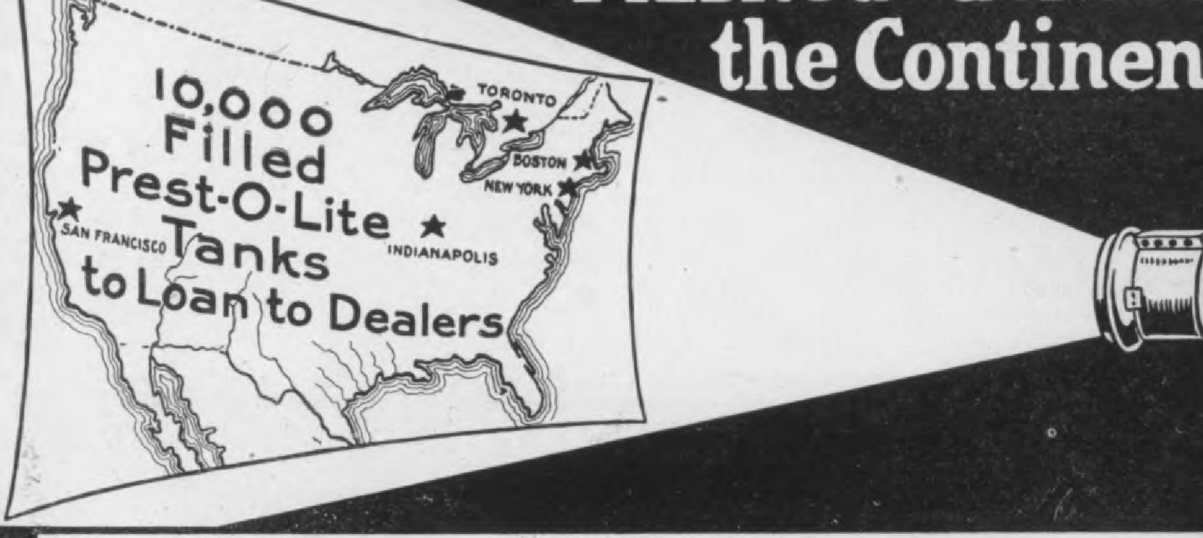

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Ready to Loan to Responsible Dealers

You never have to wait anywhere for Prest-O-Lite.

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t he goes, and it is sometimes money in pocket to know how fast he was going the time of some particular happening and able to swear to his actual miles per hour ore a magistrate, as in case of arrest by peed-curbing minion of the law.

Because of this contingency and several er considerations, many devices intended show the pace in miles per hour of motor s on the road have been put forward. h devices, variously known as "Speedom-rs," "Speed Indicators," "Autometers" and

form, a ball or weight of metal at the f end of a hinged lever, which is often doubl for balance, giving the governor as co monly seen two balls, one on each of t levers, hinged at the top, so that the balls a arms drop down to low point, with the leve depressed as far as the mechanism will perm when the governor stands still. The notal peculiarity of this mechanical combinati is the fact that the balls will separate, sprea ing the lower ends of the arms apart a c tain fixt distance, when the governor is

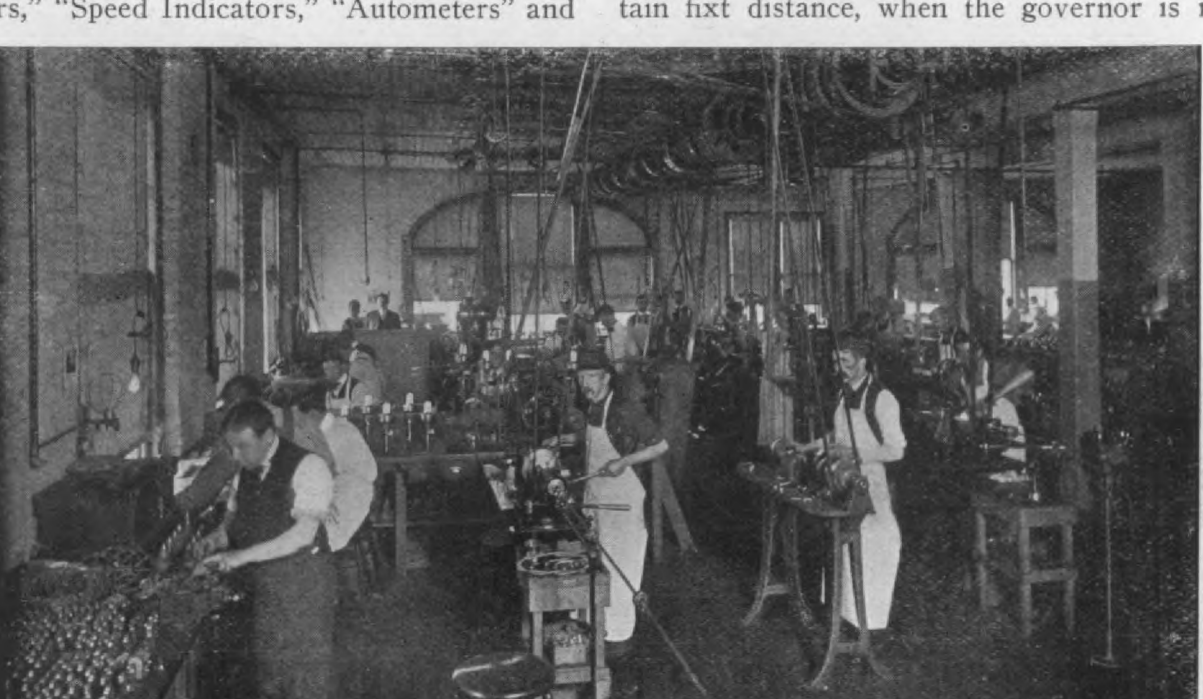

Fig. 1. Principal machine shop floor, Springfield Motometer Factory. The tools are by the best Am can makers, which are the best in the world.

on, have depended on some application of well-known "butterfly" governor, prob-y first used to regulate the motion of wa-wheels, and applied about a hundred years by James Watt to regulate the movement the steam-engine. The "Motometer," made sold by the R. H. Smith Mfg. Co., ingfield, Mass., U. S. A., comes into this terfly-governor class. The R. H. Smith g. Co. began business in 1865, as makers small manufactures in metal, requiring st accurate construction, was very suc-sful and was incorporated in 1883, and be work on the Motometer in 1902.

n the Motometer the scale is of brass, sil-plated, with the figures dead black. The veling index is black, stands still at the rect scale graduation, is easily read by the ver, and is covered with glass. The body

volved on its axis, and this spread or rise the governor balls varies with the variatio of the governor speed, while at the same ti the balls will stand at exactly the sa height and same distance apart so long the revolutions remain constant. The ba weigh each about three-quarters of an oun The coiled spring on the governor shaft sists the rise of the balls, hence the lifti power of the balls at any point of rise m be the same as the downward thrust of t spring, and the spring resists any upwa movement of the balls by jolting of the c while centrifugal action of the balls resi any drop of the index by jolting. The spri tension is 2⅛ pounds at 15 miles, 3 3- pounds at 30 miles and 4 6-16 pounds at miles. The total weight of the revolvi

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Details Make The Ca

In The Model 24

Rambler

is every feature that makes mechanical excellence and general attractive

Constructive Details

Motor—four-cylinder verticle, 4½ inch bore, 4½ inch stroke that gives full 25-30 horse pow at the road wheels.

Transmission—sliding gear of a special type in which all trouble in shifting gears is ab lutely avoided.

Final drive—propeller shaft and bevel gears with floating type rear axle fitted with ball a roller bearings throughout. Wheel base—108 inches, wheels 34 inch with 4 inch tir

All accessories, such as mechanical sight feed lubricator, circulating pump, ignition tim etc., are of the latest and most approved types.

Equipment includes full cape top, five lamps, horn, tools, storage battery, etc.

Price, as below, $2,000.

Our catalogue, describing this and five other models—$950 to $2500—is at your servi

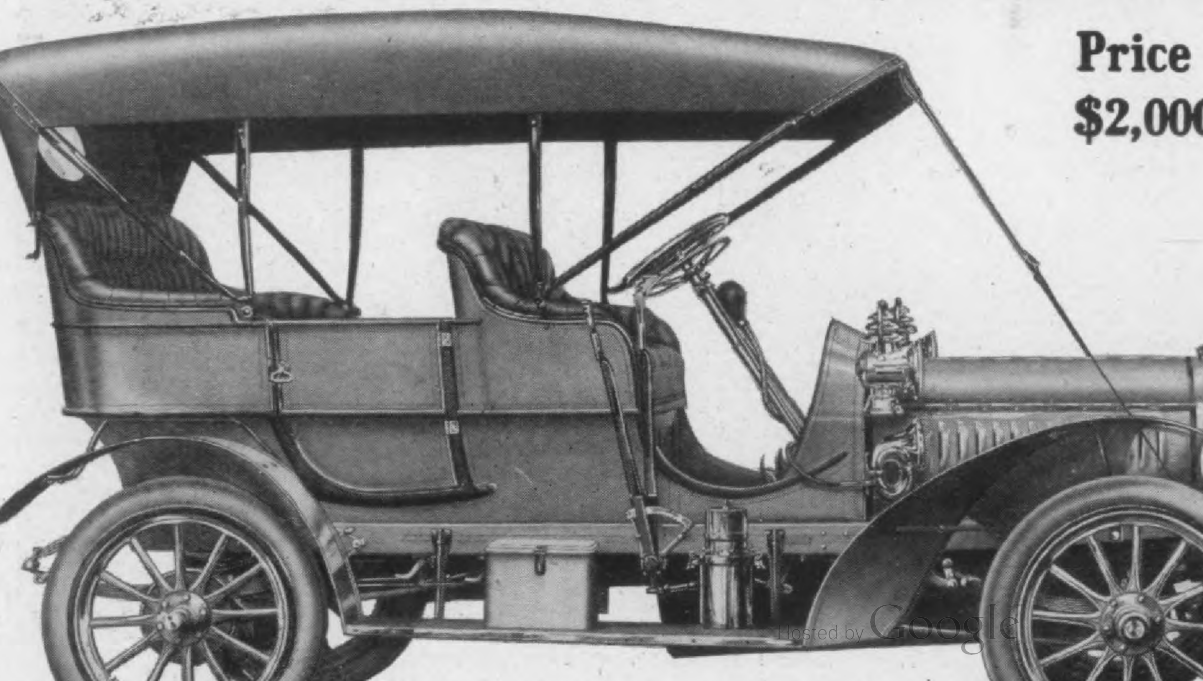
Main Office and Factory, Kenosha, Wiscons

Branches:

Chicago, Milwaukee, Boston, Philadelphia, San Francisco.

New York Agency, 38-40 West 62nd Street. Representatives in all leading

Thomas B. Jeffery & Compar



Price
$2,000

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no drop of the car which did not in-

multiplying index-lever, while the other a

Fig. 3. Springfield Motometer Factory. Finished motometers and shells, driving-shafts and flexible ss tubes, ready for assembling.

ve total destruction could give the index rod, weighing only 119 grains, momentum ugh to overcome even the 15-mile re-int of 2⅛ pounds. Hence the index po-on is unaffected by jolting of the car.

simpler form moves the scale-index direct from the rise of the balls, and varies the e tent of the scale-graduations to suit the var ing ball-lift travel-additions for each add mile of car-speed.

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Fig. 2. Springfield Motometer Factory, polishing room.

PANHARD

THE OIL THAT WILL NOT CHAR

Perfect Lubrication

"Panhard" Oil is undeniably the best for automobiles and motor boats. Is accurately prepared, and scientifically compounded. Develops and maintains the highest efficiency of the engine. Preserves the cylinders and keeps them free from carbonizing at all times.

Insist upon getting the best.
Insist upon getting "PANHARD."

The oil in the checker-board can.

Geo. A. Haws,

73 Pine Street,
New York.

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Because the governors must be exactly
ke it is of the highest manufacturing im-
rtance that any speed measuring instru-
nt should have the fewest possible num-
of pieces, and for this reason solely the
trument here described takes the smallest
ssible number of differing parts, and lifts
l drops the index to make it travel up and
wn the scale directly from and by the rise
l fall of the governor balls, with no inter-
sed lever or other mechanism whatever.

The parts are made duplicates in size and
m, and the only thing about them which
fers is the long coiled spring which resists
lift of the governor balls. These springs
skilfully made and afterwards subjected
a course of treatment tending to produce
iformity of action, but they still have very
ght tension differences, which are correct-
by adjusting the top spring-abutment.

It will be seen that the accuracy of the
ding depends wholly upon accuracy of
rkmanship and wear can do no more than
ke the index stand a very little too low on
scale, and so make the reading an almost
perceptible trifle below the speed. In
nt of fact, the loads on this little gover-
r are so very small and are borne on
er washers so nearly indestructible under
ht loads that no wear was shown by a
otometer after 14,000 miles run on a car,
maximum mileage yet made by any of
se instruments submitted to inspection of
makers.

The instruments are so nearly alike that
o of the three shown on the "exhibit
nd" were taken off, and the writer was
mitted to select others from stock, which,
en placed on the stand, gave the same
dings as those which they replaced. This
periment was more than once repeated,
th random selections by the writer, and
readings were practically identical.

DRIVING.

The common method is to drive the speed
asuring instrument of whatever form, from
front wheel of the car, thru a flexible
aft. In the case of the Motometer, this
xible shaft is made of overlying coils of
no wire, alternately right and left hand,
encased in a flexible brass-wire tube. Most
the failures come from giving this flexible
aft bends of too small radius. If properly
ced the flexible shaft described has a long
e, so long as to be yet of unknown dura-
n, as the instruments have been made to
vister 20,000 miles with six-inch shaft-
rve radii, and the shaft was yet in good
ndition. In this connection it may be not-
that direct connections can be made from
e car line-shaft with rigid shafting and
ar wheels to the Motometer mounted on

stores shows beyond question that th
speed indicators are well enough built to b
credit to the classic locality of their nat
ity.

"But," says the ordinary observer, "here
this index held up only by these little
volving balls—surely the least jar or bou
of the car will make the index dance up a

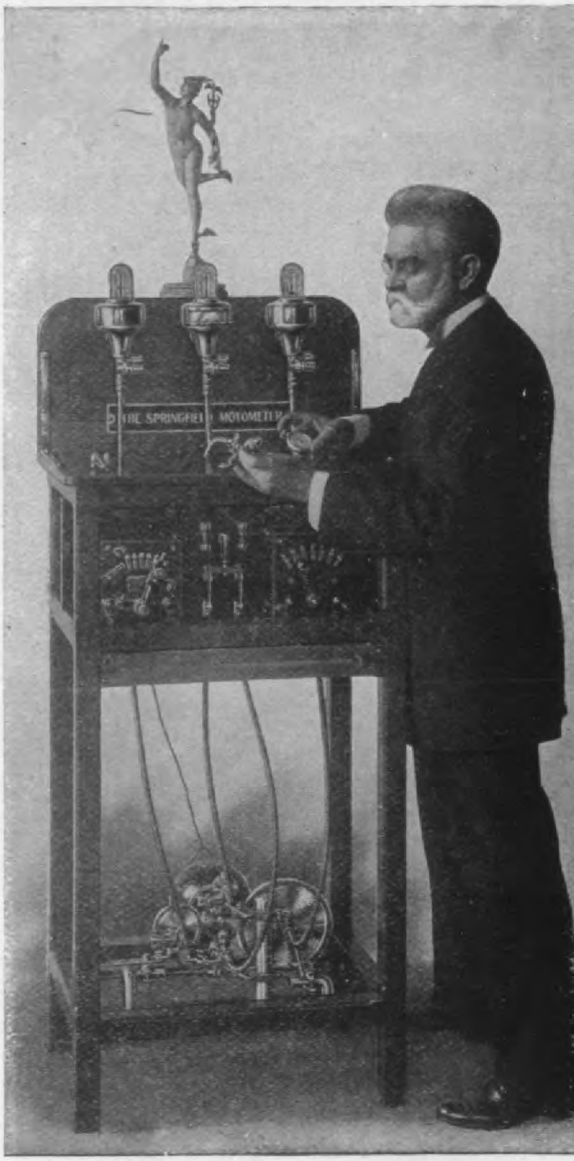

Fig. 4. Springfield Motometer, exhibit stand.
three motometers are driven at three rates by gea
from the electric motor below, the rates being a
2 and 4 respectively, so that when the middle
strument index and scale read sixty miles, those
the sides read thirty and fifteen miles respectiv
If the middle one is retained and the side ones
replaced by other instruments and the repl
ments read thirty and fifteen miles when the orig
middle one reads sixty miles, then the new ins
ments are same as those removed. Changes
made several times, and all instruments gave al
exactly the same reading.

down, so that the reading will be wholly
reliable." This view is natural, but like ma

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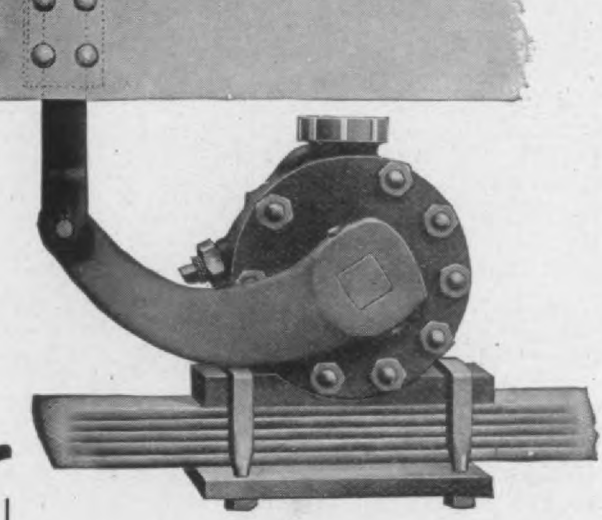

Let a Hotchkin Take the Jolt

A piston working in a circular cylinder alternately forcing glycerin through a large check valve and a small needle valve, is the principle of operation.

On the downward or compressive motion the glycerin passes through the check valve without resistance, and returns to the cylinder, allowing free play to the springs.

The slighest pressure on the recoil closes the check valve, the piston reverses, and forces the glycerin through the needle valve, which is **regulated from the outside** to the exact pressure required to check the recoil and bring the car back to its normal position, slowly, without jar or jolt. Once regulated, they require no further attention.

THE HOTCHKIN Anti-Jolt Device will check the recoil of the heaviest spring, going at full speed, over the roughest road, so you'll never know but what it was an asphalt pavement. It makes possible greater speed. You can go 40 miles as easily, smoothly and comfortably as you now go 15; give better traction and lengthen the life of your tires by eliminating all the jolt and throw from the up-thrust of the springs. It does not interfere with the downward motion of the lightest spring, but

It Positively Checks the Recoil

of the heaviest springs, bringing the car back to its normal level easily and smoothly. Write us for further particulars and how to get a set on 30 days' trial—at our risk.

The HOTCHKIN Mfg. Co.

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ectly indicating the actual velocities of correct fluctuations in the pace readings.

New Rambler Models

wo new Rambler models have just been ıght out by Thomas B. Jeffery & Co., osha, Wis. They are equipt with the e type rear axle and transmitting mech- m which have met with such success on del 24. The new models are known re- tively as Models 147 and 245.

Iodel 147 is designed to meet the demand a reliable four-cylinder touring car with fortable seating capacity for five and suf- nt power to permit travel on ordinary ntry roads.

he motor is a 4-cylinder 4½ in. bore and ke, and develops 20 to 25 H. P. The nders are cast separate. The crank case f special aluminum alloy. The rear axle dentical to that used on Model 24. The e housing is heavy seamless steel tub- made integral by a special process, with aluminum differential housing.

he frame is of prest steel with strongly ced cross girders securely riveted in place. e rear springs are full-elliptic and the nt semi-elliptic. The differential is of the r gear type.

The clutch is of the cone type, leathe faced with a ball bearing to take the sprin thrust. All tendency of the clutch to bin or to get out of line is removed by a doub universal joint located between the clutch an the transmission. The transmission gear of the new Rambler progressive sliding gea type, located on the forward end of the pro peller shaft, thus dispensing with the usu universal clutch between speed change gea and propeller shaft.

Control is by tilting wheel beneath th steering wheel, which regulates the thro tle, and a ratchet lever for the spark. Tw brakes are provided, one, consisting of e panding rings, acting on the inside of th rear wheel hub drums, is operated by pedal; the other, constrictive bands acti upon the exterior diameter of the hub drum is operated by a lever.

The body is well and strongly made. Th frame work is seasoned ash braced wi angle steel. Seat backs are made of she steel. The finish is an attractive shade royal blue, striped with a fine gold line.

The price of the Rambler 147 is $1750, i

Rambler, Model 147, 4-cylinder, 4½-inch bore and stroke; 20 to 25 H. P.; prest steel frame; full-elliptic springs rear, semi-elliptic front; spur gear differential; new Rambler transmission. Price $1750, including cape top.

gnition is by jump spark, for which cur- t is furnished by a 6-volt 60-ampere rage battery used in conjunction with a ndard four-unit vibrator coil on the dash. e timer is of their own design and is so anged that the terminal posts for the es are stationary and the wires conse- ntly do not move as the spark is ad- ced or retarded, and the tendency of the es to loosen and break is accordingly nimized.

ubrication for the motor is provided by

cluding cape top with full equipment of si curtains and storm apron.

Model 245 is identical in every respe with their Model 24, described in our Marc 1907, issue, page 129, except speed chan gears, final drive and rear axle constructio

The rear axle is the floating type wi the road wheels running on roller bearing the inner members of which are seated the extreme end of the axle housing. T inner ends of the shafts are supported in t differential and carried on roller bearings

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Be a practical motorist—learn about an automobile, at home.

You can do so easily, quickly, thoroughly, d completely by reading the series of eight lendid lectures now offered by The Corre- ondence School of Motor Car Practice of rrytown, New York.

These lectures—the first set of actually prac- al instructions for understanding and run- ng an automobile that has ever been prepared were gotten up by the Technical Department the Maxwell-Briscoe Motor Company (mak- s of The "Maxwell") under the personal pervision of H A. Grant, M E. They cover e history of m otor driven-vehicles exhaust- ely, define every part and principle of gaso- ne engines, give pointers on the care and eration of a car, etc., etc., never before put writing. A feature which makes them un- ually valuable is that they are illustrated with me *fifty original drawings* of motors, parts, etc. The actual money value of these lectures to yone interested in automobiles can scarcely be over-estimated. No automobile o driver or student of automobile affairs can to be without this remarkable work.

Whereas the ordinary course in a Corre ence School costs from $25.00 upwards, a quires many weeks for completion, this —the finest ever issued—may be obtain cluding a series of questions accompanyin lectures, and "The Making Of An Au bilist," by H. A. Grant, a fine book pages, illustrated and bound in moroc *complete, for only $5.00.*

Owners of "Maxwell" cars who will w us giving the number of their cars, an date of purchase, will be supplied with a plete outfit at $3.00, to cover cost of pri binding and mailing.

The edition of this material is limited early orders are necessary to insure getti complete series.

A Prospectus of the course will be sent Free On Reque

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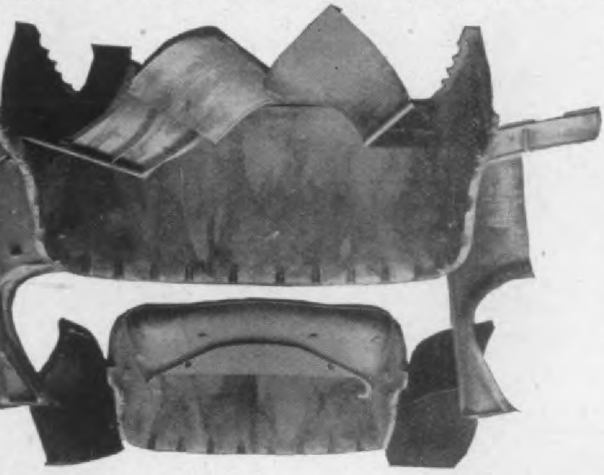
sively, constructed of built-up sawed ments. Experience even with this ex- sively built wood body soon demonstrat- that if curves were to be used and the



Complete set Marmon Aluminum Body Castings.

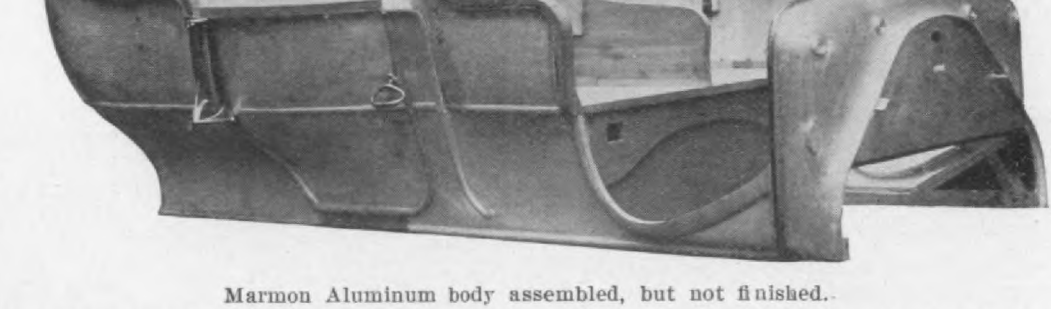
dy was to stand the weather and the rack- of speed over rough roads something ter than wood must be employed. Sheet tal would give the curves and stand the ather, but sheet metal is easily dented d tho likewise easily repaired, the cessity for repairs were likely to be too quent.

In 1903 this company made for its second a cast aluminum seat which exists to- y without a blemish though used con-

made possible by the use of cast alumin Thru the season of 1906 this type of bo was used but in 1907 the company has ma the side panels under the front seat and the dash also of cast aluminum so that body as now put out on regular stock c is entirely of this metal. Nordyke & M mon Co. make these castings themselv The tonneau seat which measures 60 inc at its widest point is cast in one pie thickness 5-32-inch. These large castin are easily moulded and it is a rare occ rence that one of them is lost in the mou ing. The strength of these body castin and of the body as a whole is remarkal The metal is tough and firm and a blow s ficient to dent one of these castings wo almost ruin a wooden or sheet metal bo

Nordyke & Marmon Co. have had lo experience in making aluminum castin and these body parts as they come fr the foundry require very little fitting in assembling and very little smoothing to p pare the surface for painting.

One peculiarity of cast aluminum is t it takes and holds the filling and paint much the same as wood, and if anything finish is harder and more durable than wood. Never has the painting on these c aluminum bodies crazed, blistered or pee off. Moisture, heat and cold, have no jurious effects on these bodies; and t have the strength and solidity to withsta



Marmon Aluminum body assembled, but not finished.

uously. The company had previously t its crank cases, transmission cases d other parts of aluminum. Aluminum ssessed the strength and rigidity and uld be cast with graceful curves, so they nsidered the use of it entirely for bodies the expense was great compared with cost of wooden bodies, the necessity of case as the company saw it, settled the tter. To-day the merit of the cast alumi- m body is fully recognized. In 1905 rdyke & Marmon Co. came on the

the severe service required of a motor c

The Detroit Auto Vehicle Co. is erect a stone addition to its factory at Rom Mich. The addition will be 60x260 f and will be used as a foundry.

The Pope Motor Car Co., Toledo, O are building a big Pope-Toledo racer for coming Vanderbilt cup race, constructed tirely of chrome-nickle steel. It is expec that Herbert Lytle will drive the car.

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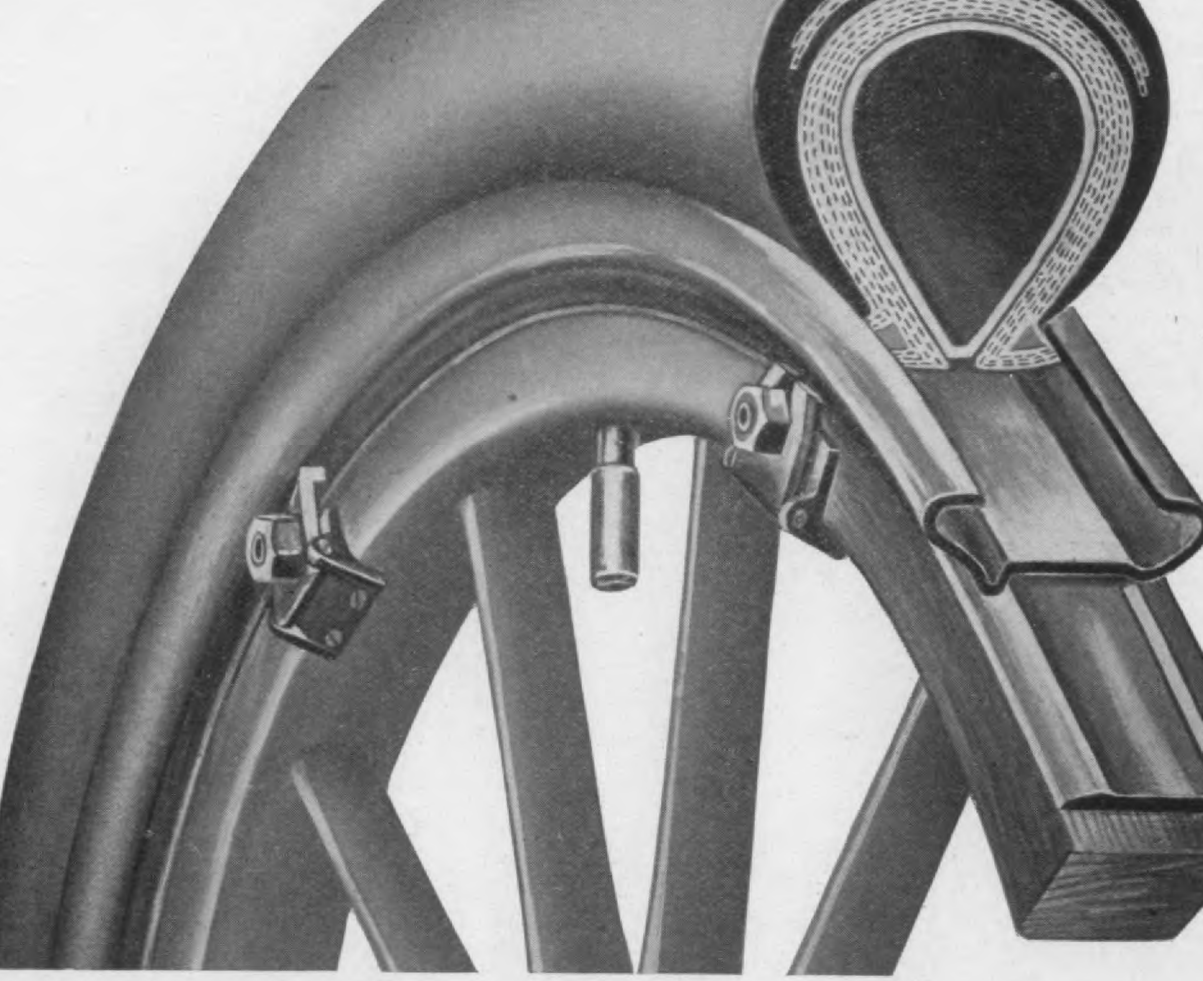

Save 27 Minutes

The usual time required to replace a punctured tire is 30 minutes. With the

CRESCENT Removable Rim

(Formerly Harburg)

a complete tire change is made in 3 minutes, by the watch.

The above sectional view shows the permanent beveled band, fitted to the wheel felloe, the adjustable rim holding any regular make of clincher tire, and the hinged clip, six of which are used to hold the rim in place.

Extra tires and rims are always carried—the tire being inflated at home before starting on a trip.

When a puncture is experienced, the damaged tire with its rim is removed and the extra rim and inflated tire is quickly bolted to the wheel, the entire operation consuming but three minutes.

Nothing could be more simple. Irritating delays are absolutely done away with. All parts are galvanized, nickeled or bronzed, thereby preventing any possibility of their rusting tight.

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Any regular make of clincher tires fit these rims. Can be used on old or new wheels.

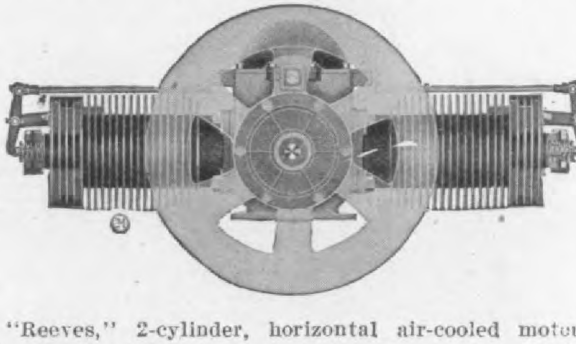
cooled, 2-cylinder, horizontal motor, del N, and the other a 4-cylinder, vertical er-cooled motor, Model L.

Iodel L cylinders are 4x4 inches and de-op 22-24 horsepower. This motor has n designed primarily to meet the demand a medium powered, medium priced run-ut motor.

ll parts of the motor are made on the st carefully prepared jigs and templates, they are interchangeable and may there-e be procured promptly, and at reason-e prices.

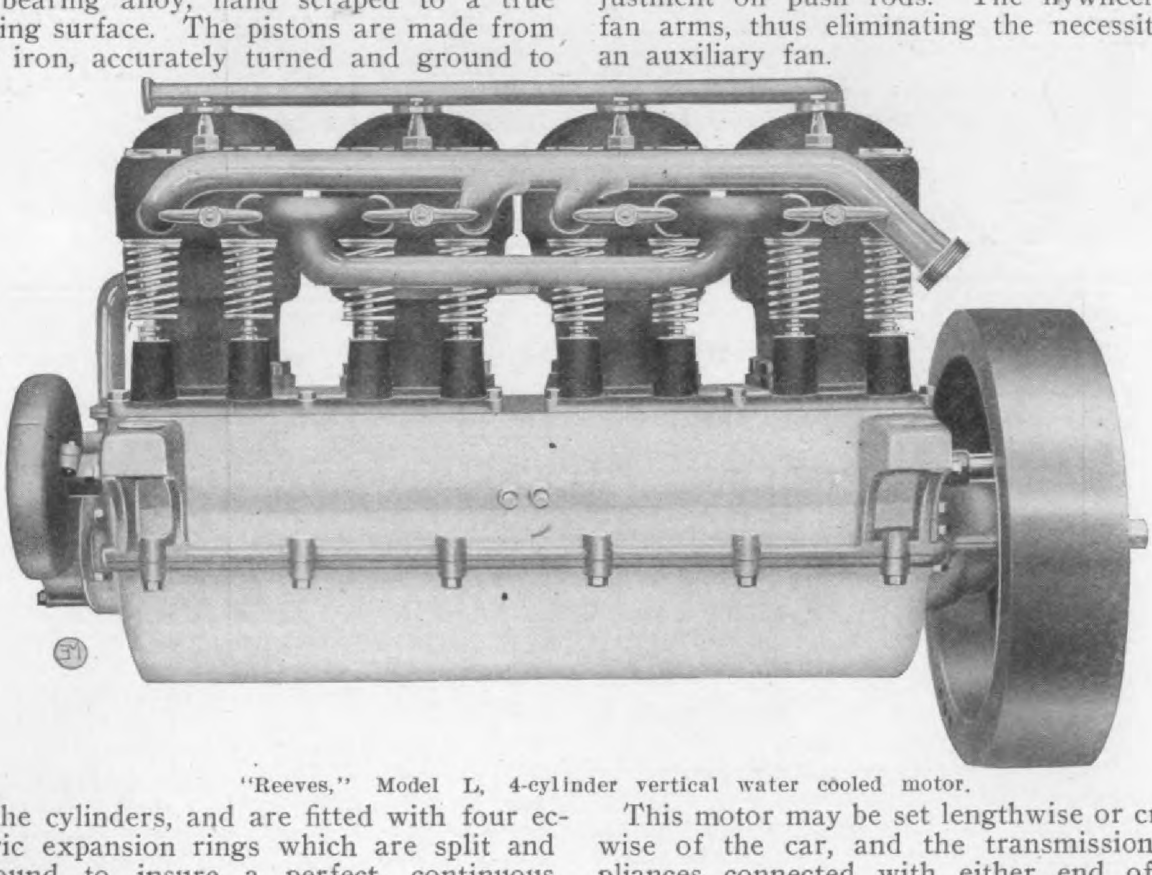
he crank case is all aluminum, the upper f carrying all bearings and the lower f the oil, the lower half being easily re-ved after the engine is mounted in the ssis, without disturbing any other parts. e cylinders are cast separate and bored, med and ground to the highest possible sh. The crank shaft is hammered from a d billet of especially tempered steel, turn-and ground. The bearings are all die interchangeable bushings, made of spe-bearing alloy, hand scraped to a true ning surface. The pistons are made from y iron, accurately turned and ground to

parts for adjustment. The crank shaft hammered from a solid billet of spec tempered steel, turned and ground. T bearings are die cast interchangeable bus ings, made of special bearing alloy, har scraped to a true running surface. The cy inders, pistons, and piston rings are grou



"Reeves," 2-cylinder, horizontal air-cooled motor

finished. The valves are 35 per cent. nick steel, ground into cast iron interchangeab and removable cages, and are mechanical operated. The valve lifters are case har ened steel, and provided with timing a justment on push rods. The flywheel h fan arms, thus eliminating the necessity an auxiliary fan.



"Reeves," Model L, 4-cylinder vertical water cooled motor.

the cylinders, and are fitted with four ec-tric expansion rings which are split and round to insure a perfect, continuous ring all 'round.

he valves are drop forged in one piece ground, and are interchangeable and chanically operated. The water jacket been carefully designed to provide ample y of water at the exact part of the cyl-

This motor may be set lengthwise or cros wise of the car, and the transmission a pliances connected with either end of t crank shaft and may be furnished to r in either direction.

Berne Nadall, an old Chicago boy, who h been abroad for a number of years, has r turned to this side of the water and is no

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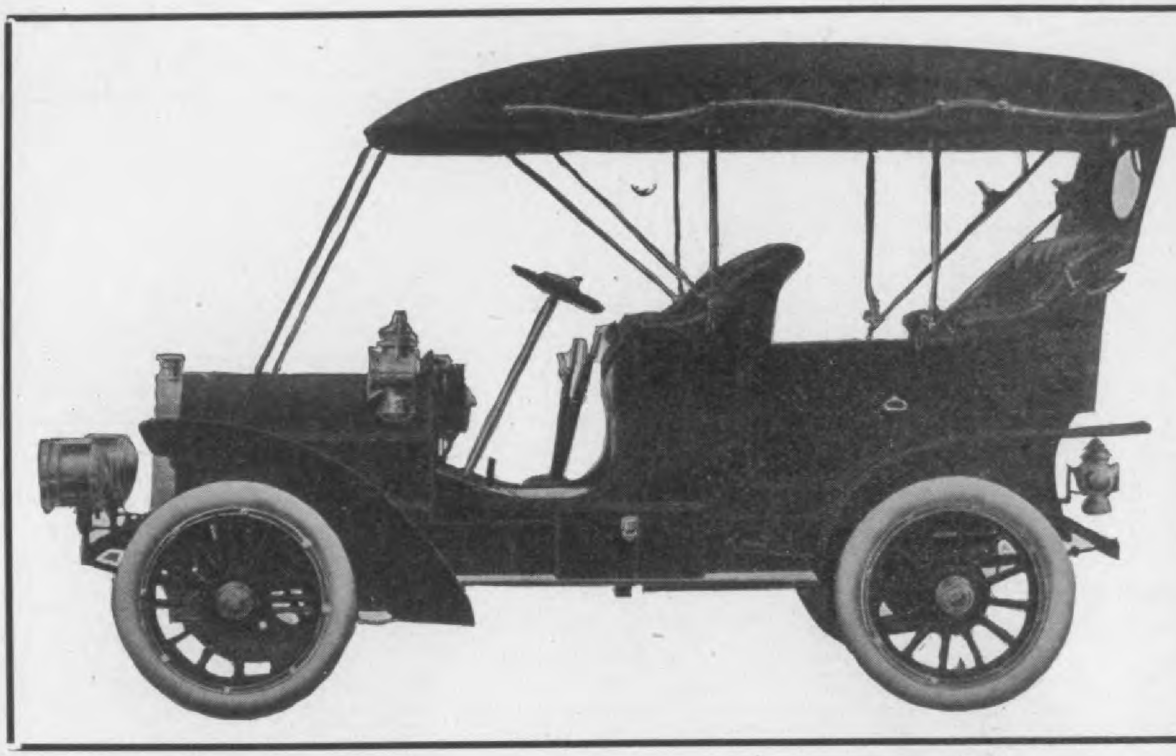
Springfield Metal Body Co.



LARGEST MANUFACTURERS OF HIGH GRADE ALUMINUM TOURING, RUNABOUT, LIMOUSINE, AND LANDAULET BODIES IN THE WORLD.

We will be pleased to correspond with manufacturers as to their requirements.

We are now closing contracts for 1908 delivery.

Write for information and prices.

SPRINGFIELD METAL BODY COMPANY,

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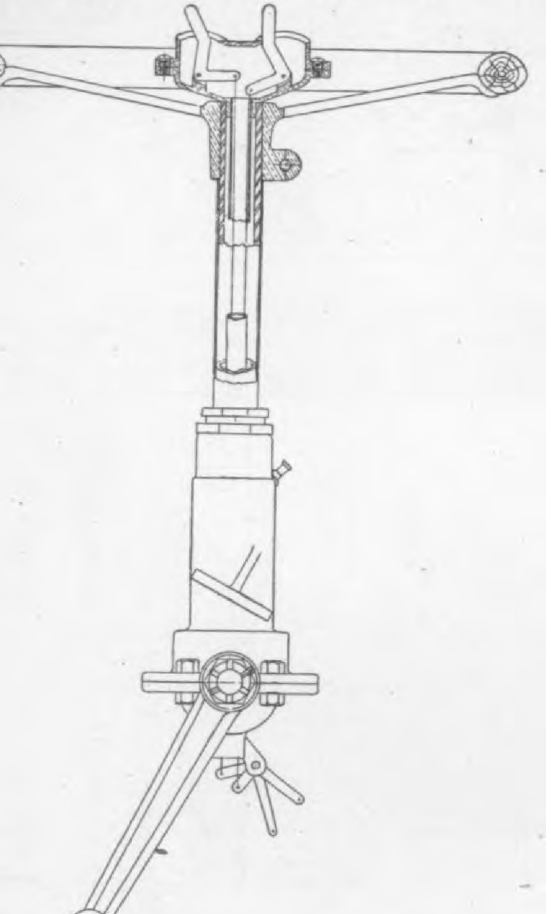
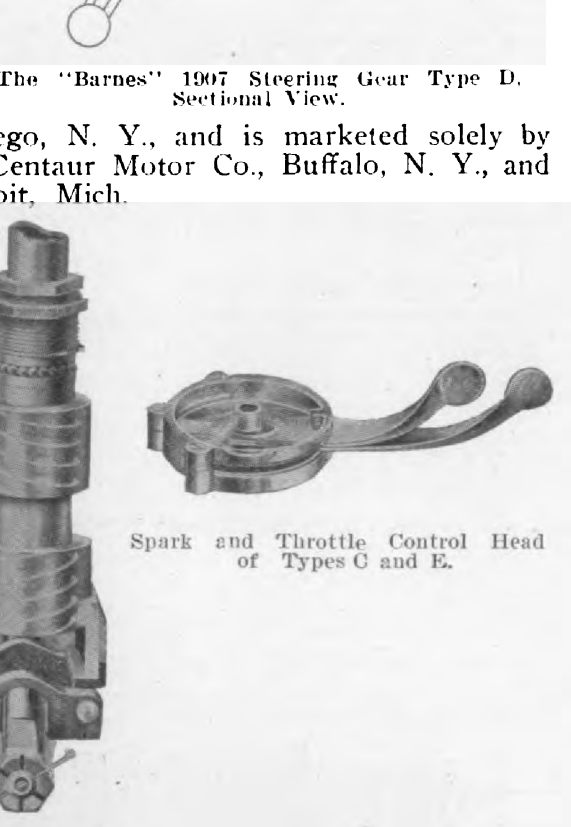
ne product of the Barnes Gear Co.,



The "Barnes" 1907 Steering Gear Type D, Sectional View.

ego, N. Y., and is marketed solely by Centaur Motor Co., Buffalo, N. Y., and oit, Mich.



Spark and Throttle Control Head of Types C and E.

anchor and gas tube are of seamless cold drawn tubing; spark rod 5-16 inch Bessemer and the control head, which is stationary, is yellow brass highly polished and lacquered; the steering mast is covered with polished and lacquered seamless brass jacket. The gear is made in three types, viz C, D and E.

On types "C" and "E" the new controller head is fitted. The throttle control levers are lockt by friction, giving a very smooth action, and permitting of a very fine adjustment of gas and spark. Type E gear is for cars weighing from 2800 to 5000 lbs. and type C for cars weighing from 1300 to 2800 pounds. Type D is for gasoline cars weighing up to 1300 pounds or electric vehicles up to 2200 pounds. The control for this type is stationary, comprising a ratchet form of new design, operated by two vertical levers which are connected by piano wire with two bell cranks at bottom of gear. Prices are as follows: Type E, $62; Type C, $52; Type D, $35, including in each case control head, hand wheel, column and bevel gas and spark gears.

New Rushmore Lamp Factory

The automobile branch of the business of the Rushmore Dynamo Works, of Plainfield, N. J., has grow to such large proportions that they are erecting, at a cost of $100,000, a new factory to be devoted exclusively to this branch of the business, and will retain the old plant for locomotive and marine searchlight manufacturing. The new buildings will be of reinforced concrete construction, the main building to be 250 feet long by 50 feet wide and two stories high. The plans call for the erection of two wings, two stories high, each 200 feet long. A separate power house, 50x50 feet will also be erected and the equipment will include a 200 H. P. Koerting producer gas engine, which with dynamo will weigh 80,000 lbs. Another gas engine of 75 H. P. will be installed for emergency use. Most of the machinery will be driven by electric motors on the group system, but a few of the heavier tools will have individual motors. There will also be a complete brass foundry, one story high, and measuring 50x50 feet.

Sunberg Forgings

J. H. Sunberg Co., Kinzie and Carpenter streets, Chicago, Ill., make automobile forgings on order. They do considerable business in the forging of crank shafts and connecting rods to customers' drawings. Their principal

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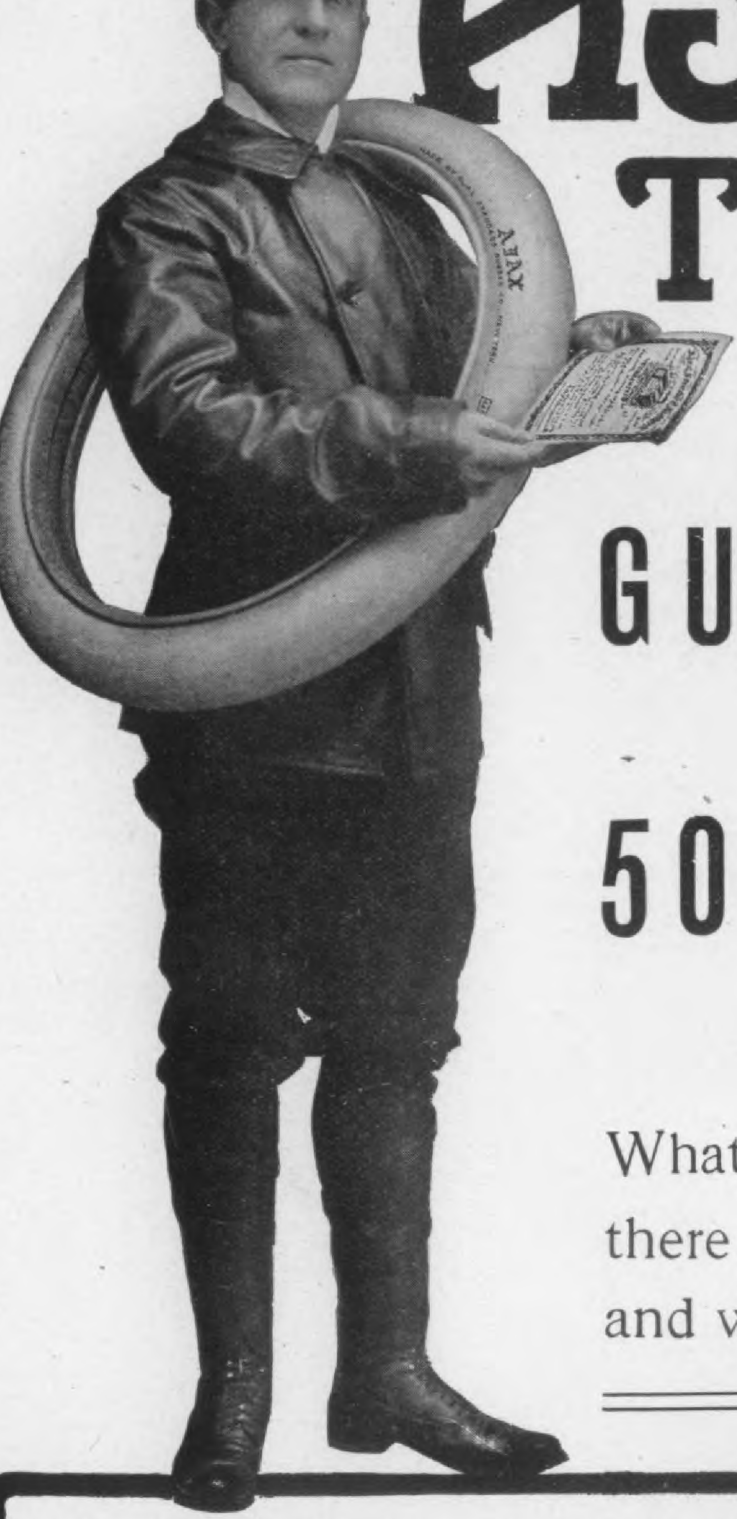

ASHA TIRE

Carries a

GUARANTE

for

5000 MILE

RIDING

What stronger proof co there be of Ajax mate and workmanship?

It is merely a matter of common sense to believe that the tire that is sold with the strongest guarantee must be the best.

Write for copy of Guarantee, stating what size tire you are using.

WRITE DEPT. G

AJAX-GRIEB RUBBER CO.

GENERAL OFFICE—N. E. Cor. 57th ST. AND BROADWAY, NEW YORK CITY. FACTORIES—NEW YORK CITY AND TRENTON, N.

BRANCHES:

Chicago—1303 Michigan Ave. St. Louis—3948 Olive St. New Orleans—933-35 Perdido St.

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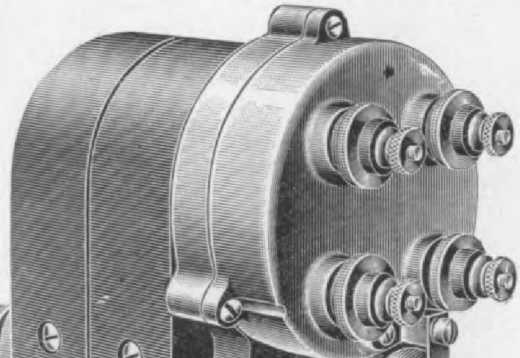
n perfecting for some time past. In this neto the current is distributed to the ous terminals by means of a distributing which is part of the magneto and is

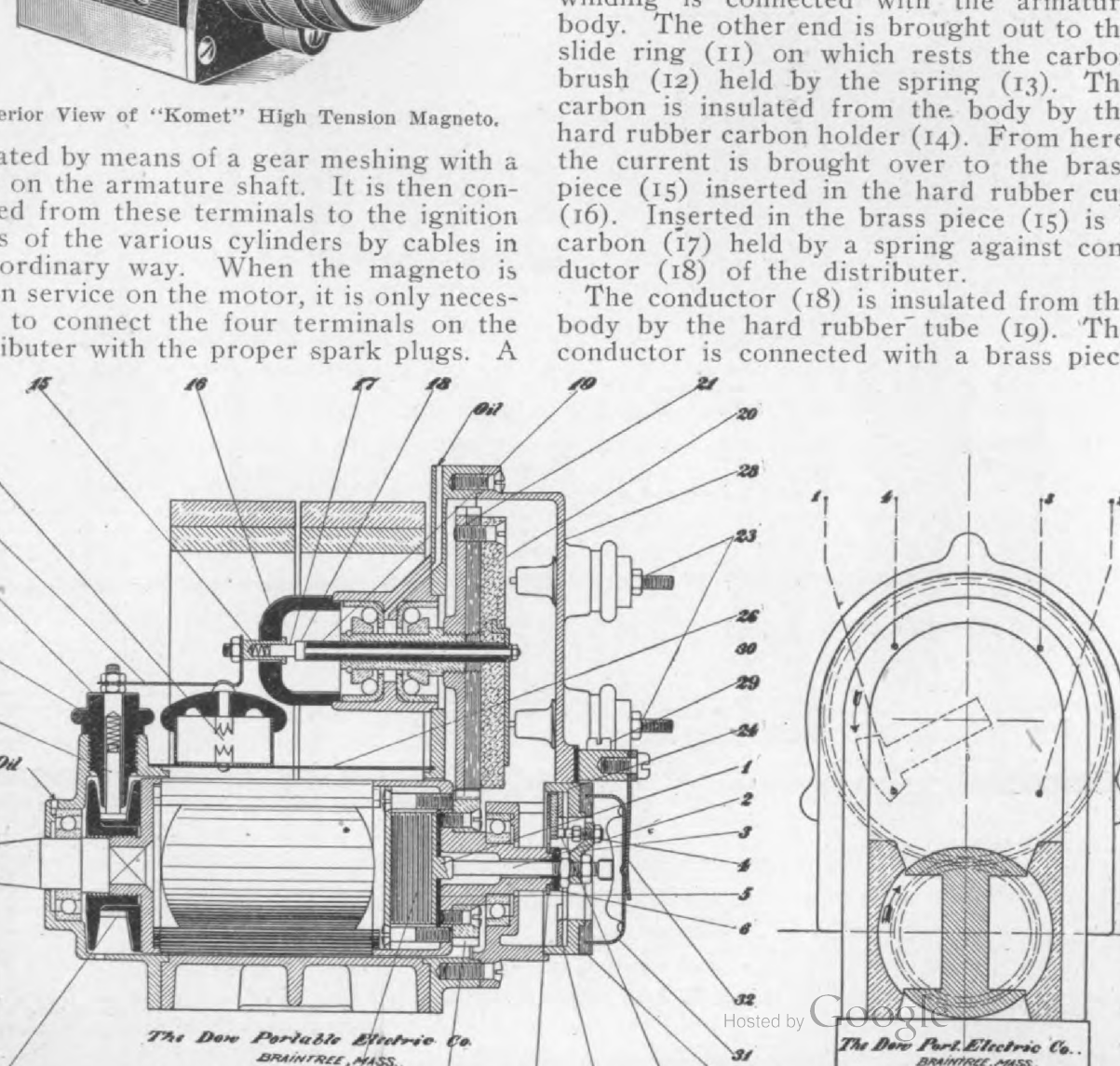


erior View of "Komet" High Tension Magneto.

ated by means of a gear meshing with a on the armature shaft. It is then con- ed from these terminals to the ignition s of the various cylinders by cables in ordinary way. When the magneto is n service on the motor, it is only neces- to connect the four terminals on the ibuter with the proper spark plugs. A

(1), which ends in the brass stud (2). I this way, the primary is brought to the con tact piece (3) holding the platinum screw (4). Brass plate (1) is insulated from th body of the magneto by the hard rubbe disc (5) and the hard rubber bushing (6 Against the contact screw (4) rests the in terrupter spring (7) with platinum point (8 therefore, the primary current is short-cir cuited from the armature body thru bras plate (1), the brass stud (2), the contac piece (3), the platinum points (4) and (8 and then thru the interrupter spring (7) t the body. Thus, the primary winding i short-circuited as long as the armatur spring pushes against the contact screw The primary circuit is interrupted as soon a the points are separated by means of th two elevations in the interrupter disc (9 The condenser (10) is connected parallel t this interruption. One end of the secondar winding is connected with the armatur body. The other end is brought out to th slide ring (11) on which rests the carbo brush (12) held by the spring (13). Th carbon is insulated from the body by th hard rubber carbon holder (14). From here the current is brought over to the bras piece (15) inserted in the hard rubber cu (16). Inserted in the brass piece (15) is carbon (17) held by a spring against con ductor (18) of the distributer.

The conductor (18) is insulated from th body by the hard rubber tube (19). Th conductor is connected with a brass piec



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No Shoe—
No Hoof;
No Hoof—
No Foot;
No Foot—
No Horse!

You know that the fabric is the strength—the very life of a motor tire.

The protection of this fabric from cuts and exposure; from dampness and rot, is one of the chief functions of the *tread.*

A tread that peels at the edges or comes loose anywhere, admits water and dirt; causes blisters, rotting and the ultimate destruction of the tire. A tread that is not tough enough to resist the grinding road-wear soon exposes the thinner covering of the shoe to wear it cannot resist. "No tread—no shoe; no shoe—no tire!"

That's why a *tough* tread is important.

That's why a tread should not be cemented to the casing, but should *be an integral part of it.*

The Goodrich Tread is made of the toughest rubber known.

The Goodrich Tread is literally—*"The tread that won't come off!"*

And that's why

Goodrich Tires

MEAN SAFETY, SATISFACTION AND ECONOMY.

No Tread—
No Shoe;
No Shoe—
No Tire;
No Tire—
No Go!

GOODRICH TIRES

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is brought into contact with the various tension terminals (23).

ne magneto is fitted with the safety k gap (27). As soon as a cable falls off one of the high tension terminals, the k jumps over this gap so that the mag- will not break down in any part. Two ks for each revolution of the armature. ording to this, the speed of the armature be the same as that of the crank shaft four-cylinder motor, and must be 1½ s the speed of the crank shaft for a six- der motor, and for a three-cylinder or, ¾ of the speed of the crank shaft. ne interruption and short-circuiting of primary current is accomplished by the end of the interrupter-spring engaging disengaging with the elevations on the rupter disc. The interrupter disc (9) is ned in the timing lever (24) which can ocked back and forth to time it. The ruption between the platinum points ld not be more than 1-64-inch. This di- sion can be kept right by changing the num screw (4).

eans are provided to cut out the mag- and stop the motor. This comprises a attached to a small (screw (29) in a ket (30). The wire runs to a switch on dash, the other terminal of the switch g connected to the body of the motor. bracket (30) is insulated from the body ne magneto. Now, by closing the h, the primary current is brought from plate No. 1 thru stud No. 2 to the cover (31), the spring (32), the brack- o), then to the switch and to the ground short-circuiting the magneto and stop- its sparking.

The Brophy Fan Belt

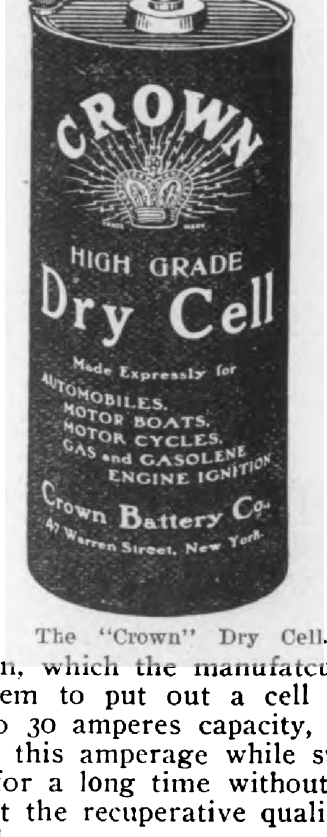
e Brophy Belting & Supply Co., La ge, Ill., are manufacturing a fan belt osed wholly of cotton cord. The belts voven in endless chain with absolutely olices or laps. They claim the belts are ffected by heat, oil or water. Stretch- f the belt is also avoided, the utmost nsion being fixt in the process of man- ure. The tensile strength of a 2-inch s figured to be over 2,200 pounds.

e manufacturers make all the belts to , to suit various conditions the belt be subject to. The belts are hand-made, are guaranteed to save 25 per cent. in expense.

ery one of the 300 Frontenac touring to be made by the Abendroth & Root

It is made in all standard and specia sizes and is especially intended for automo bile, motor boat, motor cycle, gas and gaso line engine ignition work.

The chief feature of the Crown cell is th use of absolutely pure chemicals, withou



The "Crown" Dry Cell.

adulteration, which the manufatcurers clain enables them to put out a cell which ha from 25 to 30 amperes capacity, and whicl will retain this amperage while standing o the shelf for a long time without impairin in the least the recuperative qualities or lif of the cell.

"Carbona" Cleaning Compounds

The Marshall Chemical Co., 80 Willian street, New York City, have placed on th market a set of cleaning compounds special ly gotten up for the automobilist's use and known as the automobile trio. Th outfit contains Carbona for cleaning th hands, Carbona Cream for cleaning the au tomobile body and Red Satin for polishin brass, copper and nickle work. Carbona i an unburnable liquid fluid and therefore saf to use near heat.

Nye's Automobile Oils

William F. Nye, New Bedford, Mass., i putting out three grades of oil for automo- biles, viz.: Light auto cylinder, heavy aut cylinder and gear case oil, under the nam of Whale brand. Their Light Auto Cylinde oil is for use on all grades of gasoline en- gines. While it is put up especially for cyl- inders use it can also be used on all the run-

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Two Hands are Better Than One

and the Jones Speedometer with one hand is the standard Speed Indicator of the world.

The "second" hand ind.cates the Maximum speed.
It remains permanent at the highest point until reset by a push on the stem
The hand drops automatically and instantly to the speed at which the car i
at that moment traveling.

The Jones Speedometer with Maximum Hand provides indisputable proo
against unwarranted arrest.

When reset at officers command to stop, its protective value is obvious.

The resetting stem may be sealed, immediately revealing any unauthorize
use of the car.

By a simple turn of the resetting stem the Maximum feature may be dis
posed with and both hands made to act as one, showing variable speed only

Complete description of this remarkable instrument will be found in "The Speedometer," a bulletin on speed subjects. Simply send a request to Dept. 12.

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JONES SPEEDOMETER CO.

etor, here shown.

n the Hagar Carburetor the float feed is loyed, but an external adjustment is pro-d to permit of the gasoline being kept roper height. Except for change due to r, this adjustment once made should be riable during the life of the carburetor. most radical departure from convention-nes is the discarding of the needle valve, the adjustment of the gasoline supply, the substitution for it of a form of yac-

Exterior View Hagar Carburetor.

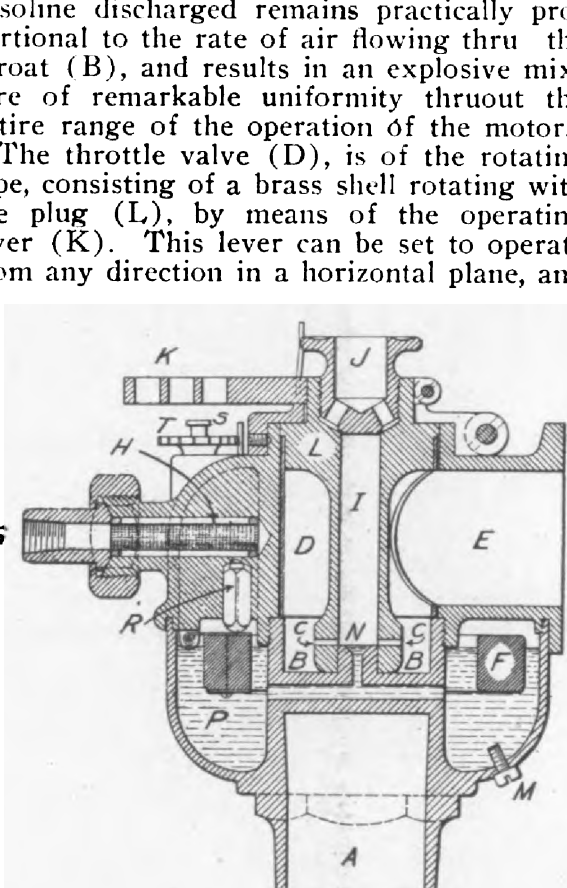
control which is said to be very effective upplying fuel in proportion to the de-d for it. This is accomplished by means single adjusting screw, and by means t, even the novice in the operation of or cars can adjust his carburetor so as give a uniform and invariable mixture out the entire range of operation of the or.

he Hagar Carburetor, aside from its float rol of gasoline supply, has no valves, no ngs, and no vibrating parts requiring ad-ment or subject to wear. It has no small ces to stop up with sediment, and is en-y accessible for examination without the ge of any adjustment.

e show herewith exterior and sectional s of the angle or side outlet type of this uretor. The gasoline enters thru the (G) with union attachment, and passes he float chamber thru the screen (H), re any sediment that might interfere with operation of the float valve is deposited. screen is readily removed for cleaning lisconnecting the union, and is of large city and not readily filled up. The float e (R) is controlled with a powerful lev-e by the float (F), the fulcrum of which

passing up and thru the throat (B) relatively high velocity, and in so doing pr ducing an inductive effect thru a numb of small openings (C), radiating from th gasoline nozzle (N). This inductive effe causes a partial vacuum in the chamber (I which draws up gasoline thru the nozz (N), and sprays it thru the openings (C where it is thoroly evaporated by the passin air current. The quantity of gasoline di charged can be regulated, by means of th regulating screw (J). When this screw tight down on its seat, the effect of the va uum formed in the chamber (J), is at max mum and a discharge of gasoline greate than required, can be obtained. If this scre be backed off from its seat, however, a passes in thru the opening so made in th top of the chamber (I), the vacuum is pa tially destroyed, and a less amount of gaso line drawn in. When once the regulatin screw (J), is properly set, the quantity o gasoline discharged remains practically pro portional to the rate of air flowing thru th throat (B), and results in an explosive mix ture of remarkable uniformity thruout th entire range of the operation of the motor.

The throttle valve (D), is of the rotatin type, consisting of a brass shell rotating wit the plug (L), by means of the operatin lever (K). This lever can be set to operat from any direction in a horizontal plane, an



Sectional View Hagar Carbureter.
For explanation of lettering see text.

is provided with reversible stops for prope adjustment. The float is of annular form made of cork coated with a varnish imperv ous to gasoline, but can be furnished in meta if desired.

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The Auto Supply Co.
1733 TO 1737 BROADWAY, N.Y. NEAR 55TH ST.

Smooth-On Iron Cements

Smooth-On Cements are chemical iron compounds that withstand fire, water, gasoline, steam or oil. When hard they become a metallic iron that expands and contracts the same as iron. This makes them valuable for permanently repairing cracked water jackets, leaky radiators, leaky exhaust pipes or mufflers, around pipe connections, loose nuts, etc., and also for general steam and hydraulic work.

Every automobile owner should carry a Smooth-On Repair Package as breaks and accidents, which have heretofore been cause of long delays, are now repaired permanently in a few minutes.

Smooth-On Repair Package contains a one pound can No. 1 iron cement; a one pound can elastic cement, a roll of tape and the Smooth-On instruction book, which tells when, where and how to use the different Smooth-On Cements.

PRICE, $1.00

We have also numerous other articles of great interest to users of automobiles and shall be pleased to mail a COPY OF OUR NEW CATALOGUE (which just reached us from the printer) to anyone interested.

Our three distinct departments of

Supplies, Apparel, Tools and Hardware

comprise everything that is practical and useful to the motorist and repairman. We are marketing the product of reputable manufacturers only and absolutely guarantee everything exactly as represented. It will pay you to visit our establishment which is the largest of its kind in the United States.

EVERYTHING PERTAINING TO AUTOMOBILES
The Auto Supply Co.

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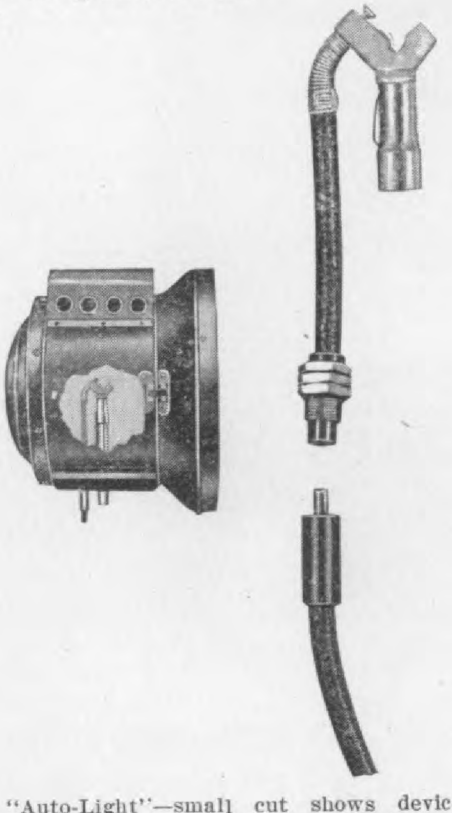
amps from the seat. This device shows care and experience on the part of the inventor. It is not connected in any way with the ignition system of the car, the inventor feeling that it is best not to add to the complication of this function of the propulsion outfit. Being operated from a separate battery also makes it applicable to steam cars as well as gasoline cars.



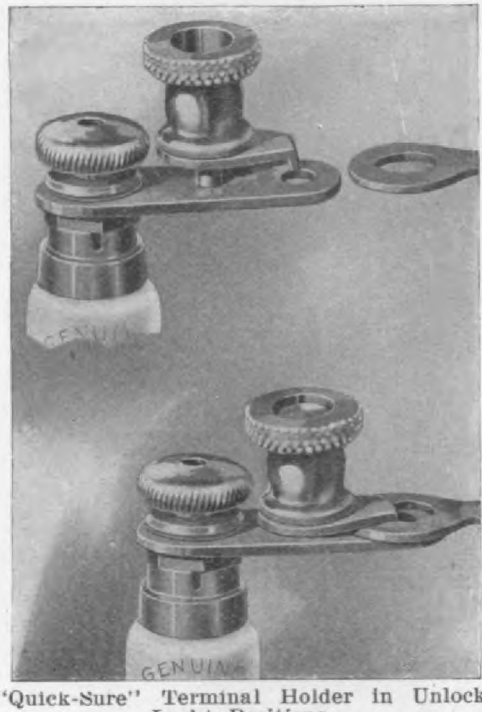
The "Auto-Light"—small cut shows device fitted to lamp and the long narrow cut shows the method of breaking the wire connection, by means of the lock plug, when the lamp is removed from the car.

The "Auto-Light" outfit consists of the battery, a small dashboard coil with switch, three secondary wires, extension lock plugs, special burner and a primary wire. One of the secondary wires is run to each lamp and one to the car frame. The extension lock plugs are for the purpose of quickly disconnecting the wires to the burner when it is desired to remove the lamps from the car. It requires but a half hour to attach the device, the operation consisting of passing the wires thru the lamp back of the burner and screwing the burner into position. A spring near the burner permits adjustment of the device to any sized lamp. The whole outfit lists at $20.

The "Quick Sure" Terminal Holder

To meet the demand for a terminal holder for ignition wiring that could be used in securely and quickly attaching the wires or

compression spring and steel pin whi swedged to the base. To connect a wi terminal to this holder the knurled cyl is lifted against the pressure of the pression spring high enough to slip th minal under the projecting arm which thru the eye of the terminal and thr base of the holder. It is securely he



The "Quick-Sure" Terminal Holder in Unlock Lockt Positions.

this position by the strong compre spring within the knurled cylinder, locking the terminal in its position so no amount of pulling or shaking will lo it. The terminal can be unlockt by si lifting the knurled cylinder. The ter holder illustrated is known as style A can be used for any style of conne They also make a style B, especially ad for spark plugs. In this type the kn cylinder is directly over the center o spark plug, instead of to one side, style A.

The J. & G. Curtain Fastener

The J. & G. Curtain Fastener is man tured by Jonah & George, Merrimac, who claim that its construction makes possible for the curtain to become unfas by flapping or otherwise, and yet to be ple and easy to open or close. The fas is made in single, double and triple to fit all thicknesses of curtains.

As soon as their new factory is com the Puritan Machine Co., Ltd., P Bldg., Detroit, Mich., will make a spe

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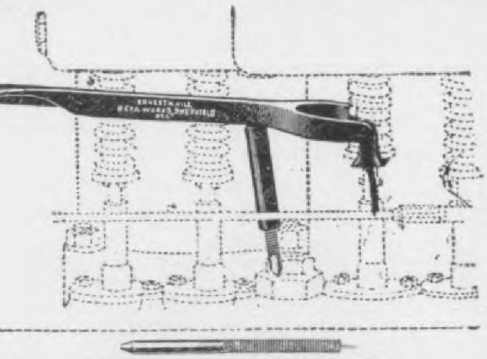
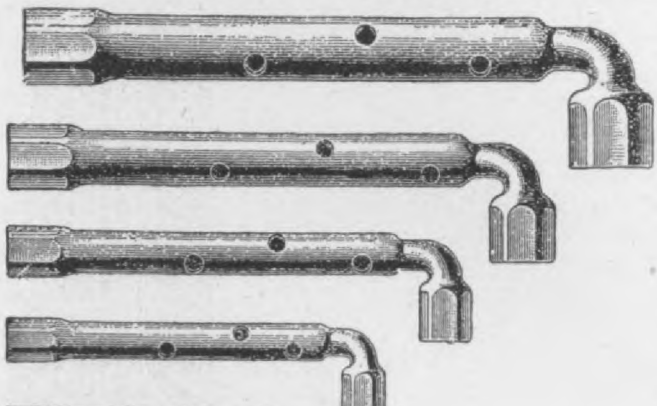


s Tool is designed to facilitate the Re-
l and **Replacement** of **Valve Springs**, and
ed with three fulcrum screws of various
hs, so as to suit all makes of engines.
valuable to repairmen desiring to grind
e valves on motors. Price, including
screws, $1.50.



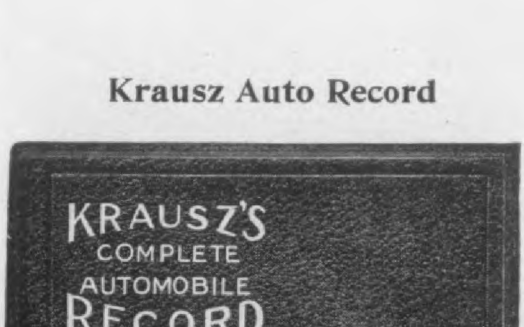
Set C—Consists of four pieces and lever handle. Will fit five standard sizes of hexagon nuts. Price, $5.00. Set D—Consists of five pieces and lever handle. Price, $6.00.

Simplex Adjustable Tire Holders

nsists of a set of three pieces—two side pieces for attaching to the body of the car, and one botton
et to be attached to running board. Can be adjusted to hold from one to three tires. The lengt
lso be adjusted from three to twelve inches at reverse end of bracket. All parts are made of extr
, non-breakable steel with highly polished brass finish and equipped with strong straps for hold
es. Price, complete set, $8.00.

ranteed Accurate Time Pieces especially designed
e on **Automobiles** and **Motor Boats**.

Krausz Auto Record



A practicable and convenient Expense and
Record Book invaluable to every auto owner
Size 4½ x 6¾ in.

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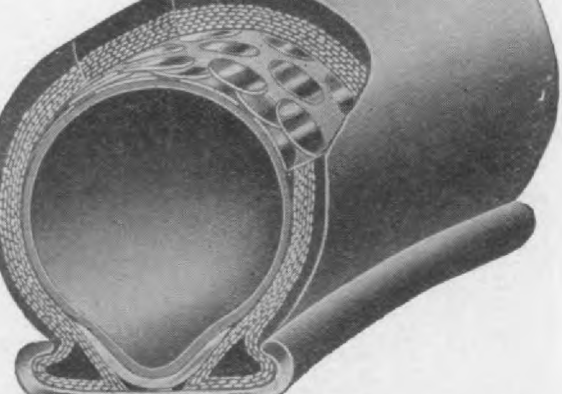
Original from Harvard University

, Akron, Ohio, have just placed on the
rket the Greenwald Extensible Tread Tire,
Greenwald Re-enforced Inner Tube and
Greenwald Internal Protector.

The Extensible Tread tire adjusts itself
omatically to any air pressure produced

he "Greenwald" Extensible Tread Pneumatic Tire.

the various conditions of weight, ex-
nsion, etc., which may exist, the fabric be-
discontinued at the hinge in the tire and
laced with rubber. As a result the makers
im that fabric ruptures blow outs, etc., are
minated, and that owing to the elasticity of
tread, greater speed and traction is ob-
ned. The increased pressure caused by
ating the air in the tire as a result of high
nospheric temperature, rapid motion over
road or other cause is automatically taken
e of by this extensible tread.

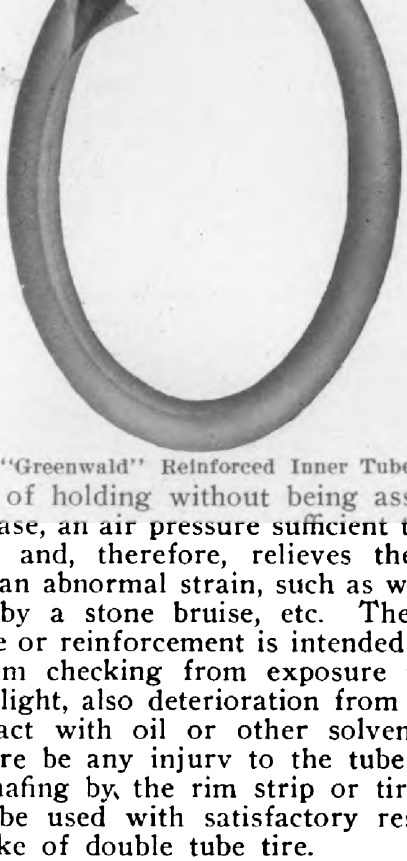


The "Greenwald" Internal Protector.

Their Internal Protector is designed to be
positive insurance against punctures, blow-
ts and numerous other injuries to which
es are susceptible. In this protector, which
entirely separate from either tire or tube,

tread, old cases that would ordinarily
unfit for service can be made to perform co
siderable mileage.

They also make a reinforced inner tu
which has a fabric envelope or reinforceme
to eliminate pinching by clips or beads
the case when not properly applied or fro
ruptures in the fabric, etc. This tube



The "Greenwald" Reinforced Inner Tube.

capable of holding without being assembl
in the case, an air pressure sufficient to ca
the car and, therefore, relieves the ou
case of an abnormal strain, such as would
caused by a stone bruise, etc. The fab
envelope or reinforcement is intended to p
vent gum checking from exposure to h
and sunlight, also deterioration from comi
in contact with oil or other solvents, r
will there be any injury to the tube pro
from chafing by the rim strip or tire too
It can be used with satisfactory results
any make of double tube tire.

Misch Automobile Valve Grinder

The Motch & Merryweather Mfg. Co., 7
717 Lakeside avenue, N. W., Cleveland, Oh
have placed on the market a machine
grinding automobile engine valves. It
similar in form to a drilling machine a
has a table 24x14-inch, the distance betwe
table and nose of spindle being 19 inch
The spindle has a travel of 4-inch and is
inch in diameter. The distance of the cen
of the spindle to the frame is 7 inches. T
countershaft runs at a speed of 200 revo
tions per minute and carries tight and loo
pulleys, 8x2½-inch. The machine compl
weighs about 150 pounds. It is said to
capable of grinding a 2¼-inch steel valve
a cast iron seat in four minutes, about o
eleventh the time required by hand work

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A GOOD storage battery is a blessing, but of what use is it if your coil draws from one to two amperes and you must have it recharged every two or three weeks? What is the remedy? Use a

CONNECTICUT

COIL

which draws only 3 to 4 tenths of an ampere and get from twelve to fifteen weeks service on one charge. Send for catalog No. 12 C.

The Connecticut Telephone & Electric Company, Inc.

30 Britannia Street, MERIDEN, CONN.

296 Broadway, New York, N. Y.
722 Main Street, Buffalo, N. Y.
1436 Michigan Avenue, Chicago, Ill.
721 Golden Gate Avenue, San Francisco, Cal.
22 Lincoln Street, Boston, Mass.
209 Boulevard Pereire, Paris, France.

Makers of the Famous
Connecticut Coil Current Indicators, Volt and Ammeters, Switches, etc.

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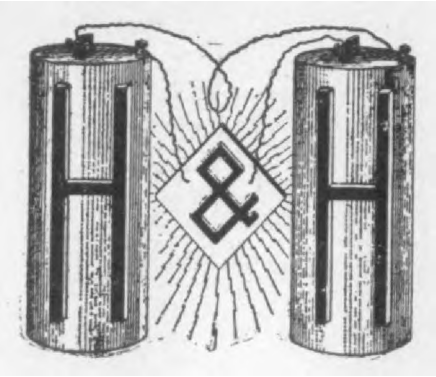
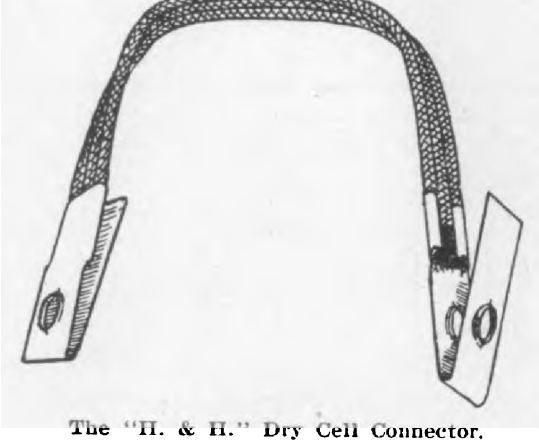
amperage. They are also manufacturing



The "H. & H." Dry Battery.

simple but efficient connector. This con-
ector has spring clips on the ends pierced
y holes concaved to admit the convex thumb
crews on the cell poles. The thumb screws
eed not be tightened any further than can
e done by the fingers, as the spring clips

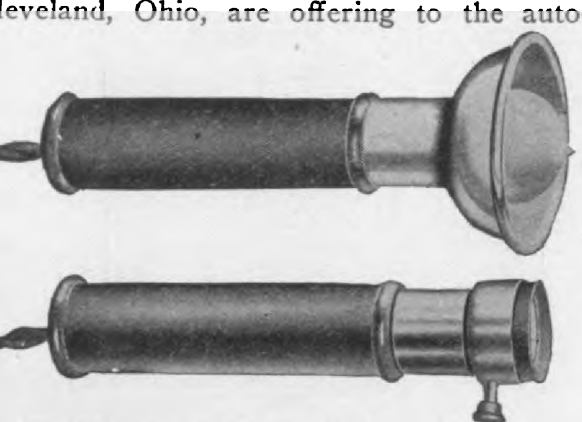


The "H. & H." Dry Cell Connector.

revent their working loose. Three flexi-
e cables are used to insure a good connec-
on even in the event of one or two getting
roken.

Matchless Light Electric Cigar Lighters and Inspection Lamps

The Matchless Light Co., Caxton Building,
leveland, Ohio, are offering to the auto-



cost. The inspection lamp is operated
the same manner and consumes the s
amount of current as the cigar lighter.
lamp gives about 8 candle-power, and
mounted in front of a strong reflector.
foot of cord is furnished. Price of com
ation outfit complete is $3.50, which inclu
one socket or holder and both lamp
cigar lighter attachments, the same so
being used with both.

The "White" Flexible Valve Remov

We show herewith the White Flex
Valve Remover, manufactured by Sam
White Co., Talcott Bldg., Providence, R

The feature of this tool is the chain, w
on account of its flexible nature allows q
operation around pipes and adjacent
tings, thereby overcoming the problem
getting at the valve where pipes and fitt
are in the way.

The chain can be adjusted to diffe
lengths by sliding the same in and out of
holes in the fulcrum lever. The holes
the lever are irregular, permitting the ch
to slide thru freely at the large end, w

The "White" Flexible Valve Remover.

the small end being smaller than the wi
part of chain link, catches the latter
holds the chain at any desired length.
removing a valve where valve, spring
key are surrounded by pipes, the cap
first removed from engine, and the h
placed on top of valve, running the ch
between pipes and down to lever. The le
is then placed under chain washer, chain
justed to best leverage, and lever give
slight downward movement compressing
spring enough to allow removal of the
The valve can be replaced in the same m
ner. The list price of the device is $2.

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OLD RELIABLE"

DIETZ
OTOR
LAMPS

or ACETYLENE

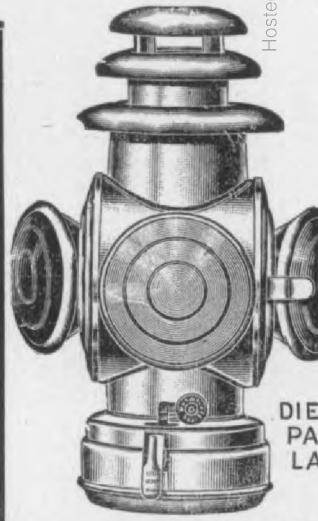
DIETZ
"Paragon" Launch Light

Dietz Interchangeable Burners

are an Exclusive Feature of DIETZ Lamps permitting the use of Kerosene, Acetylene or Electricity at will.

From Oil to Electricity
$2.00 Each List

From Oil to Acetylene, $1.50 Each List



Lenses Show Straight
Green Starboard, Ruby
$7.00 Each List

Send for Catalog and Discounts

R. E. DIETZ COMPAN

Largest Manufacturers of Lanterns in the World

60 Laight Street New York, U.

Established 1840

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soline gauge, a device for indicating the ount of gasoline in the gasoline tank.

Dial of the Freer Non-Magnetic Gasoline Gage.

'he gage is made with two types of dials, : Magnetic and non-magnetic. The non-gnetic dial has a long slot cut across its ter, in which slot the indicator moves k and forth. The magnet dial is fitted h a needle indicator, which is operated a magnetized lug directly underneath it, ich moves the needle by magnetic induc-

Dial of the Freer Magnetic Gage.

. The magnetic gage is especially adapt- for use on high-pressure tanks. The gage constructed of brass, and is guaranteed one year. It is claimed that tipping of tank will not affect its operation, and it will register with one-half inch liquid he tank. The list price of the magnetic e is $6.50; non-magnetic, $6.00.

he Firestone Dual Tread Tire and Dismountable Rim

he latest products of the Firestone Tire

to tires of 3½-inch size, and may be corporated in any type of tire during ma ufacture.

The Firestone dismountable rim is clai ed to have special advantages which a peal alike to the racing motorist and t tourist. It is adapted both to the star ard and clincher tires and their rims.

The accompanying illustrations expla the device at a glance. It is claimed f the rim that it is absolutely safe; that mechanical fastening prevents it from co ing off by any accident, and that it cann creep or work around the wheel, and th

The Firestone "Dual Tread" Tire on the left, and Firestone "Dismountable Rim" on the right.

come loose. It is simple in constructi and its efficiency is not impaired by ru or road accumulations. It is removed fro the wheel by only one lateral moveme this presenting a surface for friction equ merely to the width of the felloe. The e pense of changing automobile wheels permit equipment with the dismountab rim is said to be nominal.

To remove the rim loosen the nuts, a lowing them to remain on the bolts; tu clips in the opposite direction, then tight nuts to hold clips in that position. T rim may then be slipt off with ease. adjusting the extra rim with its inflat tire merely reverse the operation. The d flated tire may then be repaired at t motorist's convenience.

Diamond Rubber Co., Akron, Ohio, ha been advised by a user of Diamond tir that one of his tires has been run 31,0 miles with no repair excepting what he ma

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Conover

Wind Shield

(Patent applied for)

AN ADDED ATTRACTION TO ANY CAR

The only folding wind shield that is **automatically** held open or sh
or that can be operated by the driver with one hand, without stopping car.
adjustments of bolts or nuts.

Send for descriptive circular and prices. Liberal discounts to dealers.

THE CONOVER MOTOR CAR CO.

MANUFACTURERS

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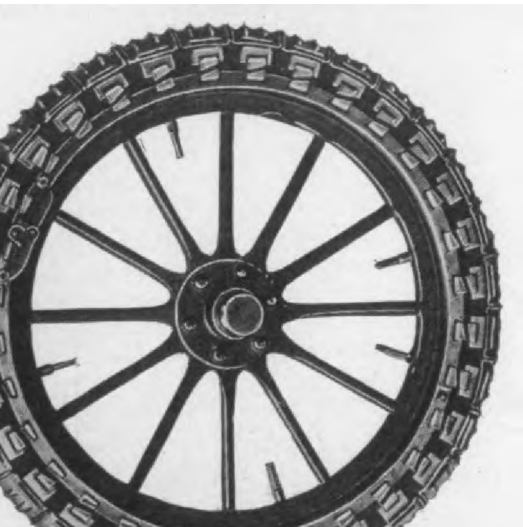
Winchester Speedodometer Co., 1557 way, New York. The auxiliary, or num hand, red in color, is carried by egular indicating hand to the highest attained by the car and remains there

Latest Winchester Speedodometer with Maximum Hand.

the car slows down or stops. A touch resetting button, which, incidentally, hin easy reach of the chauffeur's foot, es the maximum hand which instantly ack to the speed the car is then mak- nd remains there when the car stops. dvantage to the motorist who has been oned by the constable to stop is obvious. is no advance in the price of the new s incorporating this device.

"Invincible" Steel Tire Armor

accompanying cut shows a wheel fitted the Invincible Steel Tire Armor, the ct of the Invincible Tire Armor Co.,

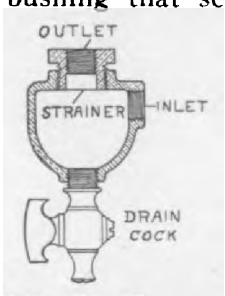


flanges for traction and strengthening purposes. The plates are the only parts of the armor which touch the tire or wheel. The side of the armor consists of a link which fits into a slot in the main plate and covers side of the tire. This link slides in the slot, causing main plate to give with the pressure at ground. It is made from 14-gage steel. Attached to this link is a smaller link, which fits into a slot on the middle or sliding link, and connects the hole hinge to a ring.

This ring sets clear around the wheel beside the clincher, but does not touch it. The rings come in halves, bolted, so that the armor can be put on or taken off in halves, and quickly. This ring has slots for each set of hinged plates over tire to ring on other side of wheel. It is made from one-quarter inch steel. A full set of four armors weighs about 72 pounds. It requires a little more to start the car on account of increased traction at ground, but it is claimed that after car is started the increased weight of wheels and better traction causes car to run steady, and with less throttle than with naked tire.

The "Mianus" Gasoline Separator

The Mianus Motor Works, of Mianus, Conn., have designed a simple gasoline separator which is claimed to do the work very effectively. Referring to the sectional cut here shown, the brass screen or strainer is attached to a bushing that screws into the



"Mianus" Gasoline Separator.

top of the separator. The gasoline enters at "inlet." Water and dirt settle at the bottom of the bowl, while the gasoline flows upward thru the screen to "outlet" on its way to the carburetor. Water and dirt are easily removed thru the drain cock.

All the winning cars in the Targa Florio race were fitted with Bosch Magnetos, made in Germany. These magnetos are distributed to the American trade by Robert Bosch, New York, Inc., 1947 Broadway, N. Y. City.

If you failed to obtain a copy of the March Journal, send 20c. at once for a copy of that valuable number, as we still have some on hand. The March number contained illustrations and specifications of

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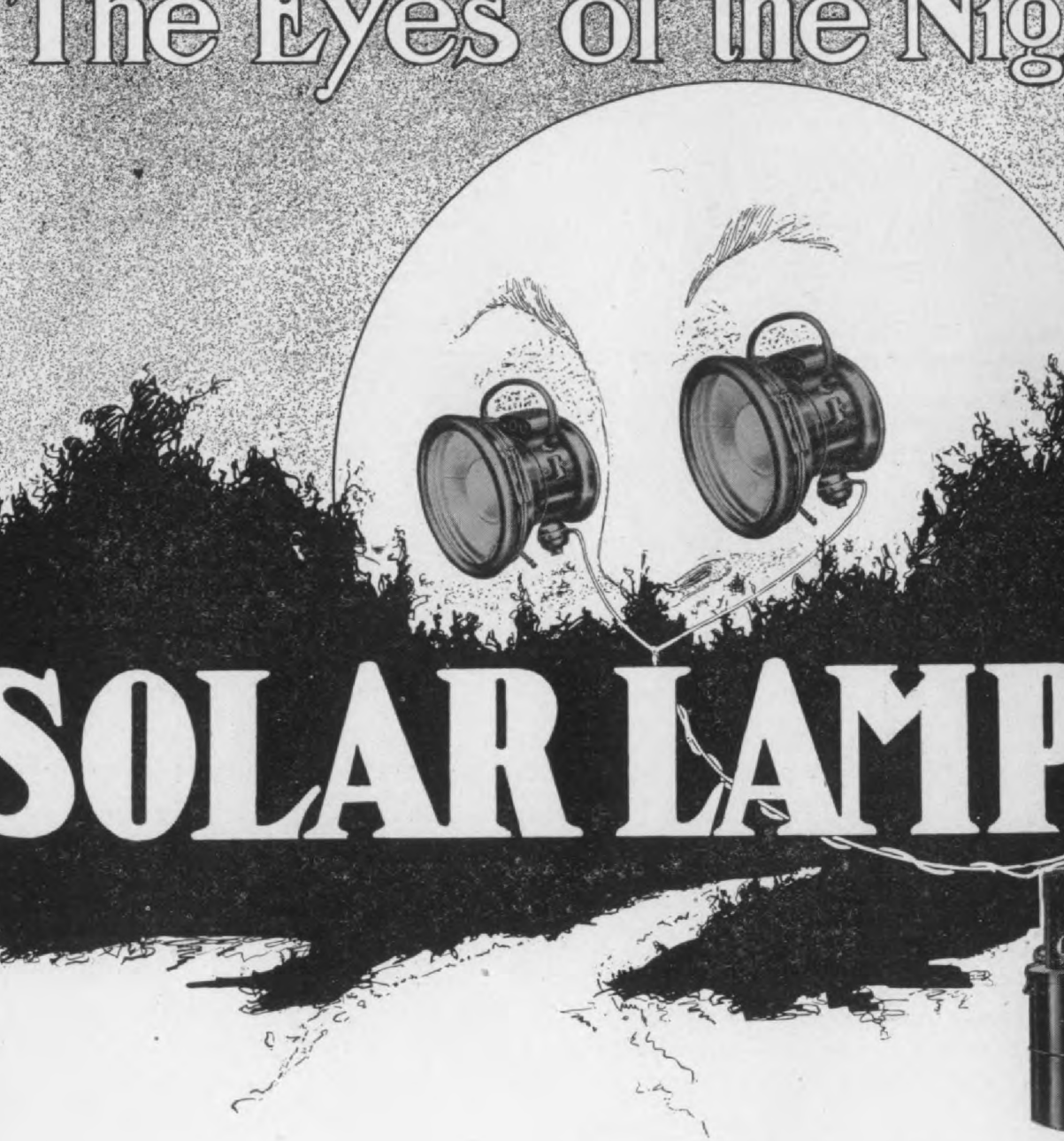

BADGER BRASS MFG. CO. KENOSHA, WIS.

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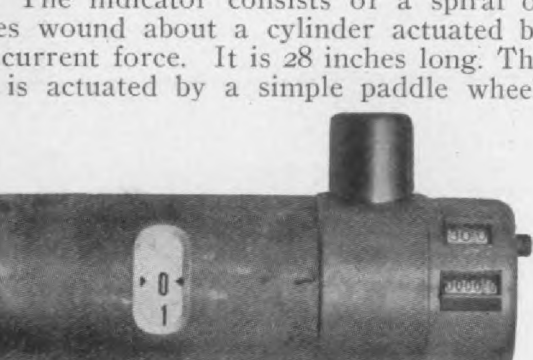
seat which can easily be removed from car if desired or folded up when not se. It is furnished either in the white nished. It is a revolving seat and the

e Graves & Congdon Auxiliary Seat in two positions. Patent applied for.

et by which it is attached to the side of onneau is of dove-tailed construction per- ng instant removal if desired, and leav- no unsightly attachments after removal. sizes are furnished. These seats are only of pleasing appearance, but very ortable, being well upholstered.

The Casgrain Speed Indicator

H. Connell Instrument Company, 34-38 mbia avenue, Boston, Mass., markets a indicator which is quite different from indicators in the method of indicating The indicator consists of a spiral of es wound about a cylinder actuated by current force. It is 28 inches long. The is actuated by a simple paddle wheel,



The Casgrain Speed Indicator.

n revolves the liquid. The faster the car the faster the paddle wheel moves, and teady flow of the liquid gives a steady

durability. It will fit any make of car The instrument lists at $50 and is guaranteed against defective workmanship or material

"Onward" Wrenches

The Onward Co., 531 West Fifteenth street Chicago, Ill., which recently succeeded to the business of E. T. Harris, has added to its line of cycle hubs, etc., tempered steel

The "Onward" Wrench.

wrenches, which are notable for their strength, lightness and durability. A number of sizes are offered and special sizes can be furnisht on order.

Sponges and Chamois Skins for Automobilists' Use

G. H. Worcester & Co., 35 Exchange street Boston, Mass., are selling Rock Island sponges and high-grade chamois skins for the automobilists' use. The sponges are claimed to be the best obtainable, coming from the rocky shore of Nassau. They vary in size from very large to as small as an orange; the large ones are the toughest because they are the oldest, and are universally used by the automobile people. Sponges are sold at auction by the natives to brokers who buy for the large houses in New York and London. These people maintain their own packing houses, where the goods are prepared for market. The process of packing and preparing consists of drying and curing the sponges, then packing them in bales when they are then ready for shipment north Their chamois skins are oil tanned.

"Healy" Inner Tube

The Healy Leather Tire Company, of 90 Gold street and 1906 Broadway, New York have been selling for some time an inner tube which they claim is giving universal satisfaction. This tube is made of a very high grade of red rubber, having a peculiar composition which gives it extreme toughness. They are wrapt in an unusual manner which gives a smooth finish and nice appearance. The joint is also made by a new method, which makes it so strong that it is absolutely impossible for it to separate. The company guarantees to repair all punctures

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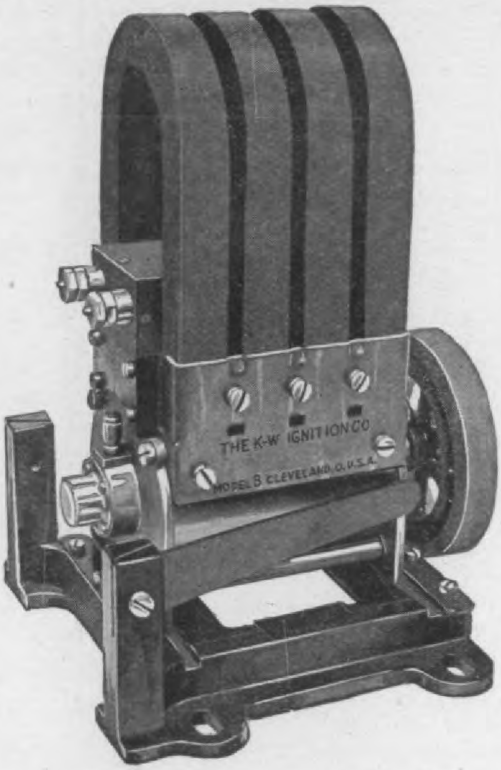
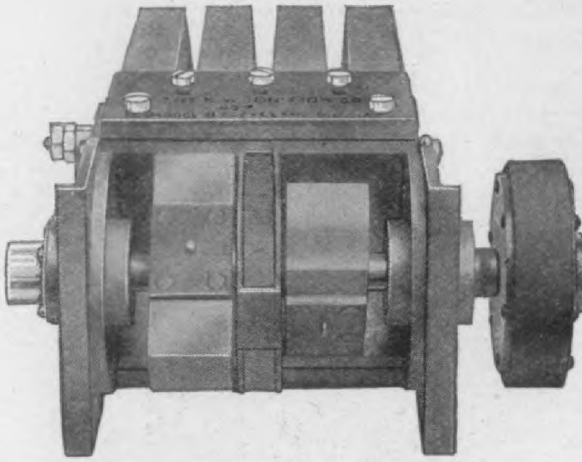
The K-W Magneto

FOR JUMP SPARK ONLY

More Power---Less Fuel---No Troubl





Internal view of working parts.
No moving wires.
No commutator.
No brushes.
Winding stands still.

Throw Your Batteries Away

Will start the engine easily without batteries.
Self regulating—No governor required. Good at all speeds.
Only moving part runs in high duty ball bearings and will last indefinitely.
Belt or friction wheel drive.
Base 6½″ x 7″. Height 11″. Weight 22 pounds.
Absolutely moisture proof.
Just the thing for your automobile or motor boat.
Price: $35.00 net cash F. O. B. Cleveland.
Guarantee: Your money back if you want it.

We want a live hustling dealer to handle our Magneto and Plug
every city in the United States.

THE VIM SPARK PLUG

Shoots a blast of flame through the ent
mixture instantaneously.

All other plugs are but spark ga
VIM is something more.

It MAGNIFIES the effect of the spark many times.
Soot Proof—Oil Proof—Trouble Proof.
Price $1.50 each, post paid.
Guarantee: Your money back if you want it.

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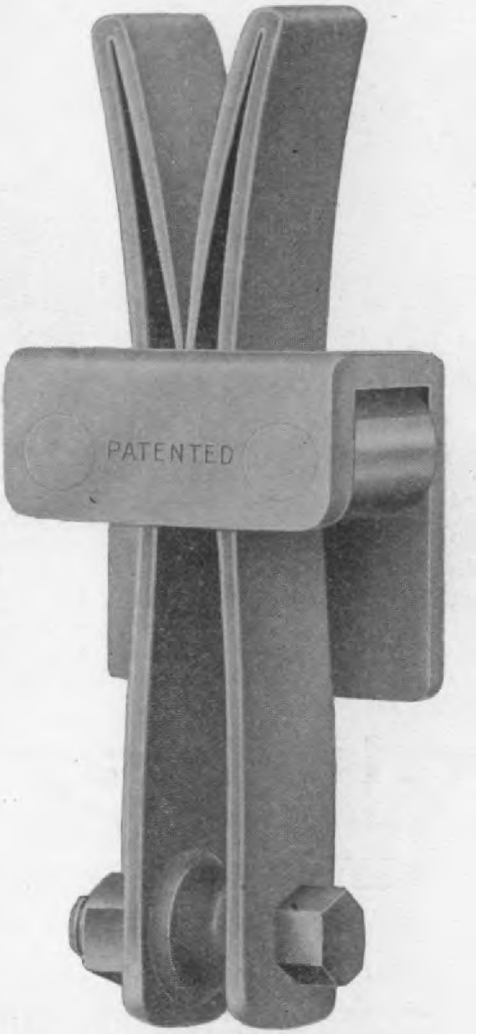
THE K-W IGNITION CO

springs are now made in two parts
l of one as formerly. The loop at
p of spring is drawn thin on the end
ent around flat together and the thin
arried away from the body of the
. The two spring parts bearing on
in ends form the spring. This gives



The 1907 "Shippey" Shock Breaker.

ring more resiliency and makes it
sensitive to the movement of the car.
n case of a heavy shock, it prevents
abrupt check of the spring action.
rings are made of best crucible spring
oil tempered. All wearing parts are
ardened. Two sizes are furnisht, one
at $25 for full set for cars weigh-
to 2500 pounds; another for all cars
his weight, listing at $30.

ne's Removable Lamp Number

ace E. Fine, Trenton, N. J., who has
urnishing the trade with lamp num-
omplete ready to install, has lately
on the lamp door. The ends are longer than needed and the surplus is cut off to suit the particular lamp to be fitted.

The frame and figures are made of aluminum, and the spring is of phosphor bronze wire. The grooves which hold the figures

Fine's Removable Lamp Number.

at top and bottom are partly open before the figures are fitted, the figures being curved slightly to get the ends in the grooves. When the figure is released, they naturally spring into position. When all the figures are placed and evenly spaced the spaces at ends and between figures are filled by inserting blank strips to fit the spaces. Then the grooves are driven down flat against the ends of the figures and the number is ready for placing in the lamp.

Will Re-manufacture Old Rubber

A plant has recently been incorporated in Milwaukee, Wis., under the name of Federal Rubber Co., to exploit a chemical discovery made by W. F. Koneman, of Chicago, a stockholder of the new concern, to manufacture new products from the old, or in other words, to restore the resiliency and life to worn-out rubber and make it again a usable article. The company is backed by fifteen wealthy men of Milwaukee, among them being C. F. Pfister, Geo. Brumder, W. F. Mayer, Fred. Vogel and the estate of the late Wm. Becker. They expect to start the erection of a $100,000 plant at Cudahy within a few weeks.

The Vacuum Oil Company, No. 29 Broadway, New York, advise us that in the recent Targa Florio Race, held in Sicily,

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CHAS. H. BESLY & CO.

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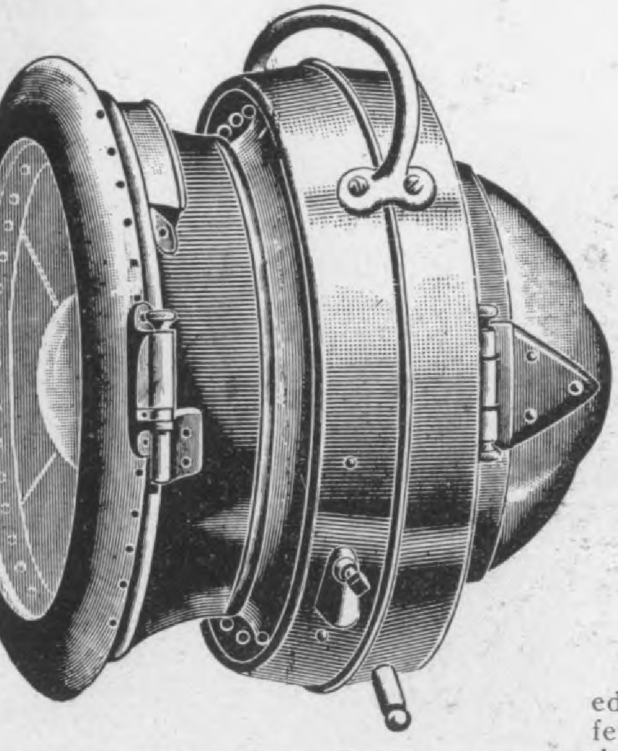
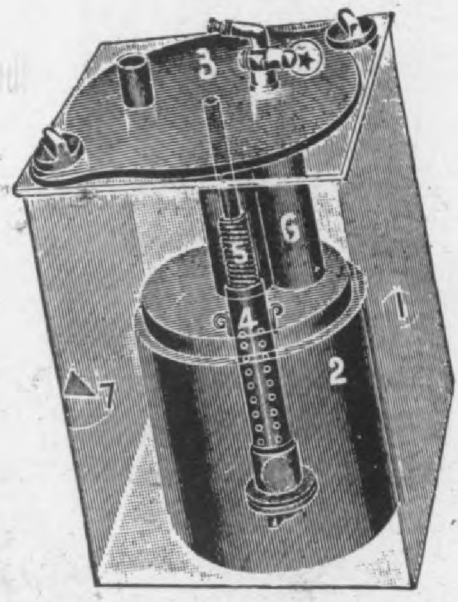
ght out for the 1907 season a line of
s.



"National" Bell Lamp, No. 93.

e "National" Searchlights are made of
y gage brass, and all parts are riveted
out. The burners are of the Von
arz type with which all their search-
s are fitted. Imported lense mirror re-
ors are used. The searchlight is made
x sizes, viz: No. 75, 85, 115, 76, 86, 116.
last three sizes of lamps are somewhat
rent in shape than the first three sizes,
re also more expensive. The specifica-
for the six sizes and prices are as fol-
: No. 75, 7-inch front, 8-inch depth,
h lense. Price, $8.00; No. 85, 8-inch
, 9-inch depth, 6-inch lense. Price,
No. 115, 9-inch front, 10-inch depth,
h lense. Price, $14; No. 76, 8½-inch
, 9-inch depth, 5-inch lense. Price, $11;
86, 9½-inch front, 9½-inch depth, 6-
lense. Price, $13; No. 116, 10½-inch
, 10½-inch depth, 7-inch lense. Price,

e "National" Alpha Lamp is riveted
out and is fitted with cast hinges. It
s front and back. The brackets and
s are made of heavy metal to withstand
usage. Made in 3 sizes, viz: No. 100,
h front, 7½-inch depth, 3-inch Bulls-
Price, $10; No. 101, 10-inch front, 9-
depth, 4-inch Bullseye. Price $12; No.
11-inch front, 10-inch depth, 4-inch
eye. Price, $15.
e Bullett Lamp is fitted with imported
r lenses, and is made of heavy brass



The "Tipo" Generator.

The "Tipo" generator, herewith illustrat-
ed, is of the automatic type and is made o
few parts, none of which can get out of or-
der. It is made in two sizes. No. 13 hold
1 lb. carbide and will run one lamp for
hours. Price, $5.50. No. 14 holds 2 lbs
carbide, and will run two lamps about 1
hours. Price, $7.

"New Process" Steel

The New Process Steel Co., Marshall
Mich., are making a specialty of furnishing
high-grade crucible steel to the automobil
and gas engine trade. "New Process" stee
can be easily machined tho it is very stiff.

This company has been so successful an
were recently compelled to commence th
enlargement of their plant. The addition
will be of sand lime brick, mill construction
with gravel roof. It will be the same dimen
sions as present building, 123 ft. by 50 ft
wide and 13 inch walls.

The new part will provide space for clean
ing and shipping rooms, core room, patter
storage, carpenter room, etc., and the pres
ent building, 60 ft. by 123 ft., will be use
as a foundry room entirely.

Thirty-five hands are now steadily em
ployed and when the new building is don
this number will be increased to 40 or 5
hands.

The officers of The New Process Stee
Co are as follows: President, S. F. Dob
bins; Vice-President, E. A. Stuart; Treas
urer, F. S. Deuel; Secretary and Manager
S. C. Fr

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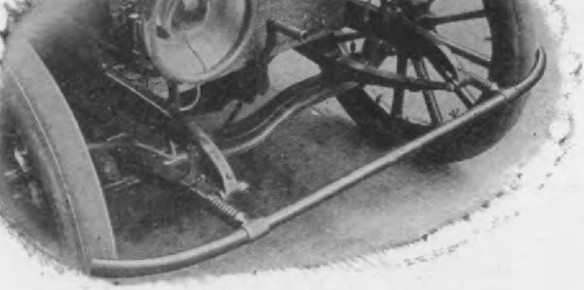
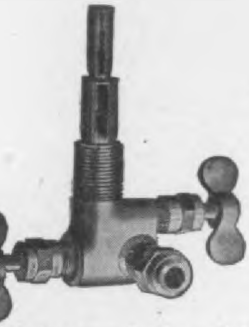


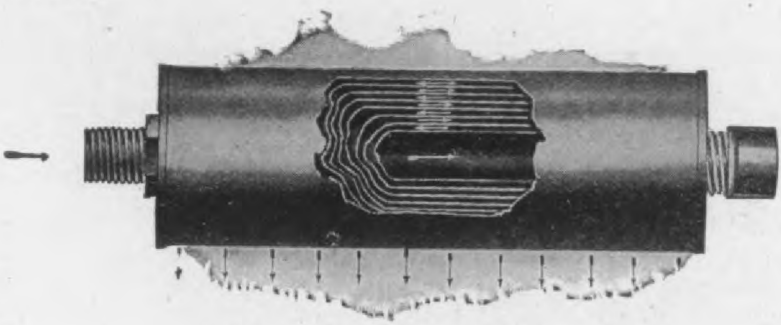
Harroun Bumper

HARROUN AUTO BUMPER
CAN BE ATTACHED TO ANY CAR

EQUIP YOUR CARS
WITH THE



rtin Reserve & Alarm Valve

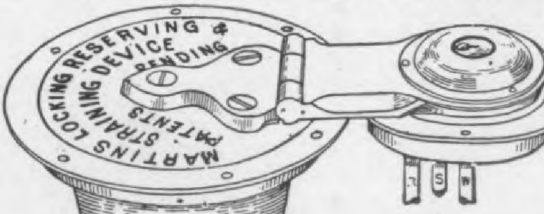


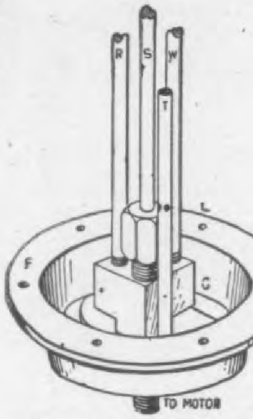
Turner Muffler & Exhaust Cooler

Ross Fluid Level Indic

tin Multiple Feed Lubricator

Turner Carburettor





Martin Locking Reserving and Straining De

Turner Foot Treadle Single and Double

Coat and Robe Rail

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CATALOGUE.

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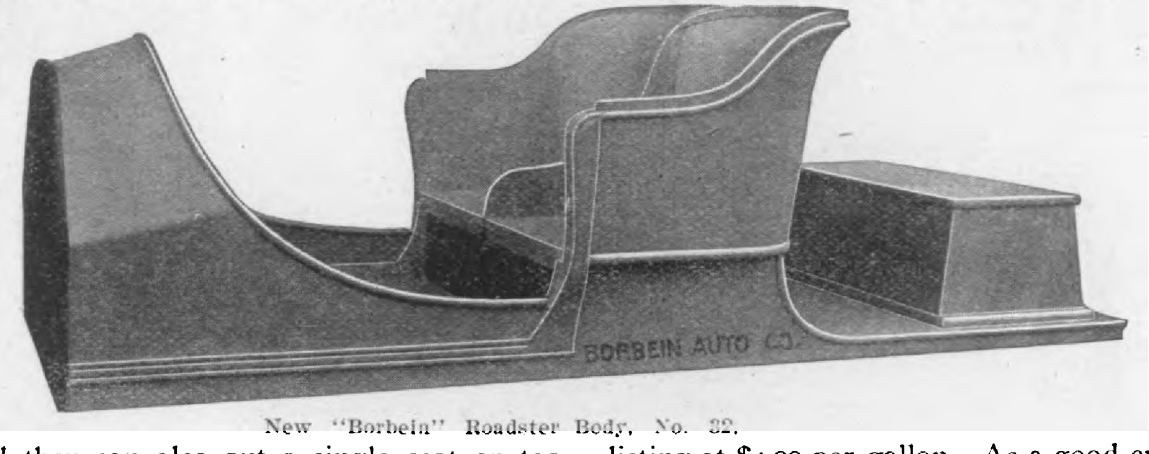
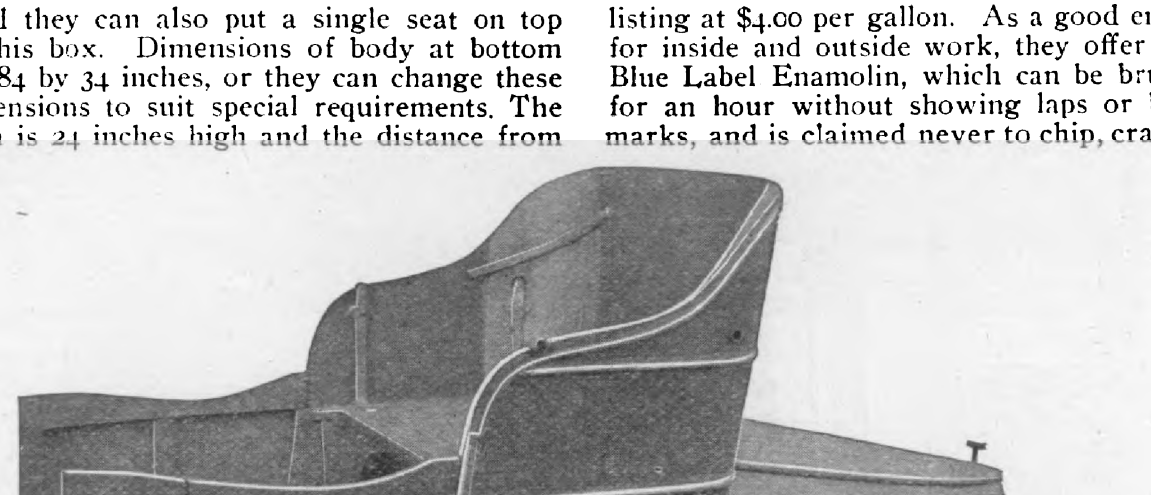
latest creations of the Borbein Auto Co., North 9th street, St. Louis, Mo.

he Roadster Body, No. 32, has a wood with a heavy metal shield extending to the front seat. The artillery box in rear has a hinged lid on top, and if de-



New "Borbein" Roadster Body, No. 32.

l they can also put a single seat on top his box. Dimensions of body at bottom 84 by 34 inches, or they can change these ensions to suit special requirements. The is 24 inches high and the distance from



New "Borbein" Turtle Back Body, No. 34.

to front of seat is 30 inches.

he Turtle Back Body, No. 34, has a door the left side only, the right side being onary. A hinged lid fastened on the le back. Length at bottom is 88 inches, h 34 inches, height of seat back 19 in-. These dimensions can, however, be ged to suit the requirements of pur-ers.

hese bodies are built up of the best le ash and poplar timber, well glued screwed together and sand-papered oth. They are furnisht in the white with

line of varnishes, fillers, etc., for finishin the woodwork on motor boats and automo biles. Their Elastic Spar varnish is claime to possess great resisting properties to a mospheric influences, salt and alkali water It is put up in 1/8, 1/4, 1/2, 1 and 5 gallon can

listing at $4.00 per gallon. As a good enam for inside and outside work, they offer the Blue Label Enamolin, which can be brushe for an hour without showing laps or brus marks, and is claimed never to chip, crack o

loose its gloss. It is supplied in 1/8, 1/4, 1/2 an 1 gallon cans, and lists at $5.00 per gallon.

Hancock Mfg. Co., makers of the Han cock Automobile Lubricator, are now se tled in their new factory, 776 E. Hen street, Charlotte, Mich., having remove from 144 E. Erie street, Chicago.

In a letter to the Hartford Suspensio Co., ordering a new set of Truffault-Har ford shock absorbers, Mr. Chas. F. Har superintendent of the mechanical departme of the Brooklyn Daily Eagle, states that th

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We are Manufacturers' Agents and Distributors, Manufacturers, Importers, Jobbers and Wholesalers of

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Western Distributors of **CONTINENTAL TIRES** Best by Every Test

We Give Your Orders

Careful and Accurate Shipment

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Excelsior Supply Co.

Send for Catalogue "AA"

Established 1876 CHICAGO, ILL.

233-235-237 RANDOLPH ST.

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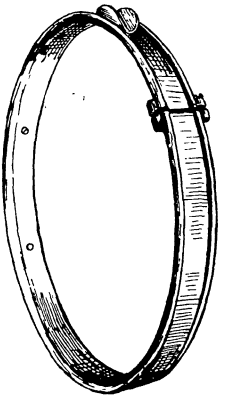
The "Ruff" Quick Detachable Clincher Rim

The Standard Detachable Rim Co., 42 Broadway, New York City, have placed on the market the "Ruff" Quick Detachable Clincher Rim, which is simply an ordinary clincher rim sawed in two crosswise so as to admit of its diameter being enlarged sufficiently to slip it over a plain wheel, with simple means of securing it in place. At the cut portion two blind lugs and connecting screws are provided, one on each side of the rim. In attaching the rim to the wheel all that is required is to slide the rim over the wheel, and then draw up the two screws with a screw-driver. The air pressure in the tire will help to make the screws draw up easy.



The "Ruff" Quick Detachable Clincher Rim.

The tire lugs are especially designed for these rims and called "Blind Lugs." They are provided with removable stems. The long stem is first used to hold the lug in place till the tire has been put on the rim, the tire is then partly inflated so as to hold the lugs in position when the long stem is removed and the short stem is screwed in its place; this leaves a perfectly smooth surface to the rim and no lug stems can be seen in the wheel.

Panther Wrapt Tread Clincher Tire

Electric Rubber Mfg. Co., of Rutherford, N. J., are now on the market with their Panther wrapt tread clincher tire, in which is used South Sea Island cotton fabric with Up-River Para gum between the plies wheel prevents the threads of the fabric from chafing each other. By a special process which they have perfected themselves the fabric is thoroly impregnated with rubber, causing them to adhere very closely and thus adding to the resiliency of the tire. These tires are made on the well-known wrapt tread principle by which, after the body of the tire is built up from the fabric, the different plies are covered with a layer of pure Para rubber about ⅛-inch thick, after which the tread of the tire, consisting of several layers of specially prepared and toughened material is wrapt under pressure to the body of the tire. The tire is then vulcanized by the slow live steam process. By this method of tire manufacture, the various layers of fabric lie perfectly smooth and are not squeezed out of alignment. This method also permits the application of a new tread after the old tread is worn down to the breaker strip, which lies between the tread and the body of the tire.

On the Panther tire, the core of the bead strip extends up beyond the point of pressure and therefore prevents rim cutting. The core is made of a special composition of their own compounding and is sufficiently elastic to bring the casing back to normal dimensions after stretching on the rim.

This concern is also manufacturing the Panther corrugated flat tread casing, which combines the good qualities of the regular casing, besides guarding against skidding on greasy or snowy pavements. They also make the Panther inner tubes in both gray and red.

Splitdorf in New and Larger Quarters

C. F. Splitdorf, the well-known New York manufacturer of ignition apparatus and electrical specialties, has moved his laboratory from 17-27 Vandewater street to 261-265 Walton avenue, corner of 138th street, Borough of Bronx.

Their new building, which has been designed and built especially for them, is of the latest fireproof construction and equipt with every modern appliance for the production of high-grade work. One important feature is the installation of the Edison breakdown service which can be thrown in at a moment's notice, thus insuring continuous and uninterrupted work. Each department is equipt with time-saving devices and the most modern machinery.

The entire building, which contains over 50,000 square feet of floor space, will be occupied solely by the Splitdorf Laboratory.

The dynamo-dynamometers, for testing automobile engines, which have been supplied by Joseph Tracy to a number of leading builders, will in future be marketed by the Sprague Electric Company under an arrangement by which Mr. Tracy will supervise the construction of the apparatus at their factory.

The Warner Instrument Co., Beloit, Wis., have built an exact working model of the regular Auto Meter of mammoth size. It is 9½ feet in height; the head of the instrument is 4 feet in diameter and has a scale 10½ feet in length, weight about 800 lbs. The instrument is entirely covered with gold leaf so as to protect it from the weather, as the instrument will be subjected to all kinds on account of the extensive tours it will make. It is mounted on a car with a special body and is now being demonstrated on the thorofares of the principal cities of the country.

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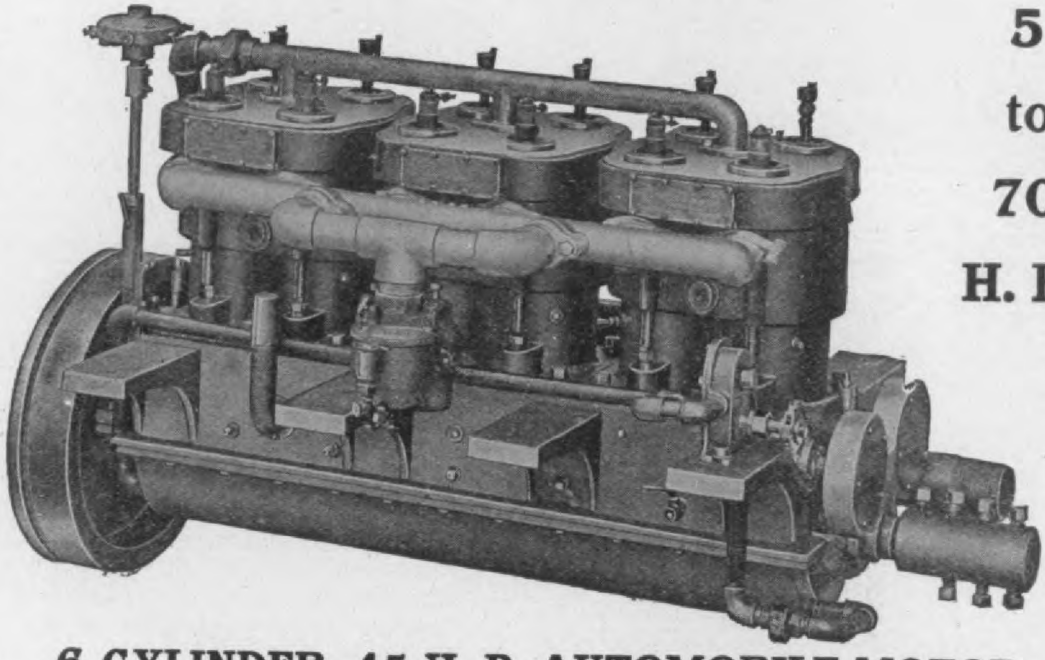
TRANSMISSIONS and CLUTCHES for AUTOMOBILES and MOTOR BOATS

Motors

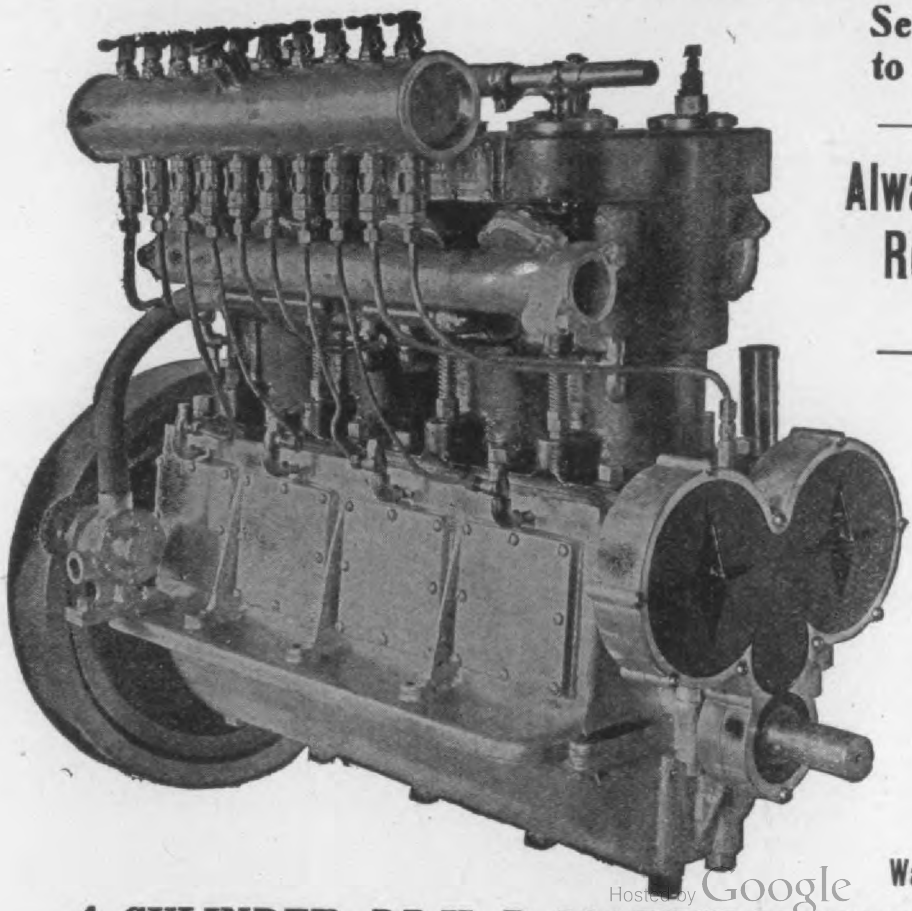


5 to 70 H. P.

6 CYLINDER, 45 H. P. AUTOMOBILE MOTOR.

Second to none.

Always Reliable



Write for Catalog and Prices.

Air and Water Cooled

4 CYLINDER, 35 H. P. MARINE MOTOR.

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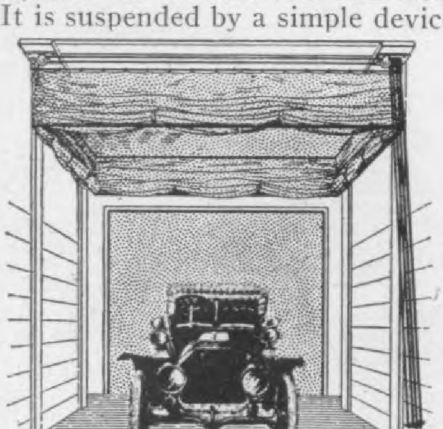
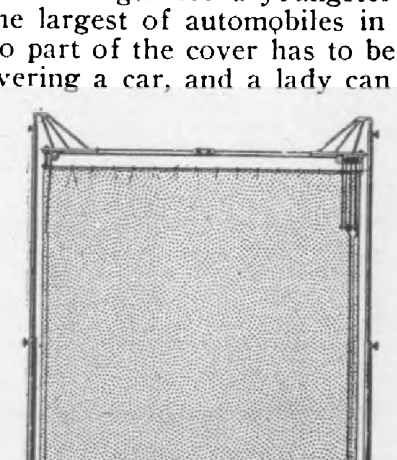
Jonesboro, Arkansas.

is made of fire-proofed material, is dust water-proof and its construction is of est, both as to materials and workman- It is suspended by a simple device from



he "Karbel" Auto Cover, for the Garage.

eiling of the garage, and is adjustable garage of any height. When the car is n use it is lowered by a simple device covers the entire car, thus keeping it from dust, which is so destructive to legant finish of an automobile. It is so ged that a child five years of age, with nable strength for a youngster can un- the largest of automobiles in five sec- no part of the cover has to be touched covering a car, and a lady can uncover



The "Karbel" Auto Cover, for Touring.

ar without in the least soiling her hands ess. The Karbel protects the entire car top to bottom, wheels and all.

e Karbel for touring can be folded and on the running board of the car when n use and being fire, dust and water- makes an ideal covering for the car on the road.

acine" Tops, Lamp Covers, Tire

grade black leather finish, whipcord back 3-ply auto cloth, bows of selected second growth ash, hand-forged joints and body irons, three side curtains on each side having large light in each one, and a roll up back curtain having a light 10x18 inches.

They also make a three-piece detachable storm front, with extra large lights in each side, front piece with two lights 20x28 inches, made to roll up and fasten under front bow, making a ready and serviceable wind shield when desired. A curtain bag is furnished to keep the curtains in when not in use. This front complete with all irons and fasteners to attach to cars lists at $80, for Mackintosh, and $100 for Pantasote.

The runabout tops are made of same materials and high-class construction as the touring car styles. The price of a 3-bow top, strap style complete with all irons and fasteners to attach to cars, is $44 in Mackintosh cloth and $52.50 in Pantasote.

Racine tire covers are made in black enamel duck or in black, red, green or tan imitation leather.

The Simplex all-brass folding glass front is hinged about one-third down from top. It is held in open position by stays which telescope by simply loosening nut at bottom of rod. The list price is $60, with ¼ inch plate glass, ready to attach to car.

The "Robbins" Touring Car Top

Irvin Robbins & Co., 32 East Georgia street, Indianapolis, Ind., are offering to the trade what they claim to be a thoroly up-to-date touring car top made with leather, covered bent auto bow sockets, eight outside joints, six straps, and goose necks to fit the body. The covering is of heavy imitation leather, lined with broadcloth, and fitted

The "Robbins" Touring Car Top.

with removable storm front in three pieces, with celluloid in all curtains.

When the top is not in use it can be folded up and strapped flat, and covered with a dust cover. The builders furnish measurement diagrams, by the use of which they guarantee that their tops will fit any machine yet constructed without any further

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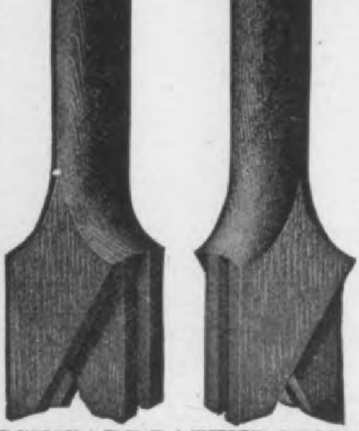

SCHWARZ PATENT SPOKE

SCHWARZ WHEEL

FINISHED WOOD WHEEL

The tenons of the spoke are grooved and mortised for interlocking.

They are put together at one time, under pressure.

WHEEL COMPLETE

The wheel can be made complete and shipped without the hub.

For Automobiles and Heavy Vehicles. The best and strongest artillery wheel made. Spokes can never loosen. Wheel will stand where every other fails.

APPROVED AND ADOPTED BY LEADING AUTOMOBILE MANUFACTURERS

Send for illustrated booklet.

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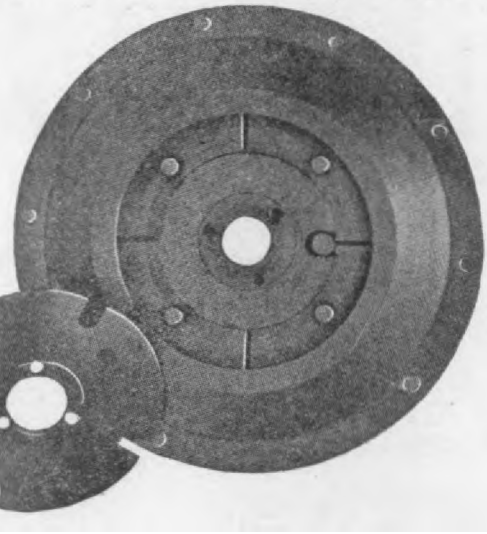
THE SCHWARZ WHEEL COMPANY

Moon's Roller Bearing Apex Friction ke. It is manufactured by the Moon x Brake Company, Penobscot Bldg., roit, Mich. The brake runs in grease its action is roller bearing. The fric- is produced by a quadruple eccentric, h forces the pressure in four direct osite motions, forming a complete rev-

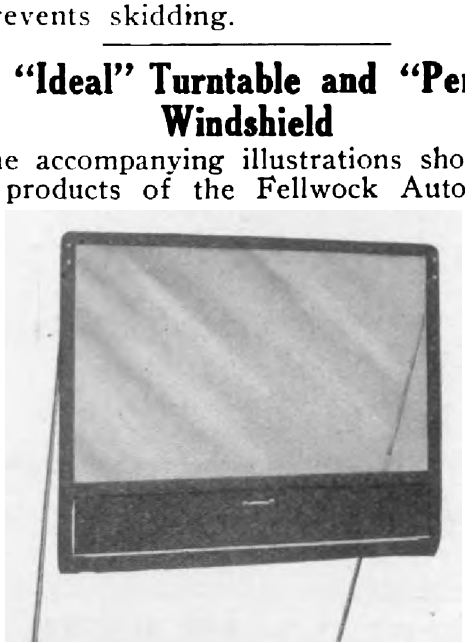


Moon Roller Bearing Brake.

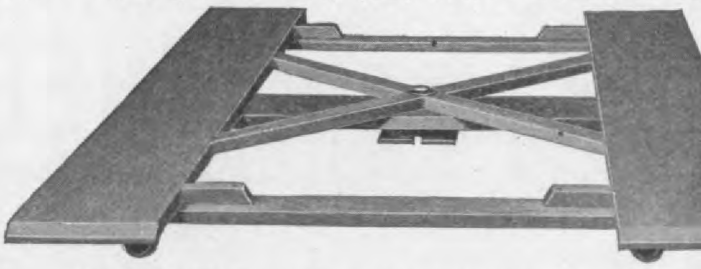
on of friction at the same instant. The e surface, excepting about 1¾ inches bearing. The power in this brake is led several times thru the medium of ccentric within an eccentric, which pro- s great leverage, and if necessary, as it metimes in cases of emergency, the op- or has the privilege of wedging same. release is instantaneous at all times and r all circumstances. The brake shoes ocketed in grease and can never burn. main claim made for this brake is that revents skidding.

"Ideal" Turntable and "Perfect" Windshield

e accompanying illustrations show two products of the Fellwock Automobile



of sound lumber and strong hardware, and claimed to last a lifetime. It can be installe on any wood or concrete floor without an alterations to same. With each turntable ar furnisht eight rollers and an iron track eigh feet in diameter. It is made in two size viz.: No. 1 for 60 to 80 inch wheel bas 2000 pound cars, $20; No. 2 for 80 to 11



The "Ideal" Turntable, with Springfield lift combina

inch wheel base 3000 pound cars, $25. Th "Ideal" fitted with the Springfield lift com bination has all the features of the regula and in addition the raising of the car whic is desirable for many reasons. The left run ner shows the jacks down in position to driv on and the right runner shows jack tilte up. The "Ideal" with Springfield lift combina tion lists as follows: No. 3 for 60 to 8 inch wheel base 2000 pound cars $35; No. for 80 to 110 inch wheel base 3000 poun cars $40.

The "Perfect" windshield is made wit French plate glass and the frame in natura finish. The wood panel is on friction hinge and can be tilted to any desirable angle t get air. It is made to fit all Maxwell car and others having a similar dash. Price $15.

In order to properly handle the increas ing sales, the Ajax Grieb Rubber Co. hav added to their selling forces H. M. De Silv and R. S. Ireland. Both men are well an favorably known in the trade, having fo years been connected with the Internationa Rubber Co. Mr. De Silva will cover th western territory and Mr. Ireland will de vote his attention to the southern territory

A number of conflicting reports have go into circulation regarding Geo. C. John's re lations with the St. Louis Car Co., but th facts in the case are that his relations hav been entirely harmonious tho he resigns hi position as salesmanager of that compan July 1, to accept a similar position with th Pennsylvania Auto-Motor Co., of Bry Mawr, Pa.

Turner & Fish Co., of Chicago, makers o the "Indestructible" steel wheel, have chang ed their name to the "Indestructible Stee

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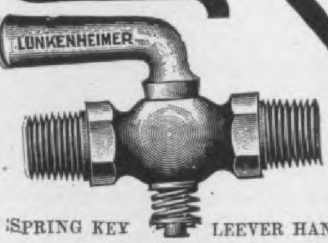
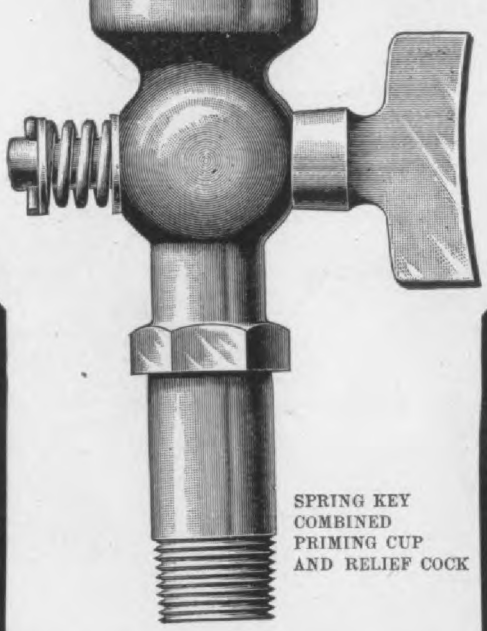
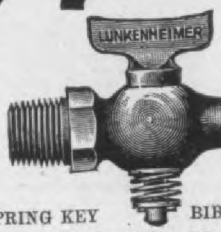


SPRING KEY LEEVER HANDLE
DOUBLE MALE END COCK



SPRING KEY
COMBINED
PRIMING CUP
AND RELIEF COCK



SPRING KEY BIB
T-HANDLE COCK

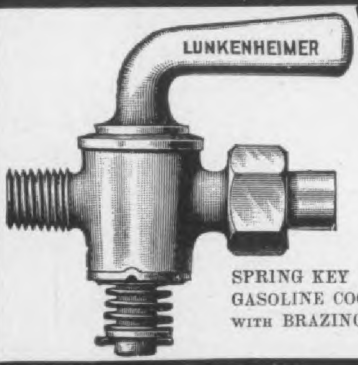
EASILY OPERATED

NEVER LEAK

ALWAYS SATISFACTORY

LUNKENHEIMER SPRING KEY COCKS

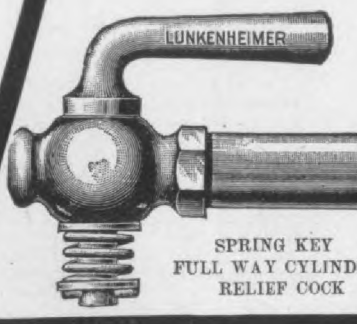
Never need adjusting, the spring will always keep the key firmly seated within th body, but does not prevent the easy operation of same. Particularly adapted fo automobiles and motor boats where the constant vibration would soon loosen coc keys, rigidly held in place as are the ordinary kind.



SPRING KEY
GASOLINE COCK
WITH BRAZING UNION

Made in all Sizes and Styles

Your local dealer should have them; if not, write us



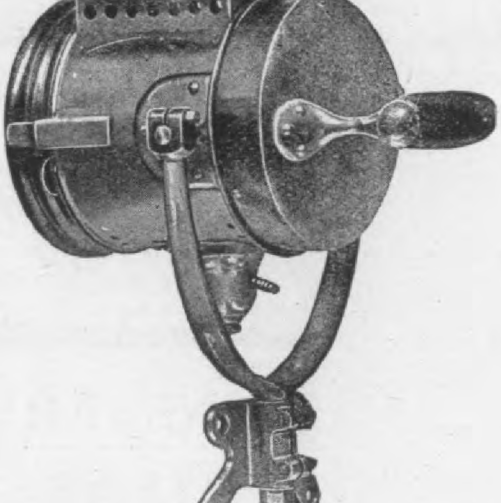
SPRING KEY
FULL WAY CYLIND
RELIEF COCK

THE LUNKENHEIMER COMPANY

LARGEST MANUFACTURERS
OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD

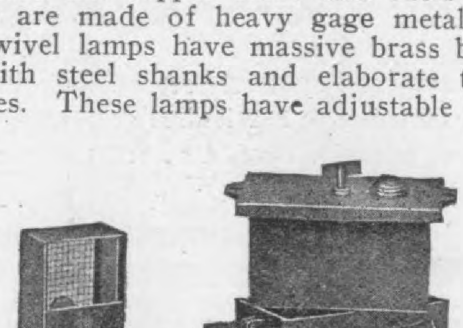
Google

automobile parts and accessories. They so manufacture a line of lamps and generators which we herewith illustrate.



The "P. M. S." Searchlight.

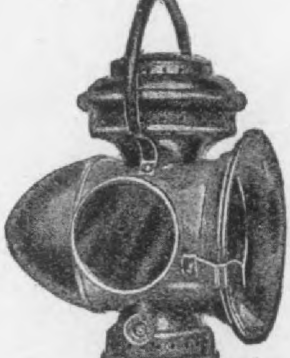
The P. M. S. searchlight is made either th or without swivel bracket or it is suped with a deck bracket for use on motorats. It is made in two grades; one with Bausch and Lomb reflector and the other th a French mirror, at prices from $7.00 $17.50 each. It is made in three sizes, 6, and 8 inch. It is of high-grade construcn, and has copper front and back. The nps are made of heavy gage metal, and swivel lamps have massive brass brackwith steel shanks and elaborate tilting ndles. These lamps have adjustable burn-



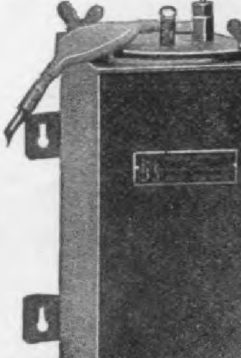
The "P. M. S." Generator, No. 3, showing shifting grate, etc.

The small P. M. S. generator, No. 1, will d one pound of carbide. This generator made in a larger size, No. 2 (not illusted), which holds a pound and a half. th of these generators are supplied with

price of No. 1 is $7.00; No. 2 $9.50 and No. 3 $12.00, with a liberal discount dealers.



The "P. M. S." Tail Lamp.



"P. M. S." Generator, No. 1.

The P. M. S. tail lamp burns kerosene and sells for $2.75 each.

They also make the P. M. S. vulcaniz outfit. This is one of the conventional repair outfits which is put up in a sm wooden box, consisting of ¼ pint of a cure, ¼ pint rubber cement, piece of sa paper, emery paper and 2 brushes. T outfit retails complete at $1.00.

"Auto-Shine"

The "Auto-Shine" Polish Company, Buffalo, N. Y., manufactures a high gra varnish polish which is compounded es cially for automobile work and is the vention of a practical painter of forty yea experience in the finishing of the high class of carriages.

This preparation cannot injure the fin finish because it contains no solid matter any kind. The makers claim that it will pit the surface; contains no gums or otl sticky substance; will not stain a white other light colored finish and will not coll dust. It removes hand marks and grea spots and restores the original lustre w little effort.

It has been used two seasons by the R. Thomas Motor Co., and the Buffalo A tomobile Station Co., to the exclusion of other varnish polishes.

The preparation is called Auto-Shine a is put up in quantities from ¼ pint to 1 g lon. On receipt of 5 cents postage, t company will send a generous sample, lar enough to polish the average size touri car. Prices range from 25 cents for a qua ter pint, to $3 for a gallon. The manufa turers will pay expressage on trial orde

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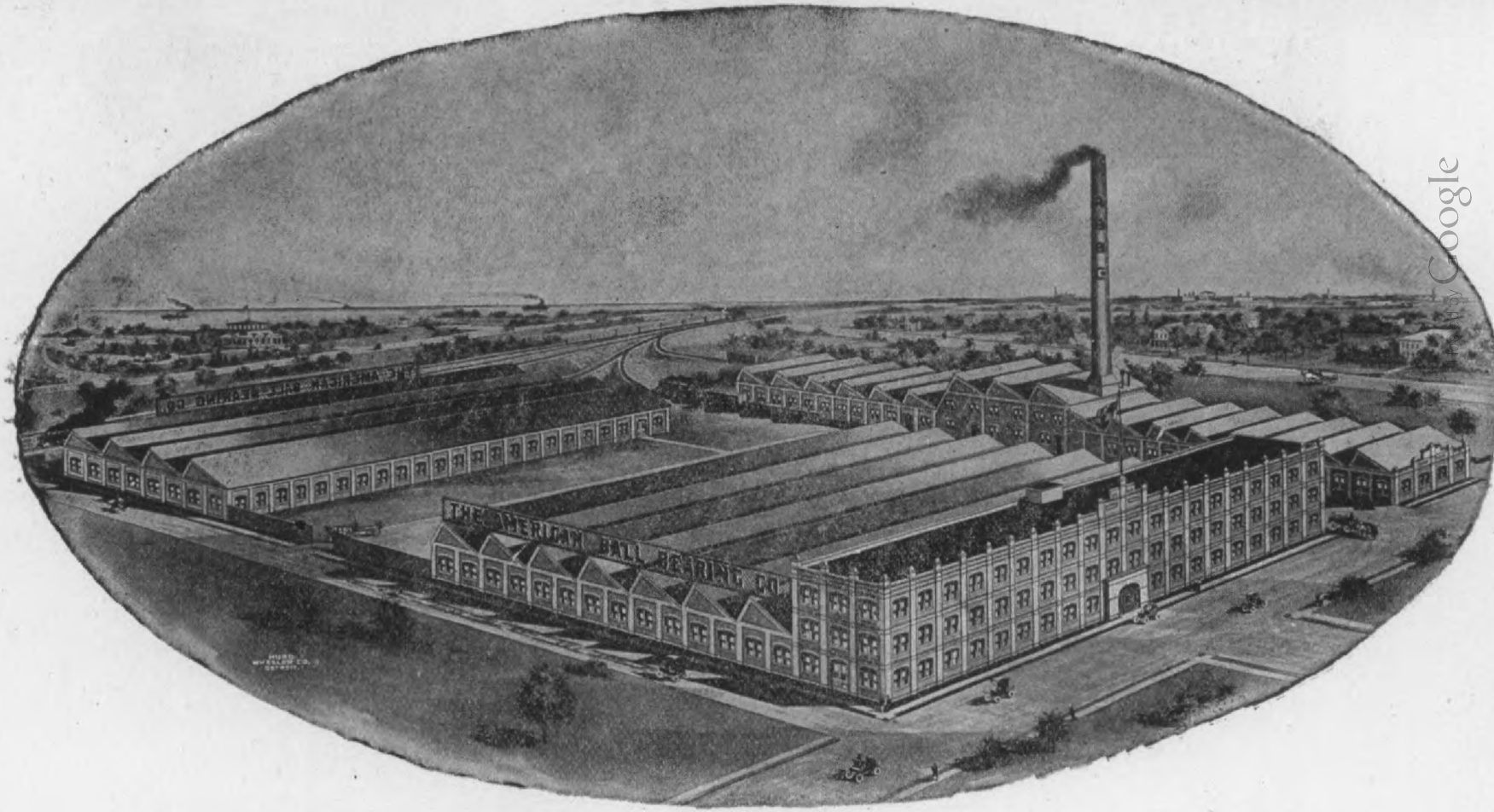

The output of complete Front and Rear Automobile Axles of this plant exceeds the capacity of all competition combined.

The American Ball-Bearing Co. L. S. & M. S. Ry. & Edgewater Pa
CLEVELAND, OHIO, U.S.A

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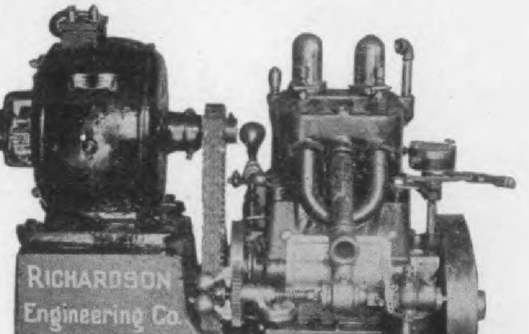
he Richardson Engineering Co., 30 rl St., Hartford, Conn., have recently put new products on the market of special rest to the automobile trade.



he "Richardson" light-weight Generating Set.

heir new generating unit is a compact, assemblage, designed especially for ging automobiles, for producing light for launch and yacht work. It embodies w feature in the silent chain drive, which les them to use a higher speed dynamo

"Richardson" Automatic Storage Battery Charging Switch.

lower speed engine, giving little vibra- and minimum weight. At present they making these sets in two sizes, viz.: 2 H. ize, 15x33x24 inches high, weight 370

tank to be connected for water connection

The "Richardson" automatic storage ba tery charging swith is used to make con nection automatically between the generato or source of current, and the storage ba tery only when the voltage is high enoug to charge the battery, and to disconnect th circuit automatically when the voltage fal too low. Each switch is furnished for spe cific voltage, or for charging a specific num ber of cells of storage battery, and must b ordered and used for that number only. A series coil is employed to assist the voltag selecting coil after the contact has been mad This insures a good strong contact, thus pre venting the burning of the clips. Each breake is provided with carbon contacts on eac side to take the arc when the circuit break altho the current at this time is so low a to reduce this arcing to a minimum. Ad justments are provided on the bottom o the breaker so that it may be set to releas within certain reasonable limits of voltag and current, also an adjustment at the to for limiting the pull of the breaker. The con tacts which carry current are a special sprin bronze, with a maximum carrying capacit long life, and in their larger circuit break ers are made up in units. The very larg breakers furnished for heavy currents consis of two coils, one coil operates the large one, which carries the heavy arm conduc ing the current. These contacts are mad of especially constructed spring clips o heavy bronze, the proper number of clip being added according to the current. Th machine is of handsome design, full polishe copper, with the exception of the coil, whic is covered with a waterproof material re sembling leather. The switch is mounted o an enameled slate base, with connection and terminals marked, all ready for mount ing, either with or without the base. Its lis price is $20.00 for any amperage capacity u to fifteen and any voltage.

Owing to the promotion of Mr. H. F Field to position of sales manager of th Hartford Rubber Works Company, the po sition of branch manager at Detroit wa left vacant, and Mr. C. W. Hatch, formerl with the Diamond Chain and Manufac turing Company, has been appointed t the position of local manager at Detroit.

In the recent Automobile Endurance Derby at Point Breeze, the winning Auto car had its rear wheels equipt with Hart ford Midgley tread Dunlop tires. Thes tires are claimed to have been used 3,00 miles before entering the race, but notwith

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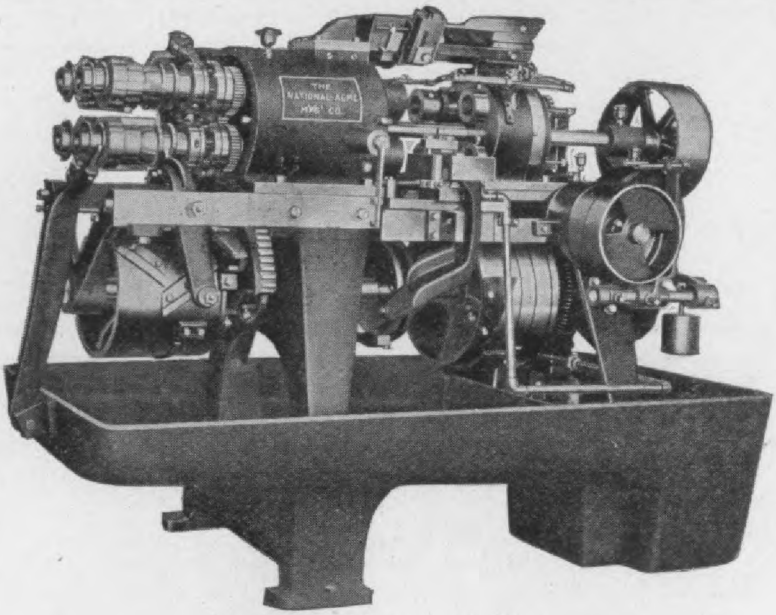
The Greatest Economy DUPLICATE PARTS



Built in sizes from ¼ to 2¼ Capacity.
It will increase your output.
It will save you money.

from the bar is attained by the use of the

Acme Automatic Multiple Spindle Screw Machine

Any piece is completed in the length of time required to perform the longest single operation.

It costs no more to operate an **ACME** than any other screw machine and it occupies no more floor space. **THE ACME** is especially adapted to the economical production of **Engine Carburetor Parts, Oilers, Spark Plugs, Bicycle Hubs, Cups and Cones.**

If For Any Reason

Special facilities for making work from rod ¾" and less in diameter.

your requirements do not warrant the installation of an **ACME**

REMEMBER OUR SCREW PLANT

We can give you

Favorable Prices

AND

Prompt Delivery

ON

Special Milled Work

MADE FROM

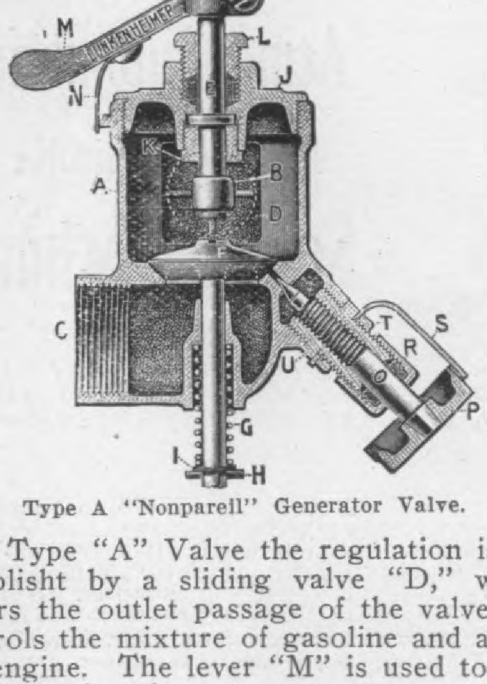
IRON—BRASS—STEEL

Send us your samples with quantities attached for quotation. Prices based on quantities.

All inquiries will receive immediate attention.

The National-Acme Manufacturing Co.

ced on the market the generator valves
own as "Nonpareil," made in four types,
" "B," "C" and "D."

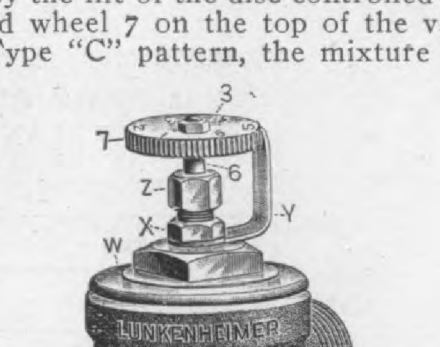


Type A "Nonpareil" Generator Valve.

n Type "A" Valve the regulation is ac-
nplisht by a sliding valve "D," which
ers the outlet passage of the valve and
trols the mixture of gasoline and air to
engine. The lever "M" is used to ma-
ulate this valve.

n Type "B" valve the mixture is regu-
d by the lift of the disc controlled by the
rled wheel 7 on the top of the valve.

n Type "C" pattern, the mixture to the

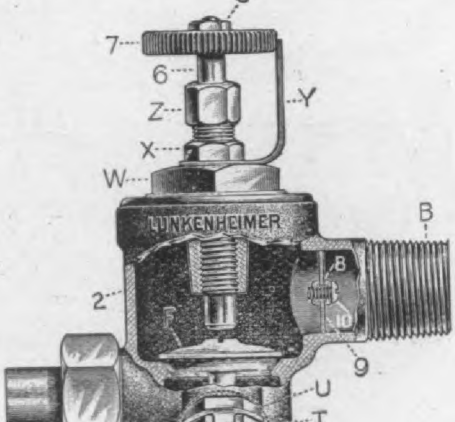


Type B "Nonpareil" Generator Valve.

nder is controlled by means of the lift
ne disc, together with the butterfly valve
the outlet passage.

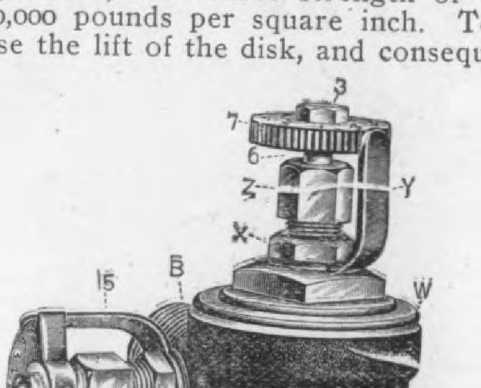
e show both interior and exterior views
ype "C" valve, the latter more clearly
ving the handle H for manipulating the

is used, while the material is so distribu
as to secure a greater amount of met
where the strain is greatest. No iron
steel is used, as gasoline would corro
these metals.



Type C "Nonpareil" Generator Valve, Sectional View.

To combine both strength and lightne
in the disks the Lunkenheimer Compa
manufacture their disks of a special bron
composition, the tensile strength of whi
is 60,000 pounds per square inch. To d
crease the lift of the disk, and consequent



Type C "Nonpareil" Generator Valve, Exterior View.

the excessive pounding, the "Nonparei
Valves have their seat openings conside
ably larger than the area of the inle

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THE CRESCENT ACETYLENE BURNERS

IMPERIAL

Bike Tip, 15c.

Manufactured under license 589342, Aug. 31st, 1897

30c per piece $3.00 per dozen.

There are **more Crescent Acetylene Burners sold in the United States** than of any other Acetylene Burners.

Every Burner Absolutely Guaranteed

That is why we employ no agents, our burners are their own drummers.

For Sale Everywhere

If not obtainable at the nearest dealer write to

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Licensees and Sole Agents

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UNIVERSAL

VICTORY

VON SCHWARZ

Licensed Acetylene BURNERS

ON SCHWARZ
PERFECTION

MADE OF ONE PIECE OF LAVA.....NO METAL ARM

Once in alignment—always in alignment

MANUFACTURED UNDER LICENS

(U. S. Patent No. 589,342 Aug. 31, 1897)

In a Class by Themselves

Standard of Merit Wherever Acetylene is Know

Used and sold by every reputable Auto Lamp Maker an Dealer. **50c per piece. $4.00 per doz.** Avoid Infringin Substitutes. "J. V. S." on Steatite; and "J. V. S." and "M K. & Co." on pillar.

the form of a spray, insuring thoro va-
izing with the air admitted thru the air
t. The disk is provided with a spring at
bottom, to insure its proper and prompt
ting, and as the stem of the disk projects
ow the valve, the disk can easily be

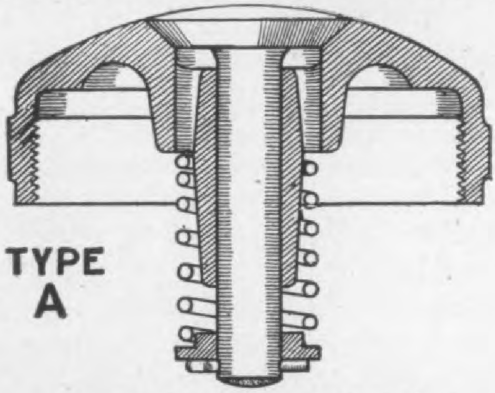
Plain Pattern Type D "Nonpareil" Generator Valve.

sed from off its seat by hand, whenever
s desired to prime the engine for start-
purposes.

When the generator valve is applied to
crankcase of a two-cycle engine, it com-
es both the functions of a carburetor and
usual check valve placed between it
the crankcase. Its operation is depend-
upon the alternate periods of pressure
partial vacuum existing in the crank-
e at different periods of the cycles.

The "Radio-Escape"

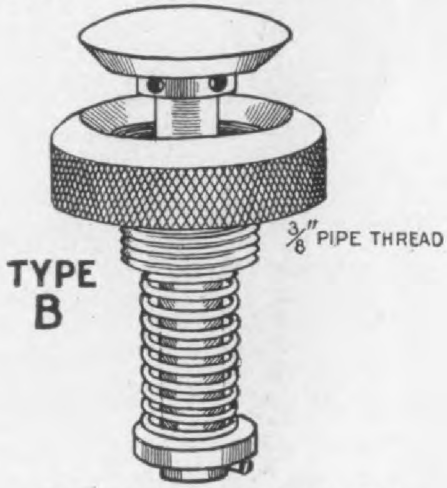
The Globe Machine & Stamping Co., 3950
milton Ave., Cleveland, Ohio, are manu-
turing and marketing the Radio-Escape,
styles of which are here shown.



The "Radio-Escape," Type A.

The object of the device is to save the cool-
liquid in gasoline automobiles, summer
winter. In winter it retains the vapor

new or old—it simply consists in sealing t
radiator by closing the overflow aud scre
ing on the Radio-Escape in place of the c
at the top.



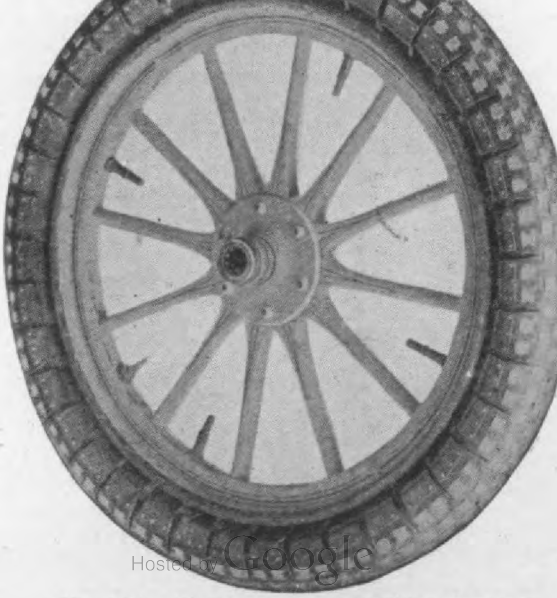
The "Radio-Escape," Type B.

The escape is of the safety-valve princi
and is set to release at 10 pounds, and as t
average sealed radiator pressure is mu
less than this, it prevents the radiator fr
being strained or exploded.

The device can either be set into the ra
iator cap, as in type A, or can be appli
by drilling and tapping the radiator cap a
screwing in Radio-Escape Type B.

The "Maplebay" Automobile Tire Cov

The Maplebay Manufacturing Compa
Crookston, Minn., have brought out a n
tire cover which we show herewith.



The "Maplebay" Automobile Tire Cover.

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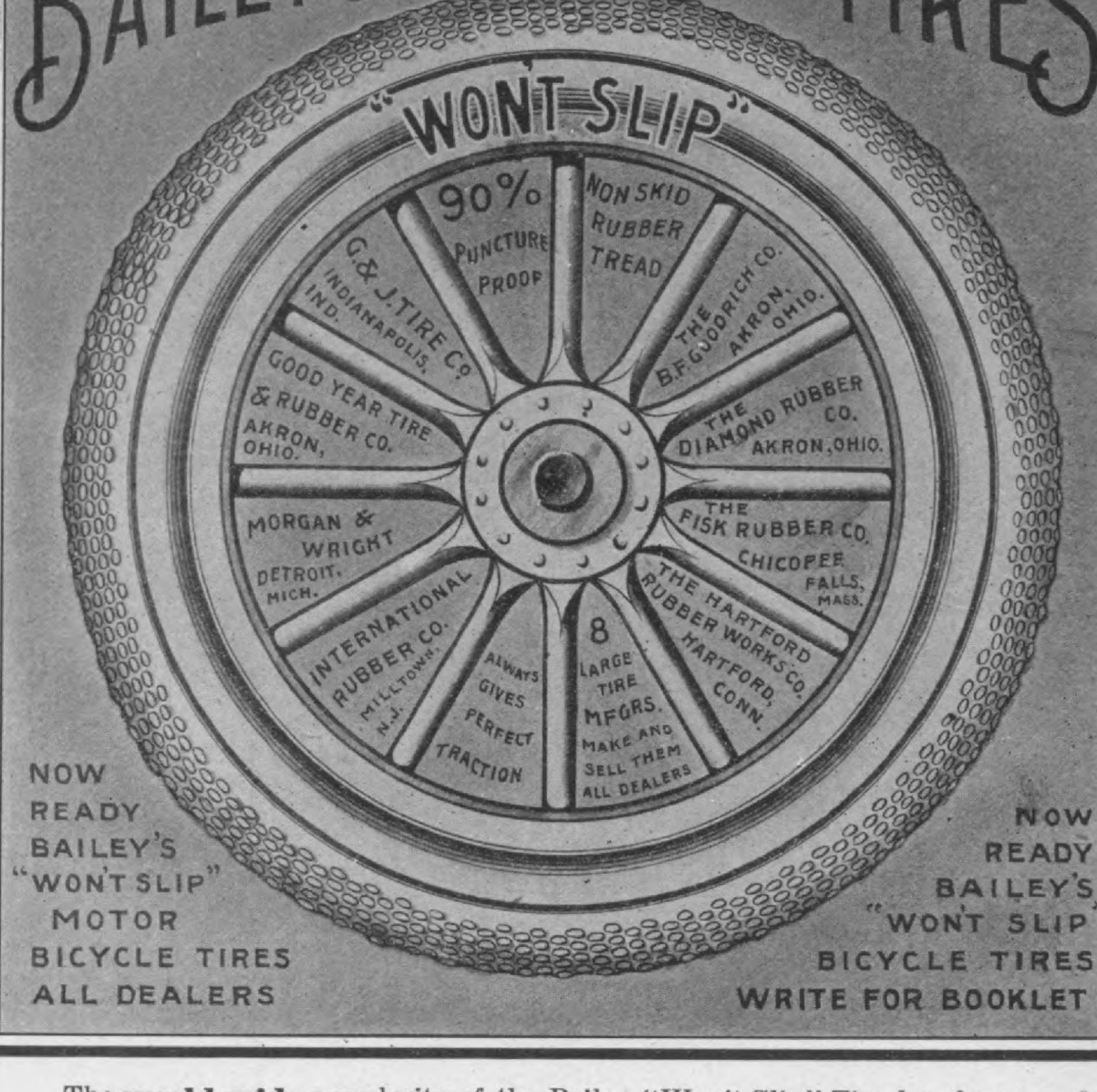

The **world wide** popularity of the Bailey "Won't Slip" Tire has been made entirely on its merits. The "mouth to mouth" advertising by those who **ride** them and who have found in them a tire which proves its **reliability, durability** and **superiority** over **any** and all anti-skid tire tread constructions has made it impossible for **8** of the largest tire manufacturers in the United States to supply the demand for Automobiles, motor cycles and bicycle tires with Bailey Tread. There is no **metal** in the Bailey Tread to **heat** the tire, **pull** loose from the rubber or tear the **road bed** and destroy the **resiliency.** The **rubber studs** of the Bailey Tread are the **true** principal that give **perfect traction** and prevent **skidding.** They are to the Automobile what the **rudder** is to the **ship.**

Insist on having the Bailey "Won't Slip" Tread Tires that **insure** you perfect security from skidding.

Write us for descriptive booklet.

N. B.—The extra cost of the Bailey Tires on the List more than smooth of same make, is 2½ and 3 in., $1.50 each; 3½ in., $2.00 each; 4 in., $2.50 each; 4½ in., $3.00 each; 5 in., $3.75 each.

N. B.—Now ready: Bailey's "Won't Slip" Tread Bands for covering all makes and sizes of smooth, new or partly worn tires at nominal cost by Bailey Tire Manufacturers. *Write for price.*

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Heerman's 4-Cylinder, 2-Cycle Motor

HUGH DOLNAR.

This motor was designed by Mr. T. W. Heermans, Consulting Engineer, 617 Chamber of Commerce Building, Chicago, Ill. The design is with a view to compactness, simplicity, and uniform torque, or crank-shaft turning impulse. The motor has four 2-cycle cylinders, water-cooled, 5¼ in. bore by 5 5-16 in. stroke.

The cylinders are cast in single units with integral water-jackets, and are fixt in opposed pairs to an open frame which has a charge intake passage open to the carburetor, and two charge compression chambers and two automatic charge intake valves at each end. The two charge intake passages are connected by a two branch supply pipe to the elevated carburetor, not shown, fixt to the branch pipe at A.

The pistons have central charge intake nozzles, opening toward the cylinder heads, and the exhaust ports, 2 in number, are in a plane above the 2-cylinder intake-ports, as clearly shown in the sectional elevation at F1, Fig. 1. Fig. 2 is the motor end elevation and Fig. 3 is a vertical section of a piston showing the cored intake passage.

The two pistons for each opposed pair of cylinders are fixt to the opposite ends of one vertical piston rod, so that both piston strokes are made against charge-compression in each of the two pairs of cylinders Each piston rod has a yoke with a rectangular opening in the middle, and these yokes take sliding pin-boxes, thru which pins pass to take the two ends of a double bell-crank, BC, BC, BC, Fig. 1. The middle point of the top member of this bell-crank is carried on a pin which is fixt in a cylindrical, vertically-sliding guide, fitted to a bored seat in the motor frame to which the cylinders are fixt. The lower member of BC is a capt wrist-box, fitted to the crank-wrist of the single throw crank-shaft, which is 1⅞ in. radius, but may be of any desired radius. The double bell-crank, BC, is two similar members, so as to make forks at each of its 3 extremities, the ends of the top member taking the piston rod block pins while the fork in the lower member of BC takes the bronze, split, crank-wrist box.

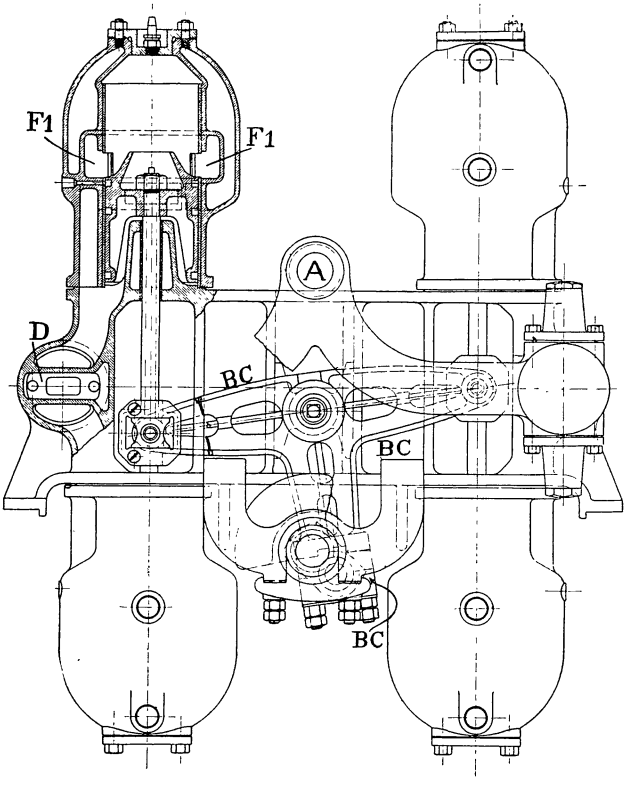

Fig. 1. Heermans' 4-cylinder, 2-cycle motor. Front elevation, in partial vertical section.

This linkage forces one pair of pistons to move upward when the other pair moves downward, and, as before stated, cushions the piston at each end of travel on the comprest cylinder-charge.

Fig. 2 shows the small fly-wheel with a built-in, two-ball governor at the right, while the section at the left shows the intake

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Harburg Tires

Made in Germany.

The very best tire costs least in the long run—a very long run—a longer run than two or three "cheap" ones.

Harburg Tire Company

232 West 58th Street

New York

BOSTON TIRE & RUBBER CO.,
751A Boylston St.,
Boston, Mass.

MOTOR CAR CO. OF N. J.,
291 Halsey St.,
Newark, N. J.

CALLAHAN, ATKINSON & CO.,
1020 Morton St.,
Baltimore, Md.

NATIONAL ELECTRIC SUPPLY CO.,
1330 New York Ave.,
Washington, D. C.

HARBURG TIRE AGENCY,
1140 Bedford Ave.,
Brooklyn, N. Y.

JOS. B. HOFF,
Lakewood, N. J.

PATERSON AUTOMOBILE EXCHANGE,
Paterson, N. J.

FRANK SHAW
260 North Broad St.,
Philadelphia, Pa.

HARRIS RUBBER & SUPPLY CO.
Cor. Turk and Polk Sts.,
San Francisco, Cal.

AUTO INN,
21-23 Main St.,
Asbury Park, N. J.

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chamber, D, open to the carburetor, and the compression chamber, E, in which the charge for the top cylinder is comprest, and the compression chamber, E1, in which the charge for the bottom cylinder is comprest.

The governor is connected to a sliding-sleeve throttle valve. In this drawing the crank-shaft axis is 9⅜ ins. below the mid-plane of the motor-frame to the top and bottom of which the cylinders are fixt, and the vertical measurement is 21 ins. from one cylinder head to the other, or 42 ins. over all, bolt heads included. There are 2 intake ports and 2 exhaust ports, in different planes and in different quadrants of the cylinder bore. The exhaust ports are 1¼ ins. long, intake-ports 13-16 ins., measured parallel to the axis of the cylinder, and the vertical measurement of the ports, outside to outside, or from top to bottom, is 2⅞ ins. F1, Fig. 1, is the exhaust chamber of one cylinder, open to the two exhaust ports and also to the four-branch exhaust pipe, F F, Fig. 2.

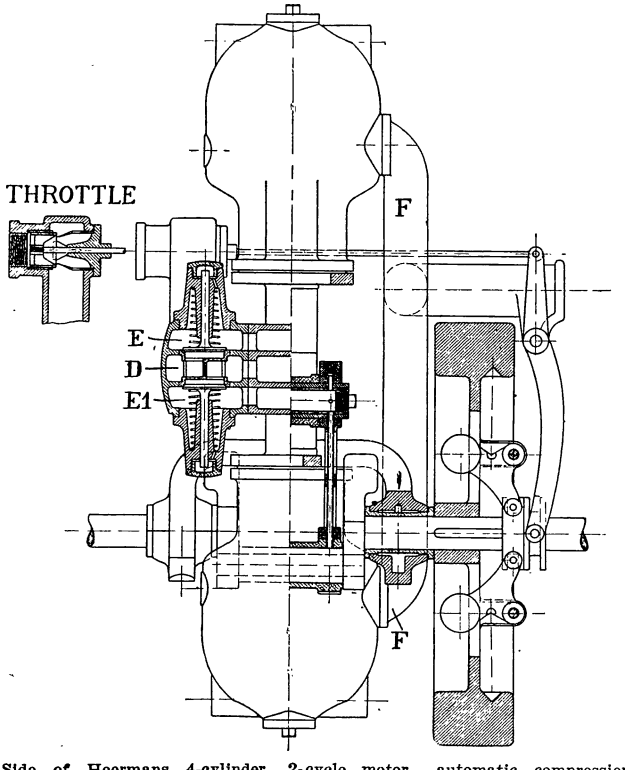

Fig. 2. Side of Heermans 4-cylinder, 2-cycle motor, automatic compression chamber valves, and passage from carburetor in section.

OPERATION.

When one pair of pistons move upward the top piston is compressing a charge while the bottom piston is being driven by a fired charge. Since there are four pistons, two of these pistons are always being driven by fired charges, and two of them are always compressing charges. The double bell-crank between the pistons and the single crank transfers working piston pressure to the crank, beginning at intervals of 90 degrees of crank pin angular advance, so that except for the loss of pressure when the exhaust ports are uncovered, 720 degrees of angular advance impulse are delivered to the crank pin during each revolution, or 360 degrees of angular crank advance, making the torque as nearly uniform as that given to the 8-throw crank-shaft by eight 4-cycle cylinders.

ADVANTAGES.

One of the greatest faults of the trunk gas engine, is the uncushioned piston stroke. In the 4-cycle motor 3 of the 4 piston strokes of each cycle end against no piston resistance, and only the compression stroke, ends against a resistance, due to the charge. All uncushioned piston strokes must have the piston and rod momentum resisted and absorbed by the crank-pin, which must also start and accelerate the rod and piston in the next stroke. In slow speed engines this fault does not lead to serious working losses, but in small, high-speed motors the piston and rod must be made as light as possible to avoid loss of power in piston and rod acceleration and retardation.

This is the first gas engine noted by the writer in which every piston stroke is cushioned, so that piston and rod momentum is taken up by useful work in charge compression, instead of having to be wastefully overcome by crank and flywheel momentum

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HARTFORD MIDGLEY TREAD TIRE

Clincher or Dunlop

Successful, Safe, Sound and Sightly

¶ From these pictures you'll get a good idea of the tire that has created a veritable sensation in all Motordom.

¶ Eminent experts like Hiram Percy Maxim, Henry Souther, Herbert Lyttle, Owners who drive, Drivers of Track, Road and Endurance Contests, Chauffeurs—all agree that it's the greatest tire invention of the age.

¶ Think what it means to buy a tire—**a tire mind you**—not a separate device—that will **never** slip or skid, even on ice. Think of 200 little spikes—**like cat's claws**, in each tire—that grip the ground continuously, yet that detract not one whit from **fastness or resiliency.**

¶ Why be satisfied with any other tire equipment? Act **now.** Insure the safety of your car and its occupants by putting on Hartford Midgley Tread Clincher or Dunlop Tires. Better have MIDGLEY UNIVERSAL RIMS, too. You can then use Clincher or Dunlop Tires at your option.

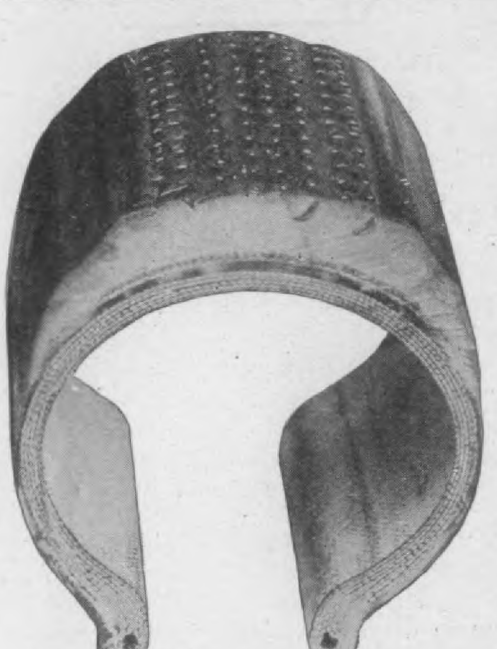
Millimeter Sizes for Foreign Cars

FREE New Road Map to Jamestown Exposition and booklet on Hartford Midgley Tread Clincher or Dunlop Tires. Write today

The Hartford Rubber Works Co.

HARTFORD - CONNECTICUT

Showing Section of Midgley Universal Rim



Showing Actual Condition after 3,400 Miles use. See the "Cat's Claws?"

New York—88 Chambers St. and 1769 Broadway. Chicago—83 Michigan Ave. Boston—494 Atlantic Av and 1020 Boylston St. Cleveland—1831 Euclid Ave. Detroit—256 Jefferson Ave. Denver—1564 Broadwa Philadelphia—138 North Tenth St. Buffalo—725 Main St. Atlanta, Georgia—55 Auburn Ave. Los Ang les—1505 South Main St. San Francisco—423-433 Golden Gate Ave.

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PISTON SIDE THRUST.

The second fault of the trunk gas engine in kinetic importance, is the piston side-thrust due to connecting rod angle. The vertical motor, ordinary form, is higher than is desirable, and the rod is shortened to the utmost permissible extent, to reduce the motor height as much as may be. Two piston strokes is about the maximum rod-length practice, and this gives a heavy side pressure on the piston.

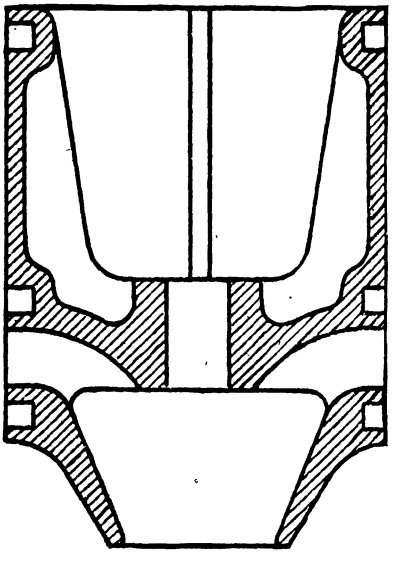

Fig. 3. Piston of Heermans' Engine.

In the motor in question the piston side thrust is almost wholly eliminated. The squared pinblocks have only a small cross-travel in the piston rod yokes, and as these pinblocks can have ample surface and can readily be made self-lubricating and can be encased and dust-proof, the side-thrust on the piston rod is reduced to a negligible factor.

NUMBER OF CRANKS.

By this construction there is but one throw for 4 cylinders, and the double bell-crank makes this one crank the exact equivalent of a four throw crank-shaft in impulse distribution of the ordinary form of motor.

NUMBER OF SLIDING SURFACES.

Counting crank-shaft bearings as equal in area and frictional resistance, and piston and cylinder friction as also the same in the ordinary motor as in Heermans' motor, tho in both these friction-producing element combinations the advantages are largely in favor of the Heermans motor, there remain 4 joints in the Heermans engine as against 8 joints, two for each connecting rod, in a 4-cylinder motor, ordinary form. Heermans' motor has two sliding surfaces and two pin-bearings which do not appear in the ordinary motor, but these have very slight travels and correspondingly small friction losses, and are offset by the saving in piston and cylinder friction.

DIMENSIONS AND WEIGHT.

The 4-cylinder motor, cylinders 5¼x 5 5-16 ins., requires 42 ins., height, 33½ ins. width, and 24 ins. in length, which is a saving in length over that of an ordinary 4-cylinder vertical, 5 ins. dia. motor, but is considerably higher than the usual type. The weight is about the same as a 4-cylinder motor of equal bore and stroke, and theoretically should give a notably greater horsepower than those of ordinary form

To sum up, this motor is small, has a single throw crank-shaft, develops small internal friction, is simple and easy to build, and has but one joint, that on the crank pin, subjected to severe duty, and this bearing is of such very large dimensions that it should wear well, there should be but little wear on the cylinder walls, as there is almost no side thrust, and every bearing is amply supported on both sides. The torque is better than in anything 4-cycle with less than 8 cylinders, and the motor has no valves save the four very light compression chamber intake-valves, which are cold, and work under no pressure at all, save that of a light closing spring.

COST.

This is an extremely cheap motor to build, its forms and dimensions being all highly suitable for repetition tool machining, and call for but little hand fitting at any point.

The Police and Fire Commissioners of Grand Rapids, Mich., have so hampered the demonstrating of Austin Cars by severe insistence on unreasonable speed limits, that the manufacturers, Austin Auto Co., are strongly inclined to move their plant to Detroit, Mich.

Beginning next fall, automobiling will be included in the manual training course of the Washington University, according to a plan suggested by Dean C. M. Woodward and backed by Samuel Cupples, who has promised to donate one or two machines as a part of the equipment. The student will be taught all about the automobiles—how to build, repair and run them.

At the annual meeting of the Automobile Club of Cincinnati the following officers were elected: President, Val Duttenhofer; first vice president, Dr. A. B. Hyl; second vice president, F. N. Temple; secretary, Dr. L. S. Colter; treasurer, C. Gordon Neff.

In addition to the factory testing crew Pope Motor Car Co., Toledo, Ohio, also employ a testing crew under the direction of the sales department, so that every Pope Toledo car after being tuned up to perfect operation by the factory crew, is taken in hand by the sales department crew who are naturally determined to have the car right. In the final inspection after the body has been fitted, etc., the sales department is also represented.

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The Trade-Mark of

"Sterling Quality" in Tires.

SIDE-WIRE SOLID MOTOR TIRES

Made in Single and Dual Types.

There is not an "ounce of experiment" in these tires; they have become the recognized standard of the World by fulfilling their promises.

We offer to makers and users of Commercial Motor Vehicles, the benefit of our wide experience, in solving their tire problems.

Complete Literature upon Request.

PNEUMATIC TIRES

For All Standard Rims.

Catalog just issued, illustrates our complete line of Pneumatic Tires, the Safety Universal Rim, Dismountable Rim, Dual Tread, etc., etc.

Send for it to-day.

The Largest Exclusive Rubber Tire Makers in America.

Firestone Tire & Rubber Co.,

Factory and General Offices, Akron, Ohio.

BRANCHES:

New York, Boston, Philadelphia, Chicago, St. Louis, Detroit, Buffalo, Pittsburg.

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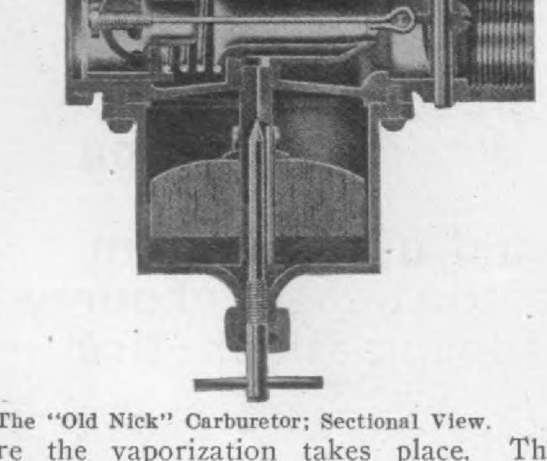
a street, Indianapolis, Ind., who claim
be equally adapted for use with either
line or alcohol, or even coal oil.
is of the float feed type, and can be
ed in all positions except upside down.
orization is effected by means of a dou-
volume of air, one coming thru the center
circle and the other over the outside,
ing at the point of the spray nozzle,

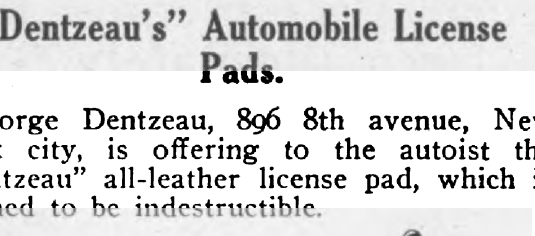


The "Old Nick" Carburetor; Sectional View.

re the vaporization takes place. The
uretor is made in ½, ¾, 1, 1¼, 1½ and
h sizes, for 1 to 6 cylinders, and lists
, $10, $12, $15, $20 and $25 respectively.
ey also make a special carburetor, fin-
l inside and out and made vertical, and
vn as the "Old Knick" Special. It is
e in 1, 1¼ and 1½-inch sizes and lists
15, $20 and $25, respectively.

Dentzeau's" Automobile License Pads.

orge Dentzeau, 896 8th avenue, New
city, is offering to the autoist the
tzeau" all-leather license pad, which is
ed to be indestructible.



Dentzeau's N. Y. and N. J. Double Pad.

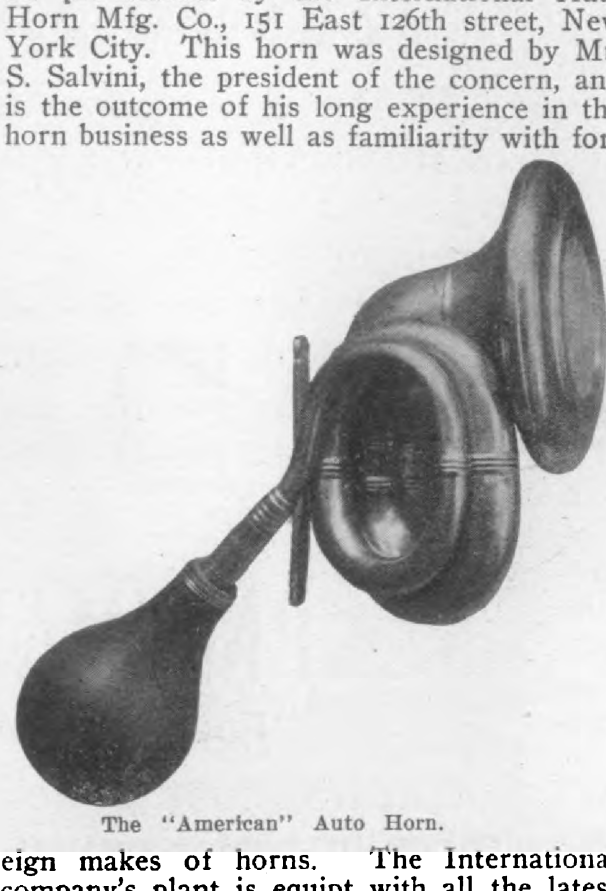
e pads are made of the best quality of

Dentzeau's N. Y. State Single License Pad.

His single pad lists at $2.00, and the dou
ble pad at $4.00. Red Cross pads are liste
at $2.00, and spring straps at $3.50 per pai

The "American" Auto Horn

The accompanying cut shows the lates
model of the "American" Auto Horn place
on the market by the International Aut
Horn Mfg. Co., 151 East 126th street, Ne
York City. This horn was designed by M
S. Salvini, the president of the concern, an
is the outcome of his long experience in th
horn business as well as familiarity with fo



The "American" Auto Horn.

eign makes of horns. The Internationa
company's plant is equipt with all the lates
improvements in the line of tools, machiner
and appliances. Their No. 32 horn lists a
$4.00 and is fitted with a fine French bulb
reed, fifty-inch flexible air-tight tube and
screen. They guarantee every horn.

The "Champion" Automobile Jack

Patterson, Gottfried & Hunter, Ltd., 146
150 Center street, New York city, hav
brought out a new style of Champion jack
which is illustrated herewith.

The fundamental principle of this jac
is in the turn buckle, the right hand threa
running thru one end and the left han
thread thru the other, so that when turn

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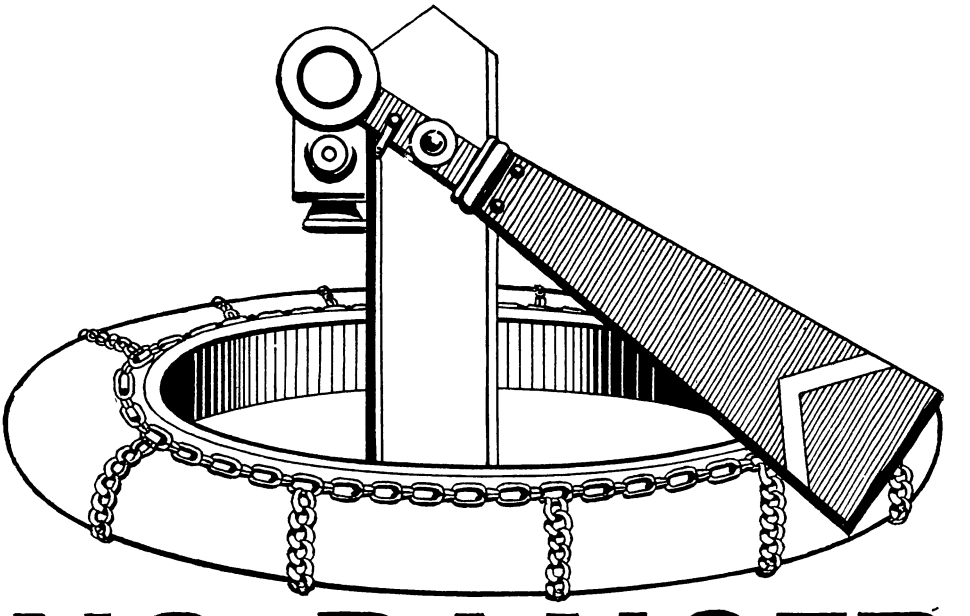

NO DANGER
OF
SKIDDING
WITH
WEED CHAIN
TIRE GRIPS
ON THE WHEELS OF YOUR CAR

Weed Chain Tire Grip Co.

28 Moore St., N. Y. City, N. Y.

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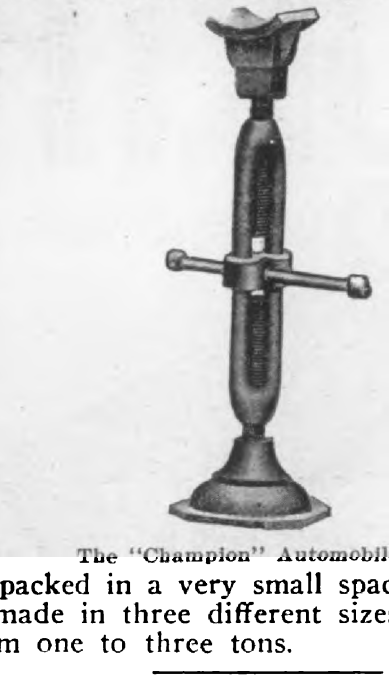


The "Champion" Automobile Jack.

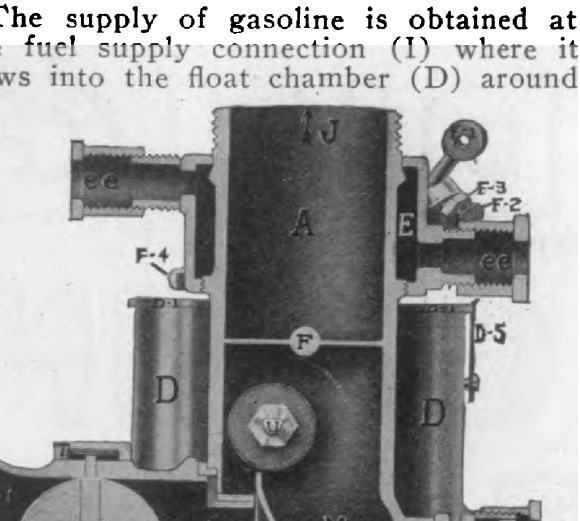
packed in a very small space. This jack made in three different sizes, taking cars m one to three tons.

The "Hall" Carburetor

We show herewith perspective and sec-nal views of the "Hall" carburetor, nufactured by the Charles E. Hall Co., Broadway, Buffalo, N. Y.

The operation of the "Hall" carburetor as follows:

The supply of gasoline is obtained at fuel supply connection (I) where it ws into the float chamber (D) around

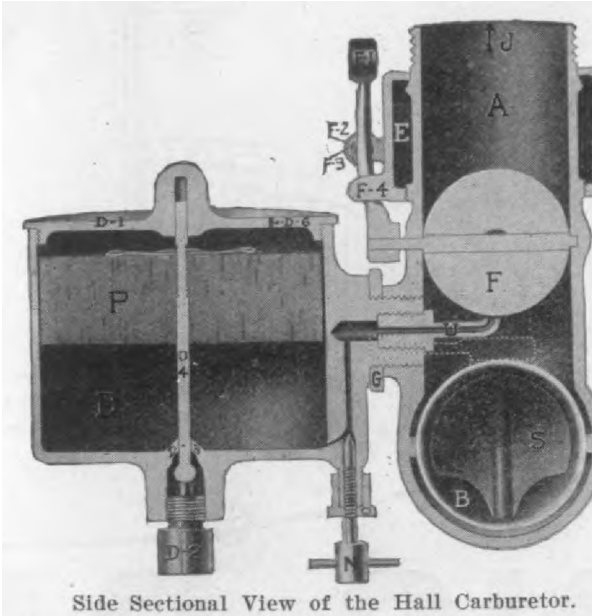


End Sectional View of the Hall Carburetor.

ball point of the float valve (D-3). As chamber fills with gasoline, the float), which is adjustable on the float-valve m, is raised, which brings the ball of

except for the strangling valve (Q) whi regulates the amount of voluntary air th is allowed to enter the mixing chamber.

At slow speeds the automatic air val (L) remains closed, and so closing the a port (except that portion controlled



Side Sectional View of the Hall Carburetor.

the strangling valve (Q), thereby causi a partial vacuum in the mixing chaml (A), accordingly, thereby lifting the quired amount of gasoline from the spr nozzle (U), to give the proper mixtu As the speed of the motor is increas and more fuel required, the increased va uum automatically opens the automa air valve (L), and so supplies the nec sary additional air, thus automatica maintaining a perfect explosive mixture

Re-Charging Tire-Filling Tanks

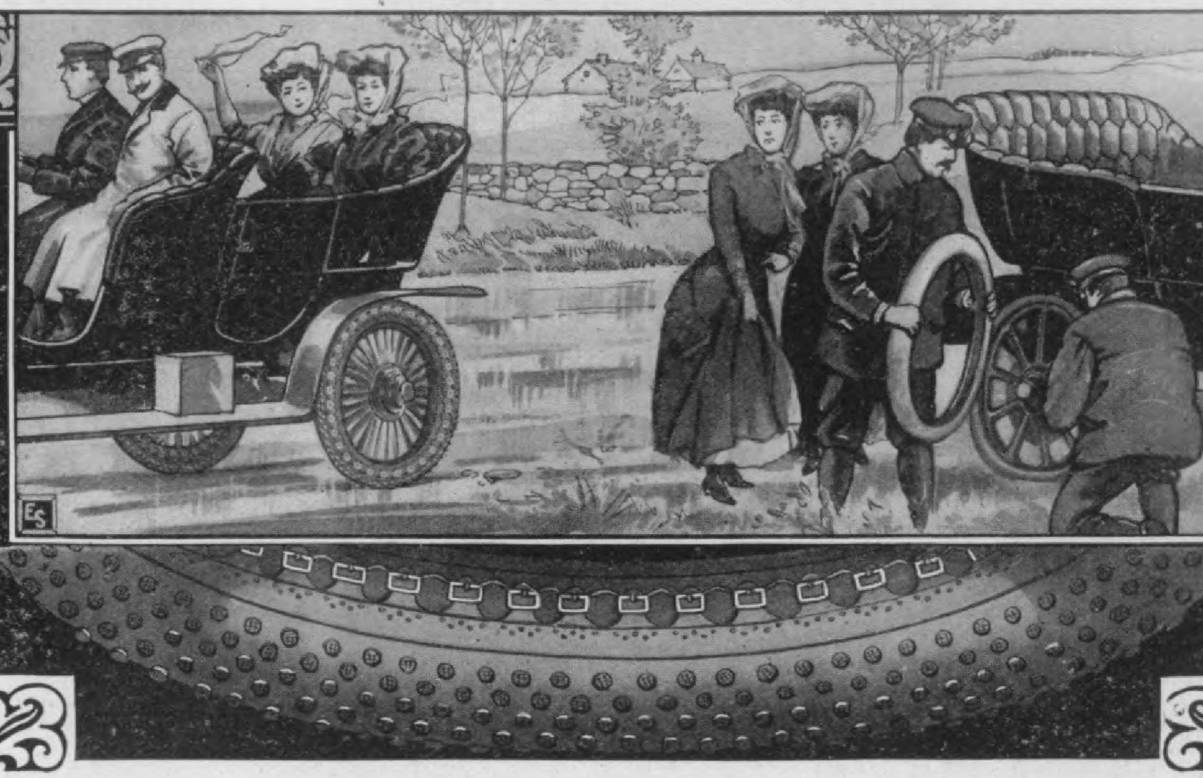
We have received from P. C. Avery, Milwaukee, Wis., a complete explanation how to charge tire-filling tanks from t large drums of liquid carbonic acid g which can be purchased from any one a dozen concerns in this country. T sizes of these drums are furnished, of and 50 pounds capacity respectively.

To fill small tank proceed as follov Turn the large drum of gas, bottom e up, with the valve down; support it on t wall by means of a strap or band of ir so that the valve will be about three f from the floor, which is a handy distance

Use three or four feet of 20-gauge inch brass or copper tubing to connect t large gas drum and the tire tank. The t tank should be set in a large bucket

WOODWORTH

DETACHABLE **TREAD** ADJUSTABLE



Tires Protected with Woodworth Treads Cannot be Punctured

Punctures and other Tire Troubles that cause wayside Delays are not only Costly but Unnecessary. They can be Avoided. The pneumatic tire is made of rubber; a substance too tender to withstand the hard usage to which it is subjected. It is not tough and cannot last long however careful the running. The Woodworth Tread Protects the Pneumatic Tire Precisely as a Shoe Protects the Foot. It Bears all the hard knocks, roughs and scuffs, wear and tear of rocky roads, rutty roads, slippery roads, muddy roads, sandy roads and all kinds of roads. It does More to Make the Running of an Automobile Safe and Economical than All Other Devices ever Invented for the Purpose. It has Saved Thousands of Tires from Punctures, Prevented Thousands of Accidents, Saved Many a Car from Demolition, Saved Many a Life and May Save Yours. Write to-day for booklet, "Safe & Sane Automobiling." Sizes and prices as follows:

	Each		Each		Each		Each
26x2	$ 8.00	30x2½	12.00	32x3½	16.00	34x5	23.00
26x2½	10.00	30x3	13.00	32x4	18.00	36x2½	16 00
26x3	11.00	30x3½	15.00	34x2½	15.00	36x3	18.00
28x2½	11.00	30x4	16.00	34x3	16.00	36x3½	19.00
28x3	12.00	32x2½	14.00	34x3½	18.00	36x4	20.00
28x3½	14.00	32x3	15 00	34x4	19 00	36x4½	22.00
				34x4½	20.00	36x5	25.00

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t runabouts such as the 4-cylinder Ford, xwell and Autocar, Irvin Robbins & Co., East Georgia St., Indianapolis, Ind., are ring the body shown in the accompany-

"Robbins" Light Coupe Top for Runabouts.

cut. It is light in construction and, efore, adds little to the weight of the after the regular seat is removed.

he painting and finish of this body is le to match that of the car. The inside mings are furnished in leather, with ngs and hair padding. The arrangement shifting of all glass in mahogany frames ows much after recognized limousine struction, so that it can be used as an n body as well as entirely closed up in ter. No pains have been spared to make fittings, trimmings and finish up-to-date elegant.

he tops are shipt crated, ready to attach the body, with complete instructions for alling the same.

Retreading Automobile Tires

new process of retreading worn or d automobile tires has recently been oduced by the manufacturers of Her-es Leather Tires, the Republic Rubber e and Shoe Co., 449 West Fifty-third eet, New York city. By the new pro-s tires are retreaded in twenty-four rs' time with pure white or bright red ber treads, made in one piece from the st Para gum compound. The treads thick in the centre, or wearing surface, thin on the edge toward the beads the tires, and are claimed to give won-ful wear and service at one-half the t of ordinary treads. Each tread is y guaranteed, and both rubber and her non-skid treads are protected by ted States patents.

New Smith Dashboard Moulding

oseph N. Smith & Co., Detroit, Mich., ing is for dashes three-quarters inch thic The size of the corner may be varied suit. The mouldings are furnished polis ed and complete, with screws ready f

New "Smith" Dashboard Moulding.

immediate attachment to the dash. The have met with enthusiastic approval fro those who have been shown samples a the prospects are for a very large use these mouldings on 1908 cars.

"J.-M." Asbestos Motor Cement

This cement is made of asbestos and wh applied forms a fireproof covering on heat surfaces of all kinds. It is made by H. W Johns-Manville Co., 100 William street, Ne York city, and is especially adapted for coa ing automobile and marine motors, muffle etc., to prevent surroundings from catchi fire and to keep discomforting heat from pa sengers.

This cement is easily applied, is very a hesive and will withstand vibration. It put up in five-pound packages, listing at cents each, with discount to the trade.

The American Die Casting Co.

The American Die Casting Company, Indianapolis, Ind., was duly organized a incorporated in Indianapolis, Indiana, February 1st, 1907. This company mak a specialty of die-casting bearings a other parts, and they produce castings all bearing metals, including all whi metals, babbitts, white brasses a bronzes, on the market. These castin are smooth and true, and are cast to a tual finished size, hence they need no m chining.

They guarantee the composition of t castings thus produced to contain the sa percentage of alloy as in the original b or the metal furnished. By this proce the shrinkage or loss is almost eliminate and in no case does the shrinkage or lo exceed five per cent. of the net weight.

A die made for one kind of metal them will cast any of the bearing met on the market with true surface and f ished to size without machining. T company makes the dies on such ter that the cost of the dies is wholly eli inated.

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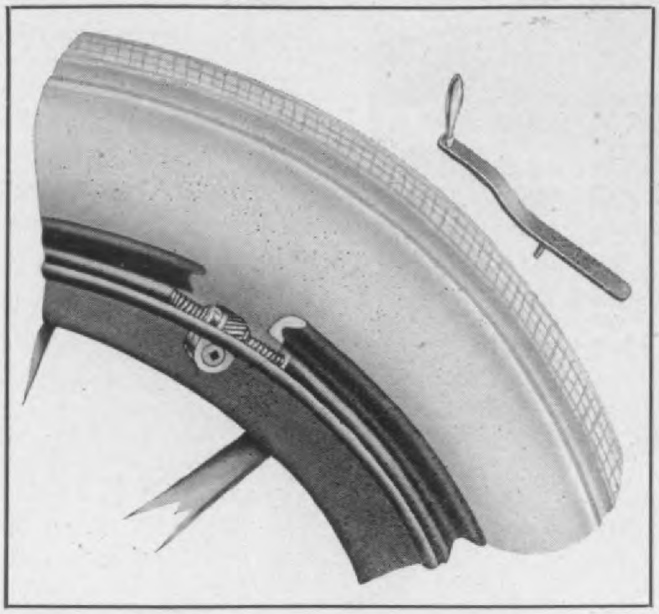
At a special meeting of the directors

THREE BIG THINGS
Accomplished for the Motorist



A LONG-LIVED TIRE—

Morgan & Wright Tires are made of extremely tough rubber stock; the fabri (the best quality obtainable) is utilized in a manner that greatly enhances it normal strength, and the *shape* of the completed tire is such as to give it the leas possible strain when inflated. The result (proven by the experience of hundred of motorists) is a tire that *can* and *does* stand a tremendous amount of hard usage

AN ANTI-SKIDDING DEVICE—

The Midgley Tread is wholly unlike any other device offered to motorists fo the same purpose. The four endless spiral wires (firmly vulcanized into th rubber) are not only effective on a *new* tire, but become *increasingly* so as th tread wears down—which is emphatically *not* the case with any other device The fact that this tread is not an attachment, but *a part of the tire*, is also a stron point in its favor, and one much appreciated by motorists.

A SAFE AND CONVENIENT DETACHABLE RIM—

The Midgley Universal Rim is unquestionably the most used rim on the mar ket. It is the *only* rim that will satisfactorily accommodate either Clincher o Dunlop tires with the *same set* of beads (Midgley beads have only to be reverse to change from one style to the other). Above illustration shows position o bead for Dunlop tire; also the turnbuckle fastening and the operating wrench In addition to its simplicity of operation, this rim has the added (and ver essential) virtue of being an absolutely *safe* rim to use.

MORGAN & WRIGHT, DETROIT

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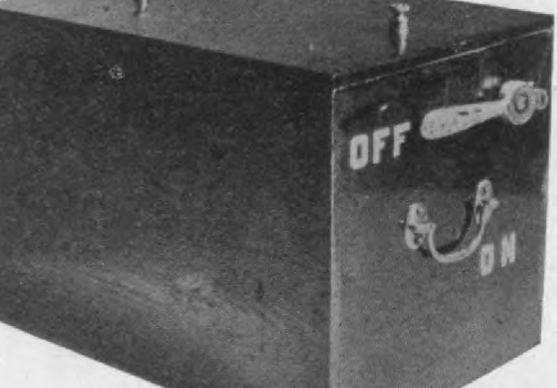
New York: 214 W. 47th St. Pittsburg: 913 East Liberty St. Kansas City: 1030 Holmes St.

a new sparking battery which possesses unique feature in the method of charging ployed. The makers claim that the bat- can be fully charged in a few minutes simply putting in a comprest briquette of



The "Hite" Sparking Battery.

ret composition. These briquettes may carried in the tool chest or any conveni- place, as they occupy but little space. ch briquette will charge the battery suf- ently for 1000 miles running.

'he battery is durable and well construct- presenting a handsome appearance. It l give from six to eight volts, depending n the coil used.

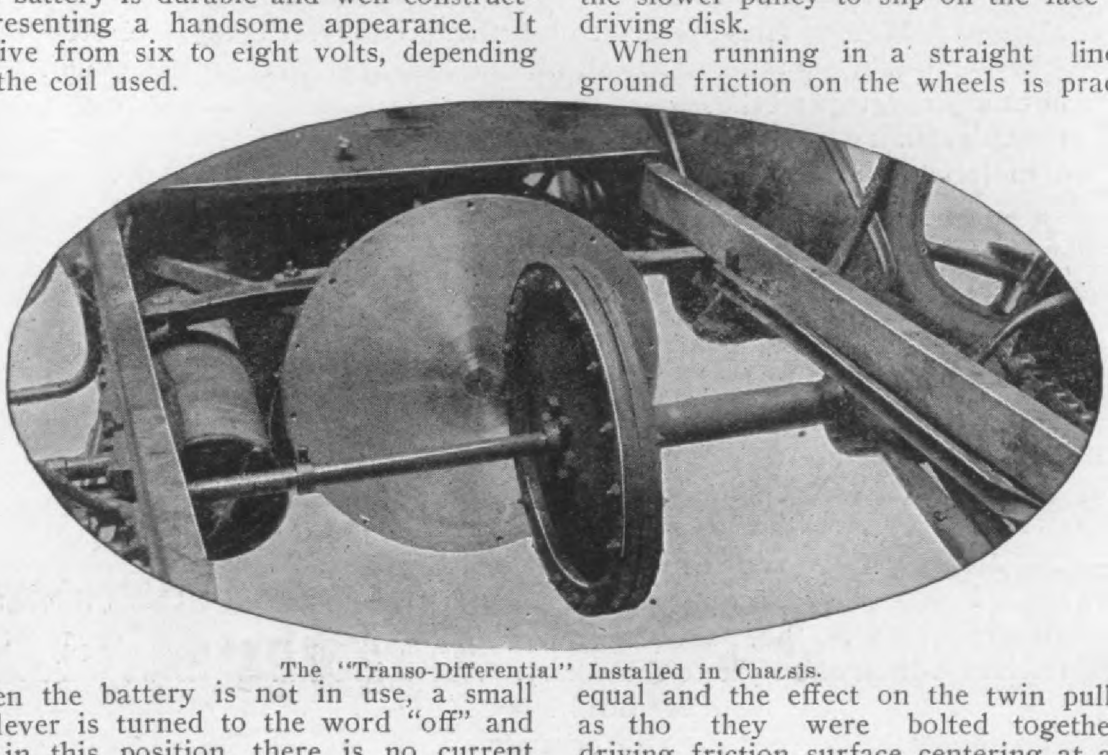
The "Transo-Differential"

In naming this device the makers have e deavored to suggest its functions and ha therefore called it the "Transo-Differentia as it is a combination of the transmissi and the differential. This combination is i tended to increase the efficiency and durabi ty of the car, as well as to lower its co so that makers of low and moderate-pric cars will not be put to the use of cheap tran mission and differentials. The price of t "Transo-Differential" is $75, a discount bei given to manufacturers.

The transmitting of motion is accomplis ed thru friction disks, the operation of whi is already well known and needs no explan tion.

The compensating feature is secured dividing the driven pulley into two distin and independent halves, revolving on t same axis and driven by the same disk, b independently, and each connected to a re wheel by a side chain. In turning a corn the power is transmitted to the wheel givi the least resistance on the ground (which of course, the wheel describing the great circle) causing its driving pulley to "r ahead," so to speak, of its twin, and causi the slower pulley to slip on the face of t driving disk.

When running in a straight line t ground friction on the wheels is practica



The "Transo-Differential" Installed in Chassis.

Vhen the battery is not in use, a small d lever is turned to the word "off" and en in this position, there is no current ving, and it is claimed no deterioration in ngth, even tho the battery stands idle for nths. By turning the handle downward the word "on," the battery is instantly dy for action. There are only two ter- als, so it is impossible to connect it im-

equal and the effect on the twin pulleys as tho they were bolted together, t driving friction surface centering at a poi midway between the respective surface ce ters of the driving pulleys and the whee travel at the same rate of speed.

The use of the Transo-Differential eli inates the bridge work necessary for t hanging of the usual transmission gear ca

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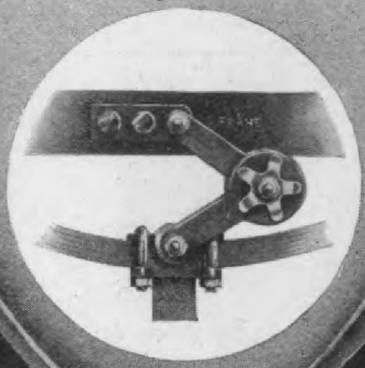
TRUFFAULT-HARTFORD SHOCK ABSORBER

SHIELDS YOU

From the dangers and discomforts of riding on rough roads. They prevent the breaking of springs, save time, tires and trouble. They are an absolute necessity on any car and can easily be applied. It is not necessary to have a master mechanic put them on, we supply all the necessary fittings and furnish blue print without additional charge, provided make and model of car is given with the order. Seventeen prominent manufacturers use them as part of their equipment. Order them right now, you will not be disappointed. We guarantee them. Our booklet goes into the subject more fully.



THE PIONEER THE BEST

HARTFORD SUSPENSION CO.

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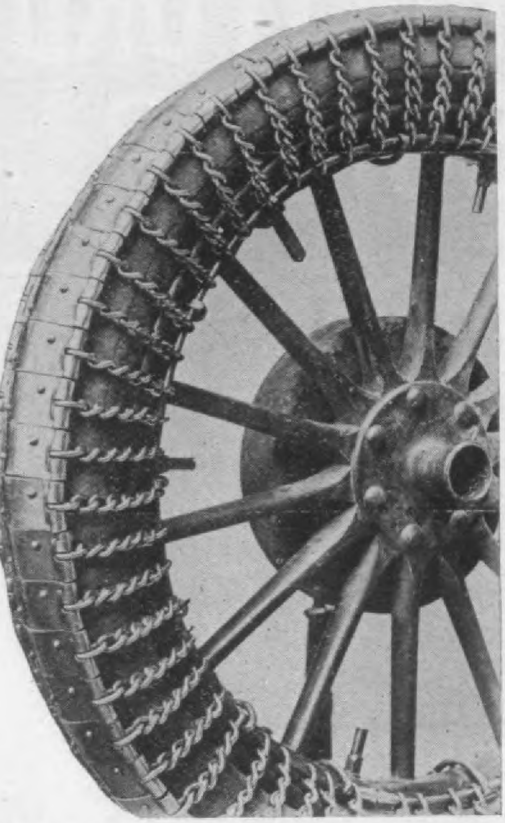
npany, Spirit Lake, Iowa, and is claimed eliminate punctures, blowouts, skidding wearing-out of tires.



Three-quarter View of a Section of the "Perfect" Tire Cover Applied to Wheel.

This cover is made with steel plates about inches wide, ovaled so as to fit the tread the tire perfectly and is lined with a belt- which holds it together and allows only smooth belting to touch the tire. The es are made wide enough so that they trude over the width of the tread a little.

are as follows: All sizes up to and inclu ing size 36x3, list at $20 each; all sizes b tween 36x3 and 30x4½ inches, list at $25, an all sizes from 30x4½ up to 40x5 inches, $30 each. Extra sections with chains attac ed list at 50 cents each.

"Fisk" Automobile Overhead Washin Machine

The J. W. Fisk Iron Works, 39 and Park Place, New York City, are manufa turing a line of overhead washing machine known respectively as the "Favorite," "Lea er," "Utility," and the "Elite." The "Favo ite" is here illustrated and lists at $25.

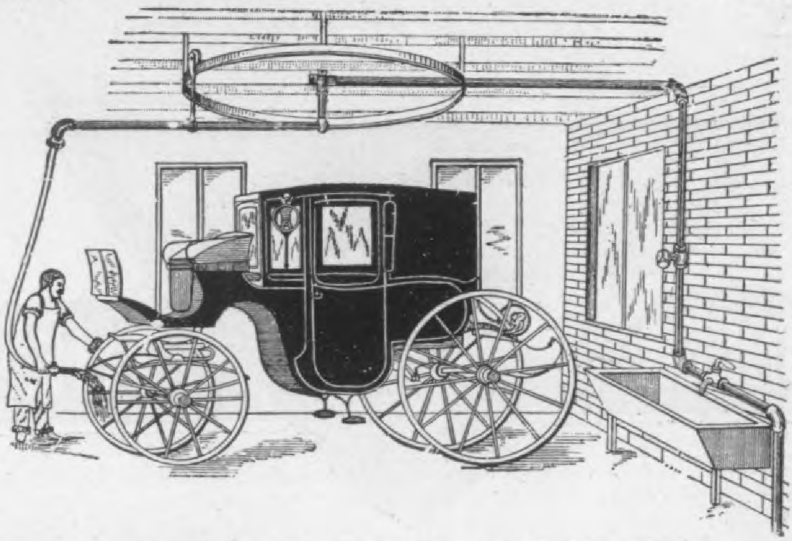
It is very substantially constructed an will withstand the rough usage usually a corded devices of this nature.

It consists of a galvanized steel trac upon which a roller, mounted upon th end of a long arm, travels. The princip working parts are of brass, and the wate tight joints are specially constructed not only wear well, but to prevent leakin

Their "Leader" does not contain all t improvements of their other machines, b fills the bill for those wanting a machine a minimum price. It lists at $20.

The "Utility" lists at $30, and by the a plication of ball bearings they are able give additional strength to the machine wit out the use of ball bearings.

For use in private garages and for tho wanting a high-priced machine, they off the "Elite." It is a small, neat, compa and ornamental machine, fitted with b bearings, and is guaranteed to give perfe satisfaction. It lists at $40.



The "Favorite" Automobile Overhead Washing Machine.

A. H. Wells & Co., Waterbury, Conn., a making a complete line of tubing for aut mobile construction. Their product consi

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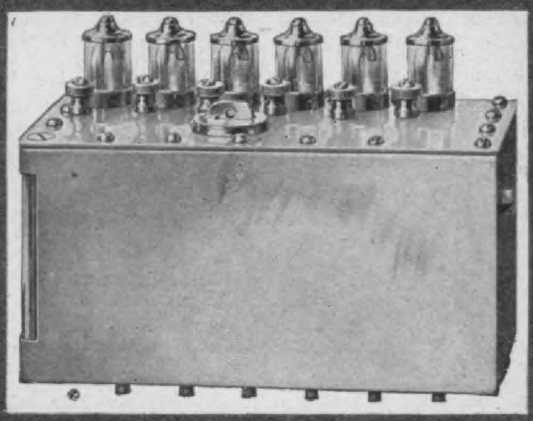
McCORD & COMPANY

1412 OLD COLONY BLDG.,

CHICAGO, U.S.A.

NEW YORK OFFICE, 24 BROAD ST.



McCORD

FORCE FEED LUBRICATORS

RADIATORS

CARBURETORS

WIRE BELTING

SPARK PLUGS

CIRCULATING PUMPS

McKIM COPPER

ASBESTOS GASKETS

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Trade Printed Matter

The small tool department of the Pratt & Whitney Co., Hartford, Conn., have just issued its catalog No. 4, covering taps, dies, milling cutters, drills, lathe tools, reamers, punches, special tools, etc., and the catalog is notable for the clearness of the illustrations and its generally excellent appearance as well as for the very ample data contained in it. Besides descriptive data on the tools illustrated, it contains tables of various gages, weights, etc., useful to users of these tools. It is fully indexed.

A neat folder has just been issued by the Peerless Motor Car Company, Cleveland, Ohio, with eight finely engraved plates of Model 15, forty-five horse power and Model 16, thirty horse power 1907 Peerless cars. These represent the eight principal types of modern motor car, the open four and seven-passenger touring car, the racy style of roadster, Limousine coupe, cape top roadster, Berline and demi-limousine body and hansom. The brochure is so arranged that it unfolds to make a very neat picture framed or otherwise that will add to the artistic appearance of an office or elsewhere.

The security of Fisk mechanically fastened automobile tires is the theme of a booklet recently issued by Fisk Rubber Co., Chicopee Falls, Mass. A number of pages contain fac simile reproductions of newspaper articles on automobile accidents resulting from tires coming off rims. The point that Fisk tires cannot come off accidentally is strongly brought to the attention of the reader.

Quite a handsome booklet has recently been issued by Firestone Tire and Rubber Co., of Akron, Ohio, descriptive of their pneumatic tires. Besides being good looking, this booklet has a ring of practicability that makes it attractive from a common sense point of view. From the first paragraph, explaining that the data in the booklet has been prepared by practical men to the final statement that "the factory is back of each branch and repair shop" the booklet appeals to one's reason and common sense.

An elegant catalog, a fitting introduction for an elegant instrument, has lately been issued by Stewart & Clark Mfg. Co., 502-520 Diversey Boulevard, Chicago, exploiting the 1908 Stewart Speedometer. It is printed on fine enameled paper on which the well made half-tone engravings have made clear, attractive illustrations, and not only the appearance, but the contents of this catalog leave a most favorable impression on the mind of a recipient. Strong arguments are offered in support of the type of mechanism used and each detail of construction is fully explained so that the reader gets a very clear idea of the reason for every step in the designing and constructing of Stewart Speedometers.

In the latest folder sent to tire dealers by Goodyear Tire and Rubber Co., Akron, Ohio, they make use of card terms and use playing cards in the cover illustration. The folder is, as they put it, is their "show down" and they very forcibly prove that they hold a good hand and that the dealer will hold a good hand if he handles Goodyear tires. One very convincing point brought out is the fact that Goodyear replacements amount to 1.41 per cent.

The catalog of the Union Supply Co., of Toledo, O., is very convincing and substantial evidence that the first-class, hustling, up-to-date jobbers of automobile material are not all located in the East. The catalog they issue contains about 100 pages and as a good, heavy paper is used the book is quite thick and substantial looking. The compilers have shown good sense in using good white paper, good illustrations (and lots of them), and in employing a first-class printer, so that altogether from a typographical point of view and from a ultilitarian point of view the book is a first-class job and not only reflects credit on the company and goods it advertises, but makes the sort of impression on a reader that a seller wants to make on a prospective buyer. The manufacturers whose goods are listed in it are fortunate.

The latest catalog of the Acme Motor Car Co., of Reading, Pa., is printed on stiff tinted paper and the cover design is an artistic poster effect showing a motorist pressing a horn bulb while out of the horn comes a blast of favorable sentiment anent the Acme cars. The illustrative scheme includes a novelty in a picture entitled "A Mid-Winter Night's Dream," showing an Acme car in moonlit, mid-winter scenery.

"A Past Performance" is the title of a book issued for the Jones Speedometer, by Mr. John B. Rowland, of Publicity Press, New York City. As the title indicates it deals with something which has gone by and not to come, and each page is brimful of entertaining matter. It is the summary of the events which transpired at the housewarming of the new Jones Speedometer building at New Rochelle, on the night of November 18 last, and judging by the illustrations, descriptions, stories and testimonials, it was a night long to be remembered with great pleasure by those who were fortunate enuf to have attended. The book devotes itself primarily to the entertainment which took place at "Forty-five Minutes from Broadway," and altho it is issued as an advertisement for the Jones Speedometer, it is humorous enuf to be sold as a book of wit. Copies can be had free by writing to the Jones Speedometer for their booklet entitled "A Past Performance."

The Automobile Owners' Supply Depot, 1655 Broadway, N. Y., established last year, have issued a catalog of pretentious size and attractive style. The index, which covers all leading accessories, is on the inside front cover inviting one to immediately search for the particular accessories uppermost in one's mind. The catalog is not elaborate, but a very good effect has been secured by the use of clear illustrations and a tasteful arrangement of the same on the pages.

The White Company, Cleveland, Ohio, have just issued the third of its admirable series of route books, which are for free distribution to all tourists. This new issue is devoted to the main touring route between New York and Boston. Complete and accurate road directions are given for traveling over this important route in either direction. The route directions are copiously illustrated, and, in addition, there is a fine double-page map. Copies of White Route Book No. 3, and of the two previous issues, may be obtained on application to The White Company, or to any of its branches or agencies.

Jos. N. Smith & Co., Detroit, Mich., have issued a new 48-page catalog of new, high-grade metal trimmings, etc., for the 1908 trade, and are sending it to the automobile trade in envelopes that are marked: "Don't throw me away, if not wanted to-day; because you'll need me to-morrow."

The latest catalog of the Motor Car Equipment Co., 55 Warren street, N. Y., is, as it purports to be, an encyclopedia of high-grade automobile accessories. It is also a common sense catalog containing plain advice regarding methods of ordering, a caution about prices, a very ample index and other common sense features that appeal to the practical. The company has also shown common sense in having the catalog printed in good style and in using good, white paper on which the illustrations show up to good advantage.

A neat little booklet has just been issued by The Lunkenheimer Co., of Cincinnati, Ohio, to advertise the merits of their generator valves. It is printed in red and black and the cover illustration comprises a half-tone one of the valves surrounded by a conventional design. Both exterior and interior views of each model are shown and the descriptive data given is very complete.

The Diamond Chain and Mfg. Co., Indianapolis, Ind., has issued an instructive treatise on power chains and sprockets. In addition to listing their complete line of automobile, bicycle and motor cycle chains, it gives much information on the manufacture and use of the machined chain. The chapter on power transmission explains the advantages of chain gearing, and draws comparison with belting, bevel gears, etc. It gives instructions and tables of sprocket dimensions which enable any manufacturer to cut the sprockets in his own shops, or test the accuracy of sprockets bought outside. The chapter on care of chains includes good, practical hints which should help any user to get the most and best service from his chains.

Indestructible Steel Wheel Co., 1303 Michigan Ave., Chicago, Ill., taking full advantage of the use of their wheels in an automobile somersault stunt to advertise the great strength of their wheels. Ringling Bros., circus proprietors, are using "Indestructible" wheels on an automobile on which this stunt is performed in their show and they have written the manufacturers a strong testimonial letter which has been reproduced in a 4-page folder in conjunction with illustrations of the hair-raising performance. The folder is being mailed to the automobile trade.

FUELS FOR EXPLOSIVE MOTORS.

This is the title of a pamphlet of 20 pages and cover recently published for private distribution by Maxwell-Briscoe Motor Co., of Tarrytown, N. Y., because of the numerous requests received for an account of the fuel test they recently conducted with three Maxwell cars running on gasoline, alcohol and kerosene, respectively. The pamphlet has been compiled by A. B. Barkman, who has gone into an exhaustive technical treatment of the subject of fuels for explosive motors, working in where most appropriate references to the practical results obtained in the Maxwell test. The matter in this pamphlet, which is 6x9, is set solid in 8-point type and the 20 pages contains immensely more data than would be supposed. As it has all been carefully compiled and is strictly correct, technically, the pamphlet is of value to all persons interested in fuel economy and both the Maxwell Co. and Mr. Barkman deserve the gratitude of the automobile trade for this contribution to the literature of the industry.

A line of coupes especially for the use of physicians is nearing completion in the Winton factory at Cleveland. The body is modeled after the coupe that Mr. Winton has had in his personal service for more than a year. It incloses the steering wheel, the dash and its equipment and the seats, affording the fullest protection from the weather to driver and passenger.

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THE MODEL FRICTION ELIMINATOR FOR BEARINGS IN THE CONSTRUCTION OF HIGH GRADE MOTOR CARS AND MOTOR BOATS IS

AUTOMOBILE BRAND PLASTIC BRONZE

BECAUSE UNDER ALL CONDITIONS IT STANDS THE GREATEST AMOUNT OF USE AND HEAT WITH THE SMALLEST POSSIBLE WEAR AND FRICTION.

ARDMORE, PA., May 28th, 1907.

IGHT MFG. & FOUNDRY CO., Pottstown, Pa.

Gentlemen:—The motor in the car with which we won the 24 Hour Track Championship at Point Breez
May 24th and 25th, was equipped with plastic bronze bearings. We did not have the slightest trouble wit
r bearings throughout the race. The motor ran perfectly cool throughout the entire contest, and at the en
the 24 hours, in which time we covered 791 miles, there was not the slightest slack in any of these bearings
I think this speaks very highly for plastic bronze and I assure you that we will continue to use it unt
e find something better, which now seems impossible.
Thanking you for your many courtesies, we remain, Yours very truly,

THE AUTOCAR CO.

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This bronze has been developed from necessity and its results have made it famou
rings are too important to be made of an inferior or experimental metal. We have dev

Dealers' Department

Helpful Hints

By A. D. Hard, M. E., Marshall, Minn.

A great many automobile manufacturers have their nuts so loosely put on that the first turn of the wrench will render them easily turned off with the fingers. This is inexcusably bad workmanship, and is the cause of many losses on the road that lead to injury to working parts. Another common neglect is not using cotter pins where they are called for. All burrs (or nuts as they are commonly called) that have any chance to rattle loose from the vibration of the motor should be crown nuts with thin steel washers to adjust them to the holes for the cotter pins to retain in place. There is no form of nut-locking so far discovered that is as effective as this. In the car that I am now using I have replaced some twenty-two plain burrs with crown burrs having these steel washers and cotter pins to retain them in place, and I would not change back for ten times what the change cost me.

If you want to make your clincher tires last until the casing wears entirely out without punctures or blow-outs or rim-cuts you can do so easily. For a casing 3½ inches in diameter buy a 3-inch single tube automobile tire of the same wheel size, and cut it open all around on the inner diameter, and remove the retaining studs. Cut the tire in two and after putting it inside the clincher casing mark with a lead pencil where the ends lap. Take it out and cut off enough of the end which was marked to render the tire just one-half inch longer than the mark indicated. Replace the prepared tire in the clincher case and put in a 3-inch inner tube inside of the protecting inner tire, and put on your wheel and pump up. But before you put the inner tire in the casing it will be well to pare the edges of it to a bevel edge in order that it will not wear the inner tube. The place where the ends come together should be protected by a strip of heavy tire tape, or two or three thicknesses of ordinary tire tape in order to protect the inner tube from pinching between the ends. This plan does not involve as much expense as you might at first conclude. Single tube tires, second grade, can be had for $12 for 3x30 size, and you save some expense by using a smaller inner tube. I have found this plan very effective in making tires extremely durable and free from ordinary troubles. As long as tires are properly filled with air they do not undergo any very destructive injury by actual use, but as soon as they begin to go flat, and grind between the rim and the ground, they will rapidly progress toward destruction.

In adjusting a carbureter begin with the least amount of gasolene supply and the largest air supply and adjust up until proper power is obtained without sutting the spark plug.

A small amount of graphite of fine grain will add greatly to the lubricating effect of any oil. Do not use too much.

An ammeter used to test batteries will run down the battery power more in ten minutes' continuous attachment than the use of the batteries for thirty days running the spark plug.

If there was some way to lock the differential so that both drive wheels would pull as though the axle was solid we could frequently get out of mud holes without calling upon the clod-hopper with his team.

St. Louis Show, December 14-21

The St. Louis Automobile Manufacturers' and Dealers' Association recently organized with a membership of fifty-five, have decided to hold a show next December. Dates will be from December 14 to 21.

Omaha Dealers' Race

On Friday, May 26, an interesting race occurred between J. J. Deright driving a Stoddard-Dayton runabout, and H. E. Fredrickson, driving a Thomas forty. The race was over the Dodge street course. Fredrickson gave Deright three-eighths of a mile start, and caught him in three miles.

Both men are dealers in Omaha.

New York Automobile Trade Association Incorporates.

At the last meeting of the Board of Directors of the New York Automobile Trade Association, held in their new rooms in the Motor Mart, the matter of incorporation was completed and the Darracq Motor Car Company, Mr. C. B. Rice; The Haynes Automobile Company, A. G. Southworth Company and D. P. Michols & Company, were elected members. Other matters of importance to dealers in New York were discussed, such as an automobile sale week, the refusal of steamship companies to allow gasoline commercial motor trucks on their piers, and the establishment of a collection department for the benefit of the members.

The first endurance run undertaken by the California Automobile Dealers' Association took place on May 20, proving a success from start to finish. Of the thirty-four cars that participated in the run fifteen cars came thru with perfect scores.

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The Selection of Materials FOR TIMKEN Roller Bearings

are not limited to any grade of stock steel, either by prive or convenience. Every bar of steel is made to the TIMKEN analysis chemically—and tested to the TIMKEN test physically—which test means a rejection of forty-five per cent of every ingot before metal of suitable density and soundness for

Timken Roller Bearings

is obtained. This steel is made for and controlled by us and has proven by practice that though the chemist and metallurgist may do their work with test, tube and crucible, there is only one sure test of anti-friction bearing quality and that is actual work under the most severe conditions. The makers of over 60% of High Grade American Automobiles recognise the

Timken Principle Correct and Timken Quality Supreme

You may not be using them yet—you will when you know the facts in detail. Write us—

THE TIMKEN ROLLER BEARING AXLE CO.

CANTON, OHIO.

EASTERN BRANCH: 10 E. 31st St., New York.
WESTERN BRANCH: 429 Wabash Ave., Chicago.

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Thomas B. Jeffery & Company

Philadelphia Branch.

The Rambler salesrooms, 207-9 North Broad, occupy a 3-story and basement brick building, 45x125 feet, built and owned by the Jeffery Company. The main floor is decorated with potted palms and festoons of autumn foliage, and the walls are relieved by a well selected series of motoring water colors, making an agreeable interior, well calculated to produce a receptive frame of mind in callers of either sex.

Mr. W. F. Smith, general manager of this Jeffery Philadelphia Branch, said that it was the Rambler distributing agency for 11 Eastern and Southern States, and placed 500 cars, total valuation about $850,000 in 1906, and had already, April 26, 1907, handled 265 cars, value amounting to $350,000, and expected to place a total of about 600 cars, valued at about $900,000 during the current year.

The average price of the cars distributed by this agency, which handles the trade of Southern New York, New Jersey, Delaware, Maryland, District of Columbia, Virginia, West Virginia, North and South Carolina, Georgia and Florida, it is stated, is somewhat less than that of 1906 because of the great run on the new 1907 Rambler Model 21, fitted with an opposed cylinder motor, cylinder 5x6 ins., 20-22-H. P.

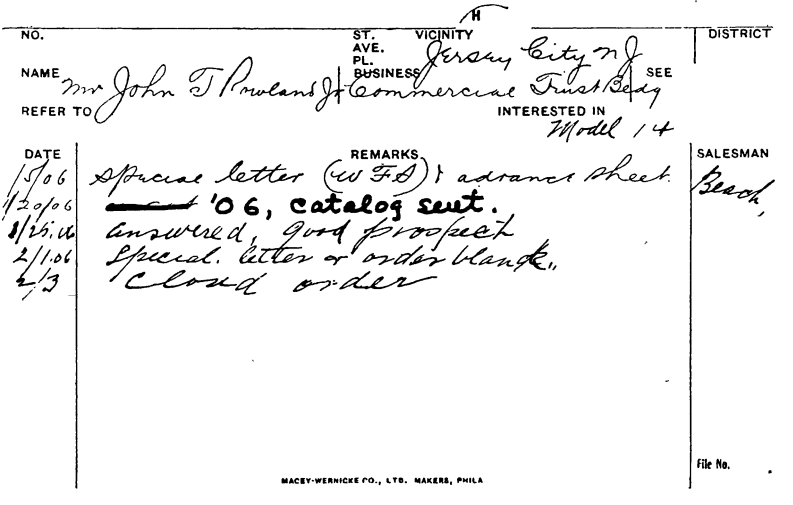
The Rambler Company makes a specially of a liberal treatment of purchasers, and promptness in shipping repairs and replacements for each and every component of any model, even the very old ones, at such individual prices as to actually total less than the retail price of the complete car. This is in strong contrast to the common practice of charging a much larger profit on repairs and replacements than on the completed car assembly, which high-priced practice finds some justification in the large handling costs of single component order filling. Each Rambler purchaser is supplied with a copy of the "Rambler Parts Price List," a 7x10 ins. book of 50 pages, containing the picture, number, code word and price of every component required to produce any Rambler car ever sold, with full instructions for ordering. The Philadelphia Branch has every one of these components in stock and readily accessible, and fills all orders the day received. This parts price list book is added to yearly, so as to keep it always as nearly up to the last factory productions as may be, and advance sheets are sent to agents with the first consignment of a new model, so as to give the purchaser every possibly facility in making repair and replacement orders. Prompt filling of orders for complete cars has also been a marked characteristic of the Rambler policy.

Of course, the great number of Ramblers now on the road gives the Jeffery designers every advantage of "trying out" in the hands of unskilled drivers, so that the things which cause delays are speedily discovered, and hence promptly improved to meet the originally unsuspected requirements of the problem.

In carrying out the details of the thoroughly systematized scheme of Rambler sales, printed matter as follows is used:

(a) A booklet, 32 pp. 3x6 ins., "Talking Points of Rambler Utility Cars, 1907." This book goes thru the 2-cylinder car components in detail, beginning with the chassis frames, and includes specific functional details, and all that the agent need say to the prospective purchaser.

(b) The same size booklet, 28 pp. Rambler 4-cylinder cars, equivalent matter.


NO. ST. AVE. PL. VICINITY Jersey City N J DISTRICT
NAME Mr John T Rowland Jr BUSINESS Commercial Trust Bldg SEE
REFER TO INTERESTED IN Model 14
DATE REMARKS SALESMAN
1/5/06 Special letter (W F S) & advance sheet. Beach
1/20/06 '06, catalog sent.
3/25/06 answered, good prospect
2/1/06 Special letter or order blank.
2/3 Closed order
File No.
MACEY-WERNICKE CO., LTD. MAKERS, PHILA

Rambler Form C Card.

(c) "Open Territory Prospects" index card form, as follows: The example is shown as filled in, and is self-explanatory.

Names of possible buyers received from previous customers principally or from advertising. In regard to advertising, Mr. Smith said that regardless of price, the Jour-

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Here are some strong statements in regard to

Aluminum Alloys

from the best posted man in the country.
Read them carefully

THE HENRY SOUTHER ENGINEERING CO.

Hartford, Conn., June 5, 1907.

Syracuse Aluminum & Bronze Company,
Syracuse, N. Y.

Gentlemen:—

Referring to your letter of May 18th, the test specimens you sent for our Endurance machine shows the following results.

ANALYSIS

Sample	Mark	Manganese	Copper	Aluminum	Zinc
37261	$\frac{3}{70}$ Endurance Specimen	0.11 per cent.	7.84 per cent.	92.05 per cent.	None
37262	$\frac{7}{800}$ "	Trace	0.34 per cent.	83.42 per cent.	16.24 per cent.

ENDURANCE

Sample	Mark	REVOLUTIONS No 1 End	No. 2 End
37261	$\frac{3}{70}$—Endurance Specimen	558,600	816,500
37262	$\frac{7}{800}$ " "	1,550,400	1,618,300

Referring to the above results: To properly understand them, it must be understood that the load was exactly the same in both cases—30 lbs.—and that it produced a fibre of 10,600 lbs. per sq. in., and a deflection of .06".

It is apparent that the alloy containing zinc has double the endurance of the one containing copper. I will further state that these are MOST EXCELLENT results for aluminum alloys, as compared with others tested by us.

Very respectfully,
THE HENRY SOUTHER ENGINEERING CO.
(Signed)
Henry Souther.

Sample 37261 is No. 12 Aluminum
Sample 37262 is OUR ALLOY

The above shows that we know what we are doing.

You cannot afford to use anything but the BEST and the only place to get it is from the

SYRACUSE ALUMINUM & BRONZE COMPANY

530 Leavenworth Avenue, Syracuse, N. Y.

Thomas J. Wetzel, 29 W. 42nd St., New York City, Eastern Sales Agt.

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nal car stories and car advertising gave the largest percentage of tangible results, which is noted with much pride on the part of this publication.

This form (c), like all the other card forms, save in color, is 3x5 ins. stiff index card, pale yellow, printed in black, copy of genuine entries here given. A considerable proportion of the Rambler sales come from information recorded on their index card forms (c).

Upon sale, the purchaser's name, address and particulars are entered on index card for (d), which is the sales record, and is also a record of prospective buyer's information.

Index card forms (c) and (d), with filing cabinets to suit, are supplied to each agent, who is constantly importuned to give prospective purchaser information.

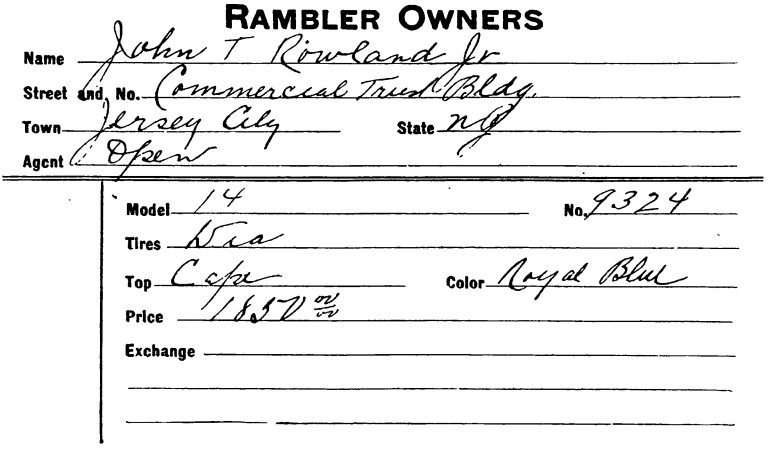
Card form (f) for names of possible purchasers, is also supplied to agents with filing cabinet to suit.

Card form (g). Every Rambler agent is supplied with form (g) and file, and the same form is filed by all principal agents and by the Kenosha Factory, making 3 duplications of each form (g) card filed in 3 different places. Upon this card is kept a record of all changes of ownership of each car sold.

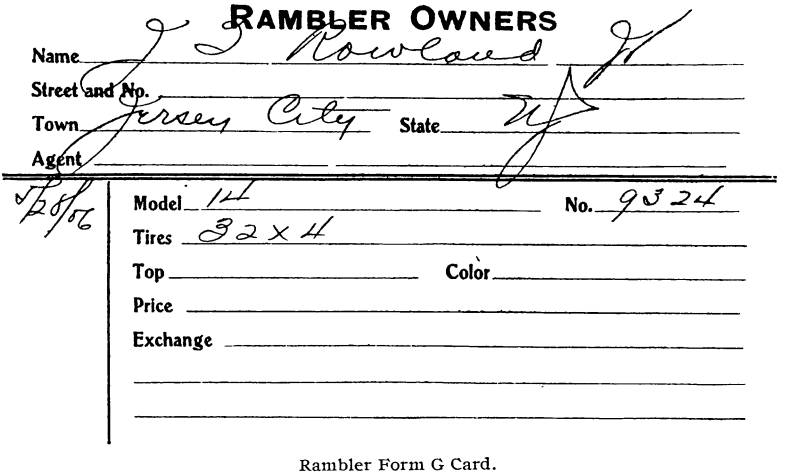
A new card form (h) has just been sent out to Jeffery agents, as a suggestion for trial. This card is a more complete and comprehensive prospective purchaser form than before used. It has been sent to the agents with a letter saying that a different colored card is to be used for each different model, and that this form (h), is a "suggestion," which looks good and is to be tried out.

The card forms given are of interest, and are the most complete yet seen by the writer.

To sum up, the sales of this company are dependent, first, on good cars at very moderate prices, meeting the requirements of middle class purchasers. Second, on solicitous attention to keeping cars sold in satisfactory condition, so that they can be on the road all the time, and thirdly, on the good-will and consequent voluntary commendation of satisfied purchasers and users.


RAMBLER OWNERS
Name John T Rowland Jr
Street and No. Commercial Trust Bldg.
Town Jersey City State N J
Agent C. Opsen
Model 14 No. 9324
Tires Dia
Top Cape Color Royal Blue
Price 1850 00/00
Exchange

Rambler Form D Card.


RAMBLER OWNERS
Name J T Rowland Jr
Street and No.
Town Jersey City State N J
Agent
7/28/06
Model 14 No. 9324
Tires 32 x 4
Top Color
Price
Exchange

Rambler Form G Card.

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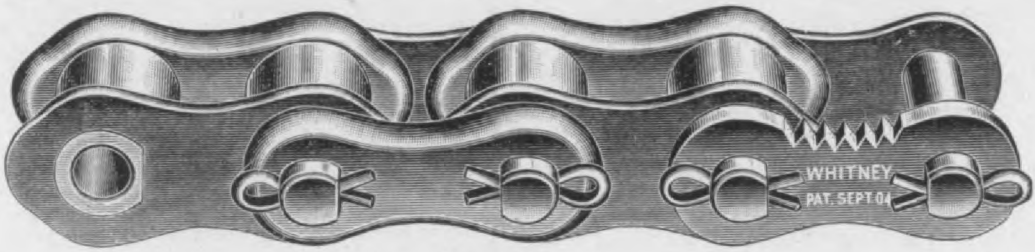
We are now located in our new fire-proof factory building and believe we have t finest chain plant in existence. We are not at this date, (June 1, 1907,) fully settled ar organized in our new quarters but are making rapid progress and can soon show result

During the past year we have invested a very large sum for the improvement conditions and methods and when our new apparatus is in full operation we will mak further gains in quality and efficiency.

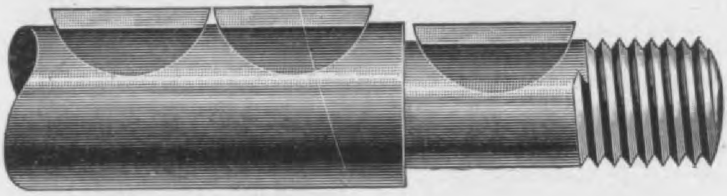
We have provided for a large increase in output being determined to please all cu tomers on delivery. This we have found impossible in the past, as the demand fo "Whitney" Chains has kept steadily ahead of our capacity at our old plant.

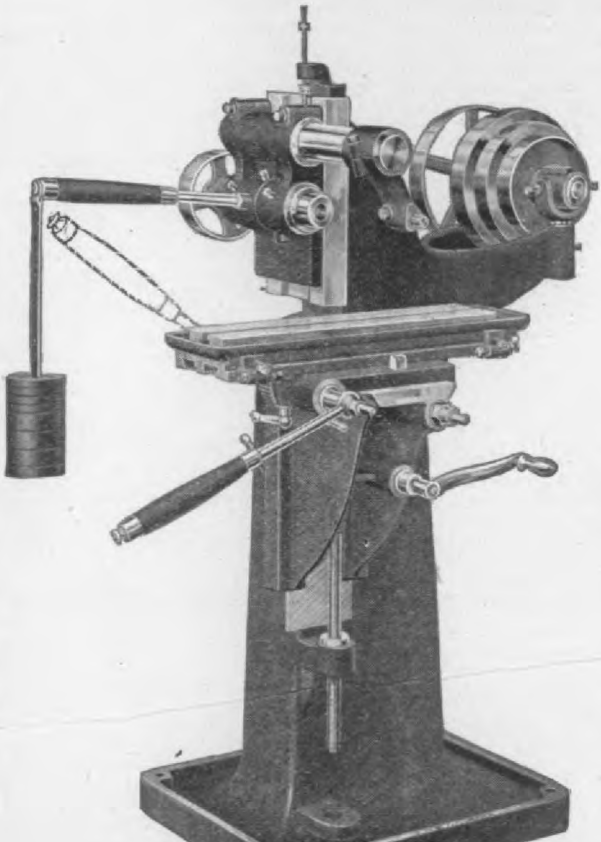
During the past year we have made many important experiments and we can assur you we have not been asleep. Customers who continue with "Whitney" Chains are n likely to regret it.

Our 1908 models will be ready August 1, 1907, which date marks the beginning the new chain season. 1908 price sheets will also be ready on August 1st.



Patented.





"Whitney" Chains

Hand Feed Milling Machines

The Woodruff Patent System of Keying

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Retail Notes

Acme Motor Car Company, of Reading, Pa., upon reorganization, appointed Theodore E. Schultz, at 1843 Broadway, New York, as agent for that territory.

Automobile Import Co., 90-96 Stanley street, Montreal, Can., will represent the Reo car in the future.

Auburn Automobile Company, of Auburn, Ind., have started the erection of their new garage, at the corner of Green and Water streets. The building will be one-story, 180 by 60 feet.

Aerocar Company's Cleveland, O., branch has been discontinued and the agency for the car placed in the hands of the American Auto Co., which has opened a large two-story garage.

Allegheny Automobile Co., recently incorporated, has opened its new garage at 915-917-919 Irwin ave., Allegheny, Pa.

Automobile Equipment Company, occupying the basement of the Quaker City Automobile Co., 138-140 North Broad street, and Frank M. Bell, located at 324 North Broad street, are two new supply and accessory houses which recently made their debut in Philadelphia.

Brachem & Son, R. H., have leased for a term of years the garage on Fleet street, Manchester, N. H. The garage will accommodate over 100 cars.

Buckeye Garage, of Zanesville, O., will erect a handsome one-story brick and concrete garage on Eighth street, that place.

Bangor Auto Garage, located at Bangor, Northampton County, Pa., is a new garage recently opened at that place by Mr. Pearce, who recently received the agency for the Rambler in that county.

Buffalo-Carburetor Co., Albany, N. Y., has increased its capital stock from $10,000 to $20,000.

Buyte, Coates & Campbell Co., the San Francisco, Cal., jobbers have established a branch in New York City, with temporary headquarters at 35 Warren street.

Borough Automobile Co., on Palmetto street, near Bushwick avenue, Brooklyn, N. Y., will represent the Haynes car.

Brown, W. J., of Wellman, Ia., will handle the Glide cars in Washington and Keokuk counties.

Brazille Automobile Co., of St. Paul, Minn., have recently made their debut in the auto business, having secured the agency for Stevens-Duryea, Buick, Autocar and Baker electrics. They located in their new garage April 1, at 15 East Ninth street.

Clark Automobile Co., E. R., located at 117-119 Lyman street, Springfield, Mass., will occupy, when completed, the new two-story fireproof garage being erected at 238 Maple street, same city.

Costa, M. J., with a number of others have formed the M. J. Costa Motor Car Co., and have located at 2117-2121 North Broad street, Philadelphia.

Capitol Hill Garage Co., 615 B street, Southeast, Washington, D. C., is now nearing completion.

Cleveland Motor Car Co., of Cleveland, have appointed two new distributors, namely, C. W. Poole, 714 Sixth avenue, Seattle, Wash., and Van Automobile Company, 4706-8-10 Washington avenue, St. Louis, Mo.

Continental Automobile Co., The, of Grand Rapids, Mich., will soon be in their new garage at 93 Jefferson avenue, where they will have a complete, modern and up-to-date salesroom, storage-room and repair shop.

Crown Auto & Cycle Co., 360 Elmwood avenue, Providence, R. I., are now in the market for the agency of some good automobile.

Champaign Automobile Co., of Champaign, Ill., has been incorporated to establish a garage.

Campbell Corwin Company, is erecting a garage at 906-910 Union street, Brooklyn, N. Y. The building for the first two stories will be 75x90 feet. The third story on the rear will be 50x75. The building will be of fireproof construction thruout, and the front will be finisht in buff brick, with limestone and terra cotta trimmings.

Cumbe Co., E. R., has moved into a new garage at 1541-1547 Cleveland Places, Denver, Col.

Dietrich Co., O. H., Ltd., of Allentown, Pa., dealers in automobiles and supplies have been succeeded by the Dietrich Motor Car Co. with the following officers: President, G. J. Heintzleman; secretary and treasurer, O. H. Dietrich.

DuPont Garage Company, 2020 M street, Northwest, Washington, D. C., has recently purchased the Washington branch of the Electric Vehicle Co., of Hartford. The company now has the agency for the Columbia, Rambler and Cleveland lines of cars. They will also continue to operate the old Panorama Building, at 15th and Ohio ave., as a commercial branch.

Davis & Treat have opened a new garage and repair shop at 3 Church street, Adrian, Mich.

Doll, Augustus, has opened a garage at 131 East Philadelphia street, York, Pa., where he will handle the Ford in that vicinity.

D'Archy, Scott & Co., 524 Golden Gate avenue, San Francisco, Cal., agents for the Dragon and Compound cars, have opened a new garage at 611 Valencia street, called the Mission Garage. They have also been appointed agents for the Craig Toledo car.

Delaware Auto Storage & Repair Co., The, of Wilmington, Del., now owned by J. S. Richardson, has greatly improved its facilities. New stock has been installed and the repair department has been enlarged.

Day, Horace B., of San Diego, Cal., has begun the erection of a large garage at 1144 First street.

Darracq Motor Car Company has opened a repair shop at 20 West Sixtieth street, New York City, having decided to use their old quarters at 1989 Broadway solely for show-room purposes.

Evans Motor Car Co., located at 719 First avenue, South Minneapolis, Minn., is building a new garage. 50x125 feet, on Hennepin avenue, between Fifteenth and Sixteenth streets, which they will occupy when completed. The company are agents for Mitchell, Wayne and Jewel cars.

Ellis Motor Car Company, of Newark, N. J., will handle the Knox cars in that city.

Fort Smith Automobile and Supply Co., of Fort Smith, Ark., is erecting a garage on North Twelfth street, near Garrison avenue.

Fargo Auto Brokerage and Garage Company, capitalized at $50,000, will occupy new quarters on Broadway, N. Y.

Fee, Robert L., of Detroit, Mich., will build a garage to be devoted exclusively to use of electric automobiles. The garage will be located on the south side of Jefferson avenue, just east of St. Antoine street, and will be operated under the name of the Fee Vincent Co.

Geisel Automobile Company, of Springfield, Mass., are erecting a one-story concrete garage in Taylor street, which will measure 100x175 ft. and cost about $10,000.

Goodwin Automobile Co., has opened a garage at 612-616 Mulberry street, Des Moines, Ia., and have secured the agency for the Rambler and Mason cars.

Howe W. C., of Camden, Me., has recently opened his new garage and supply room in connection with his repair shop, at Washington and Mechanics street.

Hathorn Auto Co., of Mason City, Ia., has completed an addition to its garage, 40x80 feet in size.

Huntsville Motor Car Co., of Huntsville, Ala., will establish a garage on Gallatin street, that place.

Hutchinson Garage Co., 29 East Avenue A, Hutchinson, Kan., operated by Lou Smith and P. B. Horner, act as agents for the Cadillac car and also carry a full line of accessories.

Harvard Automobile Company has moved into its new garage at Quincy Square, Cambridge, Mass. The building is two stories in height and measures 125x200 feet, affording accommodations for nearly 200 cars.

Henderson, Charles G., Philadelphia, is building a one-story garage at Fifty-first, north of Westmoreland, at the cost of $8000.

Imported Car Repair Co., incorporated under the New York State laws, will install in the Motor Mart of New York, at Broadway and Sixty-second street, a machine shop for the purpose of repairing the highest grades of automobiles.

Inland Auto Co., of Spokane, Wash, is building a new garage.

Illinois Mobile Co., of Chicago, representing the Gearless car, has opened at 1253-55 Michigan avenue.

Koehler, H. J., of 845 Broad street, Newark, N. J. has leased the building at 1709-1711 Broadway, New York City, where he will handle the Buick. In addition to the Broadway he operates garages at Newark, Montclair, East Orange and Paterson, N. J., where he sells the Buick, Corbin and Pope Waverly.

Kaw Valley Auto Company, of Kansas City, Mo., has opened a garage in that place.

Knox Motor Truck Company, of Springfield, Mass., have closed a contract with the Crane Automobile & Garage Co., of Providence, R. I., to represent the Atlas runabout in that section.

Keystone Motor Car Co., 238 North Broad street, Philadelphia, Pa., have started the erection of their new building on Broad street, just south of their present quarters.

Lake Avenue Automobile Co. will erect a garage on Lake avenue, N. W., opposite West Eighty-first street, Cleveland, Ohio. The building will be a one-story brick construction, 38 feet wide and 150 feet deep.

Leonard's Auto Station, H. M., located at 625 West Broad street, Elyria, Ohio, is one of the best equipt and up-to-date garages in the State. The building is 40x167 feet. Mr. Leonard has the agency for the Jackson line of automobiles.

Logan Construction Co., of Chillicothe, Ohio, has established agencies with the following: The Essex Automobile Co., Newark, N. J.; The South Broad Automobile Co., Philadelphia, Pa.; Commercial Auto & Supply Co., Washington, D. C.; F. M. DeRivas, Mexico City, Mexico; Wichita Auto Co., Wichita, Kansas.

Milwaukee Motor Car Supply Company has opened salesrooms at 115 Wisconsin street, Milwaukee, Wis., and will carry a line of automobile supplies.

Martin Bros. have recently opened a garage and repair shop at Akron, N. Y., located on Eckerson avenue.

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EVER READY

TIRE TOOL

Tire Tool Folded. Fits in the Tool Box.

Rolls the most obstinate tire on or off in a few minutes time, with remarkable ease—

No expert knowledge or practice required to operate it. Simply insert the tool, turn the handle slowly, and the result is accomplished—

Cannot possibly injure the inner tube. This feature alone insures a saving of many times its cost—

MUST BE SEEN TO BE APPRECIATED

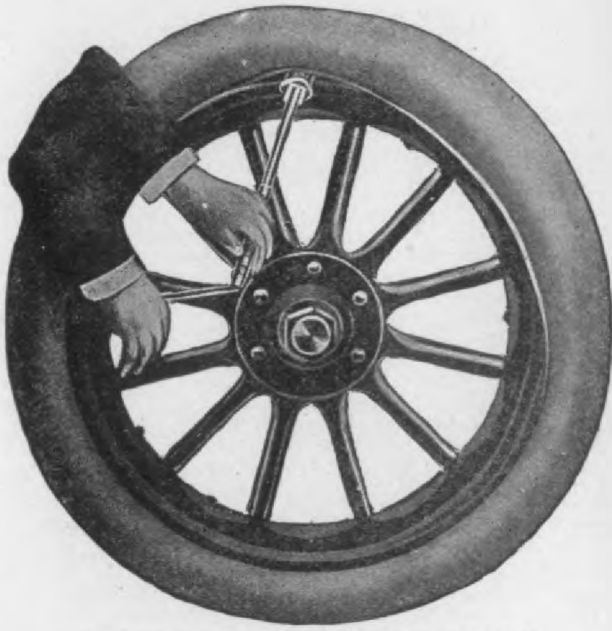
Call at our Show-Rooms

and we will gladly give you a practical demonstration. If you cannot come to us, let us send descriptive catalogue to you.

Price Complete, Including Clamp

$8.00

We also manufacture a number of other automobile improvements, which increase the efficiency of every motor car.



Rolling the Tire off—as simple as it looks.

ADDRESS DEPARTMENT 3

AUTO IMPROVEMENT COMPANY

Uptown Office and Show Rooms: 2128 BROADWAY

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Morrison, M. M., is erecting a one-story garage at 118 and 122 East Tenth street, Los Angeles, Cal. The building will be of brick, 60x70 feet.

McClure, Mr., of Oskaloosa, Iowa, agent for several makes of cars in that section, is building a garage at Ottumwa, Iowa. The garage will be one-story high, 66x55 feet, of fireproof construction, and will be located at Second and Green streets.

Nickerson Automobile Co., F. A., agents for the Pierce cars, are erecting a two-story garage on Congress street, Portland, Me.

Northampton Garage Co., of Northampton, Mass., will erect a garage at that place. The building will be of brick, two stories high, 40x90 feet.

Nicholaus, Louis, of Schenectady, N. Y., will erect a garage on North College street.

Nussbaum, E. P., formerly manager of the Automobile Supply Department of the National Electric Supply Company, of Washington, D. C., has been elected president of the newly-formed New York Auto Sales Company, doing business at 1968 Broadway, New York City.

Northwestern Automobile Co., of St. Paul, Minn., has opened a branch house at 354 Market street, to be conducted in connection with the main business.

Putnam, F. D., of 827 Elm street, New Haven, Conn., has been appointed agent for the Rainier car, in that section.

Park Garage Co., with a garage at 210 W. Ohio street, Pittsburg, Pa., will introduce the Walter car.

Philadelphia Motor Car Co., of Philadelphia, Pa., with offices in the Land Title Building, and garage at 236 North Broad street, have secured the agency for the Frayer-Miller Car.

Poor & Hooper, of Saco, Me., have opened their new garage on Thornton avenue, and are prepared to do general repair work and store cars.

Philadelphia Auto Sales Co., with W. H. McLain as manager, has opened offices at 332 North Broad street, Philadelphia, Pa., and will represent the Reliance, Jewel and Dolson cars in Southeastern Pennsylvania.

Powell, A. G., 1519 Spring street, Philadelphia, Pa., has acquired the agency for the Chalfont, a 22-25-horse power, $1500 car, built at Lenover, Chester County, Pa.

Rees Company, The, is operating an up-to-date garage and machine shop at 45 West Sixty-second street, New York City.

Roenbeck, Henry, has opened an establishment at 242 Halsey street, Newark, N. J., for vulcanizing and repairing tires.

Rarig Automobile Co., The, 540 Golden Gate avenue, San Francisco, Cal., have recently taken the agency for the Chadwick cars in Northern California.

Roberts & Co., O. G., of Columbus, Ohio, are planning to erect a garage on East Gay street, between Seventeenth street and Miami avenue, that city. The structure is to be of cement blocks, and have a floor space of 72x145 feet.

Sweeney & Neil Auto Co. has organized at Brooklyn, N. Y., and opened an agency at 59-61 Court street, where they represent the Kisselkar.

Spencer, Edgar, of Indianapolis, Ind., has opened a garage on Centre street, and will be styled the Winona Auto & Electric Co.

Tilden & Co. have opened a garage and repair shop at 652 Woodward avenue, Detroit, to succeed Henderson Bros.

Southern Automobile Company, of Asherville, N. C., has taken the agency for the Rambler for Western North Carolina.

Stratton Co., H. C. Boston, agents for the DeLuxe line of cars, will soon move into new salesroom at 173 Huntington avenue.

Syracuse Automobile Supply Co., of Syracuse, N. Y., has opened a garage at 118 South Clinton street, and will sell the Maxwell.

Southern Automobile Co., of Baltimore, Md., has moved its garage and salesroom from Mount Royal garage, Maryland and Mount Royal avenues, to the new headquarters, at 1200 Mount Royal avenue. The company has the agency for the Pierce Arrow.

Standard Automobile Company, of Pittsburg, Pa., will break ground in Aiken avenue for a six-story fireproof garage, 100x150 feet. The structure when finished and equipt with machinery will cost $200,000.

Warner & Co., C. P., Chicago representatives of the Moline, have moved to 1502 Michigan avenue.

Wayne Automobile Company, Detroit, Mich., have established new agencies as follows: Solliday Motor Car Co., 321 Fourth street, Milwaukee, Wis.; Western Auto Co., Denver, Col.; John S. Watters, 233 Baronne street, New Orleans, Louisiana; M. Francis Kane, 507 Mutual Life Building, Seattle, Wash.; J. A. Cramer, 737-741 Main street, Buffalo, N. Y., and Berger Automobile Co., 2025 Farnam street, Omaha, Neb.

Western Automobile Company is erecting a garage at 1928-30 North Twentieth street, Philadelphia, Pa. The building will measure 36x115 feet.

1908 Show at Hartford, Jan. 14 to 18

The Hartford Automobile Dealers' Association met in the Henblein Rathskeller on May 28, and prepared plans for the holding of an automobile show in Foot Guard Hall from January 14 to 18, 1908. The main floor and stage will be used entirely for automobiles. The gallery and basement will be used for exhibits of tires, parts and accessories. The admission price will be 25 cents.

Another Successful Saleswoman

Since the publication of an article in our June, 1907, number, page 229, regarding Miss Brewster, of Philadelphia, selling electric cars for the Foss-Hughes Motor Car Co. we have been informed by the Park Automobile Co., 4432 Olive street, St. Louis, Mo., that Mrs. Gertrude Bradford has been in the business for the past two years in Boston and St. Louis and has driven everything from a sixty-horse-power touring car to a light runabout. She has also been very successful in making sales.

The Thomas Line formerly handled in Philadelphia by the United Motor Car Company, 215 North Broad street, is now handled by Harry S. Houpt, located at 139-141 South Broad street. Mr. Houpt carries the Thomas line in New York city.

Martin-Evans Co., 1186 Bedford avenue, Brooklyn, N. Y., are manufacturers of Tourist inner tubes, and also solid rubber tires for vehicles of every description. They are also exclusive Long Island agents for the products of the Firestone Tire & Rubber Co.

A. F. Justin, who recently resigned as manager of the Penn Auto Supply Co., of Philadelphia, has taken charge of the Providence, R. I., branch of the Angier Co., of Boston. The Angier Co. have completed alterations in the Providence store which doubles its floor space.

A St. Louis dealer has supplied the gipsy king of Kansas with a very unique motor vehicle, which is a combination of the old gypsy wagon and the modern motor car. Such vehicles, only more elaborately equipt, are now being used in Europe by wealthy men who desire a pleasant summer's outing with their families, and yet wish to be independent of hotels.

A. W. Kirk, who has formerly traveled the Southern territory for the Hartford Rubber Works Company, is soon to open a store in Atlanta, Ga., for them and carry a complete stock of Hartford goods at that point. Business thruout the South in the products of his company is booming. The new Hartford Clincher and Dunlop Tires with the Midgley Anti-skid Tread is in great demand in that section.

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Commercial Motor Car Department

Experience of Commercial Motor Car Users

Using a Seven-Ton Truck in the Wholesale Grocery Business

J. H. Allen & Co., Allen Square, St. Paul, Minn., manufacturers, importers and wholesale grocers, are at the present time operating one seven-ton truck, manufactured by the Four Wheel Drive Wagon Co., of Milwaukee, Wis. It is rated at 40-horse power, gasoline, capacity seven tons, altho they claim to have carried as high as fourteen tons without difficulty or apparent strain on the machine. It is figured to drive with high speed at eight miles an hour, while they think six would be plenty fast enough for it, and would result in more power for emergencies, and give the opportunity of using high speed and second speed in great many instances where now they are compelled to use the slow speed and intermediate.

Their receiving department's load report for May 11th was 66,000 pounds; May 10th, 67,000 pounds; May 9th, 45,000 pounds; May 8th, 63,300 pounds, making an average of from 30 to 35 tons per day. They use about ten gallons of gasoline per day, lubricating oil and grease about 25 cents' worth per day. In the summer time they run a little lower on gasoline than in the winter time, so that ten gallons is a liberal figure.

They estimate that the machine takes the place of three and one-half heavy trucks.

Their draying, outside of what is done by the truck, has always been by contract on a tonnage basis, and as long as the truck will pull 30 tons per day they have no complaint to make about its working capacity. The most needed improvement in the car as suggested by their experience is a clutch, sufficiently strong to avoid slipping, and a lower gear, so that the machine will develop more power in cases of emergency, altho they confess that even now it is wonderfully strong, and there is seldom an occasion to resort to the winch with which it is equipt in order to extract it from a mud hole. They have their own garage and tool shop in connection and contemplate operating a couple of these cars in the future, keeping one of them in reserve for an emergency car so that in case one should meet with a mishap, the other car can promptly take its place while the one in trouble is being repaired. In this way, they state, it will warrant their keeping one man to look after the cars, and see that they are kept up to the top notch all the time. As they have a competent mechanic to make all of their repairs, this item has been nothing as yet. They claim that if they had to rely on an automobile house to make adjustments they would probably have quite a bill for repairs. So far they have not had any occasion to call in outside assistance since they commenced operating the truck, September 1st last, and since they have received the large axles that are put on all of the later machines, their troubles have practically ceased.

Logan Car Very Satisfactory in Laundry Business

The White Laundry Co., Chillicothe, Ohio, in giving their experience with motor cars, state that their business has increased fully a third since they put on a motor car. They had some trouble at first, but the time gained and the money saved more than offset any troubles they have.

They use a Logan light delivery, Model N, 10-horse power, air-cooled gasoline car built by the Logan Construction Co. The average load carried is 500 pounds and about 30 miles are covered each day in four trips. They cover the entire city of Chillicothe, which has 18,000 inhabitants. The car costs $1000. The average expense per month for gasoline is $7.50 and for lubricating oil $1.60. Repairs are figured at $5.00 per month. The operator's wages are $10 per week. They store their own car. They figure the car depreciates about $200 in value in a year. The car replaces two horses and two light delivery wagons. The wagons cost $100 each and the horses $150 each; harness, $18 per set. Cost and care of each horse was $15 per month; shoeing, $6 per year, and repairs $3 per month. Wages paid for driver were the same as at present. They figure the wagon depreciates in value about one-third in a year and one horse died every four years. Two trips were made per day. They state that the horse-drawn vehicle has no advantages over the motor car, and that the motor car gives quicker service, is less costly and is a great advertiser. The most needed improvement in motor cars as indicated by their experiences is to make them stronger in construction. They also think it advisable for manufacturers to give more explicit information to drivers. They think the Logan car is just right, especially so for laundries.

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Motor Car in Fire Department has Many Advantages

The chief of the Chicago Fire Department, Chicago, Ill., is using a Buick, Model C, gasoline touring car of 22-H. P. to respond to fire alarms. The car cost them $900. Its average daily mileage is about 50 miles and the radius of territory covered about 25 square miles. Gasoline costs them $6.75 and lubricating oil $2.00 per month. Monthly repairs are figured at $5.00 and tires at $10.00. Average monthly wages of operator and helper are $103.91 each. They figure a car depreciates $50.00 in a year. They claim the motor car can cover more miles in less time than the horse-drawn vehicle, but that the horse-drawn vehicle is less liable to break down.

Before using a motor car they used a horse and buggy, with which they made an average of 10 miles a day. The horse cost $200 and the buggy about $225. Average monthly cost of shoeing amounted to $10.00. Monthly cost of care and feed is figured at $15.00; repairs about $15.00; wages the same as today. They figure that a horse depreciates in value about $25.00, and the buggy $20.00 yearly.

In order to fully meet their requirements they state that cars should be heavy and be made of very best materials to be had. With the motor car they have made a run of 6½ miles in 19 minutes in responding to an alarm, which would have taken a horse about 45 minutes. The most needed improvement in motor cars as suggested by their experience is that they should all have standard size bolts and threads.

Olds Cars Successful in Bus Line

L. E. Bussey, 287 Meldrum avenue, Detroit, Mich., is using two Olds, Model F, 18-H. P., commercial cars for carrying passengers. He runs one car on a 6-mile trip at 25 cents per passenger, and one car on a 19-mile trip at $1.00 per passenger. The routes are over fair asphalt pavements and good macadam roads. The net profit on these two cars last season, June to September inclusive, was $3200.

The average weight of load, 20 passengers, is about 3000 pounds; the daily mileage, 50. The cars cost $3000 each. Average monthly cost of gasoline is $29.40, at 14 cents a gallon—30 days running—and lubricating oil, $3.74. Repairs, including tire replacement, are figured at $9.00 per month. He stores both cars at a cost of $15.00 per month. The average monthly wages of operators are $65, and of conductor, $48. He figures the car depreciates in value about $300 a year. He claims the most needed improvements to cars as suggested by his experience are solid tires that will stay on the wheel until worn out, and more accessibility to motors, etc. Mr. Bussey is using 34x4¼-inch side wire tires at present. He claims it to be impossible to get more than half the wear that they should give on account of being unable to keep them on the rims. He says everybody has the same trouble no matter what the make of tire. He has used three different makes, two side wire and one clincher, but has no preference, they all acting the same for him. He thinks more attention should be put to spring suspension, whether for freight or passenger service, and more accessible motors are needed for commercial work, so that repairs and adjustments can be taken care of in the least possible time. People in the passenger business especially realize the importance of this on account of keeping up to schedule. Mr. Bussey has had trouble in getting good drivers, claiming that many are competent drivers, but cannot be trusted to look after cars properly. He stores his own cars and hires drivers who can make all ordinary repairs. He states that in his line of business a horse-drawn vehicle wouldn't be "in it" for a minute.

Get There Faster with Automobile

Dr. Joseph Rogers, Donnybrook, N. D., in giving his experience with the automobile in his profession, states that with the automobile he can get around faster, can spend more time in his office, and that the automobile is much cheaper.

He uses an Olds, Model N, 8-H. P. gasoline car, costing $700. Gasoline costs him $10.00 per month, and lubricating oil $2.00. Repairs are figured at $5.00. He stores his own car. Dr. Rogers covers about 25 miles a day, two trips, two to four calls per trip. He figures the car depreciates $100 first year, $50 a year thereafter.

Prior to using the motor car, Dr. Rogers employed two horses and one carriage. The horses cost him $165 each, and $35.00 for each set of harness. His carriage cost $85. The average monthly cost of care and feed of each horse amounted to $15.00. Average monthly cost of shoeing each horse, and repairs to vehicle was $2.00 each. He figures the horse and carriage depreciate each $25.00 a year.

As a needed improvement to motor cars, Dr. Rogers suggests more clearance, also better means of supplying electricity for the spark. In order to fully meet the requirements of his profession, Dr. Rogers states that the motor car body and engine should be made of best material; cushion tires; more clearance; good carburettor; good, large gasolene tank, good oiler and transmission, and an extra drive chain should be carried if car is chain driven.

Fred. W. Wolf, Jr., Chicago, Ill., is conducting an agency for Gaeth light and medium size delivery wagons, and is also selling the Wanderlust 2000-pound wagon, his own manufacture. To complete his line he wishes to add a truck, and will be glad to hear from manufacturers.

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RELIANCE MOTOR TRUCKS

For Freight and Passenger Service.

¶ In successful operation under all kinds of conditions and service in all parts of the country.

¶ Sold under a liberal guarantee by a company in position to back it up.

¶ Manufactured complete in our own large plant which is devoted exclusively to the production of high grade commercial vehicles.

¶ Not an evolution from a pleasure vehicle, but designed strictly along truck lines with a surplus of strength in all parts.

¶ One man and a **Reliance Truck** will do the work of three men and three horse-drawn trucks, with an operating cost about equal to one horse-drawn truck. (We give you data and names of users to prove it.)

Write for catalog, and state kind of service in which you use trucks.
Some good territory open for responsible agents.

RELIANCE MOTOR CAR CO.

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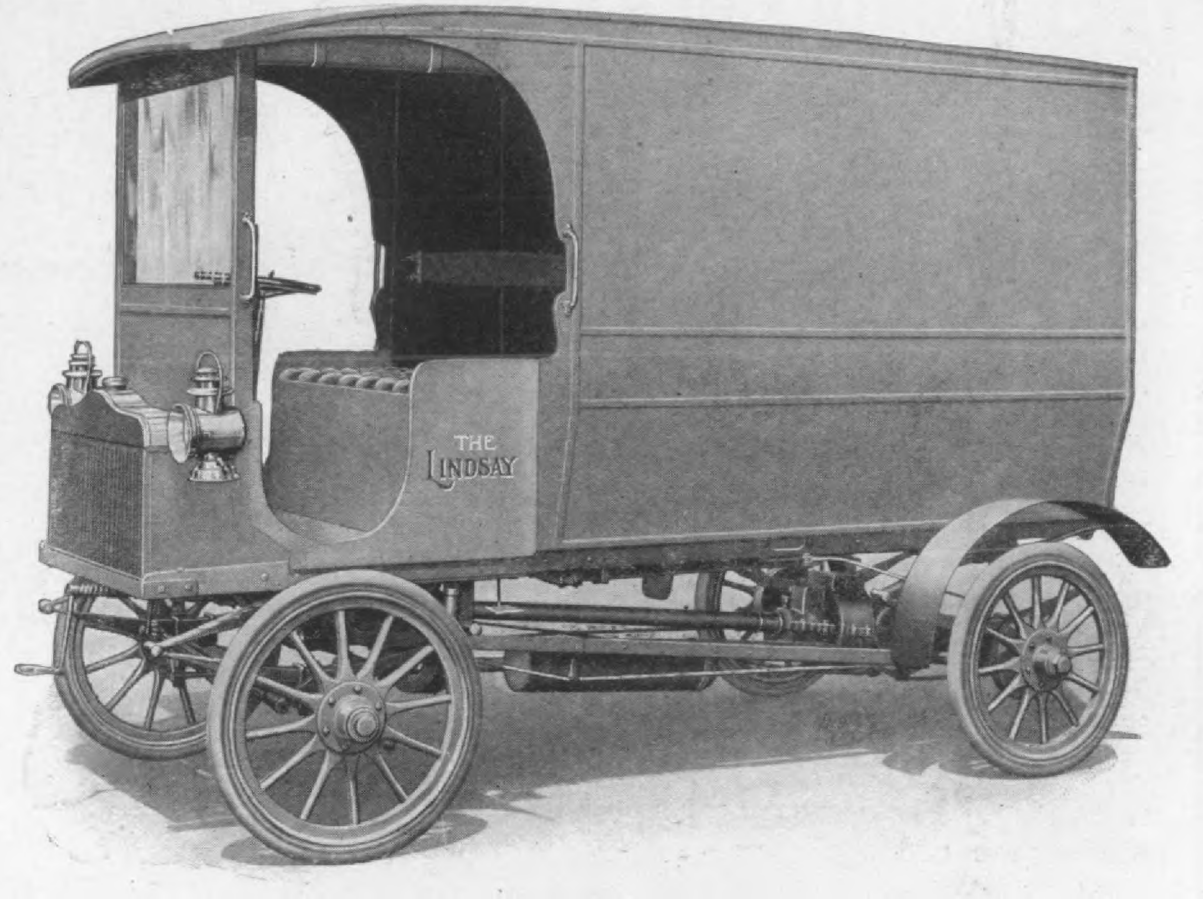
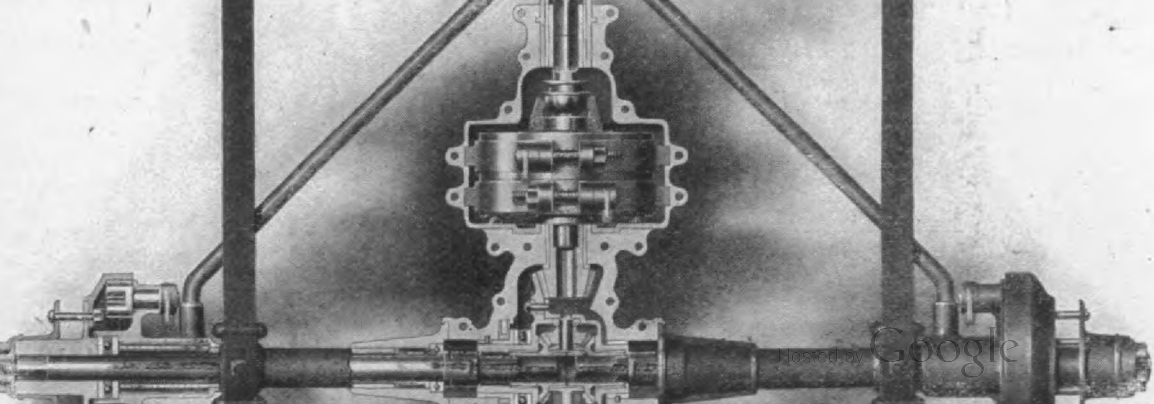
ires, has recently been brought out by Lindsay, of Indianapolis, Ind.

ie chassis is provided with a sub-frame a cross piece of the sub frame, thereby forming a casing for the driving shaft which is supported underneath by a truss rod. The



The "Lindsay" Shaft Drive Delivery Wagon.

is rigidly attached to the housing or g of the rear system, the front end of the rame being attached to the top frame a hinged shaped trunnion. The spring are attached to the rear axle casing in a manner so as to let them oscillate on axle. A 22 H. P. two-cylinder opposed ne is attached to the front end of the driving shaft is flanged at the front end an is bolted to the face of the flywheel of th engine and the rear end is attached to th transmission by a sleeve and square end which forms a bearing for the rear end o the shaft. By this construction the frame work will stand any amount of abuse and i also eliminates the use of knuckle joints



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removing the shaft sections. The radia-
n is accomplished by the use of a front
liator and a series of tubing hung under-
ath of the top frame in the rear of the en-
e. No fan is used.

Olympia Commercial Show

The first motor exhibition at Olympia, ndon, confined solely to commercial ve-les and motor boats, proved a complete cess. There were 230 exhibitors, of ich 80 stands were occupied by commer-l vehicles. On the majority of commer-l vehicle stands motor omnibuses were ged, giving witness to the relative im-tance of this branch of the industry at present time.

The Gibson Automobile Co., Indianapolis, ., is preparing to enter the commercial icle business on a large scale. The com-y is building a fireproof garage on Mas-husetts avenue, almost doubling the size the plant, and will be used exclusively trucks and delivery wagons.

An automobile service, known as the "Auto xe," will soon be introduced in New York. "Auto Luxe" was started in Paris some nths ago, and its purpose is to rent to the lic specially-built and handsomely-finished n cars with experienced drivers in liver- These cars may be hired by the week, night or month.

The American Silk Dyeing & Finishing , Hawthorne, N. J., testify that they are y well pleased with the results obtained m the motor car over those of the horse-wn vehicle, both for better service and aper rates. They have their hauling e by motor vehicles owned by a truck-company, and figure that they save ut 10 per cent. over and above what they nerly paid the railroad company.

automobile stage line will be established between and Fort Collins, Colorado.

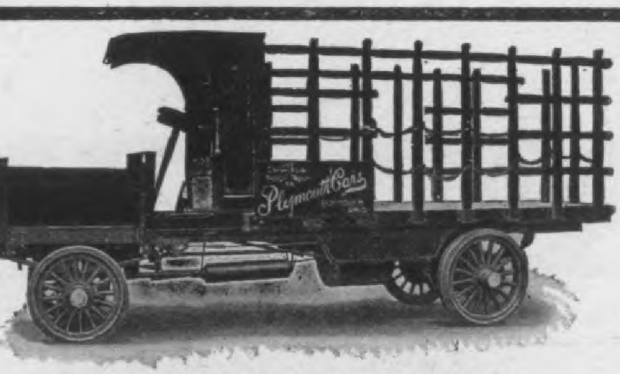
passenger service between Rawal Pi and Murree. The route is of an especi ly severe character, being a constant s cession of sharp grades up and down. Pr to the placing of the order for th buses, a series of competitive tests w held, and the White cars showed up well that they were selected for the wo despite the local prejudice in favor English-made articles.

The Commercial Motorcar Co.

INCORPORATED 1905.

Times Building, New York.

Correspondence invited with Business Houses contemplating changes or additions to their Delivery and Transportation Systems.



TWO AND THREE TON TRUCKS

PLYMOUTH CARS

The car that is demonstrating to the exacting purchaser the superiority of our Duplex Friction Transmission for reliability and ease of operation, simplicity of construction and that supply of unfailing power so necessary to COMMERCIAL vehicles. We make a specialty of Sight-Seeing cars.

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ded the horse and the proverbially slow l uncomfortable local train for the more asant, rapid and in this case cheaper thod of travel, the automobile.

Mr. E. E. White, 2814 North ave., Balore, Md., wholesale salesman of notions l white goods for Carter, Webster & mpany, of that city, has been using a ck 24-H. P. runabout since last Octo- for transporting himself and goods over extensive territory embracing York Coun- Pa., Maryland and part of Delaware. used the machine until Christmas, then l it up until March, since which he has d it continuously five days a week for iness and on Sundays for pleasure, and tes that he has not had any trouble with Furthermore he estimates that by using machine he can save from $400 to $450 year and increase his sales $8000 to ,000 a year. He uses the car on all kinds roads and some very bad hills, but says has never refused to go up any of them . The deck was removed and a large ly, held by four bolts, made to take its ce, and on this about 600 pounds of nples and baggage are carried. The deck be easily replaced when desired, as it held by only two bolts.

COVERS MORE TERRITORY.

This runabout took the place of a two- rse Dayton rig, with which 25 miles in a , making five to eight calls, was the limit, ile with the auto distances of 40 miles a are easy and ten to fifteen calls can be de. The only time when horses are bet- than the auto are during the spring ws, and even then he believes all that uld be necessary is to have larger wheels.

ADVANTAGES OF AUTO.

The machine, he states, has proved a good vertisement for him, as he attributes the was the case when using horses, and some cases it was necessary to hurry up cu tomers in order to catch a train, and, p haps, injure the amount of the sale. times trains were missed and much ti lost or a team hired at considerable exper in order to reach the next town.

EXPENSES.

The average monthly cost of gasoline $11, and for lubricating oil, $3. The to amount spent in repairs during seven mont use was only $11.50.

Mr. White considers that the deprec tion in the value of a car depends so larg on the care it receives that he cannot put into figures, but says that his machine apparently as good to-day as when n and that he is still using the original of tires. In his own words: "Any c can use a car for years if they just give a little attention and it does not require much as a horse. One can figure on usi an auto on country roads eight to n months a year and I would never think going back to hiring teams again."

Chicago Commercial Vehicle Show Next Fall

At the May meeting of the execut committee of the National Association Automobile Manufacturers, held in N York, it was decided to hold an exclus commercial vehicle show in Chicago n fall. It will be held the same time as pleasure vehicle show, November 30 to D cember 7 next. Altho the shows will held simultaneously, they will be in separ buildings, some distance apart. The ple ure cars will be exhibited in the Colise and the commercial vehicles will be sho in the Seventh Regiment Armory.

Model B. R.

2 PASSENGER RUNABOUT $400

The smallest in cost—smartest in appearance—simplest of operation—cheapest to maintain. Ideal for town and country service—for physicians, business men, etc. Reliable on any kind of road. 4 H. P. Air cooled. Speed 22 miles an hour. *With 2 cylinder 8 H. P. Motor $525.* Send for catalog . Agents wanted in unassigned territory

Waltham Orient MOTOR CARS

Model D. C.

WALTHAM SERVICE CAR $550

Makes quick, sure delivery. The cost of one team, the work of

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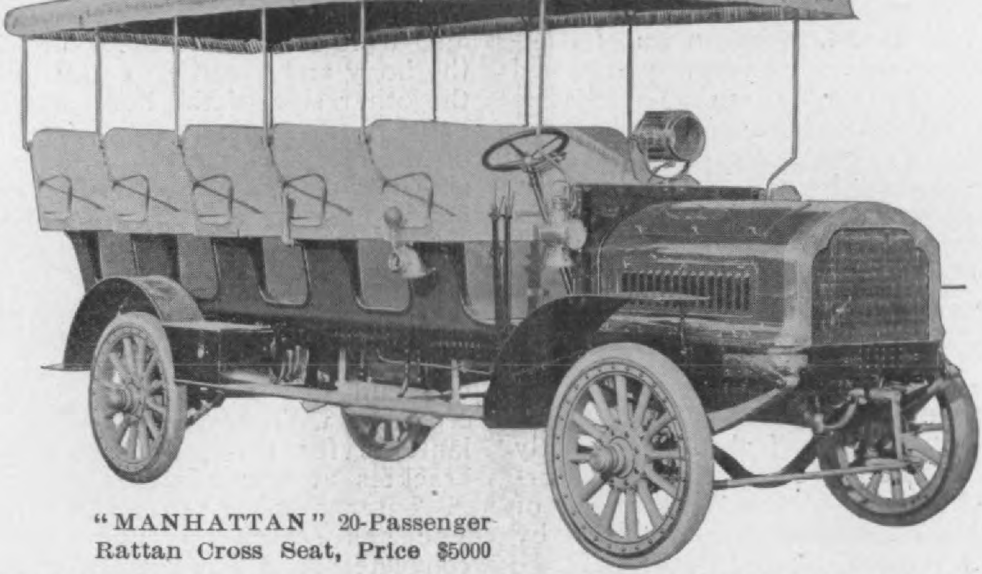


"MANHATTAN" 20-Passenger
Rattan Cross Seat, Price $5000

FOR TRANSPORTATION LINES, PLEASURE RESORTS, HOTEL WORK, ETC.

Practically the only successful gasoline busses in operation are those which we have manufactured. We make them to carry from 10 to 30 passengers. As an evidence of their practicability, both from a service and profit-making standpoint, we draw your attention to the 30 cars which have been operated the last year between New York City and Coney Island. These busses have carried over 300,000 passengers at the rate of $1.00 a head. **Sometimes each one of these busses have made five round trips a day, a total of over 200 miles.** With the exception of tires, the cars are practically in as good condition to-day as when they went into service.

Our passenger coaches have been in use for five years in all parts of the country, also Cuba and Mexico, and are paying large dividends to the companies operating them. **MANHATTAN BUSSES** are not an experiment but an assured fact, and have demonstrated their reliability in actual service. They are sure profit makers. Capacity 10 to 30 passengers. Bodies in different styles. Upholstering in Cane Seats or Leather.

"OUR MOTTO" SIMPLICITY, STRENGTH, DURABILITY and Plenty of Reserve H.P.

MACK BROS. MOTOR CAR CO., Allentown, Pa.

ANNOUNCEMENT

INDESTRUCTIBLE STEEL WHEEL CO.

SUCCESSORS TO TURNER & FISH CO.

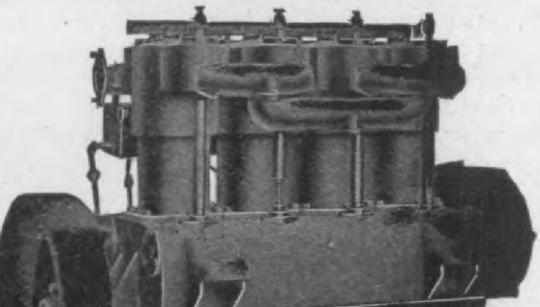
Manufacturers of All Kinds of

AUTOMOBILE STAMPINGS

Send Drawings and Specifications for Prices

Our STEEL WHEEL Our STANDARD of WORKMANSHIP

Works: LEBANON, IND. Office and Salesroom, 1303 Michigan Avenue, CHICAGO



Automobile and Truck

MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

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Knox Automobile Company, of Spring-
d, Mass., U. S. A., to the town of Rad-
, Pa., which was very recently supplied
the city of Hartford, Conn. The chassis
he Knox Waterless Model D6, and the
ly and entire construction above the
ssis was placed by the C. N. Perkins
mpany, Lawrence, Mass. The Perkins
mpany are builders of horse-drawn fire
aratus, and make a specialty of fire ex-
guishers, ladders and fire wagons and
department equipments generally.

This Fire Automobile is what is known
a "combination," the equipment consist-
of fire axes, fire ladders and fire extin-
shers. A third car of about or exactly
same construction was sold by the Per-
s Company to the fire department of
wburg, N. Y., same chassis supplied by
Knox Waterless Shops, Springfield.

two nozzles of different sizes. To prov
also a 12-foot roof ladder on one side
the body and a 20-foot extension ladder
the other side of the body with substani
hangers for same. To provide a foot boa
on the rear with side and rear hand rails
shown, with space for carrying two 2-gall
hand extinguishers or two acid receptacl
To provide two 3-gallon hand extinguishe
placed one on either side of the body ne
the front. To provide a box for carryi
wrenches and other tools, suitable brack
for carrying two hose nozzles (not furnis
ed) and one plaster-hook, one axe, o
crow-bar with suitable brackets, two har
lanterns for fire purposes with necessa
brackets at rear of body, two automob
oil lanterns and one 7-inch Rushmore ace
lene gas searchlight and generator; o
complete set of Knox truck tool equipme

Combination Fire Wagon supplied to the Hartford Fire Department, Hartford, Conn. Chassis by the Knox Waterless Shops, Springfield, Mass. Body and equipment supplied by the Perkins Company, Lawrence, Mass.

ts complete specifications are: Engine—
o cylinders, opposed, 5x7, air-cooled, 20
P. Transmission—Two speeds forward
l reverse, planetary type. 100-inch
eel base, tread 56 inches front, 58 inches
r. Tires—34x4, Hartford, solid. Springs
emi-elliptic, 46 inches rear, 40 inches
nt. Bearings—Timken roller, front
eels and rear axles. Brakes—Pedal brake
counter shaft, lever brake on both rear
eels. Steer—Hercules wheel. Speed—15
es per hour. Body—10½ feet long, 56
hes wide inside, 18½ inches high inside.
rrying capacity for 1000 feet 2½-inch
ndard hose (not furnisht). Equipment
One pair of 25-gallon chemical engines
de of the best Lake Superior copper of
ndard make, with Holloway pattern top.

This is the third machine of this kind su
plied by the Knox Waterless Company, t
enthusiastic approval of the first, suppl
to the Radnor (Pa.) Fire Department, ha
ing led to the placing of the Newburg,
Y., and Hartford, Conn., orders.

There is every reason for the use of m
chanical traction in fire department equ
ment, and the Hartford Fire Departme
purchaser of the fine combination wag
here shown, was one of the first, if not t
very first, in the United States, to ma
satisfactory and continued use of self-pr
pelled steam fire engines.

The Knox chassis is giving great sat
faction in fire department service, being
ways ready to go out of the door as so
as the alarm sounds, and making mu

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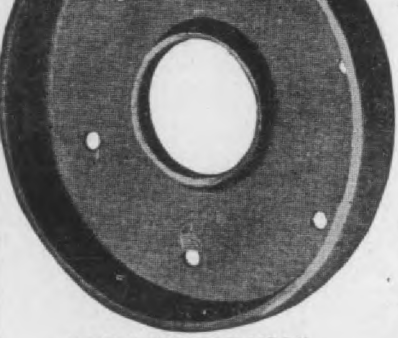

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LIGHT AND STRONG

Use Sheet Metal Stampings in place of Castings.

Headquarters for difficult forms in Sheet Steel Brass and Copper.

THE CROSBY COMPANY, - BUFFALO, N. Y

L. CHAS. KENEN
French Automobile Designer

We furnish designs, with complete working drawings, specifications for materials best treatment of steel, etc., for motor cars, trucks, omnibuses, delivery wagons, auto boats and railway motors.

Our experience, gained by many years of work in the best French shops, assures rapid and successful results, without experiments whatever.

Correspondence Solicited.

1 MADISON AVE. **NEW YORK, N. Y**

THE HUBBARD PATENT TIRE

ONLY PRACTICAL TIRE FOR THE COMMERCIAL VEHICLE.
Wears like iron—Rides like rubber.

Correspondence solicited from manufacturers and users of commercial vehicles to whom we can guarantee greater tire satisfaction than they have had heretofore.

ARTHUR H. MIDDLETON, 2821 N. Broad St., Phila., Pa

The Car of Quality

The SOULES LIGHT DELIVERY CAR, 22 H. P., two 5½ x 5 horizontal opposed cylinders, sliding gear transmission, bevel gear drive. THE CAR THAT HAS BEEN TRIED AND FOUND NOT WANTING. Agents wanted. Correspondence solicited.

Soules Motor Car Co.

Sales Dept., 736-740 WOODWARD AVE., Detroit, Mich.

3 TON **5 TON**

AMERICAN MOTOR

TRUCKS

FOR ALL PURPOSES

AMERICAN MOTOR TRUCK CO., Lockport, N. Y

THE RAPID

A light and powerful

DELIVERY CAR

Correctly designed and carefully built

Load capacity, 1000 lbs
Price F. O. B. Lockport, $1000 00

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d, Mass., by the Sultan Motor and Car npany, 121 West 89th street, New York y.

he chassis is the same general construc- as that of the Sultan touring car, de- bed in another part of this issue of "The rnal." The motor is 32 H. P. The xes are larger and more powerful for truck, but the control and change gear the same, save for lower reduction o.

he specifications of this truck are as ows:

The Sultan 32 H. P. Truck.

heel-base 116 ins., gage 56 ins., tires l, double-face, large diameter 34 ins., h of tires 6 ins. over all.

ear platform 114 ins. long by 60 ins. .

ominal paying load 4000 lbs.

otor, nominal 24-32 H. P. Must show I. P. at 1250 R.P.M. Price $3000.

Commercial Vehicle Notes

automobile bus line between Dubuque, Platte- and Cuba City, Wis., became a reality on May hen the first trip was made. The organization ting the line is known as the Idaho Automobile Electric Transportation Co.

ut June 1 an automobile stage line was inaugu- between Anatone, Asotin, Clarkston and Lewis- Wash.

jamin T. Babbitt, of Clayville, and Walter H. enson, of Whitesboro, have formed a copart- p and will run an electric bus line from Utica ssville.

Ringgold Hose Company of Newburgh, New have received their new automobile fire apparatus.

Board of Public Service of Cincinnati will pur- three motor trucks to be used by the street

The Raymond Brewing Company, of Wheeling, Va., has purchased a two-ton Studebaker elect truck.

A Stanley steam runabout has been purchased the use of Fire Chief Allen, of Trenton, N. J.

A new motor patrol wagon has been placed in t service of the police department of Richmond, Va.

James E. McMary Company, local agent in Pit burg for the Studebaker line, recently received order from the Safety Armorite Conduit Company, Pittsburg, for two 3½-ton Studebaker electric truck

Hopedale, Mass., has bought an electric combi tion chemical engine and hose wagon for its fire partment.

If the plans of the recently incorporated Langhor Transportation Company are carried out, Langhor and Morrisville will be connected with motor stag

E. R. Pease, of Omaha, Neb., has established regular omnibus service between the railroad statio and principal hotels with a sixteen-passenger Kn bus.

The R. H. Macy & Co., large department sto owners in New York City, after using fifteen electr vehicles in their delivery service for four years ha doubled their equipment.

The Board of Police Commissioners of Baltimor Md., have purchased a motor patrol wagon.

A commercial vehicle will be placed in the delive service of the Brandywine Electric and General R pair Company, of Wilmington, Del.

Canada Sugar Refining Company, of Montreal, Can has placed in service the 5000-pound Knox truck, pu chased from the Wilson Automobile Company.

An electric bus makes two round trips daily betwee Almont and Romeo, Mich., which towns are nin miles apart.

COMMERCE TRUCKS
TRADE MARK
Built for Commercial Purposes
4-CYLINDER 4-CYCLE
POWERFUL — ECONOMICAL — RELIABLE
3½ to 5 Tons Capacity

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Motor Cycle Department

Trophy for Motorcycle Competition

R. G. Betts, president of the Federation of American Motorcyclists, will present for team competition between motorcycle clubs, a solid silver trophy. The trophy will cost approximately $150, and will take the form of a shield bearing raised motorcycle designs and laurel wreaths, within which to inscribe the names of the successive victors. The trophy will be styled the Betts shield, and the donor has stipulated that the first contest shall occur at the national meet of the F. A. M., held at Providence in August.

F. A. M. Endurance Run

After several changes, the dates for the national meet of the Federation of American Motorcyclists at Providence, R. I., have been finally changed to August 1, 2, 3 and 4. This results in the starting of the F. A. M. endurance contest from New York at 4.30 A. M. Tuesday, July 30. The first day's run will be to Springfield, Mass., 190 miles, via Poughkeepsie, N. Y., Lakeville, Conn., and Lenox, Mass. The following half day the route will be from Springfield to Providence, via Worcester, 87 miles. Poughkeepsie, Springfield, Worcester and Providence will be the controls at which the contestants will be timed.

The schedule will be worked out on a basis of 15 miles per hour, the penalties to be one point for each minute the rider is late and two points for each minute he may exceed the schedule, five minutes leeway, fast and slow, being allowed for variation of watches; no competitor, however, will be permitted to come within sight of a control and there wait for his time to expire. Repairs within controls will be prohibited.

The contestants will be divided into two classes, A and B, the former being constituted of those riders using single cylinder motorcycles, and the latter of those using two or more cylinders.

Each starter will be given an initial credit of 1000 points. In addition to trying the rider's endurance and judgment of pace, the hill-climbing qualities of his mount and the economy of its operation will be put to test. The climbing qualities will be tried out on the westerly slope of Jacob's Ladder near Lee, Mass.

The test of economy will take place on the Hills Grove half mile track in Providence, immediately on the arrival of the indurancers.

The first ten men in Class A and the first five in Class B will be designated "Honor Men"; the leader in each class will be awarded a diamond medal, while the other "Honor Men" will receive combined gold and silver medals, the number of awards in the multicylinder class being contingent on there being not less than 12 starters. There also will be awarded to the private owner unconnected with the trade, and regardless of his class or position in the general score, a special gold medal, but he must have owned his machine at least 15 days previous to the start of the contest; this gold medal will be awarded in lieu of any other to which his standing may entitle him, the diamond prize only excepted.

The entry fee will be $5 and the list will close July 20, with H. J. Wehman, chairman, 108 Park Row, New York.

Providence Chooses Three Championships

The Providence Motorcycle Club has chosen three national championship events for leading events at the annual meeting of the F. A. M., at Providence, R. I., August 1 and 2. These events will be the one, two and ten-mile distances. This leaves the five-mile and the one-hour championships still open for decision.

Wray Establishes Motorcycle Record at Wilkes-Barre

A record of 1 minute 40 seconds was established at Wilkes-Barre on Memorial Day by William H. Wray with a 14 H. P. Simplex motorcycle. Besides establishing a record Wray won the free-for-all event, in which there were five starters. The record is considered a wonderful performance, as the climb of 6909 feet was made at an average of 40.9 miles per hour. The summary:

1 W. H. Wray, 14 H. P. Simplex...1.40
2 J. E. McLaughlin, 4 H. P. Indian..2.18
3 G. W. Sherman, 4 H. P. Indian....2.24 4-5
4 C. T. Anderson, 1¾ H. P. Indian..2.48
5 Oscar Hedstrom, 12 H. P. Indian..2.54

Harley-Davidson Carries off Honors in West

The Harley-Davidson motorcycle carried off all the honors at the motorcycle hill climb at Curtiss Hill, Milwaukee, Wis., on Decoration Day. The slow test held only saw two actual finishers, C. H. Lang on his two-speed Harley-Davidson and R. D. Buell on his two-cylinder Rex. Summary follows:

R. Sporleder, Mil'kee, Harley-Davidson..	.42	.41 2-5
W. Davidson, Mil'kee, Harley-Davidson.	.43 1-5	.42 1-5
F. Huyck, Chicago, Harley-Davidson...	.43 1-5	.42 1-5
R. D. Buel, Chicago, Two-cylinder Rex.	.44	.43 1-5
J. G. Turner, Chicago Special Armac...	.49 1-5	.45
C. Blankenheim, Chicago, Torpedo.....	.47	.46 1-5
G. W. Lyons, Chicago, Antoine-Torpedo.	.46 2-5	.48 3-5
C. Newbauer, Milwaukee, Merkel.....	.49 2-5	.52 4.5
T.G.McCulloh, Chicago, Harley-Davidson	.53 3-5	.55

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Fulton County Motorcycle Association Races at Johnstown

On Memorial Day at the Johnstown (Pa.), Fair Grounds the Fulton County Motorcycle Association held their first annual field day. There were six events in all, four for motorcycles and two for bicycles. About seven hundred persons attended the races.

Summaries:

One mile motorcycle race for novices, won by F. S. Smith, Johnstown, riding an "R. S.," time 1:47 3-5; second, J. Shear, Gloverville, Indian; third, J. R. Vosburgh, Johnstown, "R. S."

Five mile county championship, F. S. Smith, "R. S.," 8:46; second, J. R. Vosburgh, "R. S.;" third, J. W. Sisson, Indian.

One mile bicycle, novice, R. Gross, Gloverville, first.

One mile county championship (bicycle), D. Quackenbush, first. Time 2:53.

Unlimited pursuit race between teams from Johnstown to Gloversville. Riders made 27 miles in forty-six minutes and fifty-five seconds, an average of 1 minute and 44 seconds per mile. The contest was decided a tie between Vosburgh and Sisson.

Five mile for motorcycle belt-driven machines, L. Bremer, Gloverville, M. & M. Time 13 minutes.

Motorcycles Climb Manhasset Hill

On May 30th the fifth annual hill climbing contest of the New York Motorcycle Club in conjunction with the Brooklyn Motorcycle Club, was held on Manhasset Hill, Brooklyn.

In the first event, Class 1, Stanley T. Kellog, of Springfield, Mass., defeated Percy J. Drummond, of Newark, N. J., by three-fifths of a second. Both rode Indian machines. Results:

Class 1—Stanley T. Kellog, riding Indian. Time—1.14 4-5.

Class 2—Albert Book, riding Curtiss. Time—1.04 1-5.

Class 3—G. H. Curtiss, riding Curtiss. Time—0.50.

Class 4—G. H. Curtiss, riding Curtiss. Time—0.56 2-5.

F. A. M. Work

One of the good works in which the F. A. M. is engaged is the organization and designation of a system of accredited and competent repair shops, which work already has made substantial progress. Shops owned by such dealers and repairmen as pass the examination, which requires that certain stock and equipment be carried and that the applicants themselves shall be motorcyclists of at least two years' experience or have a rider of such experience in their employ—are officially registered, and a handsome gold bordered certificate issued (without cost) setting forth the fact. On the "Selected Routes," which the F. A. M. is issuing to its members, the names and addresses of all such accredited repairers are being printed without charge.

The first of the series of "Selected Routes for Motorcyclists," to be issued by the Federation of American Motorcyclists, is almost ready for distribution. It covers the route from New York to Providence and Boston via the Berkshire Hills and return via the Hartford-New Haven route and is laid out in a manner that permits the choice of either a day's run or a week's tour, the idea of the series being to present circular or "unrepeated" routes. The routes will be issued separately on waterproof cloth and will be of a size that may be carried in the pocket, and when the series is completed be made into a built-up book with detachable pages.

Motorcycle Show in November

As a result of the influences brought to bear on the Association of Licensed Automobile Manufacturers by the Cycle Manufacturers' Association the licensed association has let down their bars and will allow motorcycles to be exhibited at the Madison Square Garden show in November.

C. E. Bradley Motor Co., of Philadelphia, manufacturer of motors and motorcycles, have set up a department for the repair of foreign motorcycles.

The Reading Standard Co., Reading, Pa., has found it necessary to increase its manufacturing facilities in order to keep pace with the demand for Reading pedal cycles and R-S motor cycles, and has therefore purchased the business and plant of the Reading Machine Co.

The Milwaukee Motorcycle Club has elected the following officers for 1907: Dr. Thomas, president; J. T. Ball, vice-president; Arthur Davidson, secretary; Arthur Morgan, treasurer. Directors: Ralph Sporleder, Arthur Kellerman, Herbert Taylor, Dr. Thomas and Arthur Davidson.

At a meeting on June 5 the Pikes Peak Motorcycle Club was organized with a charter membership of thirty. The club was organized to promote motor cycling and for the benefit of the riders no dealer being allowed to hold office.

The following officers were elected: President, H. Holman; vice-president, N. S. Norton; secretary, Chas. B. Lansing; treasurer, Alva Stratton.

The C. M. A. annual election resulted as follows: Fred I. Johnson, president; vice-president, Ignace Schwinn, Arnold, Schwinn & Co.; secretary, J. F Cox, Pope Mfg. Co.; treasurer, Harry Walburg, Reading Standard Co. Messrs. Cox and Walburg succeeded themselves. The report of the Cycle Show Committee reporting that unexpected advancement of the dates of the New York automobile show had upset or wholly altered the situation respecting the proposed exhibit of cycles and motor cycles, and recommending that the latter be deferred until 1909, was received and adopted.

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To our Agents. Hadn't you better place that order you have been keeping your customers waiting weeks for, where you can get

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M. M., the machine that has more power, strength, stability, speed, endurance and ease of control than any other Motor Cycle built.

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GEO. P. JENKINS, 10 W. 60th St.

SAN JOSE, CALIF.
A. C. BANTA & CO., 704 South 2nd St.

AMERICAN MOTOR COMPANY

715 CENTER STREET

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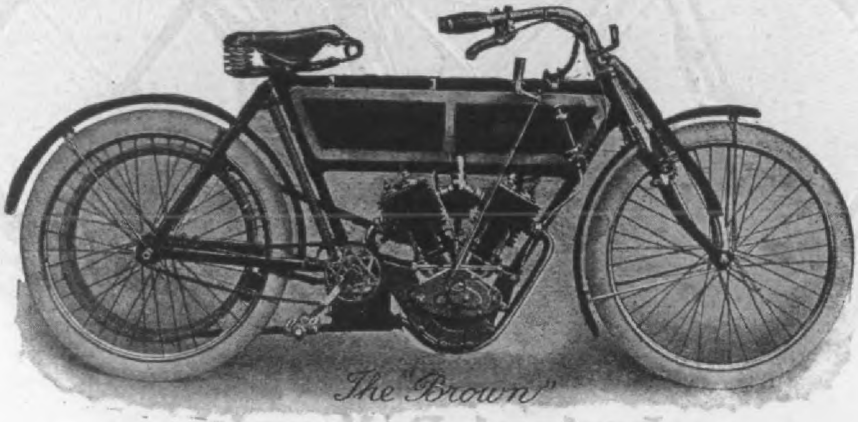
ed, which is made by Brown Bros., Ltd., at Eastern street, London, Eng. This chine is made in three types, 2¾ H. P., H. P., and 5 H. P. The motor crank e is attached to a substantial cradle, ngly bolted to a lug on the front down e, and the bottom bracket in the rear. cylinder and head of the motor are in-



The "Brown" Motor Cycle, one of the leading English machines.

al. Both valves are mechanically opera- The ignition system of the 3½ and 5 P. machines includes an accumulator, a e and break type contact breaker and E. C. trembler coil, while on the 2¾ H. P. chine a plain coil is used. The Simms-ch magneto can be furnisht in place of accumulator and coil if desired. The uretor is a genuine Model H. Longue-e. The "Duco-Flex" belt is fitted to all chines.

he manufacturers are desirous of ob-ing agents in America, and intend to rously push the sale of the machine on side of the Atlantic as soon as arrange-ts have been made for appointing agents.

designer. His first machine was fitted wi a 3 H. P. motor and is still in use to-day.

The Hilaman machines are built for lo services, and tho of moderate weight, a strongly put together. Each model is pr portioned according to its power and t work it is intended to do.

The 2¼ H. P. motor has a 2¾x3¼ cyli der; 1¼-inch valves; 3 piston rings; ⅝-in hollow wrist pin, and tool steel shaft ru ning in phospher bronze bearings, ⅞-in in diameter.

The 3½ H. P. motor has a 3¼x3½ cyli der; 1⅝-inch valves; 3 piston rings; to steel shaft in bronze bearings, 1x2 inches the drive side and a 32-lb. flywheel, whi is one-half the weight of the engine. T 7 H. P. motor consists of two cylinders the same size as that of the 3½ H. P. mot and set at an angle of 45 degrees. The fl wheel is lighter, and the motor comple weighs only 10 lbs. heavier than the 3 H. P. motor. The 2-cylinder motor is qui suitable for driving a light runabout.

e Hilaman 2¼ H. P. Motor Cycle. Price $175. Made also in 3½ and 7 H. P. types, listing at $210 an $285 respectively.

Hilaman Motor Cycles

The 2¼ H. P. machine weighs 135 lbs., t 3½ H. P. 170 lbs. and the 7 H. P. 190 l

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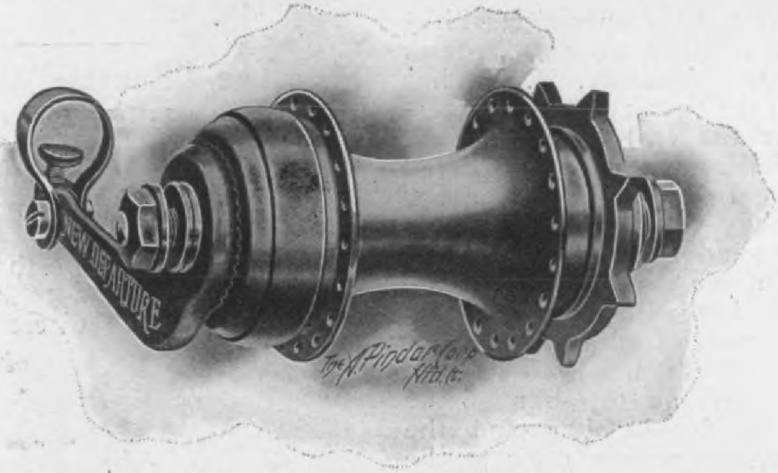
The Incomparable

New Departure Coaster Brakes

For Bicycles, Motor Cycles and Tandems



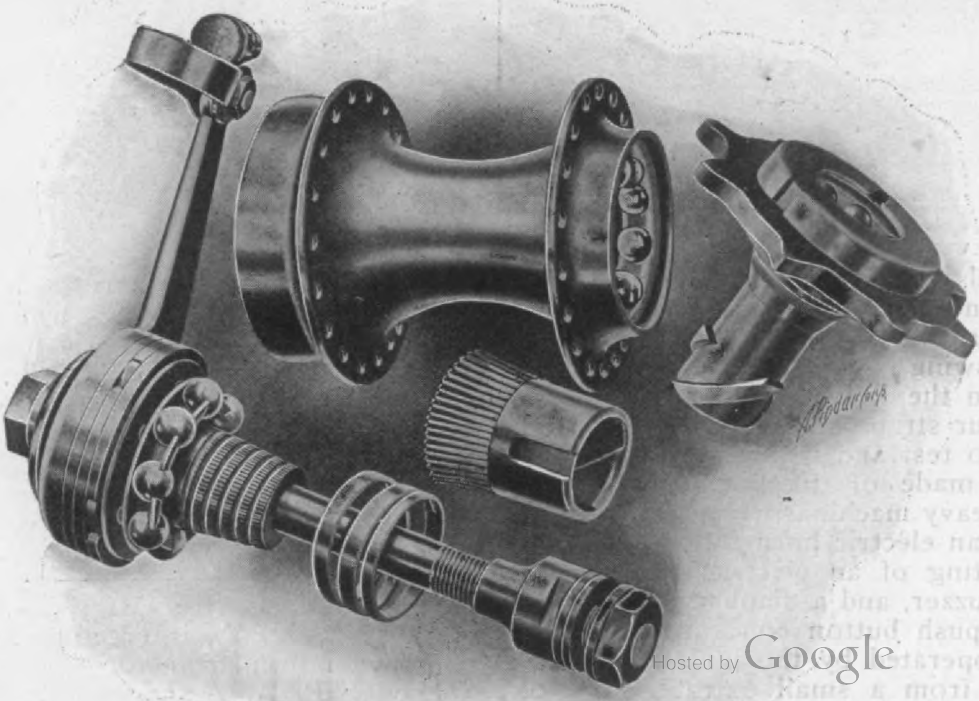
REGULAR COASTER BRAKE A

The NEW DEPARTURE COASTER BRAKE was firmly established in popular favor on two continents some years ago, and maintains its position solely on its merits.

It is simply made with all wearing parts hardened for long service, perfect in mechanism, never fails to operate, symmetrical in design, the handsomest and most satisfactory Coaster Brake on the market.

Guaranteed for one year from date of purchase.

Dealers supplied with advertising matter, electros and other "selling helps" on application.



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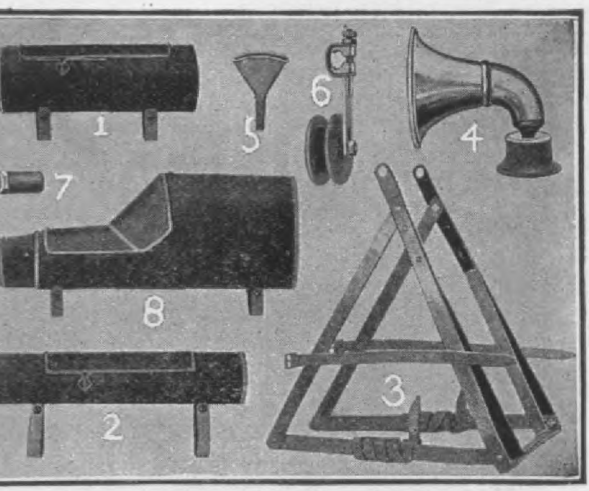
ke and adjustment for the gasoline. On two-cylinder type there is a separate lle valve for each cylinder and two gas ets.

Widmayer's Latest Motor Cycle Specialties

esides the motor cycle specialties illus-ed in our April number, page 270, Frank Widmayer, 2312 Broadway, N. Y., has ight out several other attractive acces-es in time for the early season trade. se later specialties are here illustrated are applicable to all makes of motor es, but especially to the Thor type of hine, which includes a large majority ne machines on the market.

ne illustrations herewith are numbered (1) shows a metal tool bag of cylin-al form with torpedo head. This tool ptacle fastens on the top bar of the ne between the handle bar and the lle. It is provided with a door at the fitted with a wire catch and a lock. 2 is a similar box for fastening over



Widmayer's Latest Specialties.

parallel with the Indian type of bat-box, and it has a wire catch and lock. o. 3 is a combined luggage carrier and d. It swings up and around the gaso-tank on the Indian machine. It is fit-with four straps and forms a fine stand which to test and makes repairs. Two es are made of different weights for and heavy machines, respectively.

o. 4 is an electric horn for motor cycle consisting of an electrically operated ating buzzer, and a diaphragm connect-with a push button conveniently locat-It is operated by the ignition battery ent or from a small extra battery of

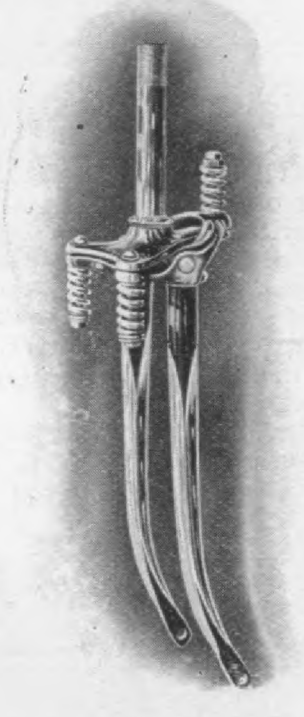
by a bushing which encases the spark pl terminal and secondary wire preventin the driver's getting an accidental shoc when reaching down to adjust the carbur tor.

No. 8 is a new battery box which is fa tened in the same place and by the sam means as the Indian and Thor batter boxes. It holds three standard size d cells 2½x7 inches.

The "Racycle" Spring Fork

The Racycle safety cushion tri-sprin fork is the product of the Miami Cycle Mfg. Co., Middletown, Ohio, and is furnis as regular equipment on their 1907 Racyc Motor Cycles.

This fork combines the rigid and sprin fork and in addition to having three heav springs to receive direct shocks, it is als



The "Racycle" Safety Cushion Tri-Spring Fork.

equipt with rebound springs which do awa with all jar and vibration and make a cush ion for the head and fork of the machine.

The fork is so constructed that it ca easily and quickly be changed to a rigi fork by the mere tightening of the sprin nuts with a hand wrench. The manufac turers guarantee against breakage of eithe springs or forks.

The G. H. Curtiss Mfg. Co., of Han mondsport, N. Y., is erecting an additic to its plant, which measures 30x60 feet.

The C. P. A. A. appointed Webster a

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possess all the essentials of the perfect tire —resiliency, durability, speed and comfort

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KOKOMO RUBBER CO.

he Cycle Manufacturers' Association and Cycle Parts and Accessories Association be held at Atlantic City, N. J., August and it is the intention of the energetic mittee in charge to make it the biggest e trade meeting ever held. The joint mittee on arrangements is composed of J. Surre, chairman; R. D. Webster, ry Walburg and D. P. Harris. The pub- y end of the meeting is in charge of a mittee consisting of Frank W. Roche, irman; G. A. Wahlgren, H. Portter Geo. H. Buzby.

he dates selected are concurrent with the s of the automobile carnival, and between two events it is likely that the hotel ac- modations will be taxed to their utmost n it is considered that these dates are in height of the season.

he Shelbourne has been secured as the dquarters and will accommodate about

he program arranged is as follows:

esday, August 6—Committee meeting. Chairmen e various committees are requested to meet with Committee of Arrangements at 11.00 A. M. and ge for meetings of their own committees in the noon.

dnesday, August 7—10.30 A. M.—Meeting of the Parts and Accessories Association; 10.30 A. M. ing of the Cycle Manufacturers' Association; 3.00 .—Bicycle run to road race.

delegates are earnestly requested to bring their bicycles, as the committee found, that owing to shortage of wheel this year, there are not one wheels in Atlantic City that could be rented his purpose.

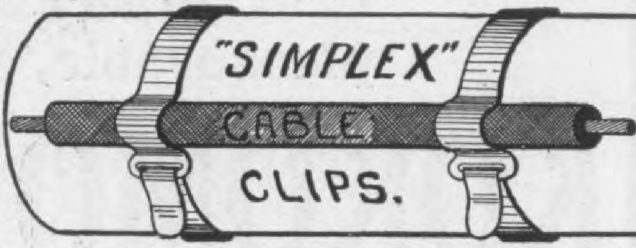
rsday, August 8.—4.30 P. M.—25-mile road race; A. M.—Meeting of the Jobbers' Association; 2.30 .—Joint meeting of the Cycle Manufacturers' As- tion, Cycle Parts and Accessories Association, and rs' Association; 5.00 P. M.—Clam bake and band rt at Inlet Pavilion.

day, August 9—2.00 P. M.—Sailing parties, start- rom the Inlet; 2.00 to 4.00 P. M.—Rolling chairs e boardwalk, starting from the Shelburne Hotel. hing every morning, 6.00 to 8.00 A. M.

v "Simplex" Motor Cycle Accessories

he Prospect Motor Mfg. Co., 7 and 9 k Place, Brooklyn, N. Y., are offering e new products to the trade, consisting lamp and generator, a siren horn and ble clip.

a large reflector in the rear, and is identic in appearance with the regular automobi type lamp. Price is $10.00.



The "Simplex" Cable Clips.

Their Simplex siren horn is made aluminum, runs on ball bearings and is a tached to the motorcycle by means of strong clamp. It is operated by a Bowde wire, which brings the small wheel in co tact with the front tire. This horn, th claim, can be heard ½-mile. Its list pri is $16.00.

The Simplex cable clips are made aluminum. They are intended to elimina all trouble from short circuit, and to ho all the wires very snugly in the frame. Th do away with the necessity of using ti tape, etc. These clips sell for 50 cents dozen or $2.50 per 100.

A. J. McCullom, the motor Racycle exper who left the factory at Middletown, Ohi on April 3, arrived in Boston, the end his journey, on May 29, having covered 19 miles.

The ten miles to the summit of Mt. Wi son, the site of the Lick Observatory, wa covered by Edward Loudenclos, a young mo torcyclist of Pasadena, Cal., in the recor breaking time of forty-nine minutes, ar returning made the descent in forty-fiv minutes. Loudenclos is secretary of the Pa adena Motorcycle Club and rides a Readir Standard motorcycle.

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Our stand may save that walk home.

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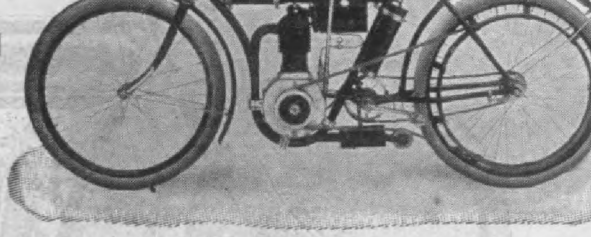
1907 ——— 3 H.P.



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takes the lead absolutely. This year we have had the most pronounced success with this Model. Its spring frame protects the rider from all the jolting and jarring, keeps your nerves in order and a ride of fifty miles or more creates an appetite, not a head-ache.

THE MERKEL MACHINE GOES WITH MERKEL SPEED,

climbs hills with almost the same speed as on a level road and no sand is deep enough to stop it.

Write us today, tell us all about what you want and we will please you. Don't forget.

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Must be on the Motor in your Motor Cycle if it is genuine, and a winner.

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The Pierce Cycle Co., Buffalo, N. Y.
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Fowler-Manson-Sherman Cycle Mfg. Co., Chicago, Ill.
Emblem Mfg. Co., Angola, N. Y.
Hornecker Motor Mfg. Co., Whiting, Indiana.
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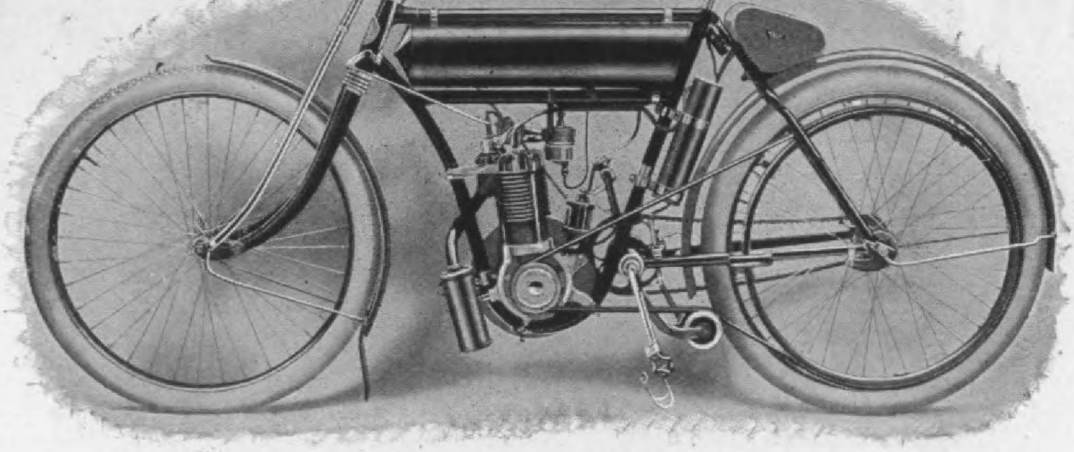

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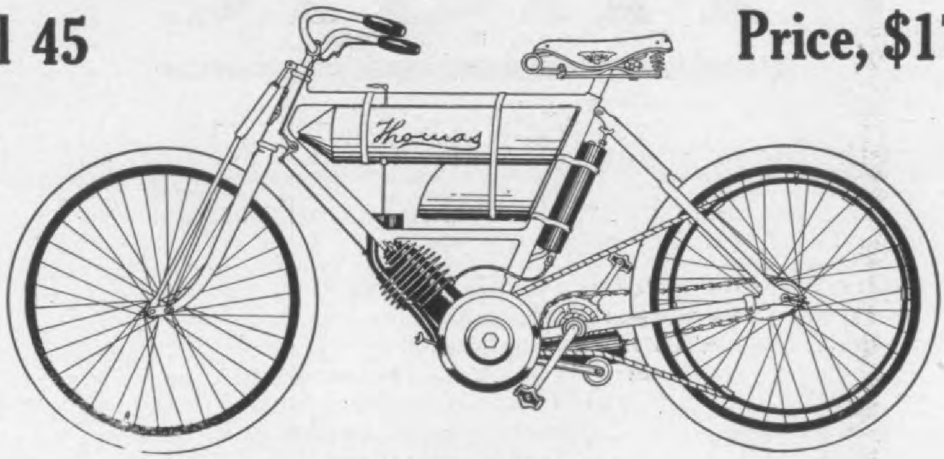
Model 45 **Price, $175.00**



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MR. AGENT, you ought to handle an **up-to-date** motorcycle. **You ought to have a sample now.** Our catalogue will **prove**

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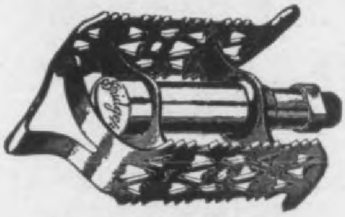
Standard Pedals

are the equipment seen on the largest number o
high-grade wheels. Why
Because of their unvaryin
excellence and recognize
and permanent value.

Made for men's, women'
or children's wheels.



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Flat, Pressed, Grooved and Offset

Teeth Punched and Pointed for $\frac{3}{16}''$ and $\frac{1}{4}''$ Chains, 1″ Pitch o
Blanks without teeth ready for milling any other pitch.

Increased Facilities—Prompt Deliveries Guaranteed

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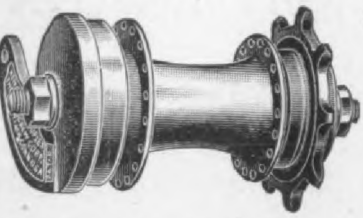
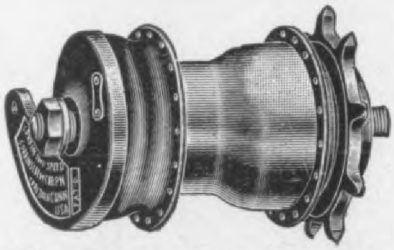
Corbin Hubs for 1907



"The Best By Test"



Corbin Duplex Brake
MODEL No. 6

Fits any wheel. Special models for chainless wheels and motorcycles with Front Hubs to match.

Corbin Two Speed Brake
MODEL No. 10

No shifting levers. Will run backward. Change of speed is made automatically.

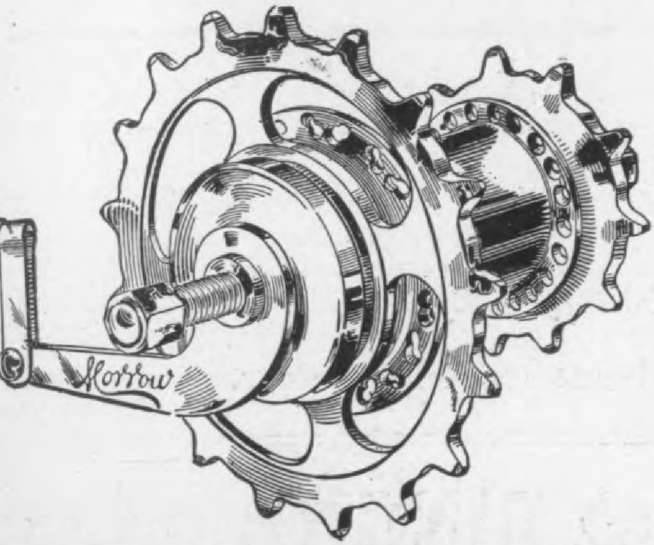
CATALOGUE ON REQUEST

THE CORBIN SCREW CORPORATION
NEW BRITAIN, CONN.

TO-MORROW NEVER COMES

Therefore, arrange TO-DAY to equip your bicycle or motor cycle with

The Morrow Coaster Brake



The illustration shows the chain drive, motor cycle brake, but we make them for belt-driven, or in fact, any style of motor cycle. Do you want more information? We have lots of it that we are willing to impart.

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Indian and Yale Motorcycles

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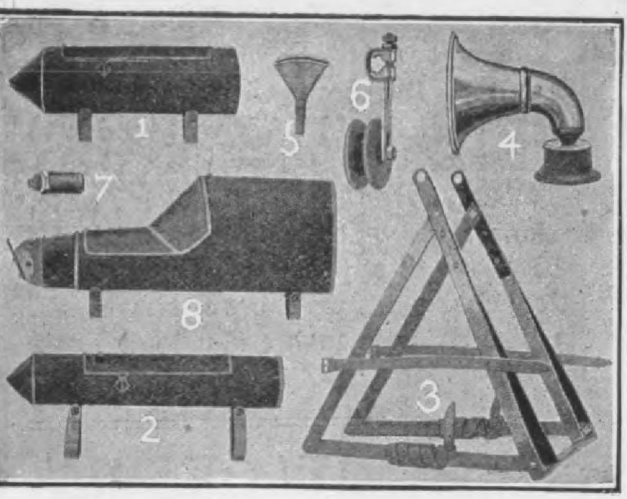

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1907 Single Cylinde

The general purpose machine.

Surplus of power. Easy riding, o account of long wheel base and moto position. Extremely durable. Rolle bearing engine. Send for catalogu A, which also describes our doubl cylinder motorcycle and line of ligh and powerful motors. Address,

G. H. Curtiss Mfg. Co

HAMMONDSPORT, N. Y.

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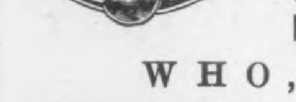
W H O , tell us?



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INCORPORATED

Manufacturers of

Columbia Automatic Gas Lamps for Automobiles and Bicycles

58-60 Wabash Ave., Chicago, I

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Sole Manufacturers, THE ORIGINAL A. J. Repair Hanger and Braziron

The best cast iron brazing compound

Special motor cycle bracket and hanger for build

26 W. Randolph St., Chicago, Ill.

Mesinger New Cavalry Motor Saddle

Built on th style of a cavalry sa on which t rider canno slip forwar backward.

We express samples p

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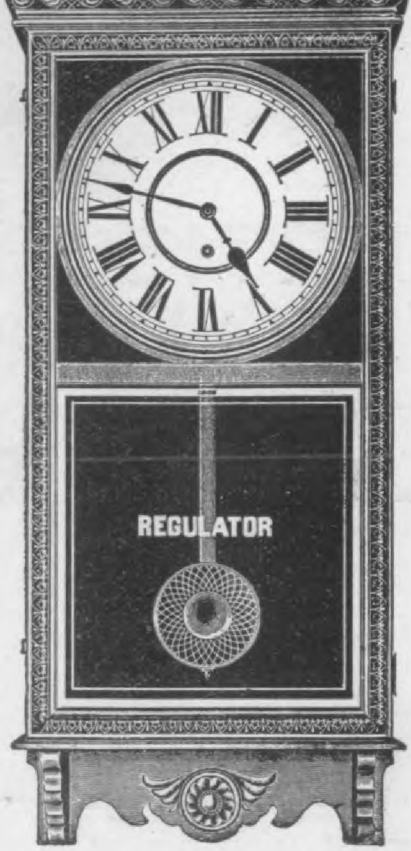

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Regulator Clock.

WHY not get this thoroughly reliable, guaranteed Regulator Clock at once and have the benefit of it. We will send it to you entirely free for only 24 Neverleak Certificates. The clock is over 3 ft. high, 16½ in. wide, has solid oak case and 8-day movement. "Brass Sign" certificates will apply on clock. One certificate with each dozen 4 oz. tubes of Neverleak. Twelve certificates will entitle you to a Brass Sign as heretofore.

BUFFALO SPECIALTY COMPANY,

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EER GREEN EGG MOTORCYCLE

5 P. Two-cylinder

Price $225.00

beral discount to dealers.

d machines taken in exchange.

Ve furnish castings for eight different mo-s, 1½ H. P. to 5 H. P., air and water-cooled. ur motor-cycle catalogue is one of the most nplete ever issued. Write for copy.

SECONDHAND MOTORCYCLES $40.00 UP.

Automobile Wrenches!

LOOK NO FURTHER!

Write for prices and samples of the **Lightest, Strongest,** most **Serviceable, Tempered Steel Wrenches** ever designed. Address

ONWARD COMPANY,

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THE ORIGINAL.

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Ball Retainer

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Yale and Snell Bicycles

REPRESENT EXTRAORDINARY VALUE

BICYCLE DEALERS! If you want to handle a line of wheels that wi prove easy sellers, secure the agency for the **"Yale"** and **"Snell"**. They hav reached a point higher than that ever attained in the construction of a bicycl It is better to sell the **"Yale"** and **"Snell"** Bicycles than to sell against th line. "A word to the wise is sufficient." Send for catalog and terms.

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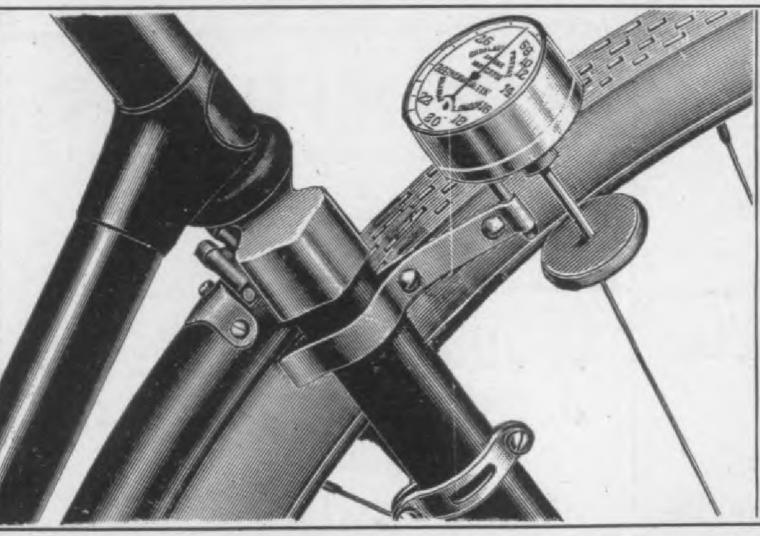

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THAT ARE WORTH WH

Simplex Speedometer
Accurate and Reliable, **$5**

Simplex Headlight
The very best imported, **$10**

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Waterproof V Belts, Simplex Belt Ho
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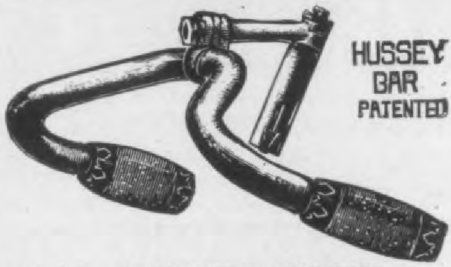
Sole U. S. Agent for the
World Famous Peugeot Motors.

Prospect Motor Mfg. Co
7-9 Park Place, Brooklyn, N



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the most complete line for 1907 ever offered. New Shapes. New Features. Write for prices.

NO 1 20" WIDE 3½" DROP 2½" FORWARD BEND

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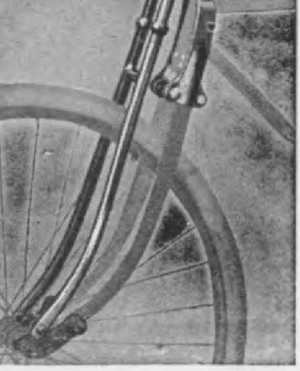

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Easily attached to any bicycle or motorcycle. Absorbs all jars, jolts and vibration.

Send for catalogue.

J. Harry Sager

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Bicycle Line Most concerns can supply you with staple articles for a complete Bicycle, but we have added to this line a specialty of Tubings, Lugs, Stems, Stays and other fittings. All makes of Cups and Cones, to help the repair man.

Come to us with your troubles, and we will supply you. See Catalogue 1907.

Auto Line Tires, Tubes, Lamps, Generators, Goggles, Carburetors, Timers, Coils, Switches, Mufflers, Jacks, etc., at **Rock Bottom Prices.**

Write for Catalogue and Discount Sheet.

Progressive Cycle & Automobile Supply Co.

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INDIAN MOTORCYCLES

Hendee Mfg. Co.

Springfield, - - Mass.

CONVERT YOUR BICYCLE

to an up-to-date **MOTORCYCLE**

THE ERIE 2 H. P. attachment fits any frame without alteration. Easily attached by anyone. A hill climber.

2 & 3 H. P. MOTORCYCLES, MOTORS, CASTINGS, ETC.

Send stamp for either catalogue.

Motorcyclists Send 15 one-cent stamps for new book "THE MOTORCYCLE." It tells about mechanism, care, operation, how to get more power, etc.

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Are said to be

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Mayo Motor Cycles

The Most Perfect Mechanically Constructed.

Power and Speed to Spare.

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We have a neat descriptive booklet of our motorcycle which we would like to send you.

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Our own Spring fork
Ride comfortably

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CROUCH MOTORCYCLES

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BICYCLES - TIRES - SUNDRIES

Careful attention paid to Prompt Shipment

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Clipper Sharpener and Surface Grinder

Motor Boat Department

Marine Coming Events

July 4—Opening of Central New York Motor Boat Association's Races, Ithaca.
July 4—Indian Harbor Yacht Club Regatta.
July 5—Toledo Yacht Club Motor Boat Races.
July 5—Central New York Motor Boat Association, Endurance Race.
July 5 to 14—Motor Boat Exhibition, Bergen, Norway.
July 6—Central New York Motor Boat Association's Races, Cayuga Lake Park.
July 20—New York to Marblehead, Mass., 270-mile Motor Boat Race, New Rochelle Yacht Club, M. S. Kattenhorn, Secretary, 136 Franklin Ave., New Rochelle, N. Y.
August 8-11—Toledo, Ohio, Yacht Club's Carnival on Lake Erie.
August 13, 14, 15—Gold Challenge Cup Race, Chippewa Bay.
August 15—Toledo Yacht Club, Long Distance Race on Lake Erie.
August 16—Annual Meet, Lake Butte des Morts Yacht Club, Oshkosh, Wis.
August 17—Annual Regatta, Oshkosh, Wis., Yacht Club.
August 20—Motor Boat Club of America, start of Jamestown Cruise.
August 22—American Power Boat Association, start of Jamestown Cruise
September 2—Races at Baldwinsville, N. Y.
September 2-6—Motor Boat Races, Jamestown Exposition.
September 23-28—Motor Boat Club of America, Regatta Week.
October 5—Motor Boat Club of America, Members' Race.
December 7-14—Annual Motor Boat Show, Grand Central Palace, N. Y. National Association of Engine and Boat Manufacturers.
January 14-18—Hartford Automobile Dealers' Show, Foot Guard Hall.
January 27-February 1—Boston Motor Boat Show, Mechanics' Hall. New England Engine and Boat Manufacturers' Association.
1908—February 20 to March 7—Fourteenth Annual Sportsman's Show at Madison Square Garden, New York. J. A. H. Dressel, Manager.

Campbell to Manage National Motor Boat Shows

Chester I. Campbell, 5 Park Square, Boston, has been appointed by the National Association of Engine and Boat Manufacturers, New England Engine and Boat Manufacturers and American Association of Engine and Boat Manufacturers to have full charge of the three motor boat shows to be held under the auspices of these three associations as follows:

The New York Show at the Grand Central Palace, from Dec. 7th to 14th, 1907.

The Chicago Show to be held at such exhibition hall and time as he may decide upon.

Boston Show to be held in Mechanics' Hall January 27th to February 1st, 1908.

The associations named above sanction only the shows in the schedule named. They have further authorized him to solicit exhibition space among the members of the respective associations and manufacturers in the trade for these shows with power to make contracts and arrange all details for such exhibitions.

The members of the National Association of Engine and Boat Manufacturers have recently received a statement from the treasurer, showing the present excellent financial condition, a balance showing nearly sixteen thousand dollars in assets, and no indebtedness. A division of a portion of this sum was contemplated, but on further consideration the Executive Committee determined that it would be better to utilize the fund as a guarantee for the coming New York Boat Show, and to help support the shows which will be held in Boston and Chicago under the auspices of the New England Engine and Boat Association and American Association of Engine and Boat Manufacturers.

It is the wish of the Executive Committee to so arrange with members who exhibit that they may participate in the net return from these shows, thereby to reduce the ultimate cost of space to a minimum, if not in its entirety.

A. P. B. A. Cruise to Jamestown

The 1907 cruise of the American Power Boat Association will be to Jamestown Exposition, the start to be made at 1.30 P. M. on August 23, from the Atlantic Yacht Club, Sea Gate. The first day's run will be to New Brunswick, N. J., where the night will be spent in the basin of the Delaware and Raritan Canal. On August 23 the run will be to Riverton, N. J., and August 24, to the entrance of Chesapeake and Delaware Canal, at Delaware City, Del.; August 25, short run on Delaware canal, and south to Sassafras river; on August 26, to Annapolis, Md.; on August 27, to Soloman's Island, Va.; on August 28, to Milford Haven, Va., and on the night of August 29 the fleet should reach Hampton Roads Yacht Club.

Arrangements have been made for supplies and gasoline thruout the cruise. Entries are requested as early in the season as possible, in order to facilitate the many arrangements necessary.

Newark Motor and Yacht Club

Newark Motor and Yacht Club, of Newark, N. J., which has only been organized for several months and which has a membership of ninety, opened the season on Decoration Day with a motor boat parade. The start was made from Kroll's boat house at the foot of Chester avenue, with a goodly number of boats in line, gaily decorated with the national and the club emblems. The course was to Bayonne, where a shore dinner was served.

Motor Boat Season Open

The Ventnor Motor Boat Club, of Atlantic City, N. J., which was organized a few weeks ago, opened the season with a parade and races on Memorial Day. The races were over a five-mile inside course. Their first event was won by L. Bye, the second by D. Albertson, the third by A. L. Thome and the fourth by N. Knauer.

Hosted by Google

divided into two classes: for boats 25 and over and boats under 25 feet. Pre- s to the race all boats entered were re- ed by the committee to cover a short se and report their time. On this basis as estimated how long the boats should n covering the race courses of approx- ely eleven miles for the large class and n miles for the small class. The boats ring the courses in the times nearest ap- ching the committee's estimate were de- d winners.

the class for boats over 25 feet Mildred, uxiliary sloop, was declared winner. Her was 1.26.05. In the small class Omo her time over the course being 1.04.30.

mary: Boats under 25 feet:

ix	1.10
tine	1.06.50
	1.04.30
	1.04.45
feet and over:	
ne	1.00.40
s	1.09.25
ed	1.26.05
ra	55.27
	1.13.23
a	1.01.40

e "Sturgeon Bay" Family Launch

order to meet the demand for a good, nch, comfortable family launch, selling price that is within reach of nearly y one, the Sturgeon Motor Boat Mfg.

The "Sturgeon Bay" 23-Foot Family Launch.

of Sturgeon Bay, Wis., offer the 23- family launch shown in the accompany- cut.

e boat is built very heavy, the keel, e work, covering boards, decks, coam- etc., being of white oak, and of ample

been tested out on the rough waters o Lake Michigan and has proved very sea worthy, and a great number of them hav been sold to the smaller lakes, where good, dry, safe and comfortable boat needed.

The concern have under way at present boat with which they expect to make 2 miles an hour.

Ailsa Craig Wins Bermuda Race

The motor boat Ailsa Craig won the rac from New York to Bermuda, crossing th finishing line at 9.59 o'clock Tuesday morn ing, June 11, having covered the 670 nauti cal miles in 65 hours 49 minutes. The boa made good weather of the seas and onl once during the voyage were the engine stopt, which was made in order to shi an igniter.

Thomas Fleming Day who was in charg was loud in his praise of the yacht's per formance. She ran 190 miles up to noo on Sunday, 276 miles up to noon on Mon day and 204 miles to the finishing line. O the trip 550 gallons of gasoline were use Summary:

Start, 4.10 o'clock P. M., June 8. Finish, June 11:

Yacht and Owner.	Finish.	Elapsed Time. D.H.M
Ailsa Craig, Craig & Stevens	9.59 A. M.	2.17.4
Idaho, Peter Shields	7.12 P. M.	3.03.0

Corrected time: Ailsa Craig, 2 days 17 hours 49 mi utes; Idaho, 2 days 18 hours 6 minutes. The Ails Craig wins by 17 minutes.

The engine of the motor boat Ailsa Craig winner of the Bermuda race, was equip with Pedersen lubricators.

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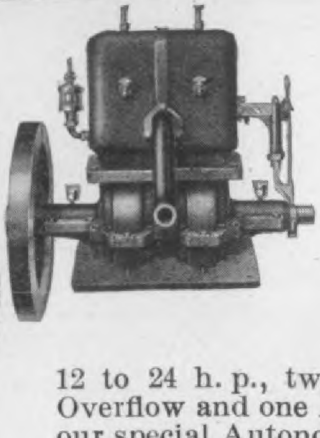
PEERLESS

Marine Engine



This is by far the best engine Mr. S. R. Du Brie produced. His other designs were leaders; he has now i proved on **every feature** of them so that the Peerless i leader of leaders. In a word, the Peerless is the fin marine engine made, not only at **its** price but at any pri

Our Peerless Swell Specia

12 to 24 h. p., two 4¾ x 5 cylinders, cast in dual units with one Pump, Overflow and one Exhaust Pipe for both; double contact eccentric commuta our special Autonomous or any standard float feed carburetor; compression o of special design insures perfect lubrication; vibration eliminated.

Use the Peerless Engine for 30 days and if it does not live up to our ev claim send it back at our expense and we promptly return your money.

Write to-day for catalog quoting all sizes.

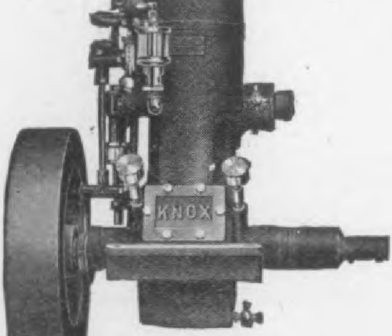
The Peerless Marine Engine Co.

326 Jefferson Ave. Detroit, M

Speed without Vibration

1907 Knox Motors

Marine and Stationary.



Marine, Three Port, 2½ to 13 H. P.
Marine, Four Cycle, 20 and 40 H. P.
Stationary, Four Cycle, upright, 4, 6 & 9 H P

Strong, Simple, Reliable, Economical.

1907 Catalogue ready.

ANTI-CORROSIVE
REGISTERED IN PATENT OFFICES UNITED STATES CANADA AND GREAT BRITAIN.
GAS ENGINE LUBRICANT
MANUFACTURED ONLY BY
E. H. KELLOGG & CO.
Nos. 242 & 244 South St. New York U.S.A.

IS THE BEST FOR

AUTOMOBILES AND MOTOR BOATS

An Engine of Good Reputation and 15 Years of Experience

Best designs, simple, reliable, best materia lowest prices, 2 and 4 cycle, 2 to 30 H. P. Sta your wants and w will quote you o best prices.

Special Offer f the Next 30 Da

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orks, of Bridgeport, Conn., have just con-
ted a new factory on the shore of Black
ck Harbor, Long Island Sound, with
ht acres of ground and seven hundred

construction. The power plant is of the s
tion gas producer type and a full equipme
of the latest machine tools has been pu
chased, and duplicate and interchangeal

View of the New Factory just completed by the Van Auken Motor and Machine Works, Bridgeport, Conn.

of water front, including a private har-
. Here the Van Auken twin screw mo-
which has awakened the interest of the
ting public, will be manufactured. The

work will be a feature of their output.

Their new twin screw motor is the resu
of ten years of study and experimenting
the part of Clarence E. Van Auken, M. E.

Answers to Marine Motor Inquiries

REBORING CYLINDER.

5824 Rural Street.

Pittsburg, Pa., March 20, 1907.

ease give me a little advice in regard to fixing
an engine. I have a 4-cylinder 4-cycle marine
or, 6-inch bore by 7-inch stroke; valve ports
inches diameter, inlet piping 1½-inch, ex-
sts 1½-inch increased to 2-inch. All valves in
head, inlets automatic, compression space 3½
es long. It turns a 28-inch 3-bladed pro-
er 450 R. P. M. I have been thinking of re-
ng the cylinder, to take out scored places,
ing new heads and fitting the valves in cages
nake them easier to take out.

n I increase the power and speed of this en-
? The fly wheel weighs about 375 pounds
is 28-inch diameter.

hat should be the compression space, proper
for valve openings, lift of valves, size of
t and exhaust piping, and where should the
aust open and close for best results?

ould I gain anything by changing the inlet
e to work mechanically? In fact, has any
ne with mechanically-operated inlets an ad-
tage over suction valves?

would like this engine to turn up from 500
00 R. P. M. and to make as much power as

that your compression space is decidedly t
large, being half the stroke. The engine a
bearings are probably strong enuf to stand
higher compression. This would facilitate spe
Reduce the compression space at least one in
Make the inlet valves very light and fit th
with light springs. If they can be increased
size the lift can be decreased corresponding
but in any event make the lift short. You c
experiment with various settings to see whi
gives the most power. For slow speeds, such
you employ, the exhaust valve need not op
early, probably 20 degrees ahead of dead cent
This will prolong the working stroke as much
possible. The exhaust valve should close ju
after dead center, two to five degrees. The inl
being suction-operated, will care for themselv
The fly wheel is twice as heavy as need be.
light load will help the speed of your boat. Y
ought to easily get 600 R. P. M. Be particu
to see that your bearings are free. A little fr
tion due to the spring of the hull will slow do
the motor wonderfully. Bearings should be lin
up after the boat is in the water, so as to
the shaft straight and free. Also be particu
with the propeller. It should be polisht and ve

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GAS ENGINE BUSINESS
FOR SALE

WE offer for sale the drawings, designs, patterns and special tools, such as jigs, templets, etc.; also the good will of one of the best known, extensively advertised, and successful two-cycle marine engine businesses in the country.

This also includes a quantity of finished and unfinished parts, and is an exceptional opportunity to obtain a fully developed line of marine gas engines, and an established business.

For particulars and full information, address,

TWO CYCLE,

Care of Cycle and Automobile Trade Journal.

Ralaco "THE SIMPLIFIED ENGINE"

Just a glance at the accompanying illustration will convinc one at all familiar with marine engines that the RALACO is si ity itself. It has less moving parts than any other make, a adjustments and working parts are more accessible.

The inlet and exhaust passages are cast within the cylinder jacket and connect with passages in the upper part of the h thereby eliminating the usual unsightly hot piping connected cylinders as found on all other engines. A CYLINDER MAY B MOVED IN A MOMENT'S TIME WITHOUT MOLESTING ANY O PART.

Valves are set in cages in cylinder head directly over the p there being no overhanging valve boxes. ALL VALVES AND C ARE INTERCHANGEABLE.

The valve gear, providing mechanically opened inlet, co but half the number of parts found on other engines.

Our perfected system of AUTOMATIC LUBRICATION does awa all lubricators, sight feeds and oil tubes.

Practically all of the working parts are enclosed within th and at all times run in a bath of oil.

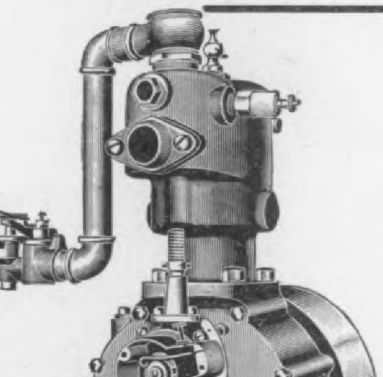
If you would have the MOST QUIET running engine on the ket, and one with the greatest number of distinctive featur desirable qualities, do not fail at least to investigate the R

ore buying. We will send you catalogue and full information promptly at your request.

ENCIES: W. J. Forbes, 220 Congress St., Boston, Mass. Wallace Brothers, Norfolk, Va Elliot Bay Iron Works, Seattle, Wash. J. P. Campbell, Jacksonville, Fla.

The Rathbun-Lacy Company, 920 Water Toledo, O

New York Office, 155 Chambers St.



The Most Power and Reliability ever given for the money

The "LITTLE GEM" Marine Moto

Price $100, including carburetor, spark coil and b teries. Bore 2 ⅞", stroke, 3¾", 2½ H. P.

It is the lightest and strongest motor on the market, weighi but 72 lbs. We stand back of every engine we sell.

It is impossible to get anywhere near this value elsewhere double the price. Send for further particulars. A word to t

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er a 45-foot cabin launch. The "Runa-
it" is a very popular type of craft, re-

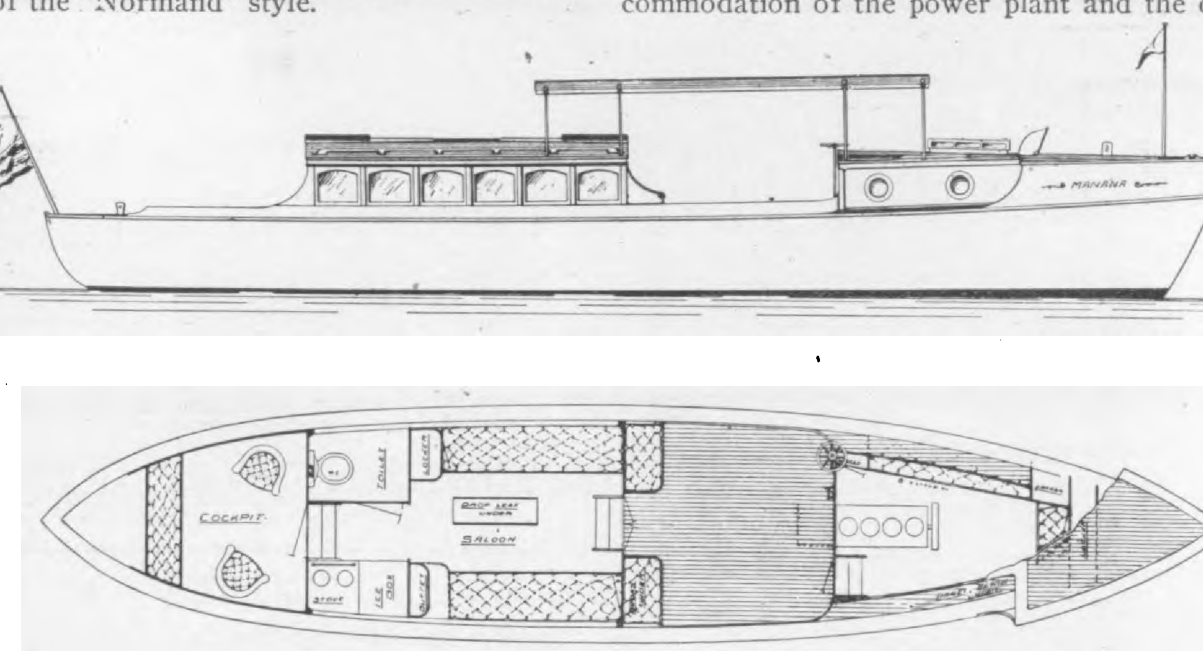
appreciated by observant people. The bo
here shown was built for a Mr. Packard, a

New "Matthews' Runabout.

tly developed and designed for reason-
e comfort and stability, together with
her speed than would be possible with
average craft. This boat is 32 feet in
gth, and has 5 foot 4 inch beam. Her
ge lines are hard to give stability, and she
ightly but durably constructed. Her stern
of the "Normand" style.

is intended for use primarily on Lake Cha
tauqua, where the owner has a summ
home, but he will also use her for win
service in the South and for limited cru
ing.

The principal feature is the motor cal
forward, as it is devoted entirely to the
commodation of the power plant and the



"Matthews" 45-ft. Cabin Launch, Plan and Profile.

The motor is placed in a pit forward, and
separated from the passenger pit by a
vart seat for the steersman or operator. An
y seat is made at the stern, and the inter-
ning space is occupied by chairs. The boat
s not entirely complete when the photo-
aph herewith reproduced was taken, but
s equipt later with brass railings for the

erator, who has a berth and toilet faciliti
also ample locker space for motor suppli
etc. A very pleasant feature of boat is
midship cockpit or bridge, giving desira
outside quarters, well protected by a b
oak frame canopy which has "Khaki" du
curtains for the sides. This bridge or co
pit has a seat at the after end on each si

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Our two and three cylin-
der engines are guaranteed
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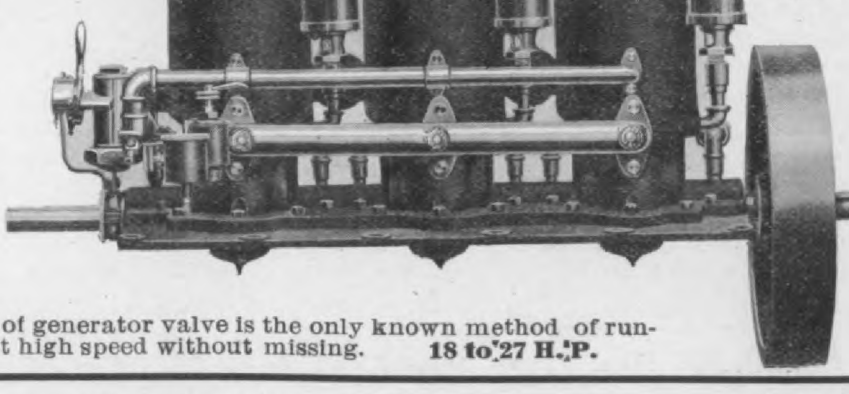

Our original arrangement of generator valve is the only known method of run-
ing a three cylinder engine at high speed without missing. **18 to 27 H. P.**

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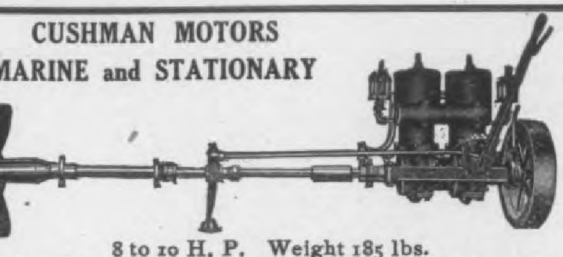

8 to 10 H. P. Weight 185 lbs.
esigned for service. Material best obtainable, work-
anship unsurpassed. Cylinder, Piston Rings and Crank
aft ground. Bearings hardened. Write for catalogue.

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Reversible, Speedy, No Cranking
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Price includes full boat equipment ready for installing. WE GUARANTEE absolute satisfaction or replace without cost to you. Write at once for catalogue of all sizes.

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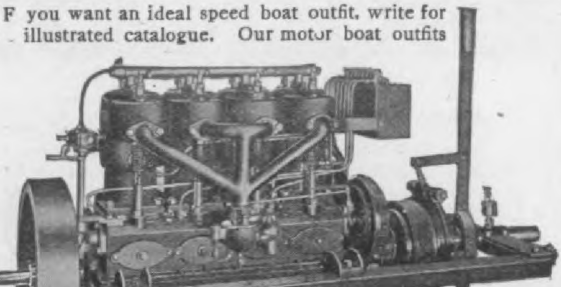

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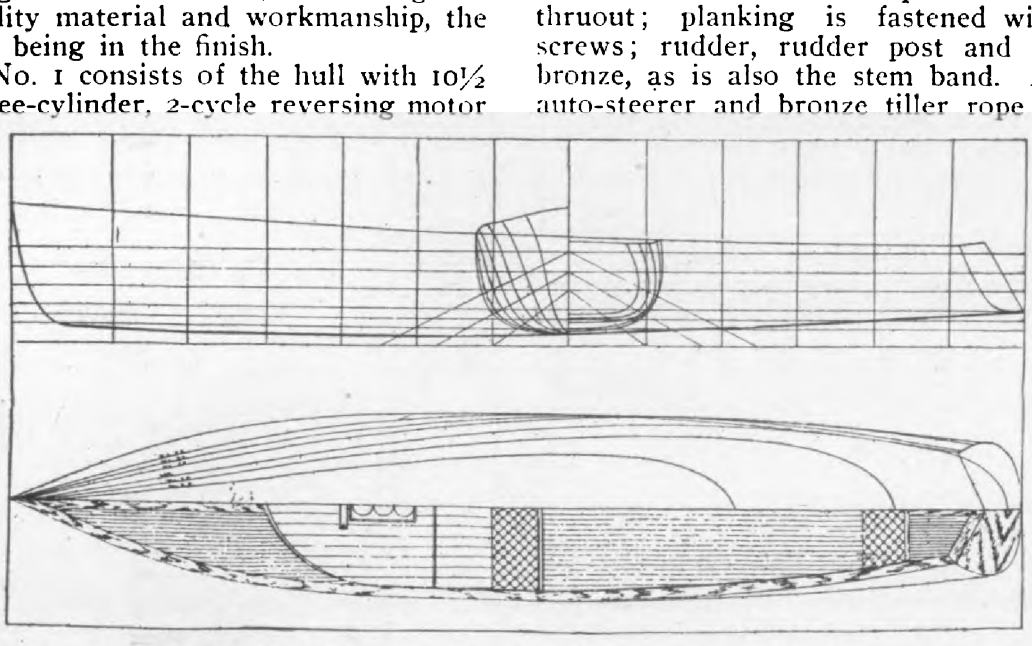
fet on the starboard, and a wardrobe on port. At the rear of the cabin there is oilet compartment, also a galley with ice , stove, dish locker, etc. The extreme stern the boat is built with a cockpit, having an y seat, and sufficient floor remaining for accommodation of two wicker chairs. The t will be fitted with a four-cylinder, four-le motor, 25-H. P. capacity, and is expect-to attain a speed of approximately 12 miles hour.

"Madison" New 27-Ft. Runabout

A Clean Cut Runabout" is what the Madi- (Wis.) Motor Boat Co. call their new foot motor boat here illustrated in plan l side views. The hull is designed for eds from 12 to 20 miles per hour, accord- to the power installed. It is a good, ong, serviceable craft able to stand a fair

Three grades are offered, all having the ne quality material and workmanship, the ference being in the finish.

Outfit No. 1 consists of the hull with 10½ P. three-cylinder, 2-cycle reversing motor



Plan & Side Views Madison, 27 ft. by 5 ft. Runabout, showing Lines, Arrangements of cockpit, etc.

ghing 375 pounds, running from 550 to R. P. M., and turning an 18-inch, three-de propeller with 24-inch pitch. The ed of outfit No. 1 is from 13½ to 14 miles hour.

Outfit No. 2 consists of the hull with a H. P. three-cylinder, 2-cycle reversing tor weighing 410 pounds, running from 550 800 R. P. M., and turning a 20-inch three-de propeller with a 30-inch pitch. The ed of this outfit is from 16 to 17 miles an r.

Outfit No. 3 consists of the hull and a 25-P. three-cylinder 2-cycle reversing motor ghing 565 pounds, running from 550 to R. P. M., and turning a 24-inch three-

beams, white oak; fenders of wood to ma deck.

The inside of the hull is painted with t coats of red lead and oil before finishing done. The outside has four coats of pai There is a bulkhead in the bow just forwa the hatch covering the engine and a door provided in the bulkhead in order that t space beneath the deck can be used for st age. Another bulkhead is placed immedia ly aft of the engine.

A seat is provided in the stern and one the forward part of the cockpit for the pil Both are athwartship and the after s has a large locker beneath it.

Grade C has plain sawed oak coveri boards, coaming, fender rail and king plan The deck is made of cedar, covered w canvas cemented on. The canvas is fil and finisht smooth. The ceiling, seats and terior of cockpit is finisht in soft wo stained mahogany.

Grade B is finisht in quarter-sawed c thruout; planking is fastened with bra screws; rudder, rudder post and sleeve bronze, as is also the stem band. A, No auto-steerer and bronze tiller rope is us

polished brass rails are placed on the fo ward deck.

Grade A is just like Grade B, except it finisht in mahogany thruout.

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MARINE ENGINE

The 2-Cycle-Engine-Sensation of the Year. Entirely ne improved design introducing many exclusive features. on Gasoline, Distillate, Kerosene or Al

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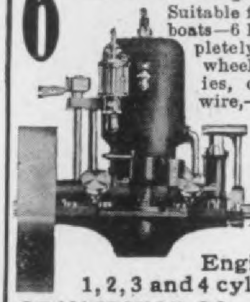
6 H. P. Complete Outfit $97.5



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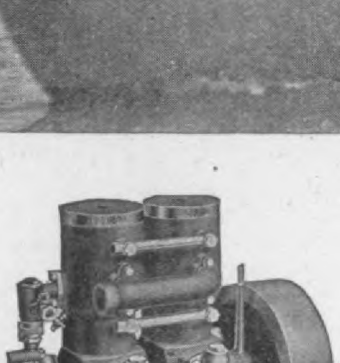

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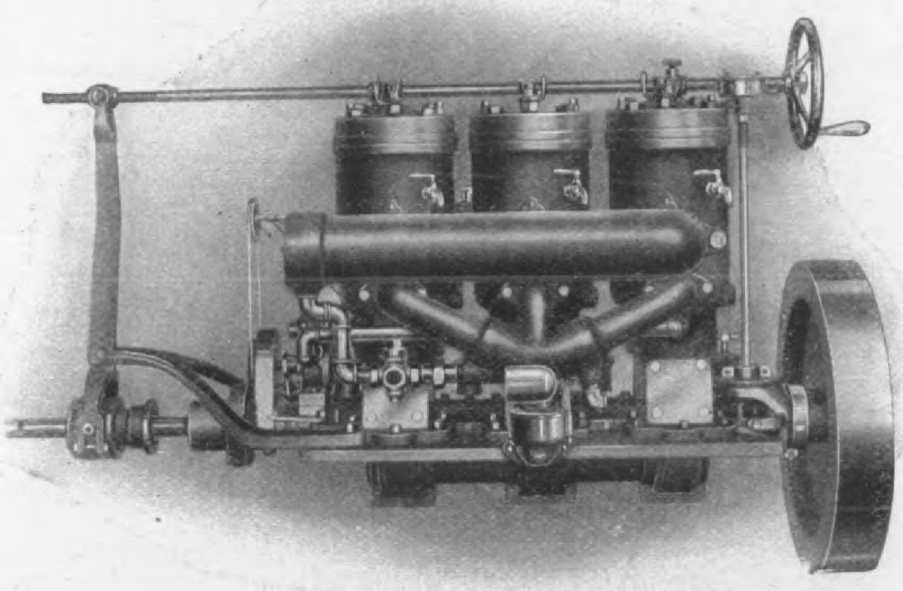
own as the M-3 B 3-cylinder motor, rated 15 to 20 H. P., and the other as the M-C, 4-cylinder, 28 to 35 H. P. For the first med type the manufacturers claim great

tioned thruout with a view of giving greatest possible strength without addi material to the combined weight of recip cating parts. The crank shaft is forg



The "Smalley" M-3B marine engine, 15 to 20 H. P., showing view of hand wheel reversing mechanism, which forms part of reversible propeller equipment furnisht with this engine.

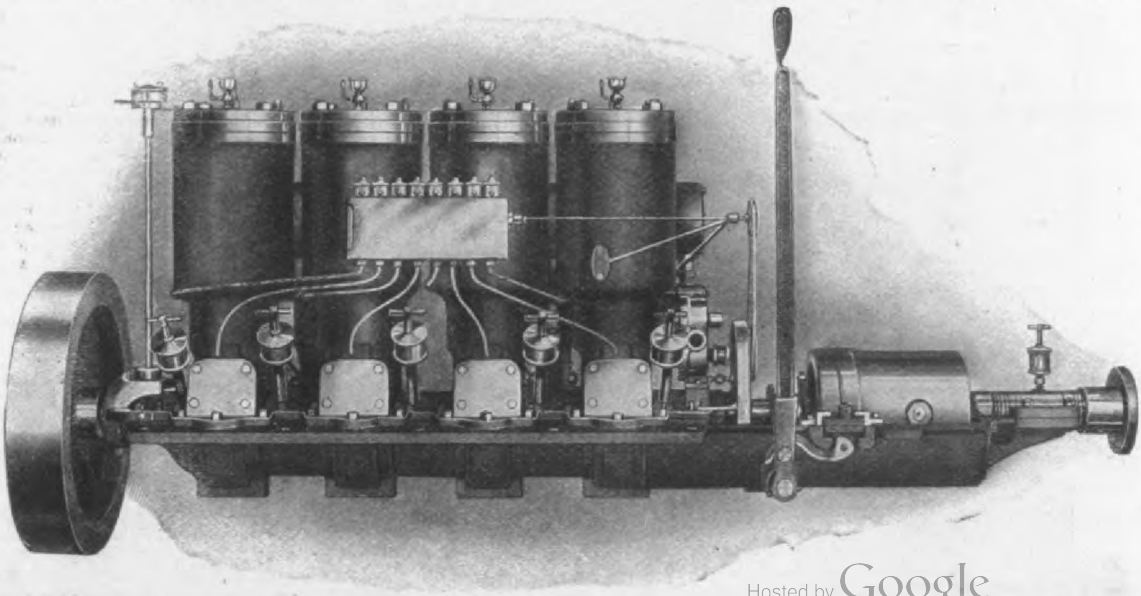
ults as a speed proposition, while the ner type turns up more slowly and is bet- adapted to boats of conservative lines. side the motors illustrated, they also ke them in 4, 6, 8 and 12 H. P. sizes.

The cylinders are cast integral and are lted to the bed plate. The cylinder head secured to cylinder by means of steel d bolts and finisht case-hardened nuts.

from a solid ingot of carbon steel.

The equipment furnisht with the M- motor consists of jump spark igniter, b tery, jump spark coil, rotary timer, sp plugs, electric switch, 18 feet of second and 26 feet of primary wire, tools, muf and either solid or reverse propeller, required.

The outfit for type M-4 C is practica



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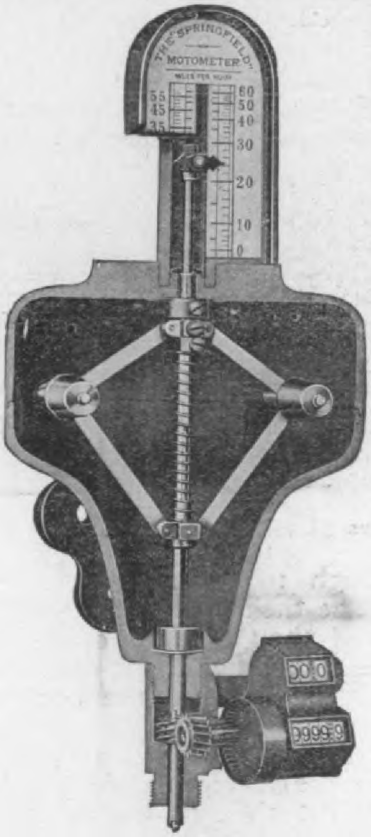
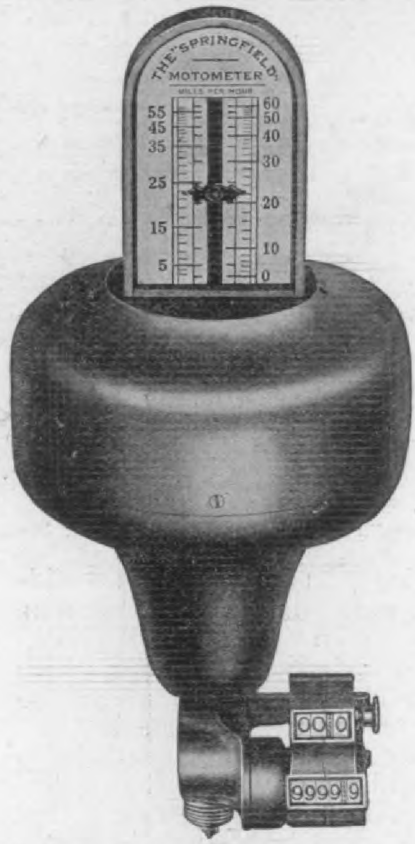
The "Smalley" M-4C marine motor, 28 to35 H. P., starboard view

THE SPRINGFIELD MOTOMETER





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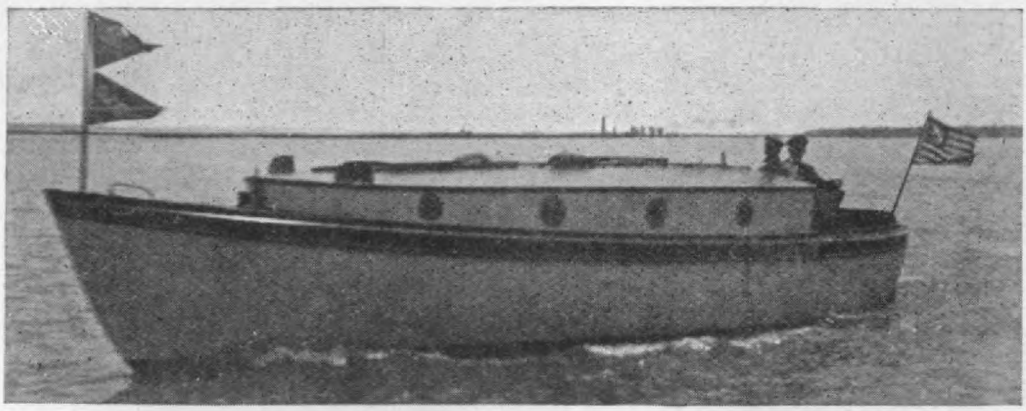
Boat and Oar Company, of Wyandotte, ch., from plans of F. S. Nock, naval ar- ect, of East Greenwich, R. I., is a trunk in cruiser; length 36 feet, beam, 8 feet draught 30 inches. The frame is select- white oak, the ribs 7 inch centers and the l in one piece. The planking is white ar; the decks mahogany. The cabin is ided into four rooms, as follows: Engine m, main cabin, galley and toilet room, is quarter sawed red oak, paneled thru-



The "Teresa;" 36 ft. long; 8 ft. beam; draws 30 inches of water.

. Eleven swing port lights and two slid- hatches give ample light and ventilation. gine room is equipt with a Rathbun- cy 2-cylinder 2-cycle 6 by 6 motor, which ves air pump for whistle and a dynamo ich stores current in two accumulator bat- ies for electric lights and a searchlight. oin is fitted with extension berths; galley h refrigerator, lockers and a two-burner stove. Toilet room has Sand's best out- The entire cabin has over 6 feet head m, but the free board has been carried h enough that the cabin does not look out proportion; Sampson stake forward, tow- post aft, both down to keel. This craft ries 2000 pounds of ballast and will stand in any sea. It made ten miles an hour on al trip.

The Yale Underwater Exhaust

The Yale Exhaust Co., West Haven, nn., claim to have solved the problem of minating all the noise, odor, vibration l back pressure in marine motors by ans of their Yale underwater exhaust, ich is here shown in detail.

vice tends to increase the speed of the e gine 10 to 30 R. P. M. No. 1 illustrati shows the main portion of the Exhau which is attached to the hull of the boat far aft as possible, taking care that the sar will not be under water more than from to 5 inches when boat is under headwa and so that the opening in vacuum shie (No. 2) will be 2 inches or more aft of t after edge of the propeller blade's circ A hole is bored thru the planking just lar enough to let the threaded end of t bronze fitting thru, and a similar size h bored thru a piece of ¾ or ⅞-inch o which is then dropt over the fitting af same is put thru the boat and laid cro wise of the planking acting as a stiffer to the latter. A brass flange is then dr over the fitting and followed by a lock n which is then drawn up tight after a lit cotton wicking has been wound above t flange on under side of the boat. The degree L is then put in place and connect with the engine. The Exhaust shield No is then placed over fitting on outside of b and fastened with brass screws, giving t whole the appearance of illustration No.

The fitting and shield are made of br and bronze, in two sizes; No. 1 for 1½-i and 2-inch exhaust pipe, listing at $7.00, a No. 2 for 1-inch and 1¼-inch exhaust pi listing at $6.50. Expansion chambers pecially designed, and made of heavy boi iron, riveted and galvanized, are furnish from $2.75 to $4.00 each, according to s required.

The Portage Motor Boat Club, of Porta Wis., now has a total membership of 57.

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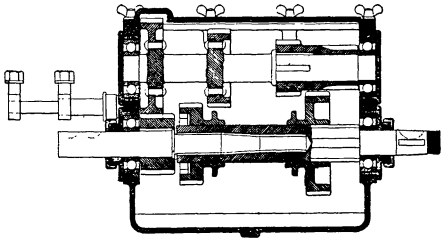

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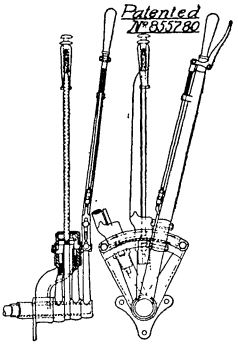

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owl as the Kennebec, made in single, ıble and triple cylinder sizes. The single nder is built in 2, 3 and 5 H. P.; double nder, 4, 6, 10 H. P., and triple cylinder, 6, 10 and 15 H. P. sizes. The 4 H. P. ıble cylinder engine has a 3½-inch cylin- bore by 4-inch stroke, and develops rated horse power at 650 R. P. M.. The e of base is 10¼ by 16 inches. Engine ft is 1⅛ inches in diameter. The height engine above shaft line is 14 inches. Its ght is 211 pounds.

'he single and double cylinder motors furnisht with either jump spark or make break ignition system, and the triple nder with jump spark ignition only.

'he cylinders are cast integral and in one ce. Pistons are of light weight and are

The prices of the motors complete ran from $90 for a 2 H. P., single cylinder, to $530 for a 15 H. P., 3-cylinder.

"Never-Sink" Boat Cushions

Chicago Flag and Cushion Co., Gre and Fulton streets, Chicago, manufactu unsinkable boat cushions which have w praise because of their meritorious featur At the Power Boat Show in Chicago, in t early part of March, several of these cus ions were in the water during the wh week, and were as buoyant at the end that time as when they were put in t water. They will float several persons f several days.

They are made of a non-absorbent veg

Kennebec Two-Cylinder, 2-Cycle Marine Motor. Price $170.

ed with 3 rings fitted and ground. The ık shaft bearings are made of high-grade nze bearing metal, and are of large di- nsions. The connecting rods are also of nze and oiled by cup oilers. The crank ft is a carbon steel forging.

Vith each motor is furnisht a complete ine propulsion outfit, consisting of a d propeller with shaft, stuffing box and

table fiber and tastefully covered with a sp cially prepared waterproof duck, or wi leatherette. They come in any requir size and will not water-log.

They are said to be lighter and cheap than cork-filled cushions, and are an orn ment to any launch or canoe. They ha the double advantage of making comfo

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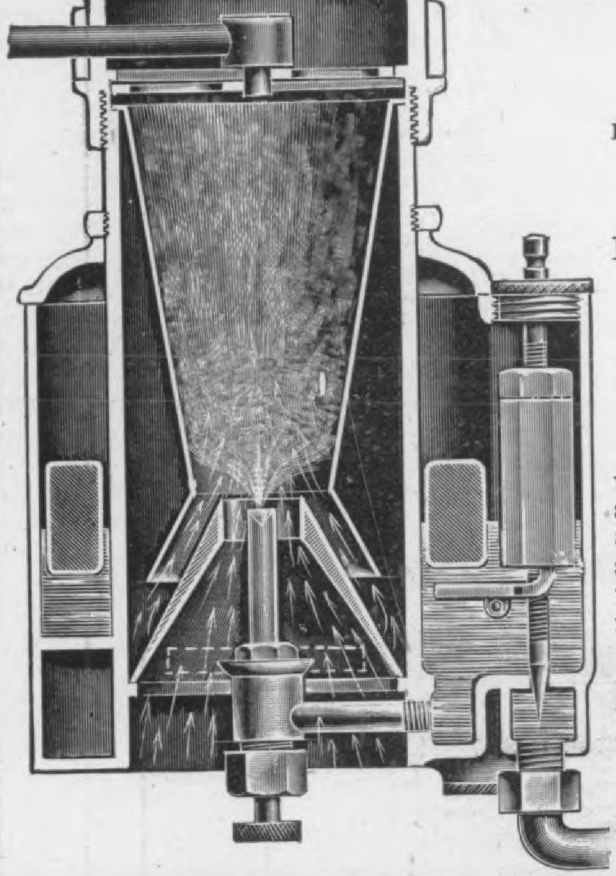

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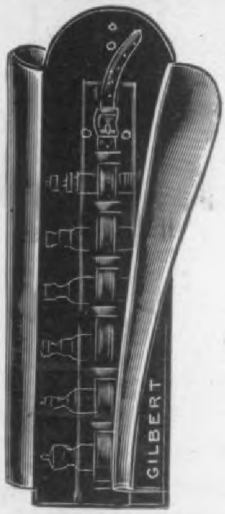

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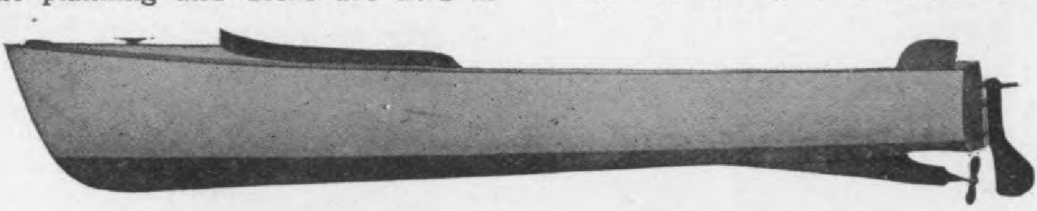
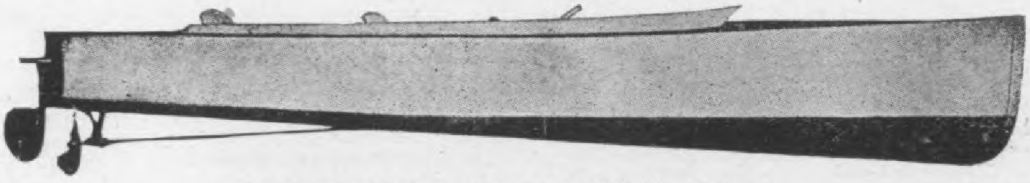
builders of gasoline engines and launches, heir "Little" runabout has a length of 16 6 inches, with a 4-feet beam. It weighs pounds with a 2-H. P. motor. The keel timbers are of selected white oak. The te pine planking and decks are held in



The D. M. T. Co.'s "Little" Runabout.

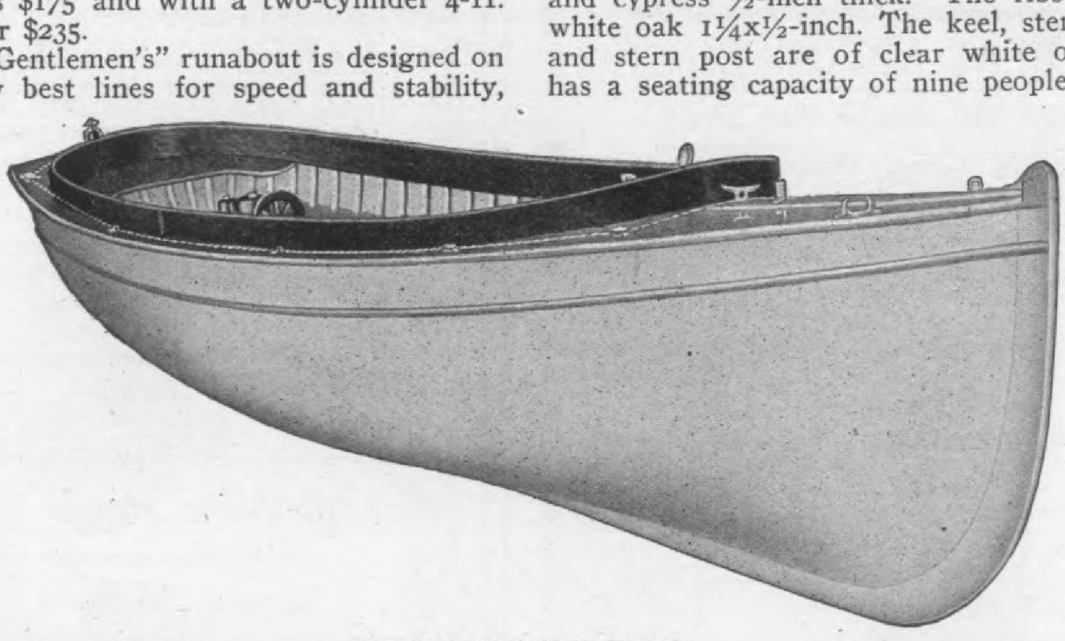
e with copper fastening. The transom, wale and engine bed are of selected oak. hard wood is finisht with two coats of spar varnish. The outside is painted three coats of blue paint to water line three coats of white below. Interior is



The D. M. T. Co.'s "Gentlemen's" Runabout.

ted white, with seats and floor of cherry The price complete with a 2-H. P. or is $175 and with a two-cylinder 4-H. motor $235.

he "Gentlemen's" runabout is designed on very best lines for speed and stability,



The "Oshkosh" 17-ft. Launch.

eloping a speed of fourteen to fifteen s, without any sacrifice of seaworthiness. ength over all is 22 feet, beam 4 feet. In truction the very best of material and kmanship are used. Its frames are of se- d white oak; planking of white pine or hington fir; copper and composition fast-

$750, and with Carlyle Johnson reverse clu and solid propeller, $800.

The "Oshkosh" 17-Foot Launch

The Oshkosh Boat Works, Oshkosh, Wi

well-known designers and builders of hig class launches and all types of sea craft, a offering for this season a 17-foot gasoli launch, which has a very light draft, allowi it to be used on almost any lake, at the san time presenting a handsome appearance.

The boat is 17 feet long and has a 4-fo 2-inch beam. It is planked with both ced and cypress ½-inch thick. The ribs are white oak 1¼x½-inch. The keel, stern, bo and stern post are of clear white oak. has a seating capacity of nine people. It

fitted with a 1¼ H. P. motor, brass steerin wheel, swedes iron tiller rope, brass fittin and develops a speed of from 7 to 8 miles a hour. The gasoline tank capacity is 10 ga lons, and the boat draws but 11 inches water.

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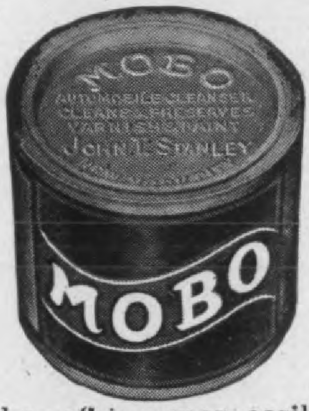
Cleveland — Detroit — Buffalo

Auto Bodies



It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO

Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

Gordon Auto Supply Co.
215 Eliot Street
Boston, Mass.

and at all good automobile supply stores in all leading cities.

Send for our Mobo booklet —"*How to Clean Well Varnish and Paint on an Automobile*" It's free.

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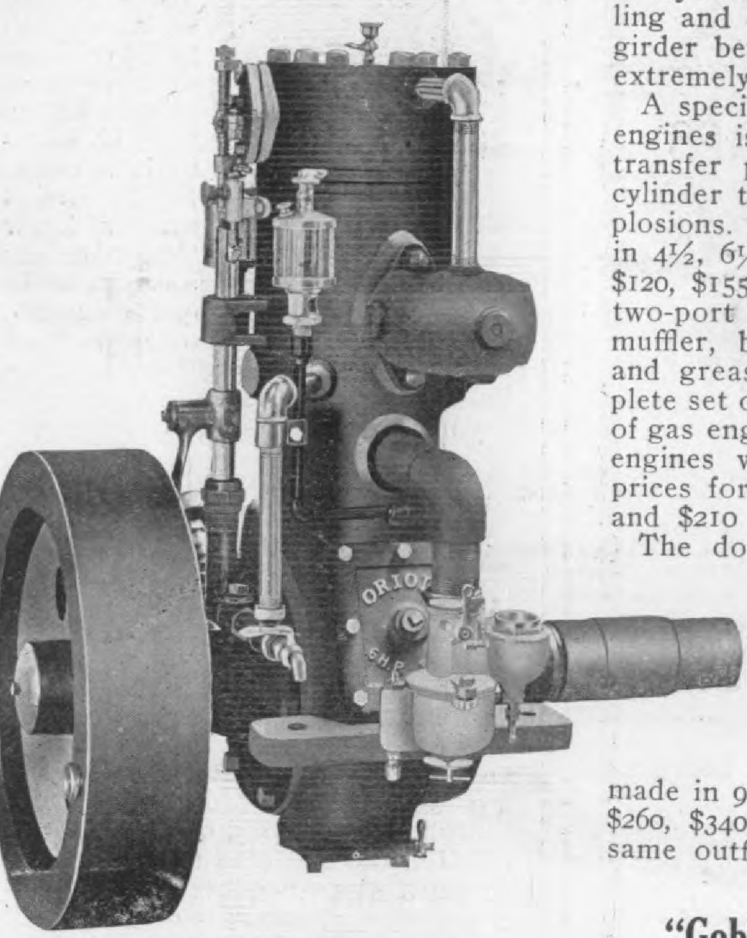
JOHN T. STANLEY

n 4½ to 16-horse powers. The tors are of the 2-cycle, 3-port type and designed for high cylinder and crank e compression and moderate piston ed. The cylinders and cylinder heads



Oriole Single Cylinder 4½ H. P. Motor.

made from first grade of close grain iron. They are accurately bored and reamed to exact size. The pistons are he trunk type, the piston acting also as oss head. They are of unusual length educe side pressure from the throw of connecting rod, and are turned to gage polished. Each piston is fitted with e ½-inch rings, eccentric turned and lap ed. The wrist pin is of phosphor ze, accurately turned to gage and pol-d. It is permanently set in the piston he connecting rod turns on the pin.

he crank shaft is of drop forged steel. main bearing plates are carefully fitted phosphor bronze bushing reamed to t size.

he connecting rod is of cast steel, care-annealed. It is of the I-beam section. upper end is split on side with tap bolt locknut to provide adjustment for wear he wrist pin. The bottom end is fitted

grease cups and a small grease cup is ted on the eccentric rod. The cylinders a pistons are also lubricated by cup oile Float feed carburetors are used. All t double cylinder engines are coupled by heavy iron vertically ribbed, combined cou ling and clutch bearing, forming a regul girder between the cylinders, making the extremely rigid.

A special feature of their double cylind engines is a bronze screen secured in t transfer passage from the base to t cylinder to prevent back firing or base e plosions. The single cylinder type is ma in 4½, 6½ and 8-H. P. sizes, which list $120, $155 and $195, respectively, equipt two-port engines with vaporizer, includi muffler, ball thrust bearing, coupling, and grease cups, extra trip springs, co plete set of wrenches, pail of grease and c of gas engine cylinder oil. Equipt as 3-po engines with float feed carburetor, t prices for these three sizes are $130, $1 and $210 respectively.

The double-cylinder 3-port motors a made in 9, 13 and 16-H. P. sizes and list $260, $340 and $420 respectively, includi same outfit as for single-cylinder motors

"Goble" Motor Boats and Hulls

Goble Motor Boat Company, Oswego, Y., are furnishing 18, 22 and 25-foot sto boats and others to order, with or witho power, the hull building being the speci feature of their business. The hulls ha white cedar or pine planking on white o frames. They are open boats with a de forward and one aft of white pine. T cockpits seat from 10 to 20 people. The finish these boats in white oak and mahogan The boats are designed to withstand t heavy weather of the Great Lakes, and t light, are safe. The engine is placed forwar near the steering wheel. The 25-foot mod complete with brass finishings, 8-H. P. Ba ber engine and reed chairs, sells for $625 O. B. Oswego. This company has faciliti for building boats up to 200 feet long.

S. G. Appel & Co., 18 Fulton street, Ne York City, manufacture a fine line of yach ing uniforms and outfits and their line w

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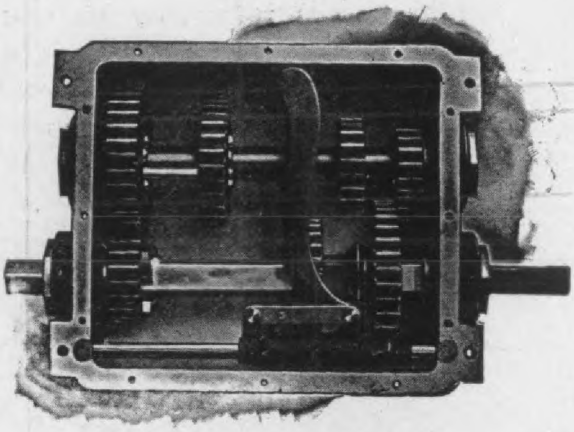
Differentials for chain and shaft drive

Back lock steering Sliding gear transmissions

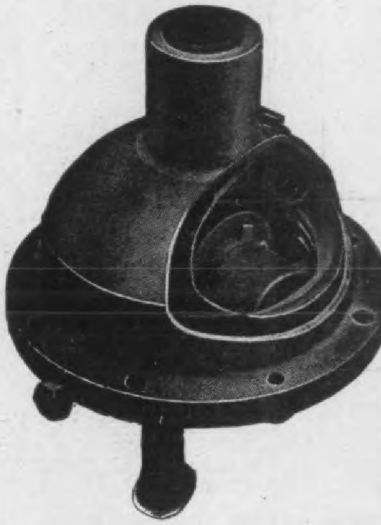


Catalogue

and

Blue

Prints



K. FRANKLIN PETERSON, 166 Lake St., Chicago
THOMAS J. WETZEL, 29 West 42nd St., New York City } Direct Factory Salesmen

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If you want to give an elegant finish to your car, use

Leather Fenders

They are far superior to wood or metal fenders, being more durable, neater and handsomer in appearance.

They are the only equipment for a hige-grade car.

Insist on having yours fitted with **LEATHER FENDERS.**

We fill orders for leather license tags promptly.

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"A Mechanical Masterpiece"

Model "F," $3,500: Model "C-7," $2,500.

Takes the Jolts Out of Rough Roads

The luxury of motion in a Marmon when running at good speed over rough roads is totally unknown in any other car.

The principle of Double Three-Point Suspension (patented) makes the running gear flexible, allowing the wheels to drop into ruts and run over bumps without jolting the passengers, without pounding the tires and without straining the mechanism.

The Easiest Riding Car in the World

Perfect Score—Glidden Tour

Unrivaled lubrication, solid cast aluminum body, roller bearing steering column, and a score of other striking features. Send for catalog. Address Dept. 15.

Nordyke & Marmon Co. (Estab. 1851) **Indianapolis, Ind.**

Member Am. Motor Car Mfrs. Assn.

I Will Prove to You

That

SULLIVANOIL

Is The Best Cylinder Oil

ONE GALLON FREE!

I have found, that when a person begins to investigate the oil question, he generally arrives at the conclusion that a thick, heavy oil which has a great deal of "body" or density is the oil of merit.

This isn't true. A dense, heavy oil is slow acting, difficult to feed properly, and even mechanical oilers cannot deliver it in proper quantity at the proper place.

The other extreme—an oil too thin—must be used so freely as to flood the cylinders, and even then the result is unsatisfactory, for it hasn't enough body to lubricate properly.

There is practically as much residue (carbon) from the one as from the other in the regular cylinder lubricating oils on the market.

Now, after years of experimenting, I have discovered an oil of just the proper density which lubricates any internal combustion cylinder perfectly, and leaves no carbon. There is no residue left after combustion. The particular density or "body" of Sullivanoil is one reason why Sullivanoil is pre-eminently the best of all cylinder oils.

Sullivanoil is of but one grade or density, and you do not have to buy three or four grades to experiment with to find the one grade that is best for your motor.

Talk—promises—arguments are all right in their places but—

I will prove to you by actual demonstrations that Sullivanoil is really what I say: "the best cylinder oil for your motor.

I will do it entirely at my expense

ONE GALLON FREE!

I will give you one-gallon can of Sullivanoil free—no delivery charges—no obligation whatever to you—to try on your car.

Simply tell me that you own an automobile and send me the name of your dealer, and I will have him deliver to you one gallon of Sullivanoil free of all charges.

Send for booklet, "How to Test Oil," which gives many facts about oil that you should know.

Write to me personally.

O. I. L. Sullivan

MAKER OF

Again this wonderful REO touring car comes into the lime-light as a star performer.

REO

$1,250

5 passengers, 16-20 horse-power.
$1250 f.o.b. Lansing, Mich. Top extra.

Sport Hill Bridgeport

40 miles an hour on 10 to 20 per cent. grade
Beats a 35-horse-powe $2750 car.
Beats the nearest of fiv competitors by 11 seconds

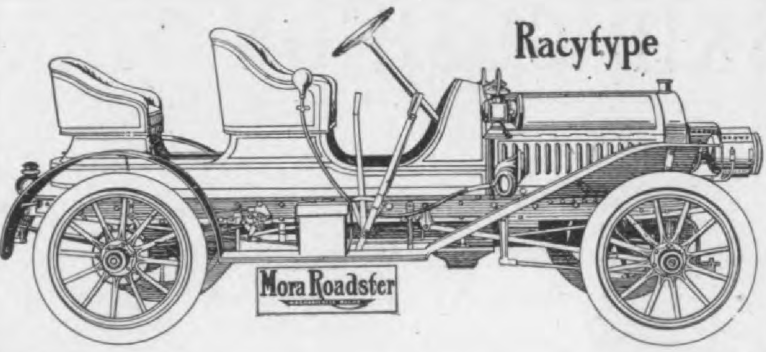
Wins the Silver Cup

And in the great New York to Albany ru (the toughest one-day endurance try-ou ever known), among 27 starters and 16 sur vivors, this same $1250 REO was one o the first five. All bigger and costlier cars

Write for the interesting 24-page "Story of the REO".

R. M. Owen & Co., Lansing, Mich

General Sales Agents.



Demonstrating Cars at Agencies as Follows:

MORA MAKE GOOD

NEW YORK CITY
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CHICAGO
1218 Michigan Avenue

PHILADELPHIA
204 N. Broad Street

BOSTON
22 Park Sq. Motor Ma

SAN FRANCISCO
605 VanNess Ave.

ROCHESTER, N. Y.
132 Park Avenue

BUFFALO
172 Main Street

PITTSBURG
138 Beatty St., E.E.

DENVER
1420 Court Plac

LOS ANGELES
1126-30 So. Main Street

MINNEAPOLIS, MINN.
110½ S. 6th St. and 512½ 2d Ave. So.

TROY, N. Y.
231 River Street

COLUMBUS, O
61 E. Spring Stree

MORA MAKES

MORA MOTOR CAR COMPANY

Office and Works

WHEN you want it,

And you get it, if you give us your orders for

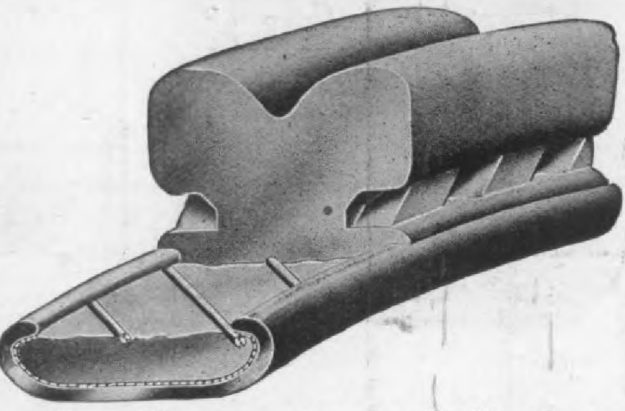
Automatic Machine Screw Work

Our plant is large, and especially adapted for this kind of work.
Let us show you samples and quote prices.
We can make them interesting.

Eclipse Machine Co.,

Elmira, N. Y.

MOTZ NON-SKID CUSHION TIRE



Is as resilient as the pneumatic with all its faults eliminated. Why then waste your money, patience and time on pneumatics?

Look at the cut! Does it not appeal to you as having all the requisite qualities? If you are in doubt, write us at once.

They fit any standard clincher rim.
We furnish a tool that will apply the tire.

(SEE CUT)

MOTZ CLINCHER TIRE

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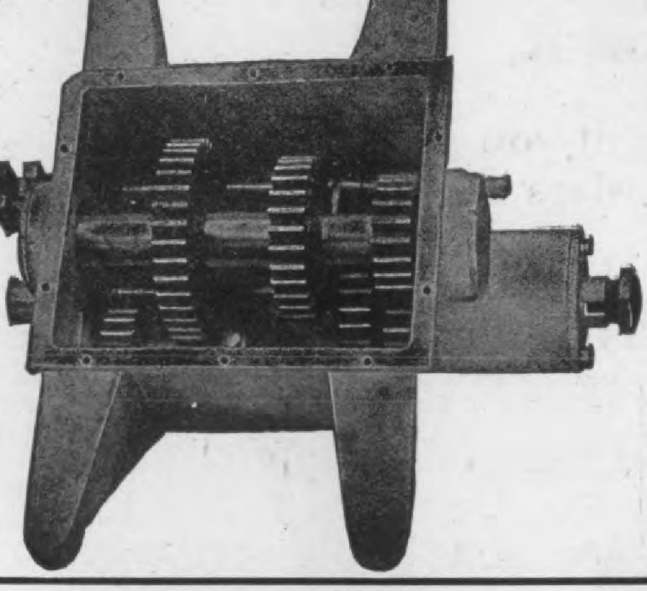
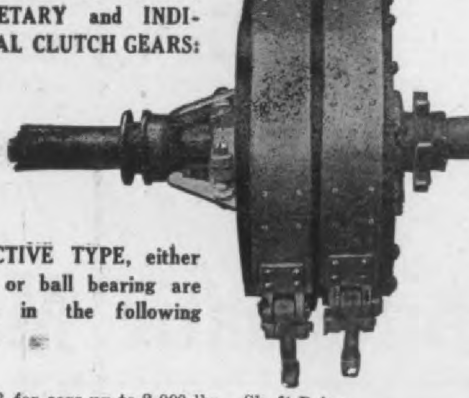


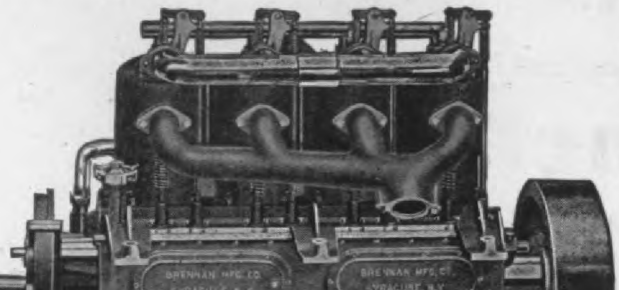
PLANETARY and INDIVIDUAL CLUTCH GEARS:



SELECTIVE TYPE, either plain or ball bearing are made in the following sizes:

No. 3 for cars up to 2,000 lbs. Shaft Drive.
No. 3½ for any size motor up to and including 4 cylinder 5x5 inches.
No. 4 shaft drive and double chain drive, for the lar types of pleasure and commercial cars and trucks.
PLANETARY GEARS are made in two sizes: No. 3, for up to 1850 lbs. No. 4, for heaviest pleasure and commer cars.

SYRACUSE GEAR CO., - Syracuse, N.



Brennan Standard Moto

in your cars mean satisfaction for y customers.

See that your 1908 cars are equip with the most efficient motors on the mar

Built in the following sizes:—

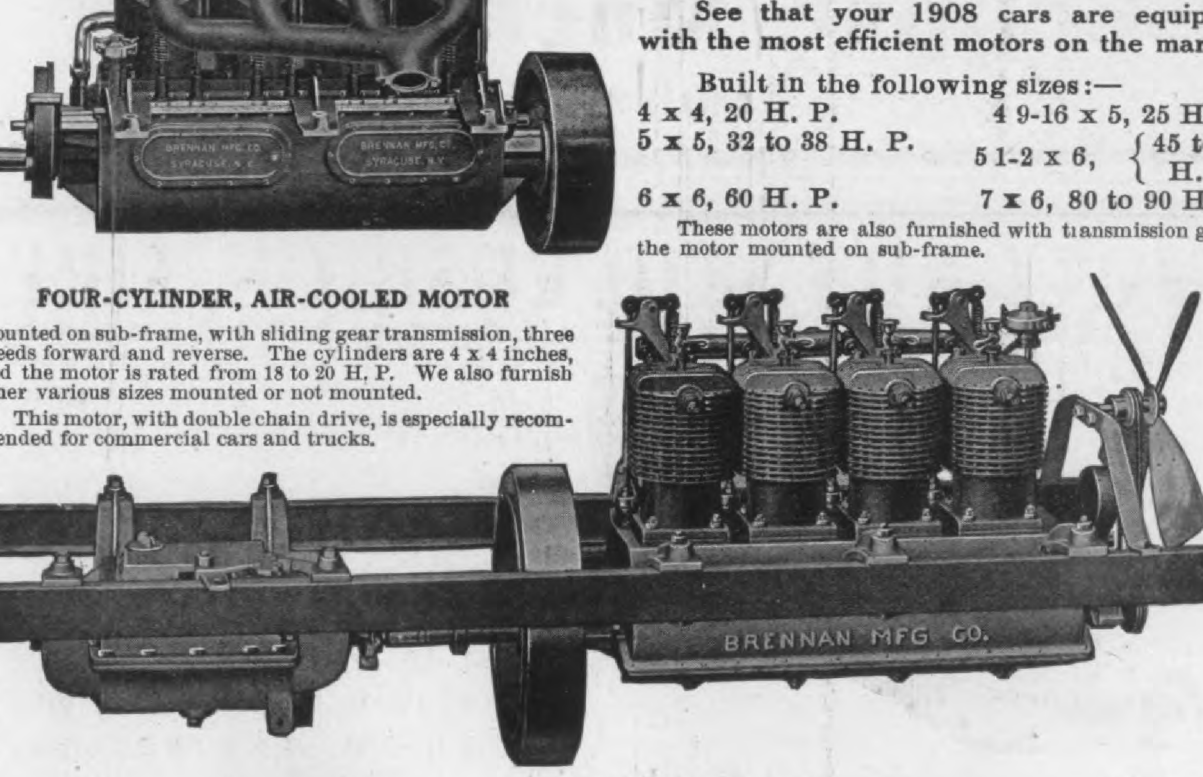
4 x 4, 20 H. P. — **4 9-16 x 5, 25 H**
5 x 5, 32 to 38 H. P. — **5 1-2 x 6, 45 t H.**
6 x 6, 60 H. P. — **7 x 6, 80 to 90 H**

These motors are also furnished with transmission g the motor mounted on sub-frame.

FOUR-CYLINDER, AIR-COOLED MOTOR

ounted on sub-frame, with sliding gear transmission, three eeds forward and reverse. The cylinders are 4 x 4 inches, d the motor is rated from 18 to 20 H. P. We also furnish her various sizes mounted or not mounted.

This motor, with double chain drive, is especially recom-ended for commercial cars and trucks.



We also make

Two-Cylinder, Horizontal Moto

fitted with transmission gear, for either chain shaft drive.

For all Standard Makes of Cars

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Colors 50 Cents
Fastened with Glove
ALLEN TIRE CO

ICE — 5-in. Shoes
Thefts of Tires
Manganese Bronze
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LLEN TIRE HOLDERS
arsons' Manganese Bronze
djustable-Detachable
arries 1 to 3 Shoes
— PRICE —
$12.00

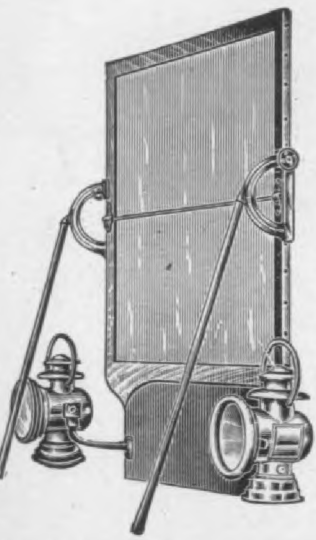
The Allen Auto Specialty Co
Manufacturers
1931 BROADWAY
NEW YORK
Phone, 5346 Col.

The Beecher Windshield

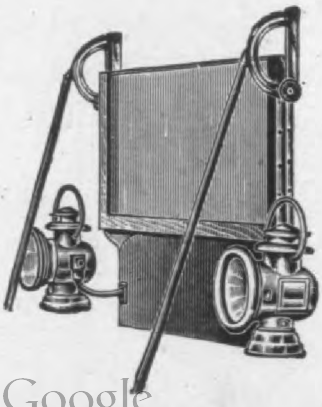
Simple in construction

Low in price

Gives complete satisfaction



In answer to the public demand for a Windshield at a low price, we have perfected the **"Beecher."** Please examine closely the illustrations and see how simply it is constructed and how easily it can be managed. Very handsome and will stand rough usage—an all around good article. Will fit any model of any make of car.



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IF COMFORT INTERESTS YOU

INVESTIGATE OUR

Coat and Foot Rails

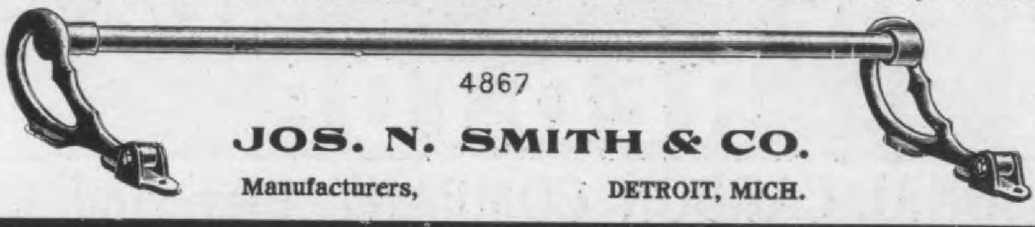
Foot rails are a necessity in large tonneau cars, to prevent the occupants fro slipping and sliding on the rear seats. A Foot Rail enables the passengers to sit i comfort even on the roughest roads.

Coat rails allow you to carry robes and wraps so that they will be out of the wa of the passengers and will not become mussed or soiled. They are, too, a handsom addition to any car.

If these comfort-bringers are not supplied by your manufacturer, write for printe matter and prices.

MR. MANUFACTURER, JOBBER AND DEALER:—

Our New Catalogue of Mountings, showing new features for 1908 is ready for mailing.—*Write for one to-day.*



4867

JOS. N. SMITH & CO.

Manufacturers, DETROIT, MICH.

What we Have Done for Others we can do for You

Our crankshafts are universally satisfactory.

Let us have an opportunity of estimating on your 1908 supply. We can guarantee accuracy in manufacture and proper grade of material. We can furnish any design, stroke, length or size up to four inches in diameter. Send us your blue prints.

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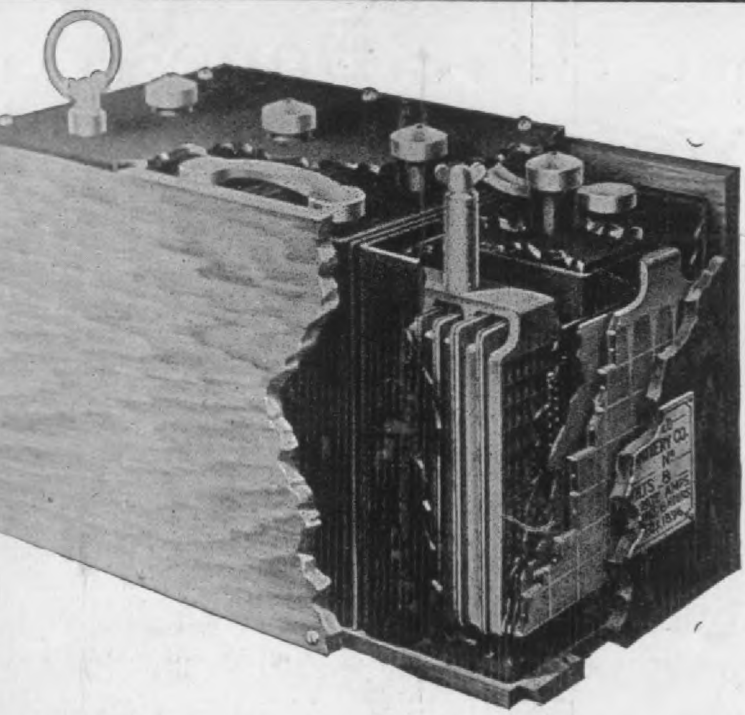
AUTOMOBILING TO USERS OF RED TOP CELLS

ASK YOUR DEALER

ASK YOUR DEALER

NATIONAL CARBON COMPANY, Cleveland, Ohio



LOOK INSIDE

The outside appearance of a storage battery is not the important thing.

You can't tell a good battery from a poor one by inspecting the cover or nickeled trimmings.

OPEN THEM UP

THE "GOULD" INVITES INSIDE INSPECTION

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 2. PHILADELPHIA AND NEW YORK AUG. 1, 1907

July Edition, 20,347

15,886	Copies mailed.
5,200	Copies delivered to News Company.
781	Copies to Philadelphia and foreign under stamps.
1,000	Copies held in reserve.
22,867	
2,520	Back numbers sent out.
20,347	Total copies July edition.
	Of these
12,696	Were paid subscriptions.
5,200	Delivered to News Co.
17,896	
2,101	Returned by News Co., to July 16, 1907.
15,795	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the July issue was 20,347.

Of these, 21,843 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 22 ounces, representing 15,886 copies, and 2520 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Knox Automobile Co. Assigns

The Knox Automobile Co., Springfield, Mass., has assigned to Alfred N. Mayo for the benefit of all its creditors, the difficulty being caused by attempting to do too much business on too small a capital. The inventory of July 1st shows assets nearly double liabilities, and the business for the past ten months shows an increase of 87½ per cent. over same period last year. Arrangements for additional capital are being made, which are expected to be consummated in ample time for 1908 business.

Coming Events

July 31-August 8—Belgium Regularity Contest for Touring Cars. A. C., of Belgium.

August 1—Hill climb, Algonquin Hill, Chicago Motor Club and Chicago Auto Trade Association.

Aug. 1-4—Providence, R. I., Federation of American Motor Cyclists, National Meet.

Aug. 1-7—Criterium of France, 1750 miles touring competition and 250 mile race for the press cup. A. C., of France.

August 5-10—Automobile Carnival (Races and Show), Atlantic City, N. J.

August 6—Orphans' Day, under direction of Rochester Automobile Club.

August 8—International Reliability Contest, Belgium.

August 9-10—New York City Brighton Beach Track, 25-hour automobile race, U. S. Motor Racing Association.

August 11-20—Auvergne Cup Competition, France.

August 17—Race Meet Olympia (Wash.), Horse and Automobile Association.

September 1—Italy, Brescia Circuit, Florio Cup, A. C., of Italy.

September 2—Overland Park Track Meet, Denver, Colorado.

September 2—Labor Day Hill Climb, Sport Hill, Bridgeport (Conn.), Automobile Club.

September 4—Padova Bovolenta, Automobile Club of Venice.

September 5—Cedar Lake Economy Run, Chicago Motor Club and Chicago Auto Trade Association.

September 9—Commercial Vehicle Trials of English Royal, A. C.

September 14—95-mile road race, Albany Automobile Club of Albany, N. Y.

September 14-15—Mont Ventoux Hill Climb.

September 15—Semmering Hill Climb.

September 28-October 7—International Automobile Show, Copenhagen, Denmark.

October 1-15—Contest of Electric Vehicles, Automobile Club, of France.

October 6—Cup of L'Auto Maisons-Laffitte.

October 13—Kilometer Contest at Dourdan, under auspices of L'Auto.

October 20—Gallion Hill Climb.

October 21—St. Louis (Mo.), International Aerial Race for the Gordon-Bennett Prize.

October 24-31—Eighth Annual Automobile Show; A. C. A., Grand Central Palace, New York.

October 31-November 7—A. L. A. M. Show, Madison Square Garden, N. Y.

November 11-23—Olympia Motor Show, London.

November 12-December 1—Paris Show, Grand Palais and Place Des Invalides, A. C., of F

November 30-December 7—Chicago National Automobile Show, S. A. Miles, Mgr., No. 7 E. 42d st., N. Y. City.

December 14-21—Local Show, St. Louis, Mo., Auto Manufacturers' and Dealers' Association.

December 28-January 4—Importers' Salon, Madison Square Garden, New York City, C. R. Mabley, Sec. and Mgr.

That the Board of Trade of Trenton, N. J., is keenly alive to the fact that there will result great advantage to the people along the line of the Vanderbilt Race Course, is shown by the fact that they have unanimously past a resolution urging the legislature and governor to pass a bill permitting roads in Mercer county to be used for the race and elimination trials.

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Fifty-Five Perfect Scores in Chicago Club's Run

On June 28 the Chicago Motor Club held a combined sealed-bonnet and reliability test over a course which included Chicago, Waukegan and Elgin. Of the eighty-six starters fifty-five, representing thirty-one different makes, came thru with perfect scores.

Unlike the sealed bonnet contest of the A. C. A. in New York, the breaking of a seal penalized the violator 50 points with an additional 25 for breaking the seal of the coil box, while in the A. C. A. contest the breaking of a seal eliminated the car.

The total distance traversed was 175 miles for large cars and 148 for small cars.

Tire trouble was the chief obstacle that beset the contestants. The Pierce and the Haynes teams of four cars each finished with perfect scores and tied for the team trophy.

The honors were well distributed, the Pierce getting four perfect scores. The Jackson had six cars and drew five certificates. The Maxwell had in seven, and six of these were perfect. The Ford had five, and three got thru. The Haynes checked thru four, and the Premier landed twice out of three chances. The Locomobile and Columbia each got two, the latter only having that many cars in. The Moline put both its cars thru. Three Buicks are on the roll of honor, which also shows the Dragon, Matheson, Studebaker, Waynes, Oldsmobile, Holsman, Royal Tourist, Pierce Racine, Corbin, Frayer-Miller, Rambler, National, Triumph, Packard, Simplex, Diamond T., Queen, Lambert, Craig-Toledo, Pope-Hartford, Carter Car and Mason.

Two-Day Meet at St. Paul, Minn.

The two-day meet held at St. Paul, June 28-29, ended with a 24-hour race, which was won by Mongini, driving a Locomobile, with a total mileage of 1,037. The meet was managed by the United States Motor Racing Association. Preceding the start of the 24-hour race was a parade of decorated cars, in which about 300 cars participated. A few sprint races were run each day.

FIRST DAY.

Ten miles, for Twin Cities championship—Won by E. C. Bald, Oldsmobile; second, Ed Zerbies, Mitchell. Time, 13.05.

Three miles, for fully equipt runabouts—Won by Dr. D. C. Cowles, Mitchell; second, Charles Ross, Ford. Time, 4.39.

Twenty-five miles for stock cars—Won by E. C. Bald, Oldsmobile; second, Simpson, National; third, Winston, Oldsmobile. Time, 30.58.

Three miles free-for-all—Won by Ralph C. Bagley, Packard; second, Simpson, National; third, Winston, Columbia. Time, 2.38.

Five mile match—Won by R. C. Bagley, Packard; second, Simpson, National. Time, 6.16 4-5.

One mile against time—By George Hilgers, Stanley. Time, 1.05.

SECOND DAY.

One mile against time—Geo. Hilgers, Stanley. Time, 1.04.

Five mile International Sweepstakes for purse of $2500—Won by E. C. Bald, Oldsmobile; second, Ralph Mongini, Packard. Time, 6.07 2-5.

The Motor and Accessories Manufacturers will hold their mid-summer meeting at Atlantic City, N. J., August 8th and 9th.

The Motor and Accessories Manufacturers refused to sanction the projected automobile show scheduled to be held on Young's New Million-Dollar Pier August 7th, 8th and 9th.

Thru Mud and Rain

At a few minutes after 5 o'clock, June 29, the 24-hour race of the Quaker City Motor Club came to a close with the Lozier car as winner.

The run was started June 28 at 5.18 with ten starters, representing eight different makes. The winning Lozier car driven by Harry Minchenor covered 717 miles, driving in a drenching rain nearly all day and with the track in bad condition.

Summary of 24-hour race:

	Miles.
Lozier, Harry Minchenor	717
Frayer Miller, Frank Lawwell	711
Darracq, William Wallace	683
Cleveland, M. La Roche	564
Frayer-Miller, Daniel Webster	499

On Friday preceding the 24-hour grind several interesting sprint races were run. Guy Vaughn with Sterns proved the star of the afternoon with three firsts.

Summary:

Five miles, for city championship, for cars costing $3000 and less—Won by T. W. Berger, Olds; second, Howard Miller, Pope-Hartford; third, George Parker, Olds. Time, 5.50 2-5.

Five-mile open—Won by Guy Vaughn, Stearns; second, T. W. Berger, Olds; third, Howard Miller, Pope-Hartford. Time, 5.44 1-5.

Ten miles, for city championship—Won by Guy Vaughn, Stearns; second, T. W. Berger, Olds. Time, 11.20.

Five-mile Quaker City Motor Club championship—Won by F. Shelton, Stoddard-Dayton. Time, 6.52 1-5. Mercedes did not finish.

Ten-mile open—Won by Guy Vaughn, Stearns; second, T. W. Berger, Olds; third, Howard Miller, Pope-Hartford. Time, 11.14 1-5.

Reading Auto Races

The Berkshire Automobile Racing Association held a very successful tournament July 4 at Shillington track. The winners were:

Two miles—$3000 and under—Walter Lovatt, Haynes. Time, 3:00.

Two miles—$5000 and under—Robert Morton, Pullman. Time, 3:07.

Two miles—$1200 and $2500—Zimmerman, Jackson. Time, 3:05 1-5.

Two miles—Under $1500—Wayne Yerger, Buick. Time, 3:25 2-5.

One mile against time—Paul Messner, Stanley. Time, 2:55 4-5.

Three mile handicap, championship Berks county—Winner Charles W. Krick, Oldsmobile (70 yards); second, Dr. J. M. Bertolet. Time, 4:41.

Two miles—$800 and $1500—M. Kinports, Ford. Time, 3:17.

Five miles free-for-all—Robert Morton, Pullman. Time, 3:00.

Unlimited pursuit—$1200 to $1850—Winner Robert Morton, Pullman; second, Zimmerman, Jackson. Distance, 28½ miles.

M. J. Budlong has resigned the presidency of the Electric Vehicle Co. and Hiram Percy Maxim and Geo. H. Strout have resigned their positions as chief engineer and sales-manager respectively of the same company.

At the meeting of the Board of Directors of the New York State Automobile Association, June 29, the following clubs were added to the roster: Long Island Automobile Club, Adirondack Automobile Club, of Sandy Hill; Automobile Club of Schenectady and Cohoes Automobile Club.

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Ninety-Day Guarantee

Following the last meeting, June 27, of the Committee of Management of the American Motor Car Manufacturers' Association, the following bulletin containing the recommended guarantee was sent to the members of the association:

THE STANDARD WARRANTY.

We warrant the motor vehicles manufactured by us for ninety days after the date of shipment, this warranty being limited to the furnishing by our factory of such parts of the motor vehicle as shall, under normal use and service, appear to us to have been defective in material or workmanship.

This warranty is limited to the shipment to the purchaser, without charge, except for transportation, of the part or parts intended to replace the part or parts claimed to have been defective, and which, upon their return to us at our factory for inspection, we shall have determined were defective, and provided the transportation charges for the parts so returned have been prepaid.

We make no warranty whatever in respect of tires, rims and batteries.

The condition of this warranty, is such that if the motor vehicle to which it applies is altered, or repaired, outside of our factory, our liability under this warranty shall cease.

The purchaser understands and agrees that no warranty of the motor vehicle is made, or authorized to be made, by this company, other than that herein above set forth.

More Floor Space Secured for the October Grand Central Palace Show

The Exhibition Committee of the Eighth Annual Automobile Show, to be held in the Grand Central Palace, New York city, October 24 to 31, 1907, under the auspices of the Automobile Club of America, announces that 10,000 square feet more space for exhibition purposes than was available last year have been secured, which will enable exhibitors to make a better showing than heretofore. An interesting balloon exhibit will be made by the Aero Club of America, as in previous years.

The A. C. A. will divide with the exhibitors the net profits of the show, and sent out as early as July 15 floor diagrams and complete information for those desiring to exhibit.

House Passes Race Bill

Trenton, N. J., July 5, the assembly past the bill legalizing the Vanderbilt automobile cup race in New Jersey by a vote of 31 to 5. The bill is now up to the senate.

Importers' Show Dates Set

December 28, January 4, is the date set for the forthcoming importers' show in Madison Square Garden, New York.

Independent Show Dates Selected

As announced by the Automobile Club of America, the date set for the eighth annual automobile show to be held in Grand Central Palace, is October 24 to October 31. Special arrangements have been made with the Grand Central Palace whereby more space will be obtained. The committee has also a new scheme of decorations which is being outlined and which will be announced when the space application blanks and other literature are issued.

16 Events Scheduled for Atlantic City's Carnival

The Contest Committee of the Atlantic City Automobile Club has planned out 16 events for the carnival to be held August 4 and 5.

The events are as follows:

Touring cars, gasoline, $3000 or less, regularly equipt, carrying five passengers.

Touring cars, championship, 60-horse power or less, regularly equipt, carrying five passengers, for the Atlantic City Bureau of Information Cup, value $500. Must be won twice for permanent ownership. Cup now held by A. W. Church, English Daimler.

Free-for-all championship, flying start.

Price handicap, gasoline, regularly equipt, carrying three passengers, $4000 scratch. Handicap one second for each $200 less in price.

Touring cars, $5000 or less, regularly equipt.

John H. Lyon's Cup, open to American touring cars of 30-horse power or less, regularly equipt, carrying five passengers, owners to drive. Must be won twice for permanent ownership. First winner, Charles Bacarach, Packard; second winner, Stoddard-Dayton; present holder, Ernest Lash, Packard.

Runabouts, gasoline, all types, opened to all runabouts, regularly catalogued and regularly equipt.

1-10 class, handicap, open to all cars that establish mark of 1-10 or better on the beach track.

Touring cars, gasoline, $3000 or less, regularly equipt.

Touring cars, gasoline, $1500 or less, regularly equipt.

Runabouts, gasoline, $1200 or less, regularly equipt.

Gentlemen's Roadster, handicap, gasoline, $5000 to $2500; $5000 scratch, one second for each $200 less in price. Owners to drive.

Time trial, gasoline, open to all.

Steam cars, open to all.

Foreign carriage, open to all foreign cars, 60-horse power or less, regularly equipt.

Stript cars, open to all cars. American manufacture.

The Atlantic City Show a Ten-Day Affair

It is announced that the show scheduled to take place in connection with the races and floral parade at Atlantic City, N. J., August 4th to 9th, will remain open until August 17, including two Sundays. The management have also arranged with Mr. Ball, the well-known decorator of the national shows, to furnish uniform decorations without cost to the exhibitors. Many prominent dealers have secured space and the show promises to be representative of the entire industry.

Missouri Automobile Association has appointed a publicity committee with Dr. S. Ed. Smith, of Macon, chairman. The committee will operate a press bureau and keep all the newspapers of the State informed on automobile happenings. The chief object of this bureau is to dispel the prejudices which exist in rural districts against the use of automobiles.

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BY AN

R.-S. MOTOR BICYCLE

First Up Pike's Peak

First Up Mount Wilson

The R-S Slogan

"Built and Tested In the Mountains"

is full of meaning.

It means the power and ability to show the way up such long, steep, dizzy heights as Pike's Peak in Colorado, and Mt. Wilson in California. The R.-S. went up the latter mountain in 61 minutes; the only automobile that succeeded required three hours. The ascents were not promoted or prompted by ourselves and were made by private owners using stock models—the same kind you get for your money.

The difficulties of such climbs can be appreciated, as may also the sterling worth of the motorcycle that could perform such feats. Tests like these are the ones that count, and if you want a motorcycle which will fulfill all requirements of speed, dependability and economy, you will make no mistake in choosing the R.-S.

Send for catalogs. They are full of "meat."

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Reading Standard Co., Reading, Pa.

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AUTOMOBILE
TRADE JOURNAL

ENTERED AT THE PHILADELPHIA POST OFFICE

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Change of advertising copy must reach this office not later than the 10th of each month. New advertisements will be accepted as late as the 20th.

Philadelphia, August 1st, 1907

Specially Built Racers Should Not Be Pitted Against Stock Cars

That there will be automobile races and competitive tests as long as the automobile continues to be the fastest vehicle known and the inborn love of vanquishing a competitor still to a large degree controls the actions of men, is not to be doubted. This being granted the pertinent question at once arises. What kind of racing events shall be encouraged by the manufacturers and the trade and what left to the sports and race meet promoters?

There are two reasons which usually act as incentives for manufacturers or dealers to enter cars in competitive trials; first and uppermost in their minds is the valuable advertising to be gained therefrom and second the information obtained, in regard to the suitableness of design and construction of the car, is considered. Unfortunately, the first seems to be the only one seriously considered by many, and race meet promoters take advantage of this fact to induce dealers and manufacturers to enter cars in events in which the cars are not properly classed and in which all too often some specially built freak machine carries off all the honors. Those who have been foolish enough to enter stock cars against such competitors are almost always the losers. Invariably the maker of the freak machine advertises that his car, not mentioning that it was specially built, beat all the other cars of whatever make and the general public who are not informed, take it for granted that the winning car was a regular model and of course the best machine.

It is surprising, indeed that so many of the trade can be induced to enter such nondescript competitions, when so little is to be gained, and so much may be lost.

What is needed above all is competitive tests of stock cars alone, endurance runs, sealed mechanism contests, and even races can be of material benefit to the industry, but let them be strictly between stock cars, exactly as sold to the public, all racing freaks being debarred from entering into such competitions. If there must be freaks let them race against each other. If anyone desires to enter stock models against such machines let them, but the rules should be so framed that it would be impossible to enter freaks against stock models.

A race without entries or with but one or two entries would be a failure, therefore if the manufacturers will refuse to enter their stock cars in those events which are not confined strictly to stock cars, more stock car events would be scheduled on race meet programs. The promoters must have entries to make their races a success, and they will schedule the races which will draw the largest entry list.

Valuable information and advertising can be secured from competition between cars equipt exactly as sold to the purchaser, and if hill-climbs endurance tests, sealed mechanism tests and race track contests are properly conducted there will be no lack of interest on the part of the purchasing public. It is time that the manufacturers and dealers take a stand and refuse to enter nondescript events in which the cars are not properly classified and all kinds of specially built cars are allowed to enter against regular stock models. Such contests are usually founded by race meet promoters whose sole object is to have an exciting contest from which the largest possible amount of gate receipts can be collected. The participation in such events by the trade, only furthers such schemes to the exclusion of legitimate stock car contests which would be of permanent value to the industry and also form the basis of much stronger and more valuable advertising.

Limit of Tire Endurance Reached

Altho much time has been consumed in vainly endeavoring to predict the ultimate form which automobile construction will reach, there are a few facts which can be learned from what is taking place at the present time. Among these facts in a prominent position is the difficulty that tire manufacturers have been

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having, and are still having, to make tires which will stand the tremendous strain to which they are necessarily subjected when used upon the enormously heavy touring cars that the automobile manufacturers are now placing on the market. Machines which will seat seven people are to-day quite common, such cars weighing from three thousand pounds upward, and it is a well known fact that it is almost impossible to make pneumatic tires of any material which will resist the severe usage to which they are subjected, when such a weight as this is placed upon them. We believe that such extremely large and heavy cars are not absolutely necessary, and that the demand for them will never be very great. It is not uncommon for tires in use upon such vehicles to blow out after slightly over two thousand miles running, and altho this might be due to pumping the tires too hard and their subsequent over-heating or to minute flaws in the tire construction, the fact remains that the tires on these machines do not stand up as they should, and constitute a continual source of trouble and expense.

Automobile manufacturers have been constantly requiring more of tire makers, and it would seem that the limit of tire endurance has at last been reached. If satisfactory results are to be had, the automobile manufacturers must meet the tire makers half way by making a strenuous effort to cut down the weight of the cars offered to the public, and as the number of purchasers who can afford to operate cars capable of seating seven passengers, are very limited, there is even now, a tendency and one which we believe will grow stronger toward the construction of three general classes of cars, namely: two, four and six cylinder machines, each being of only moderate seating capacity and of the lightest possible weight consistent with durability, to secure the longest possible tire life. The small single cylinder machines are not included in these classes, as it is well known that there is very little difficulty at present experienced with tires on such small cars or even on the four or six cylinder runabouts, most of the tire trouble coming with the use of cars of large carrying capacity.

It is conceded that the tire question is the "bug-bear" of the automobilist, and believing as we do that the limit of tire endurance has already been reached, and in many cases exceeded as shown by the action of tires which are apparently flawless, it is evident that in order to reach a solution of the difficulty the automobile manufacturers, and not the tire makers, must be looked to.

In view of these facts, the automobile manufacturers of this country should combine in their efforts to reduce as far as possible, the weight of the large models, and co-operate in this respect with tire makers to bring about a reduction of the present tire troubles as seen in connection with the heaviest cars.

Worthlessness of Present Railroad Crossing Signs

It would be almost impossible for any thinking man to take even a short automobile trip thru almost any part of our country in which grade crossings exist, without realizing the fact that railroad crossing sign-boards as at present located, are absolutely valueless in nine out of ten cases to the automobilist. Any man with only normal powers of observation can see that he has reached a railroad crossing when he is within twenty feet of the same, and a sign-board will not make the matter any more clear to him, or be of any use whatever to him, when it comes within his range of vision, at the same time as an approaching train, often too late for his vehicle to be brought to a stop. We are not now speaking of speed maniacs, but of the mass of conservative automobilists who are every day in increasing numbers, using the highways of our country.

The present location of these warning signs is a relic of the past, when there were no vehicles or users of the highways moving at a speed greater than an ordinary horse trot, but conditions have now entirely changed, and in order to conform to the present state of affairs when a large per cent. of the highway users are traveling at a speed of twenty or twenty-five miles an hour, it is imperative, that at all but the most open grade crossings the sign posts should be placed at least two hundred feet from the railroad tracks on either side—a position which would give due warning to an approaching vehicle that so many feet beyond a railroad crossing might be expected.

Such a location of sign-boards would be of decided advantage not only to automobilists, but to all road users, for it is certainly true that where a roadway makes a sudden turn and crosses a railroad track, their present location is absolutely valueless to the horse driver, as well as to the automobilist. A sign in such a position is of about as much value as would be the blowing of the engine whistle after the victim has been run down.

It is to be hoped that all road users whether automobilists or not will combine in an effort to have the railroads co-operate with them for the general protection of the public, by doing away with the antiquated method now in vogue, of placing railroad crossing signs within a few feet of the crossing, and this effort should not be abandoned until the desired result of having the signs thruout our entire country placed at suitable distances on either side of all grade crossings, is accomplished.

Resolutions adopted by the various trade and owners' organizations requesting the railroad companies to move these signs a greater distance from the tracks would undoubtedly meet with ready compliance from railroad officials, all of whom appreciate

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the necessity of adopting every possible precaution against accident.

It would also be of great advantage to have all of these signs thruout the country of a uniform color and design, so that the first glimpse of a sign would inform the driver that he was approaching a railroad crossing.

The Need for Commercial Car Agents and Sales Rooms

A summary of the automobile dealers in almost any of our large cities will show that so far there are very few agents with established show rooms or headquarters handling commercial cars. Even very few of the older established agencies for pleasure cars carry commercial vehicles also. Nearly all such vehicles are at present sold by representatives of the factory manufacturing the car, and very few of these men have permanently established show, sales rooms or machine shops.

This condition of affairs is working injury to the commercial car business, for factry representatives without definite headquarters or machine shops cannot properly obtain business and surely cannot suitably take care of customers after purchases have been made. The commercial field is exactly the place where proper attention and quick repairs or replacements are extremely necessary. A slight delay of a repair part for a pleasure vehicle can be tolerated, as it simply means an inconvenience to the owner or his family, but such a delay to a commercial vehicle part may derange a whole delivery system and entail endless expense, not to mention the dissatisfaction of customers, the avoidance of which is of vital importance.

If motor delivery vehicles are to be almost universally used and we believe that time is surely coming, now is the time that every make of such vehicles should have a well-established and permanent agency in each large city, sewing the seeds of the enormous business to be done in the near future. If the sale is not sufficiently large at this time to warrant a special agency, the cars should be represented by some well-known agent already established; in any case purchasers should be able to locate the different commercial cars at definite stands and should also be able to obtain parts within a reasonable time from such agencies. There is very little doubt that in nearly all of our large cities considerable more business could be done in the field of light delivery than is now being transacted. But to secure this business, aggressive agencies must be established whose representatives will go out after such sales instead of waiting for customers to come to them, as is usually done by the pleasure car agents, very few of whom employ outside men. The few manufacturers who are pushing the sale of commercial cars seem to be picking out the hardest possible customers first, namely, the department stores, who of all people have their horse delivery service highly organized and on as efficient a basis as possible. While an agent is inducing such a firm to buy one truck, and it sometimes requires considerable time to do this, as the introduction of motor delivery means the discarding of a large outfit and the installation of a new equipment, he might have sold fifty cars to individual or smaller merchants whose two or three wagon delivery methods are probably not over-efficient and to whom such a change does not mean the complete reconstruction of a large equipment. The sales to these smaller firms would soon cause the large stores to take notice and in due time adopt the up-to-date methods.

With any firm the purchase of a motor truck is strictly a business proposition and the fact that money can be saved either directly or indirectly by the use of motor trucks must be demonstrated to them. Motor delivery saves directly where the conditions of service are such that the actual expense by this method is less than by using horses —indirectly by added range, quicker and more satisfactory deliveries, more satisfied purchases or where the advertising value of such a delivery system is a decided factor. In order to demonstrate these facts to business firms it is absolutely necessary to have well-equipt and permanently-established agencies. These representatives should also on short notice be able to furnish competent operators as it is well known that most of the trouble experienced by beginners with commercial cars is due to incompetent drivers. A merchant with his first motor delivery wagon is much in the same predicament as a first user of the typewriter; he does not know just how to handle it. The agents for typewriters very soon learned that it was the part of wisdom to be able to furnish operators at any time and sales were made much more rapidly owing to the feeling of security and relief from responsibility which these operators inspired. The same thing is true with truck users and unquestionably many more sales could be made if the purchaser knew that at any time he could get a competent operator and be well taken care of.

Some at least of the truck and light-delivery car manufacturers realizing that now is the time to properly prepare the way, have negotiated with successful agents to represent aggressively their products and we believe that others will soon follow suit, attacking the commercial car sales problem by means of agencies with suitably equipt machine departments and permanently located sales rooms.

Cars or Drivers?

What is the object of motor-car racing? Is the desire and intention the development and exaltation of individual drivers? Or do the manufacturers go to an expense of $25,000 or $30,000 apiece to produce racing

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cars to find out what makes the best car for high-speed work?

In the Vanderbilt Cup race the spectators individualized the drivers strongly and ignored the cars entirely. The daily press did the same thing, in some instances going to the extreme of printing the driver's names only, with no mention of carmakers' names at all.

Ostensibly the object of racing is to gain knowledge of what is best in motor car construction. In this case the course is made to present ordinary long distance touring conditions. The Vanderbilt Cup course gave many opportunities for accident; it was very hilly and crooked, and abounded with tire-puncture producers. Over such a road it was drivers before cars, and the press and public were not far wrong in "featuring" the drivers and paying practically no attention to the cars.

The object of racing is certainly not to improve drivers, but to improve cars, when racing truly reveals their faults.

Very clearly the first thing needed is a race course which will test the car, not the driver.

Shall the tire durability be tested by difficult turns, with abundant puncture producers everywhere present on the road-surface? The rubber tire is a comparatively weak structure. Its weakness is inherent, because rubber is a weak material, and cannot be made stronger. Yet a tire puncture came very near deciding the victor in the cup race. But it is absurd to say that car builders wish racing contests to be decided by tire punctures or tire explosions, any more than they want the driver to be the principal factor. This process of elimination brings us to a consideration of the chassis only, and makes car speed and car durability as a whole the elements for comparison.

What is wanted is a course on which the power, speed and durability of the individual racing car itself can be fairly shown, so as to obtain comparative results with various types of propulsion elements, so that builders can learn what is really the best material and construction for their cars.

Glidden Tour Scoring Defective

The system of penalizing is so based that it favors clubs with a large number of entries and works hardship to clubs of only a few entries, as the 1000 points given each club to start with, no matter with how many entries, is reduced in the following way: For each minute or fraction in excess of two minutes late at controls one-third of one point is reduced from a club of three cars, one-fourth of a point for clubs of four cars, one-fifth of a point for clubs of five cars, etc. Equal credit reductions for each dollar, maker's catalogue value, of repairs or replacements are given.

This penalty scale is evidently based on equal accident expectation, making 10 cars 10 times as liable to accident as one car, and hence, rightly, the 10-car club should only pay one-tenth the penalty of one car, or three-tenths the penalties of three cars, for the same fault. This is all right so far, but is wrongly applied as per these two "examples" quoted from the official Fourth A. A. A. annual tour booklet:

"EXAMPLE, PARTS PENALIZATION."

"A team of three cars, one of which replaces a spring valued at $10.00, will be penalized 3 1-3 points, which is one-third of one point for one dollar."

"A team of 10 cars, one of which should do precisely the same thing, will be penalized one point, or one-tenth of a point for each dollar."

"EXAMPLE, TIME PENALIZATION."

"A team of four cars, one of which is three minutes late arriving at a control, will be penalized one-fourth of a point for the one minute over and above the two-minute allowance. A team of eight cars, one of which is three minutes late arriving at a control, will be penalized one-eighth of a point for the one minute in excess of the two-minute allowance."

Like causes should produce like effects. The replacement of a $10.00 spring is just as big a fault in a 10-car club as in a 3-car club, and should penalize each club to the same extent; that is to say, should equally decrease the credit points of the two clubs. But by the example, each club having 1000 points start credit, the 3-car club has 996 2-3 points good after penalization for the broken spring, while the 10-car club would have yet 999 points good.

If each individual car started with 1000 points good, and each club was penalized one point for each minute late of each car and one point for each dollar of replacements, and then the credit remainder for each club at the end of the run were divided by the number of cars in that club, the quotients obtained would correctly and fairly show the comparative standing of the clubs.

If a 3-car club, having a total of 12 springs, breaks one spring, 1-12 of total, then a 10-car club with 40 springs should break 1-12 of 40—3 1-3 springs. Now say that each individual car has 1000 points start credit, giving the 3-car club 3000 points start credit and the 10-car club 10,000 points start credit. When the spring breaking charges were penalized at one point deduction for each dollar, the 3-car club would have 2990 points credit and the 10-car club, breaking the same percentage of springs, would have 9966.67 points credit, and dividing club credits by numbers of club cars would give 2990 divided by 3, quotient 996.666, and 9966.67 divided by 10, quotient the same, save for the repeating decimal, 996.667, making like causes produce like effects which is as near as human law can come to justice.

The Hower trophy penalization deals with single cars only, 1000 points individual credit, and one point off for each late minute or dollar of repairs, which is equally fair for all parties.

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The fourth annual Glidden Trophy con-
est began at Cleveland, Ohio, at 7.00
. M., Wednesday, July 10, whence the
ars ran to Toledo, Ohio, and on Wed-
esday, July 11, the run was from Toledo
o South Bend, Indiana, and Friday's run
as from South Bend to the Auditorium
nnex, Chicago. The general story of
ese first three days follows:

As with all of the "3-A" functions, ac-
urate information regarding this Fourth
lidden Tour is very difficult to obtain,
nd recorded facts are persistently elusive.

The original scheme of these Glidden
ours was meritorious, inasmuch as it stim-
lated participation in an extended touring
ontest by the foundation of a permanent
ophy, and the promised publication of ab-
olutely accurate records of the perform-
nce of each contesting car on the road,
ut up to this 1907 competition the "per-
ect score" awards have been made, in
ome instances at least, to cars which had
eplacements of such important members
s springs, axles and even motor cylinders,
o that the Glidden testimonial was by no
eans a warrant of absolute long-tour
eliability for the car which proudly dis-
layed it.

The extended tour car test would give
ighly valuable comparative conclusions if
e passage of a lot of cars over the same
oad the same day placed each and every
ne of the competitors in exactly the same
ifficulties on the route, but this can never
be, and accidents from exterior ca
will always greatly influence the final
sults of any extended touring contest
long as the course covered is not kept
solutely clear and free from everything
everybody except the competing cars,
even then the weather, as a blinding r
storm, for example, at a dangerous p
on an unknown road, might bring disa
to the very best car.

However, taken all together, the l
road run is the best car test there is,
the results will always be largely affe
by chance circumstances, for the most
beyond the control of the contestants

This influence of chance was illustr
in the first day's run, when a boy came
of a dust cloud directly in front o
Welch car, and the driver sent his forw
wheel against an iron bridge support ra
than run over the youth, and was
penalized for axle repairs. The Welc
a high-powered, low-weight car, well b
and has small expectation of axle fail
yet this particular Welch car in this
scored an axle failure very early in
tour.

To obtain identical running condit
every car must be at the same place on
same road at the same time, which
manifest impossibility. But in spite of
part played by chance in the results
tained the long road-run, as before sta
is the best car test available, and a 1
mile clean score is well worth the th

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ıe 1904 A. A. A. run was from New k to the St. Louis World's Exposition. re were 77 entries, 66 finishes and no e or trophy.

ıe Glidden Trophy was offered by rles J. Glidden, on the occasion of the A. A. A. run, round trip, New York, tford, Bretton Woods, Concord, Wor- er and return. Percy P. Pierce, driving erce car, received the trophy. There 34 starters and 27 finishers.

or the 1906 tour two trophies were of- d, the Glidden and one by Paul H. ning, chairman of the A. A. A. Touring rd, and the course was longer, Buffalo York State towns to Lake Cham- n, Montreal and Quebec, Canada, fin- ıg at Bretton Woods. The Glidden phy went again to Percy P. Pierce, ing a Pierce car, and the Deming Tro- to C. W. Kelsey, in a Maxwell car. 1906 A. A. A. tour had 74 entries and tarters, eight of which were non-con- ants, and 30 finishes, with 13 "perfect es" which took no notice, according to ılar estimation, of repairs by the way.

HE PRESENT 1907 GLIDDEN TOUR.

"team interest" feature has been in- uced by awarding the custody of the den Trophy to a club instead of to an vidual, and Touring Board Chairman 3. Hower offers a trophy to be award- he entrant of the runabout making the individual score.

he entrance fee is $100, with 82 entries, ded into 47 Glidden contestants, 14 ver contestants and 16 non-contestants. eems that some entrants were early or did not start, as the "official" list tains the names of 115 proposed start- and cars, while it is also "officially" ed that only 74 A. A. A. tourists began run at the Hollenden Hotel, Cleveland, 10, 1907.

REGULATIONS OF THE TOUR.

he A. A. A. distributed, gratis, a book- of 85 pages, containing complete in- nation as to this 1907 tour, including os and minutely detailed road descrip- s with local illustrations. This A. A. tion contained is here condensed.

The control of the tour is in the Tourin Board, Frank B. Hower, chairman; Dai H Lewis, secretary; James P. Dill, L. E Myers and Philip S. Flinn, there being n appeal from Board decisoins.

The cars supplied free of cost to th A. A. A. are Pierce 6-cylinder 65-H. P. ca Pathfinder, a Pierce "official" car, a Max well-Briscoe "official" car and a Premie C "official" car. Spooner and Wells, Ne York, are official photographers for th tour.

DAY'S ROUTES, 1907 TOUR.

July 10	Cleveland, Ohio—Toledo, Ohio	121 mil
11	Toledo—South Bend, Indiana	166.3 mil
12	South Bend—Chicago	101.1 mil
15	Chicago—South Bend	101.1 mil
16	South Bend—Indianapolis	147.5 mil
17	Indianapolis—Columbus, Ohio	174.2 mil
18	Columbus—Canton, Ohio	151.4 mil
19	Canton—Pittsburgh, Pa.	99.8 mil
20	Pittsburgh—Bedford Springs	97.2 mil
22	Bedford Springs—Baltimore, Md.	140.2 mil
23	Baltimore—Philadelphia, Pa.	171.9 mil
24	Philadelphia—New York City	98.2 mil
Total		1,570 mil

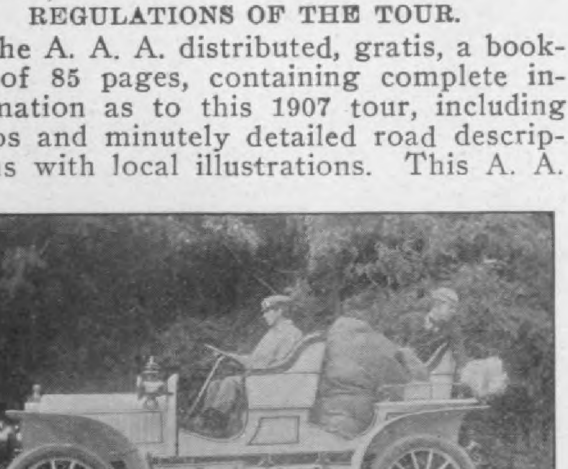
The cars will be checked at Jersey Cit Court House, cross by Pennsylvania ferr to New York and form a line on Twenty fourth street, and will then run up Broa way to be officially checked out at Ce tral Park. No certificate will be given not checked out at this place.

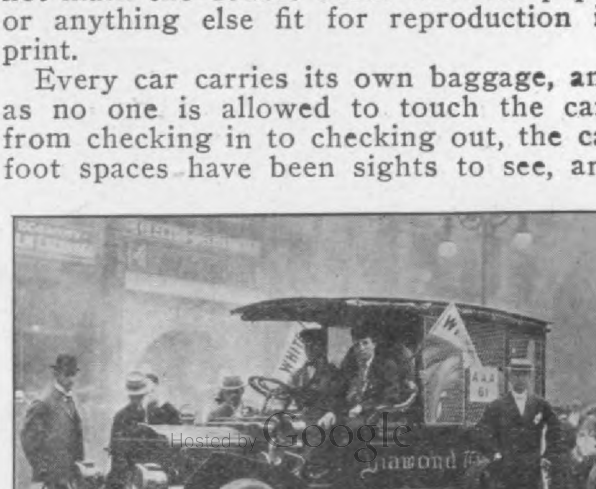
"CONFETTI."

"The entire route of the tour will b marked with confetti, distributed by pil cars, which will leave early every mor ing."

The route has, so far, been so marke and more too, as the pilot in more tha one instance made the wrong turning fir and marked it with conspicuous bunch of cut paper and then went back a marked the other correct turning. Th contestants made both turns, too, but di not mark the double event with cut pap or anything else fit for reproduction print.

Every car carries its own baggage, a as no one is allowed to touch the ca from checking in to checking out, the c foot spaces have been sights to see, a





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the baggage handling and storing at the hotel doors, after checking out for the start, has not made for security of property nor comfort of individuals in transit.

The advance hotel work was done by Thomas Cook & Sons, and accommodations were anything but satisfactory in many places. But this is probably to be expected to a greater or less extent in such a tour.

FROM CLEVELAND TO TOLEDO.

The writer reached the Hollenden, Cleveland, Tuesday, July 9, and found plenty of A. A. A. tourists already there. The next morning, after breakfasting at 6.00 A. M., and finally checking out, we started from the Hollenden at 7.40 A. M.

The notable feature of this day's run was the great and cordial interest displayed everywhere along the route, by all classes, men, women and children alike. It was a triumphal porcession of waving hands, smiles and good wishes from every one.

Personally, the writer suffered severely from want of goggles. In many places the dust lay inches deep on the dirt roads and sometimes spurted out of the ruts like water. Much of the way it was impossible to see a car-length ahead, but as every one held about the same 25-mile pace there was only one accident, caused by a boy appearing in front of a Welch car in the dust cloud, as previously mentioned. Our car reached the Toledo control at 1.30 without noteworthy incident, and with 40 minutes to spare. After lunch the writer provided himself with goggles.

FROM TOLEDO TO SOUTH BEND.

We checked out at Toledo, 7.12 A. M., Thursday, July 11, and headed for South Bend, Indiana, 166.3 miles. Heavy rains in the night had changed long stretches of good natural soil road, over which good time could have been made the day before, into almost impassable mud holes. We had no chains on our wheels, and as the car was very heavy the hind wheels constantly tried to pass the front ones, first on one side and then on the other, so that we had to follow the deepest ruts to keep out of the ditches. The day was cloudy, with several sprinkles of rain and one sharp shower, which stung our faces as we drove against the wind.

The same cordial reception was given everywhere, with only one solitary instance of fault-finding by a horse driver. This was a very hard run in every way, both for cars and drivers, owing to the almost impassable condition of the roads and two serious accidents occurred. Shortly after passing out of Toledo Kenneth R. Otis, of the Cleveland Automobile Club, while driving his own 6-cylinder Pierce, was upset by the giving way of an embankment as he was passing another car. Himself, his wife and her sister were severely injured. Mr. Spooner, official photographer, and Noonan, the Otis driver, were passengers in the car at the time, but were uninjured. Miss Rollins and Mr. Otis were both pinned under the machine, but assistance was immediately given, and they were extricated.

Mr. T. J. Clark, of the Chicago Automobile Club, was driving his own car near Bryan, 63 miles from Toledo, when it skidded and turned once and a half over. E. W. McGookin, Chicago; Peter R. Fehey, of Cleveland, and George Hunt, Clark's driver, passengers in Clark's car, escaped injury. Clark was dragged from the car as it was turning over by Dr. Andrew Callahan, of Buffalo, who was in the official "Red Cross" car close behind. Mr. Clark was severely cut about the face, and sustained a fracture of the lower jaw and two ribs.

The Otis car was wrecked, but the Clark car, in spite of a broken steering wheel, was driven into South Bend by George Hunt, Mr. Clark's driver.

Both these accidents occurred while owners were driving on very dangerous roads and carrying their own drivers as passengers.

FROM SOUTH BEND TO CHICAGO.

From the hotel Oliver, South Bend, we checked out at some time after 8 A. M. for a short run of only 101.2 miles to Chicago, which we expected to make in three hours at most, as we had a 50-mile car and the roads were good. The same cordial spirit was everywhere shown, the day was fine, roads fair or good, no mud, no dust and everything joyous. The route was changed to Michigan City, north of Valparaiso, and we were well in the lead, a few miles west of Michigan City, 30 minutes in advance of our own schedule, when our commutator began to cut and short-circuit. Proper detail construction would have let us change commutators in 15 minutes, as we had another with us. As it was, a broken set-screw, and a screw dropt down beside the cam shaft, so that everything had to be pulled apart under the motor. This held us in one place for five hours and cost us 250 points penalty. We made from 40 to 50 miles after we were finally right, and reached the Auditorium Annex some time between 6 and 7 P. M., seven hours behind our own expectations.

We had past pretty much everything in front of us before reaching Michigan City, where our mishap occurred, and had the pleasure of seeing them all pass us as we were broiling in the July sun.

Saturday and Sunday the tourists who had no stories to write rested from the horrors of the Toledo-South Bend run, which will never be forgotten by any one who experienced them, as a car running crosswise of a narrow road, in deep mud, with deep ditches on each side, and no chains on the wheels is something to think about.

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CHICAGO TO SOUTH BEND.

The tourists started out again on Monday morning, after a two days' rest in Chicago, the cars checking out from the First Regiment Armory shortly after 8 o'clock, with an overcast sky and every indication of a severe storm. The schedule was one of six and a quarter hours. Before we got fairly out of the city limits, rain began to fall, and there were intermittent showers and thunder-storms during the entire day. In all 69 cars left Chicago this morning.

To-day a new method of scoring was introduced by Chairman Hower. Each driver was handed a cardboard placard with a number upon it, which denoted the order of the start. The rule was that no car was to pass a car carrying a lower number than the one carried by the car approaching from the rear except when the car in advance was stopt or was proceeding at a very slow pace. Then the overtaking car could pass, the drivers exchanging numbers.

The end of the day's run, the fourth day, shows 28 clean scores for the Glidden Trophy out of 37 contestants still running. and seven clean scores out of the nine contestants for the Hower Trophy. The standing of the clubs to-night, at the end of the run from Chicago to South Bend is as follows: Pittsburg Automobile Club, 1000 points; Automobile Club of Buffalo, 1000; New York Motor Club, 965.6; Cleveland Automobile Club, 744.1; Westchester Motor Club, 664; Chicago Automobile Club, 637; Automobile Club of America, 497.5; Automobile Club of Detroit, 457.5.

SOUTH BEND TO INDIANAPOLIS.

About nine o'clock a downpour began which made the clay roads very slippery, but, on the whole, the roads were better than had been expected and many of the tourists rode in ease with their feet perched upon the dash.

OVATION GIVEN BY FARMERS.

The most noticeable feature of the day's run was the cordial reception accorded by the farmers, who gathered in groups with their families in wagons by the roadside, and cheered the mud and dust-covered caravan.

Fortunately the roads were hard and after rolling along over the roads for a change, instead of ploughing thru them. Indianapolis was reached and the cars were checked in and placed under the care of the police in the circle about the public monument. There were all kinds of entertainments given by the hospitable Indiana Automobile Club.

The pacemaker system works wonders, and there was much less reckless speeding and no accidents of a serious nature.

THE 174-MILE RUN TO COLUMBUS.

This day's run was looked forward to with uneasiness by most of the contestants, altho nine and one-half hours were allowed by the schedule. The checking out in a drizzle did not tend to raise the spirits of the company.

In the main, however, the roads were good, the national highway being a straight macadam turnpike with only infrequent rough spots.

Out of Springfield there are a succession of ugly water breaks, but for several miles they had been marked with red flags by the Springfield Automobile Club.

The welcome by residents along the road was as hearty as yesterday, and many bouquets were thrown at the passing cars.

For the Glidden Trophy the Buffalo and Pittsburgh Clubs still have perfect scores.

COLUMBUS TO CANTON.

The time allowance for to-day's run to Canton of 152 miles was eight hours and forty-five minutes. The trip was rather trying as for most part it was over clay roads and there were many steep hills crost by water breaks, but the weather was good. The confetti car once more took a wrong road with the usual disasterous results, disastrous at least to the drivers' peace of mind. The score car, a non-contestant, broke part of the steering gear and coasted gently into the old State canal of Garfield fame. No further damage was done—the car was pulled out. The 30-H. P. Walter car, driven by Ed. Walter, after taking a bridge near Beidler at good speed was unable to make the sharp turn following without hitting a telegraph pole, so ploughed into an open field. No damage was done, however, and after being hauled out the car proceeded and checked in on time. The close contest between the Buffalo and Pittsburgh teams, each with perfect scores, was marred to-day by Gus G. Buse, of the Buffalo team in his Packard, losing 42 points and leaving the Pittsburgh the only perfect score team. This team will start first on the run to-morrow, so as to enter their own home place, Pittsburgh, first of the line.

CANTON TO PITTSBURGH.

The run of 100 miles to-day from Canton was for about half the distance over mountain roads, the roughest yet encountered.

As a result of the first day in the mountains several springs were broken, some axles bent and a number of cars failed to get in on time. The perfect score Pittsburgh Club team were received enthusiastically by large crowds on the streets and many buildings were decorated. Two bullets were fired by unknown parties into the back of R. H. Tucker's Royal car to-day. Four more clean score cars were penalized, owing to the very bad going, leaving 20 perfect score cars. Lozier No. 25 broken spring and delay 57 points. Gaeth No. 28 3 points. Haynes No. 55, 2 points. I. C. Kirkham's Maxwell No. 41, 37 points. Four other cars lost points, but had already been penalized. For the Hower Trophy there are 5 perfect scores. The contestants had but six hours to finish inside the time limit, which necessitated a pace too rapid for safety. The consistent running of the small two-cylinder cars has been a revelation to many.

PITTSBURGH TO BEDFORD SPRINGS.

The run this day of 98 miles over the mountains was the most severe yet attempted and many perfect score cars were penalized. The Pierce Great Arrow No. 21, of the Pittsburgh team, was delayed, owing to the throwing out of one of its occupants and was one hour and 32 minutes late, thus spoiling the perfect score of the Pittsburgh Club. Buffalo now leads with 981 4-5; Pittsburgh second, 977½. For the Hower Trophy the 35-H. P. Stoddard-Dayton, of G. F. Smith, and H. K. Sheridan's White steamer, are the only perfect score cars. Poor gasoline obtained at Ligonier caused several cars delay and penalization.

BEDFORD SPRINGS TO BALTIMORE.

The run to Baltimore thru one of the most picturesque parts of the country, was apparently enjoyed by most on the tour and much less difficulty was experienced and most checked in on time. The tourists were bothered by the large number of toll gates which were in places not over a mile apart. The White and Stoddard-Dayton are still tied with perfect scores for the Hower Trophy. The scores of the Buffalo, Pittsburgh, Cleveland, Westchester and A. C. A. teams remain as yesterday, Buffalo being in the lead.

BALTIMORE TO PHILADELPHIA.

The run to Philadelphia of 171 miles with fair weather, good roads and a time allowance of 10½ hours was really easy and was one of the few days of pleasure on the tour. There were few accidents and no perfect scores spoiled. The Haynes, No. 55, which up to this time had but two points against it, at Malvern in the afternoon broke the rear axle near the right wheel and had to withdraw. There were six cars arrived late, among them Mrs. Cuneo, who had spring trouble but she was heartily cheered as she drove up to the Hotel Walton at 11.45 that night. The Welsh stopt at the Autocar factory with a broken crank shaft which necessitated its withdrawal.

The Deere broke two front springs but arrived at 9.30 and the American Mors was reported with a broken spring about 20 miles out. The tie between the Stoddard Dayton and the White Steamer for the Hower trophy still holds and as to those running perfectly there is some question as to the method of award if both reach New York City with perfect scores.

At the Walton a drawing by the perfect score

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cars for position in the line after the official and confetti cars when entering New York City resulted as follows: 47, 39, 22, 39, 11, 104, 14, 17, 54, 49, 9, 48, 42, 19, 27, 108, 3 and 50.

The entry into Philadelphia was marked by a most cordial welcome. From Malvern to the city there are numerous toll houses the frequent stops at which would have been very annoying but for the fact that each car was presented with a flag by the "Press" of Philadelphia, allowing it to pass all the toll gates free. This courtesy was highly appreciated by the tourists. Enthusiastic crowds viewed the dust-covered cars as they sped through the city. The cars for the most part arrived ahead of time and after the checking in were housed under police guard in the court of the City Hall. After the scores had been completed the tourists were driven in private and sight-seeing cars to the Majestic Hotel. The recent gorgeous illuminations for the Elks were in full blaze for the night, in honor of the tourists. As joint hosts the Quaker City Motor Club, the Philadelphia Automobile Club and the Germantown Automobile Club royally entertained the guests. At the Majestic after an address of welcome by Mayor Reyburn and short addresses by Glidden and Chairman Hower there was a vaudeville show and refreshments were served.

PHILADELPHIA TO NEW YORK.

At seven o'clock sharp about 50 cars checked out for the 98-mile run to New York City or rather to the City Hall, Jersey City, as the cars were to check in at that place. The running time of 5½ hours proved ample and all the cars checked in on time, the scores of the clubs remaining as at Philadelphia. This makes the Buffalo Club the winner by 4 3-10 points better score than the Pittsburg Club, a close second.

The tie between the White and Stoddard-Dayton for the Hower trophy was not settled by today's run.

After leaving Jersey City by the Pennsylvania 23d street ferry the cars formed in parade line at 24th street. Chairman Hower's car led and was followed by Mrs. Cuneo who was given this place by courtesy of the tourists, the press car, which had acted as a confetti car distributing each day about 100 pounds to mark the route, came next in line and was followed by the official car. The perfect score cars, 18 in number, formed the second division, following in the order of the numbers drawn at Philadelphia, Walter White leading. The cars were joined by many friends whose cars lined in behind and the procession proceeded to Broadway and 58th street, thru to 5th avenue and around the Plaza Circle. The lineup on 59th street toward the park was then photographed and then immediately disbanded. The tourists were anxious to wash up and don civilians clothes once more, all tired but proud of the performance of the cars. Many of the mud and dust covered cars were immediately placed at the curb in front of their respective agencies. The line of the parade was crowded with people to witness the finish of the most strenuous try-out ever given the American automobile.

At 8 o'clock at the Hotel Astor the official scores were read and a silver loving cup presented to Mrs. Cuneo by 110 of the tourists. The cup will be suitably inscribed. A form of certificate will be given to each car which completed the tour. Details of the method of running off the tie for the Hower trophy have just been settled. The cars will start from the A. C. A., N. Y., Monday, July 29th for Cleveland accompanied by Chairman Hower and a confetti car and from Cleveland will continue over Glidden route until one is penalized.

It is expected that the cars may cover a portion or all of the route again if necessary. Mr. Glidden expressed himself as well pleased with the outcome of the tour, and was particularly impressed by the hearty and enthusiastic reception given the tourists thruout the entire run. During the evening a congratulatory telegram was received by Mr. Glidden from Judge Hotchkiss, president of the A. A. A.

The performance of the few small powered low priced cars has been a surprise to many. The Reo car No. 33 which finished with a perfect score, starts to-night for a non-engine stop run to the Jamestown Exposition.

It is a noticeable fact that there are no air-cooled ars in the tour this year, altho the Marmon and Knox made perfect scores last year. The Frayer-Miller, however, had intended entering the car used in the 24 hour endurance race but were unable to get it ready in time. The following is the official score of the clubs and individual cars as given by the committee:

GLIDDEN TROPHY.

New York Motor Club, 683 2-5.

Car.	H.P.	Car.	Score.	Entrant.	Club.
3	40-45	Pierce	1000	R. D. Garden	N. Y. M. C.
26	30-35	Ranier	392	A. Cuneo	N. Y. M. C.
31	40	Walter	1000	E. S. Lea	N. J. A. C.
39	40	Berliet	1000	A. N. Jervis	N. Y. M. C.
43	40	Acme	679	J. W. Mears	N. Y. A. C.
*4[illegible]		Aerocar	1000	A. M. Robbins	N. Y. M. C.
48	20	White	1000	A. J. Scalfe	N. Y. M. C.
*30	30	Autocar	1000	H. M. Cole	Q. C. M. C.
32	40	Oldsm'le	997	W. J. Howard	.....
34	16	Reo	766	H. T. Thomas	Buffalo A. C.

Cleveland Automobile Club, 483 5-9.

Car.	H.P.	Car.	Score.	Entrant.	Club.
*2	60-65	Pierce	888 8-9	K. R. Otis	Cleve. A. C.
*25	40	Lozier	1000	F. Black	Cleve. A. C.
28	35	Gaeth	997	P. Gaeth	Cleve. A. C.
*37	50	Meteor	723	A. L. Petersen	Ind'lis A. C.
42	45	Royal T.	1000	R. H. Tucker	Cleve. A. C.
49	30	Peerless	1000	C. H. Burman	Cleve. A. C.
50	30	Peerless	1000	W. C. Straub	Cleve. A. C.
*23	35-40	Shoem'k'r	974	H.C.Shoemaker	Chic. M. C.
47	30	White	1000	W. C. White	Chic. A. C.

Chicago Automobile Club, 240-1-7.

Car.	H.P.	Car.	Score.	Entrant.	Club.
*1	40-45	Apperson	857 1-7	N.VanSicklen	Chic. A. C.
*6	30	Packard	703 1-7	T. J. Clark	Chic. A. C.
24	30	Mitchell	295	W. M. Lewis	Chic. A. C.
38	35	Stod.-Day	858	H. C. Tillotson	Chic. A. C.
54	50	Haynes	1000	Ed. Noble	Chic. A. C.
*55	30	Haynes	1000	F. N. Nutt	Chic. A. C.
*56	40-45	Columbia	776	F. E. Dayton	Chic. A. C.

Buffalo Automobile Club, 981 4-5.

Car.	H.P.	Car.	Score.	Entrant.	Club.
9	60	Thos.Fly.	1000	G. S. Salzman	Buffalo A. C.
11	60	Thos.Fly.	1000	M. Hallowell	Buffalo A. C.
17	60-65	Pierce	1000	F. S. Dey	Buffalo A. C.
27	40-45	Pierce	1000	A. Kumpf	Buffalo A. C.
44	24	Packard	909	G. G. Buse	Buffalo A. C.

Pittsburg Automobile Club, 977 1-2.

Car.	H.P.	Car.	Score.	Entrant.	Club.
14	40-45	Pierce	1000	P. S. Flynn	Pitts. A. C.
21	40-45	Pierce	910	P. P. Jones	Pitts. A. C.
22	30	Packard	1000	H. H. Perkins	Pitts. A. C.
29	50	Welch	1000	G. P. Moore	Pitts. A. C.

Detroit Automobile Club, Club Score, 0.

Car.	H.P.	Car.	Score.	Entrant.	Club.
*7	50	Welch	988	A. R. Welch	Detroit A. C.
*12	40	Thomas	947	R. D. Chapin	Detroit A. C.
*36	40	Pungs-F.	750	E. B. Finch	Detroit A. C.
*46	40	Aerocar	1000	G. F. Barr	Detroit A. C.

Automobile Club of America, 498½.

Car.	H.P.	Car.	Score.	Entrant.	Club.
*16	45	Royal T.	744	O. A. Parker	A. C. A.
33	40	Reo	1000	R. M. Owen	A. C. A.
*35	16	Reo	1000	R. M. Owen	A. C. A.
19	24	Premier	1000	G. A. Weidely	A. C. A.

Westchester Motor Club, 620 1-3.

Car.	H.P.	Car.	Score.	Entrant.	Club.
41	16-20	Maxwell	873	I. C. Kirkham	W. M. C.
58	16-20	Maxwell	997	L. S. Tyler	W. M. C.
*59	24	Maxwell	66 1-2	C. A. Fleming	W. M. C.

Individual Scores for Hower Trophy.

Car.	H.P.	Car.	Score.	Entrant.	Club.
100	40-45	Pierce R.	994	A. E. Hughes	R. I. A. C.
*103	40	Prem'r R.	1000	H. O. Smith	.....
104	35	Stod.-Day	1000	G. F. Smith	Q. C. M. C.
*106	40-45	Matheson	944	R. G. Kelsey	L. I. A. C.
*107	24	Marion	1000	H. E. Stutz	A. A. A.
108	30	White	1000	H. K. Sheridan	Cleve. A. C.
*109	35	Contin'al	941	C. S. Johnston	A. A. A.
*111	35	Pa.R'n't.	1000	W. Owen	A. A. A.
*112	24	Dragon	988	J. W. Haynes	Chic. A. C.
*113	24	Dragon	1000	H.Branstetter	Chic. A. C.
*115	35	Cleveland	1000	W. H. Badger	Cleveland

Contestants for Certificates.

Car.	H.P.	Car.	Score.	Entrant.	Club.
10	24	A. Mors	852	F. J. Pardee	St. L. A. C.
15	40	A. Mors	1000	G. Cabanne	St. L. A. C.
*51	30-35	Elmore	868	J. H. Becker	Cleve. A. A.

Noncontestants.

Car.	H.P.	Car.	Entrant	Club.
12	40	Thomas	R. D. Chapin	Detroit A. C.
52	30-35	Deere	W. G. Houck	.....
57	50	Wayne	A. D. Cressler	Chic. A. C.
40	18	White	R. H. Johnson	N. Y. M. C.
60	60	Thomas	Wm. Turner	Buffalo A. C.
61	24	White	H. G. Smith	A. A. A.
105	35	Loco'leR.	J. Zimmerman	Chic. M. C.
101	60	Thomas	C. A. Coey	Chic. A. C.
*102	40	Pierce R.	H. E. Coffin	Detroit A. C.
114	40	Thomas	J. G. Barclay	Buffalo A. C.

*Withdrawn.

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) kilometer course, about 477 miles, in 6 urs, 46 minutes, 33 seconds, an average 70.58 miles per hour, a world's record average time in automobile road racing. ancois Szisz, of France, driving a Renault, ished second in 6.53.10; third, Baras, ance, driving Brasier, and Rongier, ance, Dietrich, fourth.

Chicago Club's Magnificient Home Opened

The new magnificent six-story home of the icago Automobile Club on Plymouth ave- e was formally opened on July 1.

The garage is entered from the street and cupies nearly the whole of the first floor. The club house is well fitted up for the nveniences of its members, there being eping quarters, grill and billiard rooms. nging, card rooms and a cafe.

The Automobile Club of California, San ancisco, has taken a determined stand ainst racing for records over the roads the State between this city and Los geles.

July fourth proved blue ribbon day, city council permitting the use of oc boulevard for racing; over which n events were run.

Preceding the races was a floral par on the boardwalk. In all the events th were plenty of entries and each was w contested.

Montague Roberts, driving a Thomas covered a mile in 44 seconds. An Auto was also driven in a mile trial in 1.18

The officials of the Albany Automol Club are completing arrangements for th 100-mile road race, which is to be held a course near the capital city on Septem 14, permission to use the roads having b secured from the supervisors. The r will be run over a six-round course, meas ing a little more than 15 miles. The cont is open to amateur drivers only. The co peting cars must be four-cylinder machir either touring or runabout, not exceed 60-horse power and owned by residents Albany, Schenectady, Renselaer, Colum or Saratoga counties.

A New English Motor Car Race Track

The Brooklands Motordrome at Weybridge, England. This is an automobile race track, 100 feet wide. 2 iles in circumference, bisected by a diagonal stretch affording a level run for the finish before the gran

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Considerations of Motor Car Elements

HUGH DOLNAR.

(The name of the writer of these considerations is well known to our readers as a describer of new cars, and his extended experience as a machine designer and constructor gives value to his deductions and suggestions. Should any of our readers dissent from the conclusions reached in these articles, the columns of the Journal are open to all, in the full belief that free discussion and interchange of opinion is the shortest road to perfection.—Editor.)

Starting Devices and Self-Starting Motors

The ordinary form of gas engine in exclusive use for motor-car driving has no reservoir of power corresponding to the steam-engine boiler and is therefore wholly inert when stopt and cannot be made truly self-starting, tho common usage speaks of gas engines fitted with mechanical starting devises as "self-starting" meaning that the motor can be started without much muscular exertion on the part of the driver, who has merely to make such changes in the motor as will enable it to make use of some starting device other than the strength of the driver applied directly to the starting crank.

The hand starting-crank is commonly applied directly to the end of the motor crank-shaft, either with or without first relieving the piston of part of the compression pressure. With the piston diameters now in use considerable strength is required to start the motor with the hand crank, even when equipt with some one of the many forms of compression-releasing devices which have been invented, and the violent muscular effort required often leads to painful accidents to the one who is turning the crank, even when the cranking proceeds in normal form, as the starter stands close to the radiator and in stooping quickly is liable to severely injure his head by striking it against the radiator edge or cap. Instances have been known in which the cheek of the starter has been laid open, and the writer saw one unfortunate cut his right ear in two on the radiator cap edge, while a recent newspaper paragraph told of a starter's tongue being bitten in two in this manner.

The more common form of accident to the starter comes from "back-firing," as it is termed, meaning the too early firing of the charge, which drives the crank violently in a direction contrary to that in which the starter is turning and so sprains the wrist, which is the most common effect, or perhaps may break the bones of the hand or the arm. Every one who is much about motor cars can recall a long list of more or less serious disablements from back-firing. The writer witnessed the breaking of the bones of the hand of a powerful mechanic, and is personally acquainted with an expert driver who had both bones of his right forearm broken by a starting crank, in such fashion that several successive surgical operations and thirteen months in the hospital resulted, caused, of course, by failure to be certain that the spark-timing device was retarded to a safe position before attempting to start the motor.

It is easy enough to invent linkages to operate in combination with the starting crank as it is applied to the motor crank-shaft for starting, which will release the compression and retard the spark-time so that hand-cranking becomes comparatively easy and safe, and many such arrangements have been applied, but not one has been so suitable and so well-built and certain in operation as to bring it into common use, and some most painful accidents have resulted from the failure of these automatic starting safety devices to work as intended. Because of the added complication and the failure to give satisfactory results, these safety starting devices have come into emphatic disfavor, and are very seldom fitted at present, it being thought better to make the starter look to his own convenience and safety by manipulating the compression relief cocks and regulating the spark-time himself, before beginning to crank the motor.

SELF-STARTING MOTORS.

To make a gas engine start without turning the crank-shaft by hand, some reservoir of force or pressure must be had as a source of power, and some means of applying this power to cause the motor piston or pistons, at least, to move, must be supplied.

A cap containing an explosive has been tried, which when fired would drive the piston and give the fly-wheel sufficient momentum to make the motor start. A comprest air reservoir and air pump worked by the motor have been used in several ways, such as driving an independent air-piston linked to a rack coacting with a pinion fixt to the crank-shaft, or driving two of the cylinders of a 4-cylinder motor and thus causing the other two to begin to work as gas engines, the motor is then restored to its normal form and the two cylinders which are working keep the engine running until the first two cylinders draw gas, or by a third method, working all four cylinders as comprest-air driven motors at first and then changing them all to operate normally, depending on the momentum of the fly-wheel to start them working as gas engines.

Menges, in the "Crankless" Harrison car, first charged all four cylinders with pure air, then added acetylene gas to this pure air charge and fired it and instantly changed the motor back again to normal form, causing the first charges of air and acetylene gas to start the motor, which then worked with normal charges drawn thru the carburetor.

When the working cylinders are used in any but the normal cycle, the valves must be operated to suit the change, and this condi-

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tion involves a change in the cam-action, either by bringing an entire different cam-shaft and cams into action, or by shifting the regular or normal cam-shaft endwise, so as to work the valves by a different set of cams.

Various arrangements of levers, straps, chains and ratchet and pawl actions have been employed to enable the driver to start the motor without moving from his seat in the car, but such arrangements depend wholly on the power of the driver's muscles, and are not really self-starters at all, but are only modifications of the hand-starting mechanism.

Besides the Menges-Harrison Self-start, the writer is aware of but one other American car motor which deserves to be classed as self-starting. This is the "Triumph," in which pressure from one working cylinder of a gas-engine car motor is delivered to a storage tank and held there at a pressure of from 100 to 125 pounds per inch, ready to start the motor. When the motor is to be started the cam-shaft is moved endwise, bringing eight starting cams which move the working cylinder valves into position, so that the rearward pair of cylinders of a 4-cylinder motor can work as comprest air motors and so start the other pair of cylinders as gas engines; then the cam-shaft is moved endwise back to normal position and the rearward pair of cylinders are then driven by the forward pair working as gas engines, so that they, too, begin as gas engines. The Triumph pressure tank is not arranged to be filled with compressed air from an exterior source of supply, and therefore an ordinary hand starting-crank is fitted, by which the motor may be started in the usual manner, after which running of the car on the road establishes an air-tank pressure, so that it is not necessary to crank the motor often for starting because there will commonly be sufficient pressure in the air-tank to start the motor in the manner specified.

There is no doubt whatever of the great desirability of a really good, practicable and thoroly reliable starting mechanism for car-motors, and because a self-starting motor is so much needed it is certain that it will be produced, if not already to be found in its best form.

The results of a long trial run with the Triumph self-starting motor are told in another place in this issue of the journal. This self-starter is comparatively simple, is not very costly and does not at all interfere with the reliability nor the power of the motor. The Triumph self-start appears to be about as good as can be done without the use of a separate air-compressor and air cylinder for turning the crank-shaft, which is what must be used, so far as is now seen, if the turning effort is not given by using some of the motor cylinders for imparting to the crank-shaft its primary revolutions.

Commercial Components

Shall each separate builder of cars produce structures of marked individuality, differing in important particulars from anything made by anyone else and original in every principal detail?

No car builder does this, as all the makers buy some parts of their cars from suppliers to the trade, but there is a broad originality possible in principal components and this originality, of greater or less extent and scope, is, of course, advertised as a mark of superiority in intelligence and mechanical ability.

The commercial supplier of a certain component, as, say, the rear axle and front axle of a motor car, reaches a much greater number of individual users than can be found as purchasers of any one make of motor car. Every single one of the users of a commercial component is sure to report all faults to his supplier, the maker of the car, who in turn is certain to report to the component maker, who is thus informed of the actual service done by his work all over the country, under all conditions of road and by all classes of car purchasers and drivers.

It also appears to be certain that a car built up from approved principal components cannot greatly disappoint the purchaser, provided that these good principal elements are assembled by a constructor of sound judgment who will see to it that the auxiliary details, designed and constructed by himself, are efficient in form and are well built.

Probably as time passes cars will become divided into a very few well-established types; if this should prove to be the case the maker of commercial components will dominate the final situation because all cars will be assembled of parts each made by the best specialist, who must always excel the best general constructor in perfection of product.

Aluminum vs. Grey Iron

Is aluminum a necessity in motor-car chassis construction? This important question is answered in emphatic negative by the fact that first-class cars are made with grey-iron crank boxes very little if any heavier than those of aluminum, which shows that the gear box can also be made of grey iron and yet fill all requirements, but, of course, gives increased weight. Grey iron can be had in any desired quantities, and if handled under expert direction can to a certain extent take the place of aluminum castings in motor car construction without excessive weight additions, and with added "reliability" as far as screw threads are concerned. It is pretty certain that a very serviceable car for the average user can be made of ordinary steels and grey iron, with all working joints hardened, for about 50 per cent. of the flat cost of what is now regarded as high-class in motor-car production, or 35 to 40 per cent. of the flat cost of the very best cars now made, where chrome nickel steel and aluminum castings are used freely and that the ordinary materials, by skillful designing and treating of all working parts can be made as satisfactory to many users as the car built of high-grade material thruout.

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Steering Actions

Always after writing the story of a car with the designer of the car, there comes an illuminating talk between the designer and the describer, in which the designer goes over the reasons for his changes, and tells why he has not built his new model as he believes it should have been built.

The story almost invariably turns on some sales agent's catch-word, which has become impressed on the motoring public mind as representing an indispensable requirement of the really good motor-car, to the extent of influencing the choice of the prospective car-buyer.

After losing sales steadily for a season because he has dared to cross the catch-word accepted as final for some detail, the designer becomes very ready to meet the catch-word requirement in his next season's design.

One of the catch-words now fully committed to memory by the motoring public is "Irreversible Steering." Of course, the term is not exact, as a steering gear not reversible could turn the car in one direction only, but "Irreversible Steering" is a good mouth-filling expression, and is accepted as meaning "Locked Steering Action," in which no wheel-shock can move the steering wheel.

Kelly, of the Wayne, said, "Yes, I have abandoned the rack and pinion steering in favor of the right and left hand external and internal screw threads and double-crutch globe-end steering bell-crank. That is the best steering action yet, in my opinion, big wearing surfaces and perfect wear take-up. I don't believe at all in the worm and worm-gear action, which has only point bearings, and must wear fastest in the "straight-ahead" engagement, and which cannot have the lost motion taken out by any adjustment yet shown. The rack and pinion costs less, has plenty of engagement surface area, and naturally takes the cross-wise main steering-rod, and has a hundred times the life of the worm and worm-gear, and if the rack and pinion are cut round top and bottom teeth, the pinion can be forced hard into the rack, teeth bottoming, and do away with all lost motion. We traded in one of our first cars, that had been run hard and all the time for two years, and the rack and pinion steering action was good as ever, no lost motion at all. But we lost a lot of sales because we could not claim "irreversible," tho you never feel a front-wheel shock with the rack and pinion steering, and so I am putting out this new screw and nut steering action for 1907, to meet a silly catch-word—"Irreversible steering."

The Bartholomew "Glide" man said, "Oh, yes! you needn't laugh! we took out our compound spur gear steering action that was fourteen times as good as any worm and worm-sector, and put the worm and sector right in for 1907, and you bet we don't lose any more sales because we haven't got 'Irreversible Steering.' Yes, we are 'sliding gear' for 1907, too. Our big planetary was splendid, change any old time any old way, soft as silk and smooth as butter, but if folks want to buy 'whir-r-r-r' sliding gears we are just smart enough to make and sell them."

Smith, of the "Great Smith," of Topeka, said, "Oh, yes, it's sliding gear all right. Yes, most of the time it changes all right—of course, when the gear teeth come square end to end they don't mix worth a cent, and our planetaries never gave us any trouble at all, but folks won't stand for 'planetary' any more, so we are 'sliding gear.' I wouldn't drive a sliding gear myself." "Yes, I am sticking to my spiral spur-pinion and sector steering, spiral internal sector teeth. Of course, the action is all the same as a plain pinion and gear sector, only the spiral makes it smoother, and when the buyer asks if it is 'irreversible' we just show him the spiral pinion, and that looks like a worm, and the leverage is enough to keep the wheel shock from being felt on the steering wheel."

Blair, of the "Craig-Toledo," said, "Do you suppose I would put that single-point surface-bearing worm and worm-sector in a car I built? I guess not. I put in the quintuple thread screw with the take-up trunion nut, and I've got 3⅝ square inches of thrust contact. I can keep my steering gear perfectly tight, and, of course, it is near enough 'irreversible' to claim it. Anyway, you can't feel anything on the hand wheel."

All of which means that the catch-word must rule, after the agent has taught the public the parrot phrase.

STRUTS AND TORSION ARMS.

There is a very surprising difference of opinion among car designers as to the value of the torsion arm, as well as that of the struts. Both large and small cars are made without struts and without torsion resisting arms. In other case the torsion arm is used in connection with two struts from the rear axle to the chassis frame sides, and sometimes four struts are placed two from each axle to the middle of the frame sides, or to some other point. There are also various triangular axle braces fitted, which have the axles as bases and are jointed to the chassis frame girts.

If the torsion arm is not placed, then the rear side springs must resist the rear axle torsion, and if the struts are omitted then the front part of the rear side springs must transmit the driver thrust to the car. If the car does as well without the torsion arm and struts it is difficult to understand why these members are placed, and if the torsion arm and strut perform valuable functions it is difficult to see how they can well be omitted.

Steering Gears and Axles of Small Cars

Recently the writer was asked his opinion of a new car of the large wheeled type. The machine in question was the first one of its kind, 750 pounds, $650; 40 inch wheels, fitted with solid tires, and, as I remember it, 72 inch wheel base, very roughly built, with a pair of opposed cylinders under the seat, friction

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speed change, side chains to the rear wheels, and was said to show 14 B. H. P.

The writer viewed this new high wheeler with scant approval and spoke with entire candor: "Ten inches added to the wheel-base would cost very little more and would vastly improve the riding qualities. The front and rear axles are both very light, far too light for safety, and the front axle yokes have not nearly opening enough, and the axle steering arms should be twice as long as they are. The steering gear is bad and the axles will not stand grief." The designer of this new high-wheeler at once replied that the which were only about five inches, were abundantly strong, that the steering arm radii, which were only about five inches each, were plenty long enough, that the car was safe, had been driven 700 miles and had shown no weakness anywhere, and could easily make 40 miles an hour.

Observing the designer's confidence, the writer refrained from added speech and took his seat in the new car for a trial run. The car had plenty of power, and rode fairly well on its four half-elliptics on smooth macadamize, but jounced over car tracks and had all the bounce its short wheel-base called for on bumpy road surfaces.

The designer was disposed to make speed, and the writer held on apprehensively, watching the rims of the front wheels, and the driver's crude handling of the car with mental as well as physical disquiet. The loose board deck of the after-body displaced itself while the car was hopping over some bumps which better driving could have avoided, when suddenly the car swerved very sharply to the right, headed straight for a low bank, which it partly mounted, and then tripped over to the left, and remained upturned on the flats of the two left side wheels. The chain came off the grounded rear-wheel sprocket, and the motor turned the right hand wheel rapidly in the atmosphere.

Finding nothing broken, in his own frame work, the writer stood boldly on his feet and wiped the blood off his nose. The driver of the car landed on his feet uninjured. "The steering gear is certainly too light," said the observer to the designer, as both regarded the high-wheeler lying on its side, while the broken steering-rod was visible lying on the road. When the car was righted the right rear-wheel was observed to stand about thirty degrees off perpendicular, top outward. The designer gathered up the bent and broken steering-rod, and together we pushed the car on the grass at the side of the road, where it stood with its front wheels at different angles. Fortunately, the trolley station was near a hand, and a car due in ten minutes.

Many cars are faulty in front-axle and steering linkage construction. The yoke opening is often smaller than it should be, and it seems to be almost the rule to make the steering arms too short. Their dimensions, however, showed a general increase in the 1907 models, but longer stub axle hubs and pins and longer steering arms are yet sorely needed in many cars which are otherwise fairly well proportioned. There is no valid argument against very long steering arms, and very long knuckle pins, as the strength and front wheel steadiness gained far more than offset the slightly increased weight.

In case of high-wheelers, long steering arms and long stub-axle or pivot pins are imperatively demanded, because the road-obstacle leverage increases as the wheel-diameter increases, and is also made more effective by the substitution of the solid tire, for the pneumatic.

The light weight and low speed of the high-wheeler are favorable factors in the problem, but the large wheel diameter, and the solid tires, which do not mount obstacles so readily as pneumatics, demand ample front wheel supporting and controlling element dimensions, and the increased vibration caused by solid tires calls for the best of fitting thruout the entire steering linkage.

There seems to be no good reason for the very short wheel base of such cars. The first American cars were very short in the wheel-bases, 56, 60, 68 and 72 inches being used, and as the first successful high wheeler had a short wheel-base, it undoubtedly very greatly influenced the present high-wheel practice. Increase of wheel-base adds very little to either the cost or weight, and every added wheel-base inch improves the solid tire riding perceptibly.

Doubtless there will be a great number of high-wheel cars made and used, and it would be well if they had much more wheel-base and much better built steering linkages than are now placed in many of this class of motor cars.

The Ford Motor Co., Detroit, Mich., announce that there will be no change in the 1907 six-cylinder model for the season of 1908.

During the recent visit to Boston by the Japanese General Kuroki, he was driven about in automobiles and he was so imprest with the usefulness of the automobile that he exclaimed that every modern army organization should include an automobile corps and that he would do his best to have one in the Japanese army in the near future.

Ezra E. Kirk, formerly with E. R. Thomas Motor Company, has been appointed western sales manager for the Rainier Company. He will have charge of the territory west of and including Pittsburg and Buffalo.

The organization heretofore known as the City and Country Motor Club has been superseded by a new club called the New York Automobile Club, and the new organization has taken over the entire equipment of the former, including the two club houses. It is probable that the officers of the former club will be re-elected as officers of the new club.

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Trade Changes and Removals

Anderson Carriage Co., of Anderson, Ohio, has recently been incorporated as the Anderson Carriage Co., Inc., with the following officers: A. D. Anderson, president; W. R. Pervical, vice president and general manager, and E. R. Wooley, secretary and treasurer.

Buick Auto Co., of Flint, Mich., has increased its capital stock from $1,500,000 to $2,000,000.

Columbus Carriage Company, of Columbus, Ohio, carriage business sold to Ohio Carriage Mfg. Co., of Cincinnati, Ohio. Stockholders and officers will engage in the woodware business under the name of the Columbus Woodware Co.

Crescent Parts Co., formerly located with Wycoff, Church & Partridge, New York, is now situated at 244 W. Forty-ninth street.

Electric Storage Battery Co. have moved their San Francisco, Cal., offices from 11 Hawthorne street, to the Crocker Building.

Fedders Mfg. Company, Buffalo, N. Y., will shortly remove from their present location, 1592 Genesee street, to 57-59 Tonawando street.

Federal Rubber Company, Cudahy, Wis., has increased its capital stock from $100,000 to $620,000.

Gabriel Horn Mfg. Co. has removed from 3900 Hamilton avenue, to 1407 E 40th street, Cleveland, O.

General Accumulator and Battery Co., of Milwaukee, Wis., is contemplating a large increase in its capital stock.

Gemmer Engine Co., of Wabash, Ind., has been succeeded by Gemmer Manufacturing Company, of Detroit, Mich.

Hildreth Motor and Pump Co., of Lansing, Mich., style changed to The Hildreth Mfg. Co.

O'Neil, J. E., Lawrence, Mass., dealer, has incorporated his business under the style of O'Neil Automobile Garage Co., Inc.

Pope Mfg. and Construction Company, of Fond Du Lac, Wis., has filed an amendment changing the name to Pope Boat Company and increasing the capital stock to $25,000.

Pittsfield Spark Coil Co., inform us that they have removed from Pittsfield, Mass. to Dalton, Mass.

Randall-Faichney Company has removed to Sudbury Bldg., Boston, Mass.

Sport's, Ltd., dealers and agents in automobile accessories and motor cycles in New York city, have removed from 1775 Broadway near Fifty-seventh st., to 2049 Broadway, near Seventy-first street.

Wright Cooler and Hood Mfg. Co., have removed from 335 Wabash avenue, to 1545 Michigan avenue, Chicago, Ill.

Fires, Judgments and Failures

Badger Brass Mfg. Co., of Kenosha, Wis., defendant in suit by S. W. Rushmore, of Plainfield, N. J., dismissed.

Craig-Toledo Motor Company, of Toledo, Ohio, is now in the hands of a receiver, E. J. Marshall.

Duryea Power Company, of Reading, Pa., defunct, creditors voted Berks County Trust Company trustee.

Grout Automobile Company, of Orange, Mass., plant is closed at present. W. L. Grout has filed an attachment for $200,000 on the plant. It is stated that the financial standing of the company is in no way impaired.

Mott & Smith, at Central and Cleveland avenues, Far Rockaway, N. Y., was damaged by fire, caused by explosion of gasoline.

Mastin, J. H., machine shop and garage at Auburn, Neb., destroyed by fire June 27.

Osen & Hunter, San Jose, Cal., large garage, totally destroyed by fire on June 27, causing a loss of $65,000.

Smith, Fred M., bicycle dealer of Hibbling, Minn., filed petition in bankruptcy.

Treat & Clark, Bangor, Me., dealers, dissolved partnership, Clark retiring and J. H. Nash being admitted to the firm.

Western Motor Car Company's garage, Sacramento, Cal., located at 1004 K street, was destroyed by fire on June 18. Loss approximately $4000.

Willis, E. J. Co., New York city, defunct, Jesse Watson was elected trustee.

Wilmington Automobile Company of Wilmington, Del., slightly damaged by fire.

Legislation

CONNECTICUT.

The new bill as past by the Legislature provides for a maximum speed limit of 25 miles per hour everywhere in the State, whether in city or country. The law also provided that a driver's license shall be forfeited upon his third conviction for going over the 25-mile speed limit. Low powered cars are taxed $5 per year, while cars over 30 horse power are assest $10 per year. The minimum age limit of a driver is set at 18 years.

INDIANA.

Evansville—In accordance with new ordinance the speed limit is now eight miles per hour.

MASSACHUSETTS.

The new registration law which goes into effect August 1, places the annual fee at $5 for automobiles and $2 for motor cycles.

Creditable Performances

A two-cylinder Reo touring car entered in the recent Copenhagen Auto Club reliability run in Denmark on May 26, finished the 300 kilometer course with a perfect score.

National Motor Vehicle Company, of Indianapolis, Ind., still claims the world's record for 24 hours, which is 1094 3-16 miles, as this record was established by one car only.

The Pope Toledo stock touring car driven by Lytle in the twenty-four hour endurance race at Detroit, June 21-22, up until the accident, broke all world's records for endurance on circular track by forty-nine miles.

On June 24 at Bridgeport, Conn., the 24-horsepower Premier stock touring car, which was started on a non-stop engine run on June 3, under the auspices of the Bridgeport Automobile Club, completed the test, having covered in all 4906 miles.

The Fawkes Automobile Co., of Minneapolis, Minn., have just completed a 222 hr. non-stop run with a 1907 two-cylinder Rambler. The run was started on May 10, at 3 P. M., and continued until 9 o'clock Sunday evening the 19th. The car finisht in perfect condition.

The Haynes runabout which Mr. C. B. Warren drove in the sealed bonnet contest with success is still sealed, and has covered a total of nearly 1000 miles. The car will be driven in demonstrations with the seals intact until it becomes necessary to break them.

S. D. Waldon, sales manager of the Packard Motor Car Company, of Detroit, recently made a notable run from Detroit to New York City in a 1908 thirty-horse power Packard test car, with a load of four persons and heavy baggage, covering the 797 miles in two days, altho during the greatest part of the distance rain and mud were encountered.

The Mora Racytype No. 184, which was entered in and completed the 600-mile run of the New York sealed bonnet contest with a perfect score, has traveled in all 2863 miles with all seals unbroken. The car, after finishing the New York contest, journeyed to Chicago, where it entered the sealed bonnet contest of the Chicago Club. It came thru with all seals intact, but penalized a few points for being late, caused by a wagon backing into it and bending the axle. The car was then turned towards New York, where it arrived with all seals of both clubs intact.

The American Motor Car Manufacturers' Association, after a thoro discussion of the Chicago show question, have decided to work in harmony with the N. A. A. M. in the promotion of the affair in Chicago this December.

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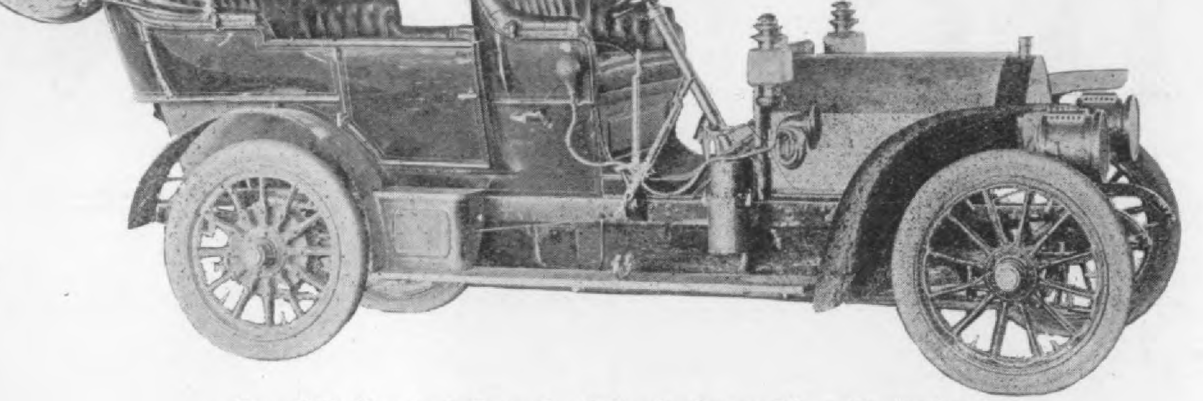
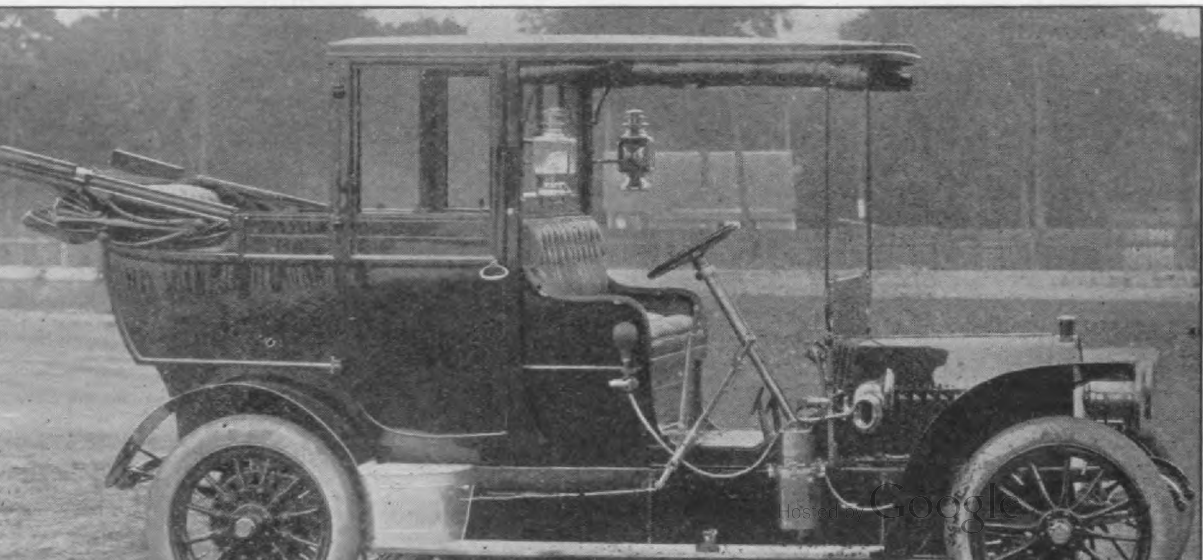


The 1908 Standard Type I. 40-H. P. Locomobile with touring body.

Two Locomobile Models for 1908

lready the season of 1907 has been rele-
d to the past at the great factory of the
omobile Company of America, in Bridge-
, Conn., and all hands are living and
king in 1908. In other words, the last
car rolled away to its owner long ago,
the busy shops are rapidly turning out
models, the first trial machines having
on the road under test for many months
re manufacturing was commenced. The
pany has adhered to its policy of build-
two models; these are practically identi-
in their mechanical features and general
gn, the main difference being in the mat-
of dimensions and power. The smaller
hine, designated as Type E, is rated
0 horse power, while the larger car,
e I, has a 40 horse power motor. In
cases the design is the same. Both
have 4 speed selective transmissions,
e and break ignition, double chain drive;
materials and workmanship being iden-
. Each chassis may be had as a runa-
bout, a touring car, a limousine or a la
daulet. The smaller machine, Type E, ca
be furnished with a removable tonnea
which is interchangeable with a rear dec
or boot carrying a rumble seat, which fol
down and out of sight when not in use, ar
a capacious box just behind the rumble se
in which no small amount of touring requi
ites can be stowed. The fastenings consi
of wing-nuts, so that no tools are require
for changing over from touring car to ru
about, or vice versa; two men can readi
make the change in twenty minutes. Whe
either the rear deck or the tonneau is
position there is nothing to indicate that
is not permanently attached to the car; eve
a close inspection does not betray the inte
changeability of the body. In the case of th
larger car, Type I, the same scheme may b
employed. It also has the folding rumb
seat and, naturally, more stowage spac
than the 20-horse power runabout. An alun
inum dash of the dished type is fitted to th



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DOLSON

1908

IT is with that degree of pleasure which follows only the knowledge of a rare work well accomplished that the Dolson Automobile Company announces the completion of its nineteen hundred eight models and their readiness for immediate delivery to agents.

These splendid cars are the elaboration of nearly forty years of vehicle building, and nothing that human skill could devise or ingenuity suggest has been spared to make them the royalty of motordom. In beauty of design and in luxury of appointment; in that delightful silent flight which is so exhilirating to all who know it; in absolute worthiness of construction; and in all those finer concomittants that go to make automobiling the perfect pastime, the nineteen hundred eight Dolson cars measure up to that high type of motor car refinement and efficiency which has for years been the ideal of John Dolson and the chief aim of his automobile career.

Following out the well-known Dolson power policy the nineteen hundred eight models continue to be among the highest powered shaft driven cars built. They are veritable Samsons in the automobile world. The strength of giants is in their loins of steel. John Dolson has for years been a most consistent advocate of high power in automobiles, and has lived to see his theories, once rejected as extreme, approved and successfully applied by the self-same engineers who once derided them. Power is the soul of the automobile, and for years Mr. Dolson has devoted his energies and ability to the perfection of the high-powered motor car and in this nineteen hundred eight creation he has given to the public a Goliath that will plow the sands of the western deserts or mount the grades of nature's huge upheavals where lighter powered cars would choke and die of their own impotence. Power and simplicity have been the Dolson watchwords—and they make for all that is really great in the motor car.

The nineteen hundred eight models are all four-cylinder cars, and comprise the Dolson Sixty—seven passengers, the Dolson Forty, and the world-famous "Cannonball." There are no frills on the new cars. They are sane and simple in construction, and regal in their marvelous strength and surpassing beauty. Price considered, there is not on top of earth so good, so great, so worthy an automobile as

"THE CAR JOHN DOLSON BUILDS"

The Season of 1908 promises to break all records for sales of high powered cars. The manufacturing capacity of the Dolson factory has been largely increased for the coming season and we can handle several good contracts in addition to the agencies already established. Immediate deliveries can be made and early correspondence is solicited.

DOLSON AUTOMOBILE CO.

CHARLOTTE, MICHIGAN

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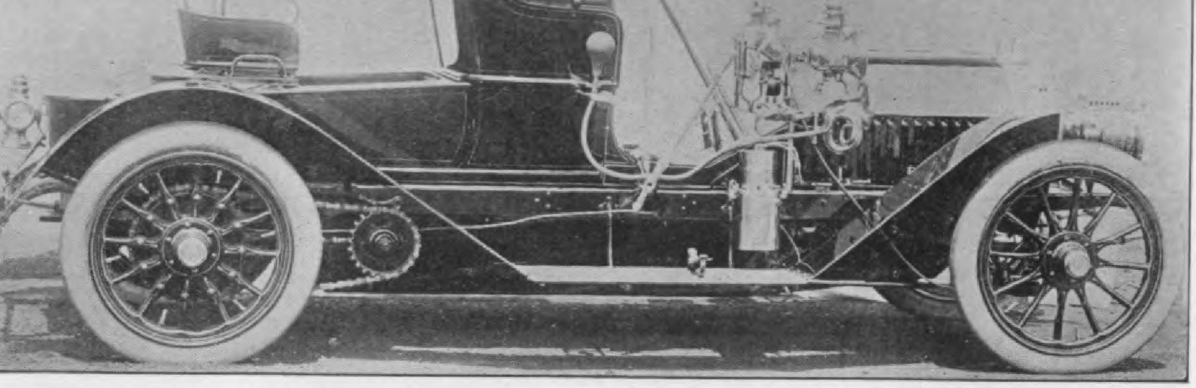

1908 40-H. P. Locomobile, as a runabout. The 1908 bodies can be removed and replaced by a la
dauiet or limousine body.

ller car when equipt as a touring car or about, but with a limousine body a ight mahogany dash is employed. The orse power chassis always takes a ma- any dash, regardless of the style of y.

n interesting feature of the 1908 20-horse er car is that it is equipt with a four- d selective change-speed gear, similar to used on the larger car, but of smaller ensions. In the 1907 model there are three speeds, controlled by a progressive r. The four speeds make the car an emely handy one to drive, especially in a country, as it is possible to keep the ne running at the most advantageous of speed under any condition of grade oad surface, and to secure the most eco- ical operation and the greatest speed ob- able from the horse power.

he description that follows may be taken pply equally to both models, except where exceptions are specifically noted. In fact, is a difficult matter to distinguish one chass from the other except by comparison of d mensions, and this similarity extends als to the unseen parts and to the methods c construction employed thruout. The cy inders are cast in pairs, as heretofore, ar are mounted on a manganese bronze cranl case, a method of construction that has give satisfaction after several years' use. A ne feature for 1908 is the use of a bronze pla to close a large opening in the head of th water jacketing; the uptake for the wat circulation is connected thru this cove plate, the removal of which gives free a cess to the water jackets for cleaning ar inspection. Valves are all mechanically ope ated and symmetrically arranged on opposi sides, inlet valves on the right. Each can shaft is made from a single bar of steel, can integral, so that there is absolutely nothir to work loose or give trouble. The can

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In the Chicago Motor Club Reliability Test We Entered Two Ramblers

Both made all controls on the minute and finished in perfect condition.

The four-cylinder Model 245 made a perfect score, but a 1908 two-cylinder Model 31 incurred a penalty of sixty-five points through breaking of a battery wire.

In the Milwaukee sealed bonnet test of June 29th we entered

Three Ramblers; Result— Three Perfect Scores

and immediately following two of these cars covered over 200 miles in two days and returned with the seal unbroken and in perfect order.

These are the things that prove the

Rambler

The Car of Steady Service

Main Office and Factory, Kenosha, Wisconsin

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THOMAS B. JEFFERY & COMPANY

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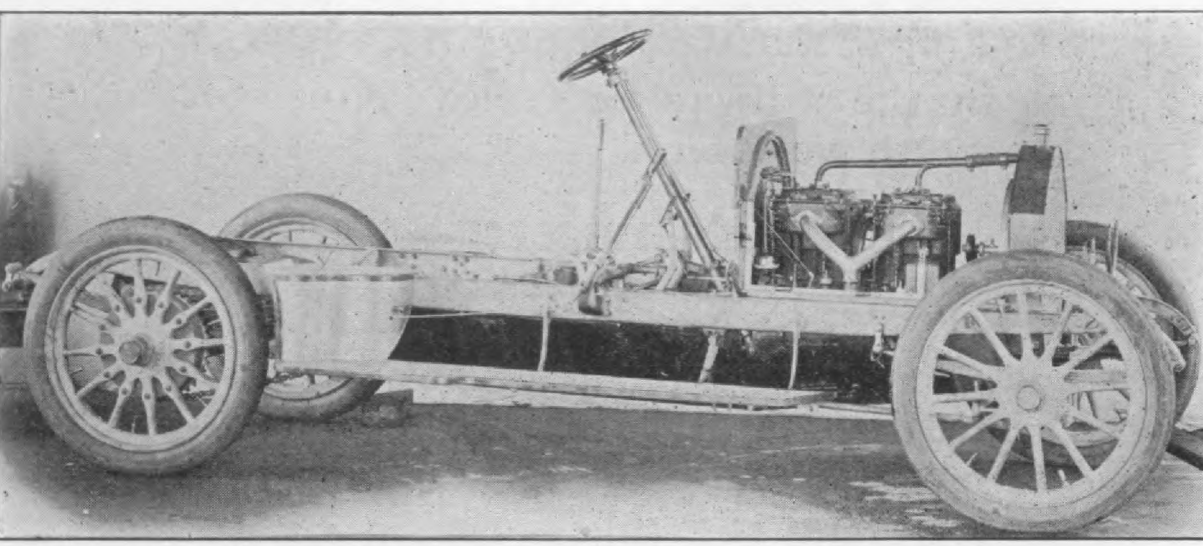
ne time of ignition is varied by sliding the mshaft lengthwise and so bringing differ-t parts of the varying profile of the cams der the trip-rods. The gears operating e camshafts are housed in a dustproof uminum casing bolted to the front end of e crank case. Each of the camshaft gears ives another gear, the one on the inlet le rotating the magneto used to furnish e ignition current and the other driving e centrifugal circulating pump.

In the 20-horse power car the magneto is e only source of current used, the engine ng readily started without batteries. In e larger car, however, storage batteries e provided as a part of the standard uipment in order to facilitate crank-g. Compression relief cams are also ployed in the large engine, being formed

the use of the foot-operated accelerator.

OILING SYSTEM.

A mechanical lubricator, driven by a s belt from a pulley on the rear end of exhaust camshaft, is placed under the slop footboard and just over the exhaust p whose heat keeps the oil in a condition flow easily thru the pumps and pi "Tell-tales" on the dash enable the dri to know just how the oil is running. hand pump is provided for use in case excess of oil is required temporarily, or emergency use. On the 40 H. P. mo an extra oil reservoir, holding 14 pints hung on the frame and connected by a p to the lubricator tank. If the oil in lubricator becomes exhausted a fresh sup can be pumped up from the auxiliary ta This arrangement is infinitely more agr



Chassis of the 40-H. P. 1908 Locomobile. The 20-H. P. car is practically the same, except f dimensions. Power plant and radiator well back, giving good weight distribution. Wheels 36 inche rear tires, 4½ inches; front, 4 inches. Rear springs, 50 inches long and front, 40 inches. Wheel bas 123 inches.

egrally with the exhaust cams and act-, of course, on the exhaust valves. The gneto is of the low-tension type, the same used in the 1907 models, and is secured a strap-and-bolt arrangement, but bolt is now on top instead of at the side. flexible coupling has been placed on the np shaft to insure against binding and make it an easy matter to remove the np. The pump shaft carries a flanged ley for the fan belt.

Warm air for the carburetor is drawn thru holes in flanges cast on the exhaust nifold—a new feature. The air pipe ex-ds across the engine between the pairs cylinders to the carburetor on the inlet e; a valve regulates the volume of warm admitted, this valve being close to the

able than the familiar plan of carrying a of oil in the tonneau, or strapt to some p of the car. This arrangement is omit from the smaller model, which carries gallon of oil, enough for several hund miles, as the company claims a record over 500 miles on one gallon of oil for t car.

MANUFACTURING METHODS.

In the manufacture of the engine a nu ber of interesting processes are employ some of which are extremely simple, n withstanding their effectiveness. For stance, piston rings are so finished that wh placed in their cylinders they fit as clos as if they had run long enough to beco worn to an exact bearing surface. This accomplished by placing the rings after th

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The 1908 MITCHELL

at all agencies

September 1, 1907

The 1908 Mitchell, the finest touring car in the world for $2000 as well as the runabout and the NEW Mitchell Roadster shown at all agencies September 1, 1907. See them. Say to any Mitchell agent—"Show Me." He'll show you in a Mitchell for 5 miles or 50 whichever you say. Convince yourself that for power, control, silence, speed and sweet running there is nothing can equal the 1908 Mitchell at the price.

The 1907 Mitchell a Winner

At Hamline Track, St. Paul, Ed Zerbies in the 24 hour race, after wrecking two cars on the fence at the turns because of the dust—having no other car, borrowed a 20 h.p. Mitchell Runabout from a doctor in the crowd and drove it for nearly four hundred miles until another Mitchell 35 h. p. could be secured. In the face of this awful handicap Zerbies finished only 28 miles behind the winner who drove a 40 h. p. car, selling for over twice as much as the Mitchell, and in addition broke all previous world's records for 24 hours—183 miles.

The 1908 Mitchell chassis is a refinement of the 1907 with all the latter's good points and the same standard construction. You can't afford to overlook the 1908 Mitchell.

MITCHELL MOTOR CAR CO.

188 Mitchell St. **RACINE, WIS.**

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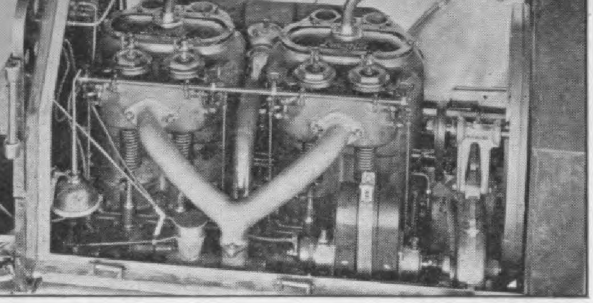


908 Locomobile 40-H. P. Motor. Inlet side, show- the make and break ignition system, the band thod of holding the magneto and the special oil holding bracket.

d worked back and forth, just as is the ton in the engine, with a little abrasive ostance to remove the irregularities from rings. As a result of this process the gs are worn exactly as they would be rn by actual use in service, and when y are assembled into their engine they closely and hold compression as well as they had been run for some time. Anher result is that they remain tight for a g time. It is, of course, necessary to new the grinding cylinders at frequent ervals, as they are quite rapidly destroyed; this is found to be well worth while, in w of the good results obtained from the ocess.

After leaving the grinding machine on ich the preliminary work is done the rings magnetized, thanks to the magnetic chuck which they are held, and in this condin would be sure to attract and hold small rticles of metal. There would consequentbe unnecessary wear on the cylinder walls, ton rings and pistons, and under some cumstances this might become very seri-. A simple demagnetizing apparatus has n installed, however, and this, when ought into use, leaves the rings as free m magnetism as they were before grind-, removing the possibility of trouble from s source.

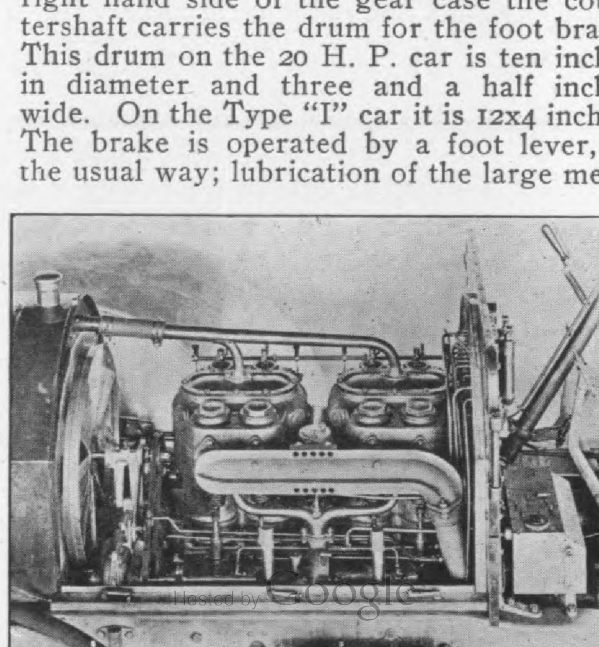
The connecting rods are of high-carbon, en hearth forged steel, the solid wrist-pin ls bushed with hardened steel and the it big ends lined with Parsons' white ss. It has been the custom at the Locobile factory, to bore out the big ends in oring machine, and then fit each one to own crank pin by scraping. While this thod was good, a better one has been lved. The bearings are bored a shade aller and a mandrel of highly polished l hardened steel, very slightly tapered l of the exact size of the crank pin at largest part, is forced thru the big ends, pecial press being used for the purpose. e passage of the mandrel expands the

tion, both for smooth running and for sisting wear than a scraped or machi bearing. Actual tests made before this p was adopted showed that bearings that w mandrel-finished wore longer and better t scraped bearings. The main bearings of crank shaft, which are also lined with P sons' white brass, will be finished in the sa way. The crankshaft is machined from solid hydraulic forging of alloy steel.

CLUTCH AND CHANGE SPEED GEAR

The clutch is a simple cone of ample dia eter and width, faced with heavy leat backed by flat springs; the springs cause clutch to take hold gradually, starting car without jerking and jumping and only making the car pleasant to ride in, also saving wear and tear on the eng and transmission mechanism. Spring thr is self-contained when the clutch is engag The universal joint between the clutch a the gear box is made up of steel forgin hardened and ground; the pins are stati ary, held in position by bolts with castella and cotter-pinned nuts, and the bearing s face extends nearly the full width of knuckle.

The gearbox is made of manganese bron with cover-plates of aluminum compositi and all the gear shafts run on Hess-Bri ball bearings. A rearward extension of main casing contains the differential and bevel gears driving the countershaft, wh also turns in ball bearings. There are t sliding groups on the squared shaft, c having two gears for first and second spe and the other a gear and a clutch for third and fourth speed respectively, the dr being direct on the high speed. On right hand side of the gear case the co tershaft carries the drum for the foot bra This drum on the 20 H. P. car is ten incl in diameter and three and a half incl wide. On the Type "I" car it is 12x4 inch The brake is operated by a foot lever, the usual way; lubrication of the large me



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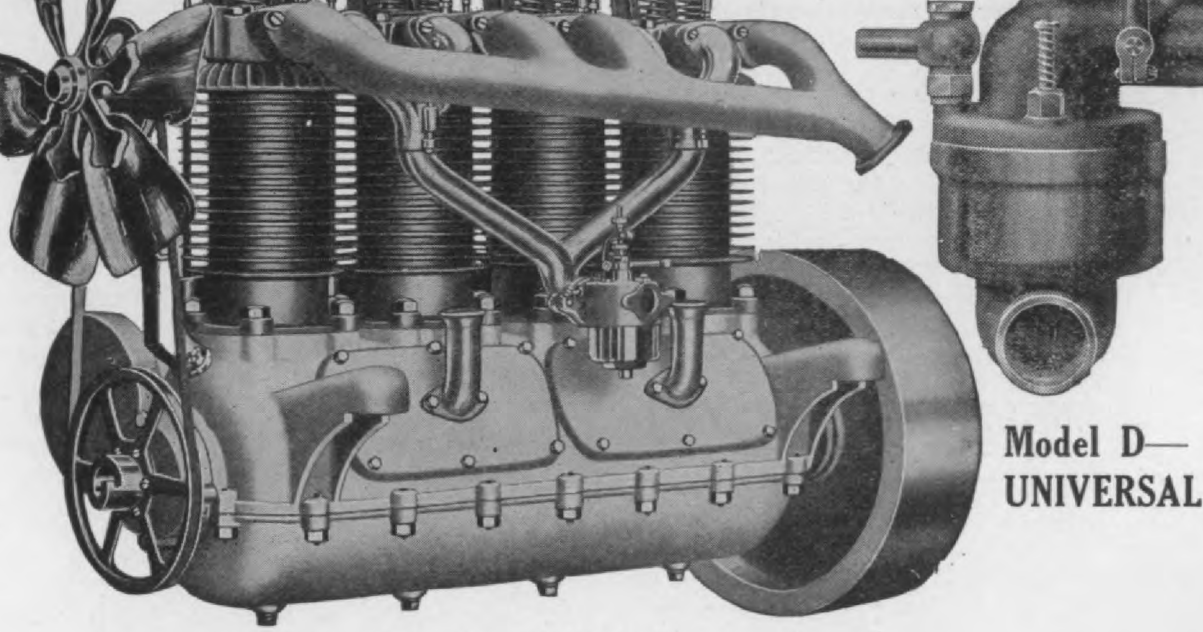

Model D—
UNIVERSAL

4″ Bore, 4″ Stroke, 20-24 H. P.

The heavy demand for this particular pe of **Carrico Engine** leads us to urge ose who are considering the use of it in 08 Models to act quickly. Our output is pidly being contracted for. Catalogs, ue-Prints, and Quotations furnished to sponsible manufacturers on request.

THE CARRICO HAS WONDERFUL RECORD

In Three Years,

ot One Delay in Deliveries.

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ir Cooled or Water Cooled

at's up to you. We make both pes and make them equally well.

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olf Cars) Minneapolis.

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THE PERFECT CARBURETOR

Read These Claims and Give a Chance to Prove Them to Yo

Model D—Universal

Is the simplest, most effective curburetor e devised.

Gives a better mixture, yet a more economi mixture, than any other carburetor.

Gives the greatest mileage per gallon of fuel

Is equally effective at all altitudes and in temperatures.

Gives a perfect gas supply on the steep grades and around curves.

Has fewer parts than any other carbureto easily cleaned and easily understood by amateur.

Is equally effective on two or four cycle engi

This is precisely the sort of carburetor have been hoping would some day be made. We got it! Do you want the proof?

SPEED CHANGING PULLEY COMPANY

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TO OWNERS OF TH FORD RUNABOUT:

The Universal Model Carburetor is necessary the perfect working of t Ford four-cylinder runabo We guarantee it to give u form explosion to every c inder, relieve the machi of the jerky motion, a give perfect control and fl bility at all times.

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ar sprockets are formed integral with the eel brake drums, the whole being bolted the enlarged spokes of the rear wheels. e emergency brakes are of the internal type, d are entirely inclosed. Sizes are as fol-ws: Type "E," 11x1½ inches; type "I," x2. Steel cables form the connection be-een the lever and the brakes. The lever cillates a transverse shaft and a short arm each end of the shaft carries the front d of the cable thru which it is connected th its brake. The total braking surface of e Type "E" car is about 220, and of the ype I car about 320 square inches.

AXLES AND STEERING GEAR.

Both front and rear axles, in both cars, e of forged steel, of I-beam section, and th are dropt, the rear axle being "crank-" near its ends and the front axle having graceful downward sweep at the center. ring seats and, in the case of the front le, the steering yokes, are forged integral ith the axles, so that each is in a single lid forging. The steering yokes and piv-s, upon which so much depends, are sub-antially designed. The transverse rod con-cting the steering pivots is placed behind e axle, where it is protected from acci-ntal damage, and conforms to the sweep the axle. The joints are of the ball-and-cket type, with spring buffers to absorb ocks, and are inclosed in leather boots, hich exclude dust and dirt and retain lu-icating grease. The steering gear is of e worm and sector type, both worm and ctor being glass hard, and by means of an centric bushing on the sector shaft wear n be taken up, obviating any back lash hich may develop after long use. Spark d throttle levers are mounted on top of e steering wheel, but do not move with e wheel. Their movement is carried thru e steering tube by means of smaller con-ntric tubes carrying at their lower end nall bevel gears meshing with similar ars on the lower ends of short vertical afts whose upper ends carry the levers ru which the throttle and spark are con-olled. The hand wheel is of bronze with a n or grip of black vulcanized hard rub-r moulded over the bronze, making a ndsome, durable and comfortable rim to e.

The frame is of prest alloy steel thruout. d the cross members to which the trans-ission is hung are deep and substantial. he rear ends of the main frames are con-ected by a steel bar passing thru holes the end forgings; the outer ends of these rs carry the spring shackles. At the front d of the frame is a dropt member or

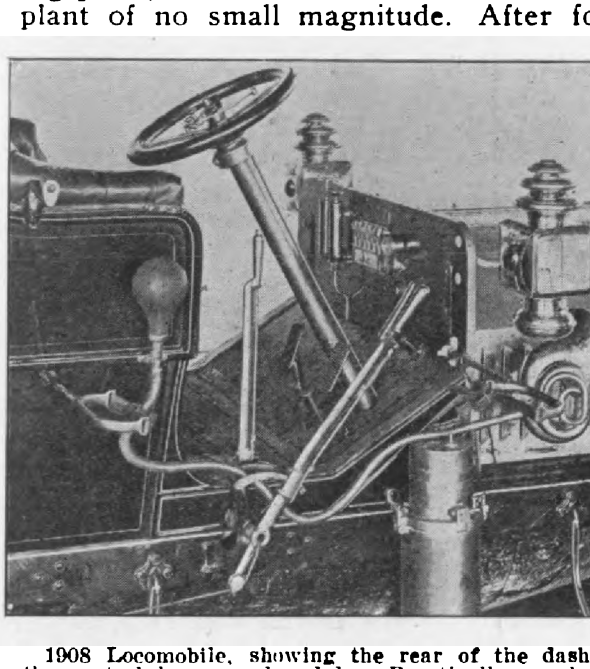
so that the front of the radiator is a behind the center line of the front axle. results in a good distribution of the wei makes the car handle well and adds no little to the comfort of the passengers. Se elliptic springs are employed thruout.

WHEELS AND TIRES.

On the large car, Type I, the wheels thirty-six inches in diameter, front and re the rear tires are four and a half inch the front tires four inch. The rear spri are fifty inches long and the front spri forty inches. On the smaller car, Type the wheels are thirty-two iches in diame front and rear, and both front and rear t are four inch. Rear springs are forty-f inches long and front springs thirty inches. The wheel bases are a hundred twenty-three inches and a hundred and inches respectively for touring cars. W Type E is built as a limousine, howe the wheel base is increased to a hund and sixteen inches, fourteen inches lon than the touring car. All wheels run ball bearings.

FORGING AND HEAT TREATMENTS.

All drop forgings used in the Locomol approximately 200 together with the d dies, are made in the company's own fo ing plant, which is in itself a manufactu plant of no small magnitude. After fo



1908 Locomobile, showing the rear of the dash the control levers and pedals. Practically no cha have been made in the control of the large car a 4-speed selective system of change speed si to the large car has been installed in the 20-H model.

ing, the parts are subjected to delicate h treating processes by which the strengt enormously increased and each is given proper hardness for the work it is to Some parts, such as gears, are given a f heat treatment after being finished, as

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Are You Prepared for the Worst Roads?

Not all motoring is over good roads. If it was, most any tire would do. If we could eliminate the unlooked-for tests that are given to tires on next-to-impassable roads—roads that have to be covered in cross-country runs—it would not be necessary for us to insist on so much extra strength in

MORGAN & WRIGHT TIRES

There is absolutely no "theory" about this extra strength matter. Any motorist who has traveled off the city boulevards knows that it takes a wholly different tire to stand up on all sorts of roads than it takes to travel around town. And for this reason, the Motorist who is planning a tour had better fortify himself with all the extra tire strength he can buy.

We wouldn't talk so loud about this matter if our tires hadn't proven their value so frequently under trying road conditions—if it were not for the extra strength that is put into them for use on the worst roads.

WE MANUFACTURE A FULL LINE OF BATTERY JARS AND ACCESSORIES OF A 1 QUALITY. SEND SPECIFICATIONS AND GET OUR QUOTATIONS

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Philadelphia: 830 N. Broad St.
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Minneapolis: 708 Hennepin Ave.
Atlanta: 49 S. Forsyth St.
St. Louis: 538 N. Vandeventer Ave.

Kansas City: 1030 Holmes St.
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Seattle: Ninth Ave. & Pike St.

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itude of the plant involved in the making nd heat-treatment of forgings can be ıdged from the fact that the consumption f oil for fuel amounts to a thousand gal-ons a day. All forgings are pickled in acid, nd subjected to a sand blast and then hand led.

All finished parts are sent to a testing de-artment before being assembled, and are ubjected to minute tests for accuracy, ver-ier instruments and micrometers being em-loyed, together with special testing ma-hines for special parts. Errors of more han a thousandth part of an inch result in he part being sent back to be made right; r, if the error cannot be corrected, the part "scrapt." One of the most intricate ieces of work in the whole establishment is he cutting of the camshaft for the inlet de, with its eight cams—four for the valves nd four for the ignitors—the latter with heir varying contour. A special machine or this work was designed and built at the ocomobile factory, and is almost human in s weirdly automatic action.

special enamel which makes a perma foundation for the finishing coats of p and varnish. The color put on the ca the paint shop is optional with the purcha

In outward appearance, generally speak the 1908 Locomobile cars resemble models, altho the Type "E" car is so what altered. There are no swee changes in either model, the most impor departure from 1907 design being the stitution of a four-speed selective gea Type E for the three-speed progressive used in the 1907 car and a much larger gine in the large car. The sprocket bo forming steps leading into the tonneau, been worked out a little differently a outward form, looking neater and at same time occupying less space. Square lamps will be standard equipment ins of round ones. Another detail is a new rail which, when not in use disappear the top of the front seats. The equipm includes five lamps, generator, horn, to spare parts, top irons, tire carriers and rest.

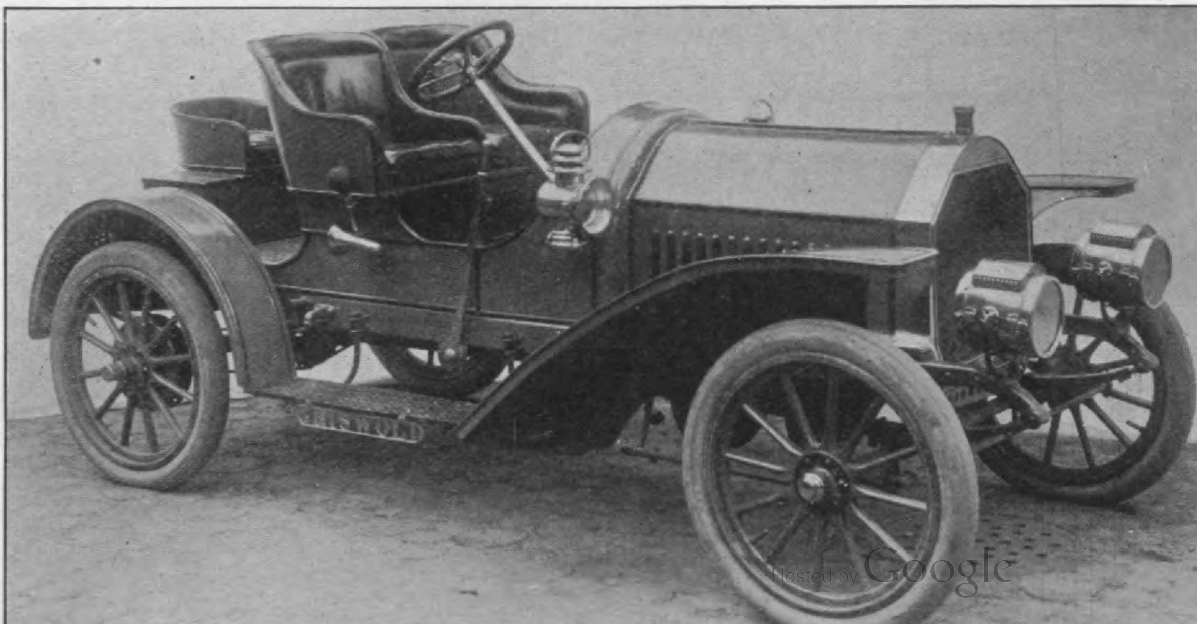
The 1908 "Griswold" Cars

HUGH DOLNAR.

The Griswold Motor Car Company, De-roit, Michigan, U. S. A., placed the first ne of its cars on the road early in May, 907. This car is unique in having a vertical notor crank-shaft and a symmetrical fric-on drive, and is here illustrated and de-cribed in some detail for the first time in ny publication.

The Griswold cars are built from des by Mr. Joseph P. La Vigne, widely kn as a machine-tool designer and builder to the motor car trade as the inventor patentee of the La Vigne oiler.

He had his first motor car on the roa New Haven, Conn., in 1899. The wheel of this car was 65 ins., gage 56 ins.,



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The rates of insurance are almost prohibitive and the risk great.

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hen properly designed, cost between 10% and 20% more than combustible buildings. With s
mall difference in cost can you afford to take the risk? Compared with the security which con
reproof construction affords from interruptions to business by fire, the difference is trifling. Sa
n insurance rates and low costs of maintenance soon repay the small additional first cost.

We are

Architects and Engineers

naking a specialty of reinforced concrete construction, and design every feature of the work i
own offices. From the explicit drawings and specifications which we prepare, the owner is enabl
btain the lowest possible competitive prices from contractors. Thorough knowledge of the re
nents of this form of construction enable us to secure the best results.

We have designed and supervised the erection of over fifty concrete buildings. *We*
ad no failures.

Send for illustrated book of our work and testimonial letters from satisfied clients.

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Ballinger & Perrot

2. Right side of Griswold motor. The bevel and pinion at the top are for starting, the hand- being applied to the left end of the horizontal g shaft, at the rear of the foot-board. The stands on top of everything, in the middle of iassis frame, whence it can be removed without bing the transmission. By removing the crank- nd-covers the crank-shaft and rod-ends are fully ed to the eye and hand from both sides, making x adjustment very easy indeed. The water cir- on is thermal. A 5-lead oiler is fitted, but only ds are used. The ignition is jump-spark, with oils in a coil box inside the front board, and dry in a compartment under the driver's seat. The ank, 10 gallons capacity, 100 miles range, is also d under the front seat. The fly-wheel is cased the sides, so as to be safe when running.

ins. front and 42x4 ins. rear. The mo- vas 3, water-cooled, 4x4 ins., 2-cycle cyl- rs, crank-box pressure cylinder-supply. transmission was two speeds forward pur gears, internal friction-clutch-selec- all gears always engaged, with spiral to the divided rear axles. The reverse by reversing the motor. This car had nabout body to seat two passengers, lever steering, weighed about 1800 lbs., could make 45 miles on a level road.

is car was burned up from a gasoline three months after it was first placed he road, and as La Vigne was busy manufacturing automatic screw ma- es, he did not place another car on the until August, 1901. This second La e car had 110 ins. wheel base, 55 ins. , all tires 36x3½ ins., motor, 3 cylin- 4½x4½, water-cooled, 2-cycle and re- ng, same general transmission scheme first car, with spiral gear to the divided axles. In his first car, La Vigne placed motor crosswise, under the car-body: second car motor was placed under a in front. This second car weighed t 2300 lbs., and could make 55 miles, vas never fully completed as capital was to take up the 2-cycle motor.

r. La Vigne's next attempt was known La Petite," wheel-base 60 ins., gage s., tires all 28x2½ ins., motor two, air- ed, 4-cycle, 3x3 in. cylinders, set at 30- apart, both connected to one crank, ders under the hood in front, still the two-speeds forward drive, friction se- on, but with a reversing gear and bevel-

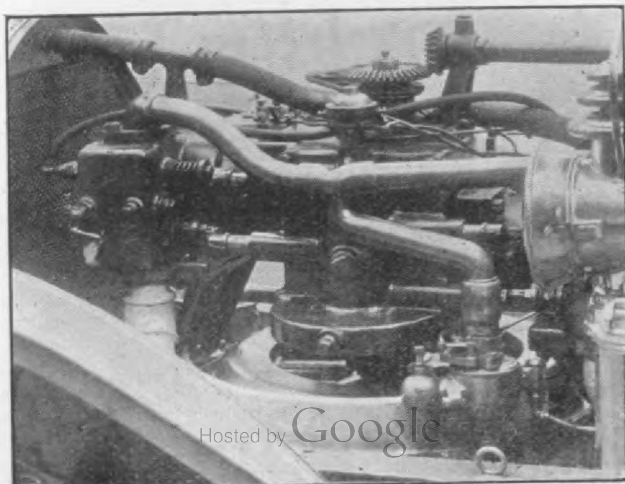
only arrangement which gives a symmetri- cal construction with the friction disk an traversing-wheel speed-change and reverse This "Griswold" model, the first of a pro jected line of light, moderately-priced car is here shown as a 3-passenger runabou driven by an opposed pair of horizontal cy inders, set lengthwise of the car under th middle of the hood, with a vertical crank shaft, and an aluminum alloy friction dis on the under side of the horizontal fly-whee This vertical placing of the crank-shaft per mits locating the traversing friction whe in the middle, under the fly-wheel, so tha the line shaft can be placed in the middle o the chassis frame, with bevel gear to the di vided rear axles, thus obtaining a symmet rical friction drive.

At first thought the vertical crank-shaf seems an awkward arrangement, but com prehensive consideration shows it to be ad vantageous at every point, and to reall eliminate the fly-wheel load which is car ried by the horizontal crank-shaft with th friction speed change and reverse, as wi be shown in the detailed description.

NOTABLE FEATURES.

The objects sought in this design wer lengthwise placing of the opposed moto to avoid vibration, the location of the mo tive and speed change unit assemblage un der the hood in front, where everything i accessible, and the obtaining of a symmet rical friction speed change and reverse. Pre vious practice placed the opposed cylinde motor crosswise, which necessitates shor stroke and short connecting rods

La Vigne, by using a vertical crank-shaf was enabled to use long cylinders and rod lengthwise of the car, largely eliminating vi bration, and bringing the aluminum drivin disk fixt to the horizontal fly-wheel in th middle of the chassis frame over the frictio



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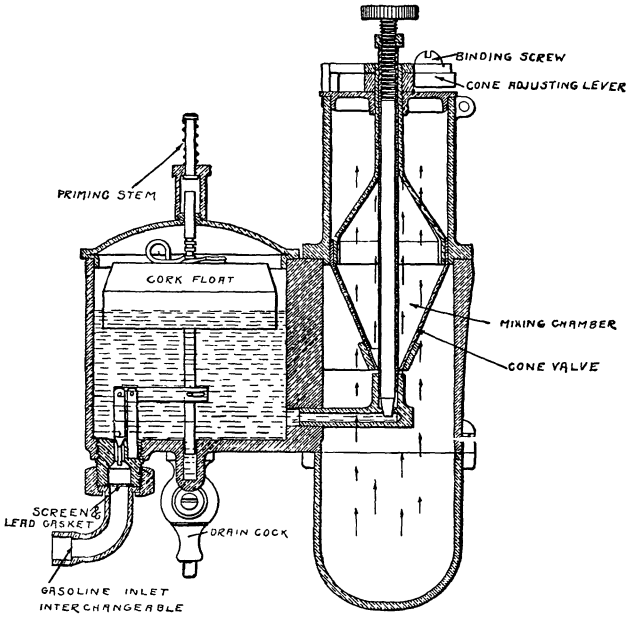
The 1908 Buffalo Carburetor



A mechanical carburetor in all that the term implies. Its movements are not left to chance, but it is positive in its action throughout its entire range, from zero to full opening. Atmospheric conditions do not alter its perfect working. Its construction throughout is based on the correct principles of carburetion.

The entering column of air passes the gasoline nozzle at adjustable openings in the cone valve. The cone valve and the throttle are link connected and move in unison. Both are adjusted to give the proper mixture for slow speed. As increased power or speed is desired, the cone valve and throttle are rotated by the operator, increasing the quantity of mixture admitted, while the speed of the mixture passing the nozzles is kept the same. This feature insures a perfect mixture for all powers, prevents a greater quantity of fuel from being drawn by the motor than can be properly burned and accounts for the great economy obtained with a 1908 BUFFALO MECHANICAL CARBURETOR.

Skilled workmanship and high-grade materials only, enter into its construction. The leading American Motorcars, such as Ford, Corbin, Welch, Knox, Wayne, Jackson, Queen, Wolfe, etc, use the **Buffalo.** It was the equipment of the Ford car which broke the world's record in the recent 24-hour race at Detroit. If **you** try the 1908 "Buffalo" you will be convinced.

BUFFALO CARBURETOR CO.

889 Main Street **Buffalo, N. Y.**

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u the front-board, and having a ratchet the rear end to which the hand starting-nk is applied.

'he crank-shaft, crank arms and crank have a continuous oil hole beginning the top and ending at the middle of the er crank-pin. This oil hole takes a heavy ase cup at the top which would supply lted grease if sufficiently warmed; cross-e oil-holes thru the crank-pins oil the necting rod wrist-bearings from a force-d oil-lead which supplies the crank-shaft hole in the middle of the top bearing

and one in front, pedal controlled, lift friction-wheel casing and wheel-shaft jo nals vertically to press the wheel against t driving disk. The pedal-thrust is tra ferred to the three wheel-lifting eccentr thru a single coiled spring which gives sistance enough to something more th lift the weight of the fly-wheel and cra shaft, but is not so stiff as to permit jurious lifting power to be applied to t friction wheel.

The arrangement of parts described giv the longest possible line-shaft for a giv

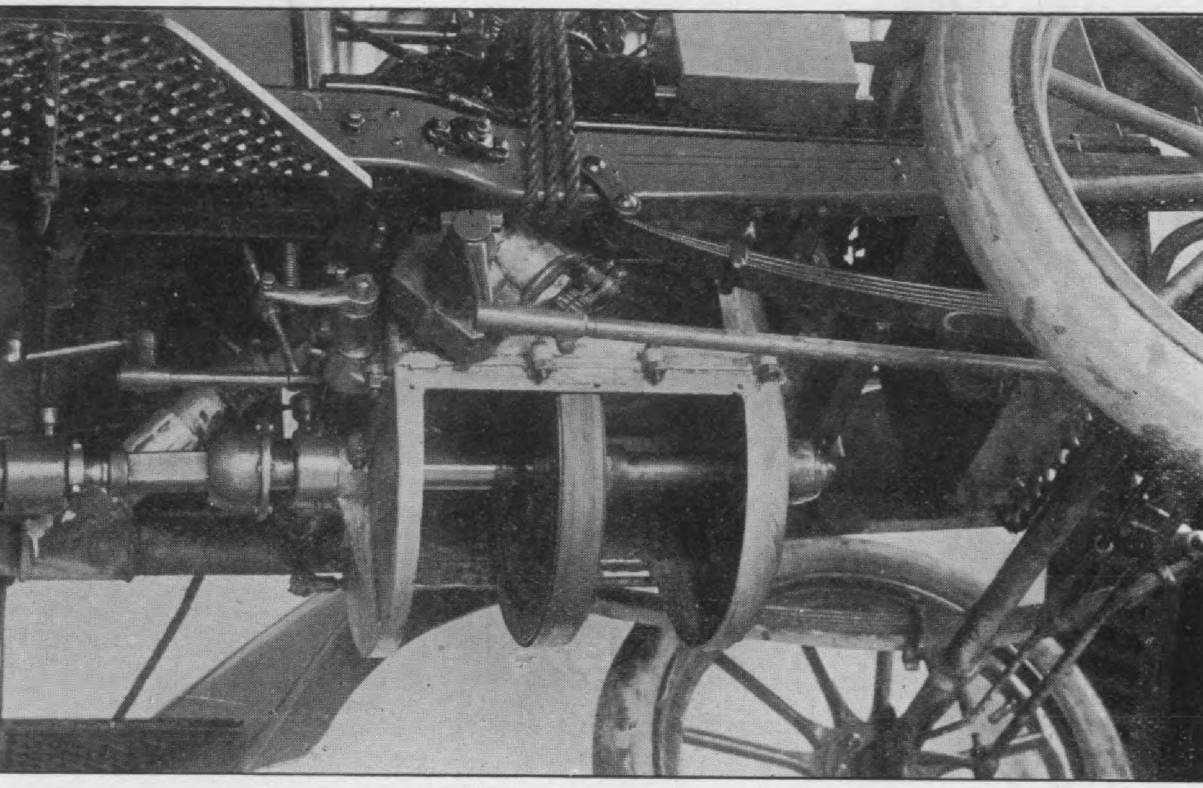

Fig. 4. Under side of Griswold car, showing the friction-wheel, standing about the middle of its minum casing, which is cut away in this first car to expose the friction-wheel, which is faced with ather fiber." The friction is of the usual form, a ring, with beveled edges, held on a metal cylinder ween metal flanges, secured with thru bolts. Thediameter of the aluminum disk, bolted to the under e of the fly-wheel is 32 ins. The traversing friction wheel is 17 ins. out. dia. x 1¼ ins. working face e leather-fiber ring is 2 inches deep, up and down, 1½ ins. thick between the flanges, and is beveled ¼ each side of the working face. The friction-wheel shaft is in Hyatt roller bearings in the casing hubs e wheel casing is cast in two parts, divided in the horizontal axial plane, so that by removing the der part the friction-wheel shaft and bearings can be released. This casing is lifted bodily towards the wheel by 3 eccentrics journaled in hangers dropt down from the chassis frame cross-girts; of these entrics, one is applied at each side of the casing in the rear, and one in the middle in the front that the casing is suspended at 3 points all in the same horizontal plane. The transfer of motion m the vertical hand-lever to the horizontal bell-crank for traversing the friction-wheel is made by ks threaded into the lever and bell-crank ends, and a flat link is jointed in the forks, which turn the screw-threads thus giving a universal action. The friction-wheel has a grooved hub to take the t-oiling shifting-rod fork. The bevel gear reduction at the rear axle is 4 to 1.

n one oil-lead of a La Vigne oiler. The er part of the crank-box holds a ring ool in which an inclined scoop fixt to under side of the under crank-arm trav-and throws the oil drippings, collected he pool, upward into the path of the ks, which beat it into mist that perfect-ils the pistons. The lower crank-shaft nal is oiled by a cross-hole from the top

wheel base, and also avoids all needle driving-shaft angle, all with suitable a convenient dimensions and 11 ins. ro clearance of the friction wheel, which more than the rear-axle bevel-gear housi has.

CONTROL.

The speed and direction changes are e fected by one pedal and one vertical han

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The Rutenber Carburetor

is the result of a careful study as to the requirements of the modern four and six cylinder high speed motors.

There are several carburetors on the market that will make your engine run, yet there are very few that will control your engine properly and make it run smoothly at all speeds.

The Rutenber will do this for you and a trial will prove the soundness of our assertions.

The above cut shows our Type A. 1907, and by turning the flange around, it can be used either as a vertical or horizontal outlet carburetor.

Send for Booklet and prices.

E. A. RUTENBER

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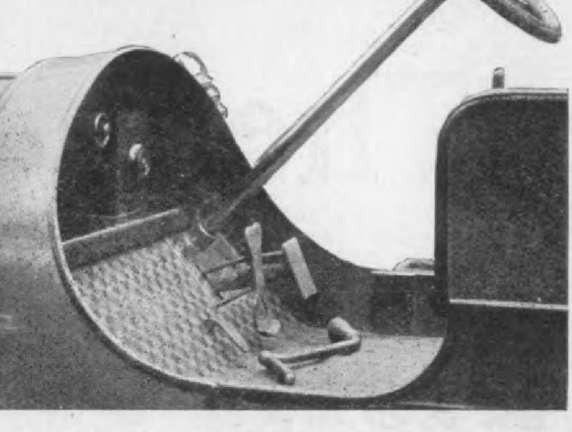

. 5. Griswold car control. The single vertical shown in Fig. 1 gives all speeds forward and vard, and is not latched, but is retained in posi- by a leather friction disk, friction screw-adjusted, e enlarged hub of the lever. The spark and le levers are on top of the steering wheel. The ng action is the Warner worm and worm-gear . The muffler is opened by the small horizontal at the left. The pedal at the right applies the ub drum, internal brake-shoes. The middle pedal by heel and toe action to latch and release and or lifts the friction-wheel casing to release the on-wheel contact with the disk or to establish riction contact. The control is of the simplest ption, and can be learned in a few minutes. The ng-crank is applied to the sleeve and starting- shaft, seen at left of the coil box. The start- ank is seen lying on the foot-board. The starting shaft and pinion slide to the rear, drawing the ng-pinion and starting-gear out of engagement each other, so that the starting-pinion stands when not in use.

el journal seats and casing are integral, the whole casing, slotted at the top to permit the top of the friction wheel each the aluminum disk, is lifted or t bodily by rocking the specified e lifting eccentrics. The lifting pedal is ed and unlatched by a heel and toe ement so that the friction-wheel can be l or dropt instantly, and the eccen- action is powerful enough to make this l very easily moved, so that coasting ntages can be taken on all inclines e the car will run itself. The speed and tion change is extremely simple and ry quickly made, giving an ideal con- for crowded streets.

e reverse can be applied at any time, the reverse and pedal-brake together stop the car, it is claimed, in something two car lengths from 20 miles an hour.

FRICTION LOSSES.

e friction speed and direction car-con- s very cheap, is perfectly silent, can be ntly changed by an inexperienced driv- d cannot be injured by mishandling.

is car weighs with two passengers t 2500 lbs., and a pair of 5x5, 4-cycle lers can drive it over 40 miles per hour. would be very good work indeed for same motor with a geared speed- ge and shows in the most conclusive ner possible that the friction-drive is

leaves, and the rear springs are 42 ins. long 5 leaves.

The chassis frame is prest steel, 5-3 thick, 34½ ins. wide in the rear and 32 in wide in front. The greatest frame-sid depth is 4 inches.

THE MOTOR.

This motor is an ordinary commercial de sign, with special lugs to stand on front an rear inclined pedestals bolted to the chassi frame cross-girts. Both the crank-box end are applied, so that when the supply pipe i removed the crank-box ends can be take off and give a clear way from either sid thru the crank-box, making the connectin rods completely and readily accessible. Th entire motor can be removed without dis turbing any part of the transmission. Th motor shown weighs 360 lbs.

The water circulation is thermal, and th lubrication is by a 5-lead La Vigne oiler, bu only 3 leads are used.

BRAKES.

These are internal expanding in the 1 ins. dia. rear hub drums, shoes faced wit Gandy belting and pedal-applied thru a equalizer.

ON THE ROAD.

Some short runs in the streets of Detro showed the control of the "Griswold" t be extremely convenient, a touch of th foot releasing the friction pedal so that th car is made free for coasting. The 3-eccen tric linkage in this car to engage and dis engage the friction wheel and disk, gives a excellent quick, powerful and certain actua tion, so that the driver can have perfec confidence in his control, and the frictio pedal moves so easily that advantage is sur to be taken of every opportunity for coast ing.

A hundred-mile, measured-fuel run wa planned, but the car had an unreliabl speedometer and recorder, so poor as to b no use at all, and no decisive road-tes could be made. Saturday afternoon, Jul 6, the Griswold was driven with 3 passen gers over the Grosse Pointe Riverside roa to Mt. Clemens and back to Detroit, th whole run, including something like te miles of street and Boulevard work, cover ing about 50 miles. The car is very heavy much more so than will be the regular mod els, and weighed with 3 passengers up an tank and tool-box filled 2670 lbs., and th motor showed an uneven action all the wa to Mt. Clemens, not giving more than 3 miles anywhere, and sometimes almost stop ping. There was the usual uncertainty a to cause, the batteries, coil-box and car

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Think what that means!

Two hundred days, at least, of freedom from tire expense and worry. Isn't it merely a matter of common sense to believe that the tire that is sold with the strongest guarantee **must** be the best?

Write for copy of guarantee, stating what size tire you are using.

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AJAX-GRIEB RUBBER CO.

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BRANCHES:

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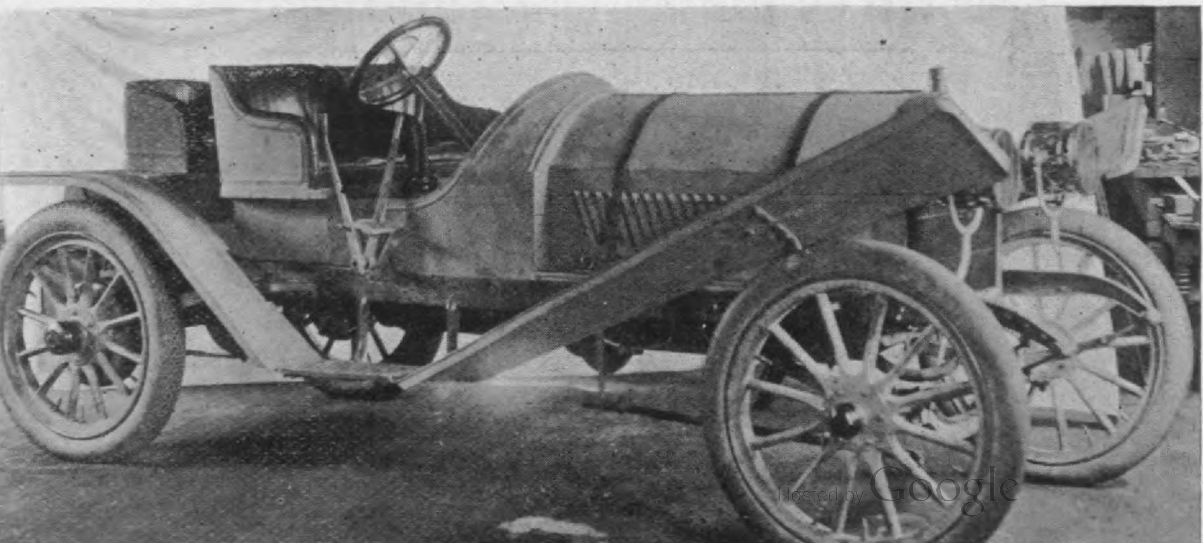
the run failed to show much of any-
g except perfect control and quick
dling, with abundant power after the
or was supplied with fuel. The Griswold
ngs are easy, and the lengthwise motor
s practically no vibration at all, while
simplicity and certainty of the control
es very easy work for the driver.
r. La Vigne proposes to equip this first
with a good speedometer, and to make
s which will fully determine the efficien-

be expected with its weight and piston are
No careful tests have yet been made an
where with the friction drive on the roa
but all the friction-driven cars show
much speed and hill-climbing ability as t
gear-driven cars of equal weight and powe
so far as the writer's experience goes, a
no other drive is so simple and so easy
the driver, all of which gives interest to t
efficiency tests proposed by Mr. La Vign

The D. L. G. 6-Cylinder Automobile

new 6-cylinder, 35 H. P. runabout to
known as the D. L. G. has recently been
ed on the market by the D. L. G. Motor
Co., of St. Louis, Mo. The machine
designed by B. R. Liebert, a German
gner. The accompanying photograph
ws the completed car. A unit power plant
used, consisting of the 6-cylinder motor
tiple disc clutch and the 3 speed selective
ing gear encased together, no moving
s being exposed to dirt. The engine and
lan shaft are practically in one straight
. The gasoline tank is at the rear of
frame and exhaust pressure feed to the
ouretor is employed. Ignition is by Sims-
ch high tension magneto and no coils or
eries are used. All gears are encased
a pan extends from the front to the rear
the change speed gear case. The clutch
sists of alternate copper and steel discs
ning in oil, giving a gradual engagement
hout jerk and it is claimed the car is
able of a speed variation of from 2 to
miles per hour.
Mercedes type of radiator and fan are

used, being set well to the rear. The da
is free of mechanism, carrying but an a
pressure gage for the gasoline supply a
a gage showing the pressure in the circ
lating water system.
The cylinders are 4 inches bore by 4
inches stroke, cast in pairs with the exhau
valves on the right side, operated by dire
push rods and the inlet valves in the he
operated thru rocker arms. The centrifug
pump on one side and the magneto on t
other at the front are operated by enclos
gears from the engine shaft. The u
plant is supported on a prest steel sub-fran
The Gemmer self-locking steering gear
used. The frame is of prest steel rais
at the rear. The front axle is I-beam s
tion and the rear is a Timken of the flo
ing type; Timken bearings being used
both axles. The front springs are 40 by
inches, of 7 leaves, perched on top of t
axle, while the rear are 48 by 2 inches, w
8 leaves. These springs are of Krupp c
cible steel oil tempered. The same chas
except for added wheel base is used for t



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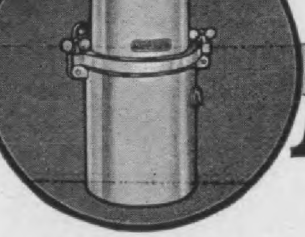
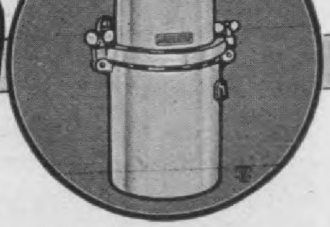


ATWOOD

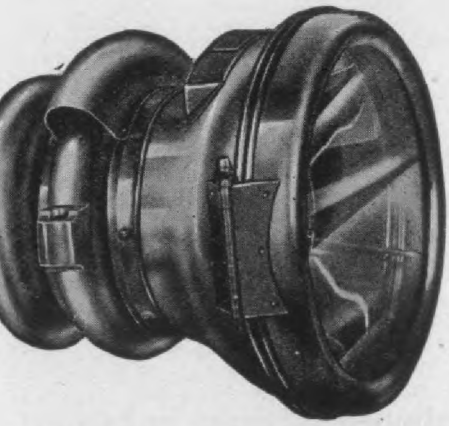


MORE POWERFUL MORE EFFICIENT MORE RELIABLE

Than Any Automobile Lamp on the Market

Mechanically perfect, elegant in appearance, simplicity in constru n, and the best material procurable are the basic principles of all t wood product, and supplemented by a perfect factory organization.

Gas tanks are becoming more unpopular every day, for the reason that they reac out of order. The Atwood Seamless Generator eliminates lighting trouble of all kin l is absolutely reliable under all conditions. It is always ready for instant service. T erator is round, seamless drawn of extra heavy gauge brass; no seams to break; no sol come apart; practically indestructible. It has given absolute satisfaction under all con s and tests. *Experts—men who know pronounce it the simplest and most practi erator made.*



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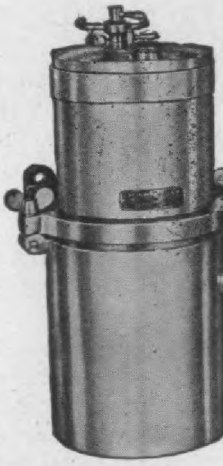
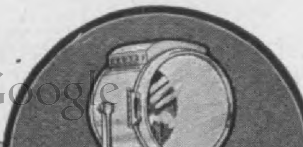


ATWOOD MANUFACTURING CO.

AMESBURY, MASS.

LAMPS



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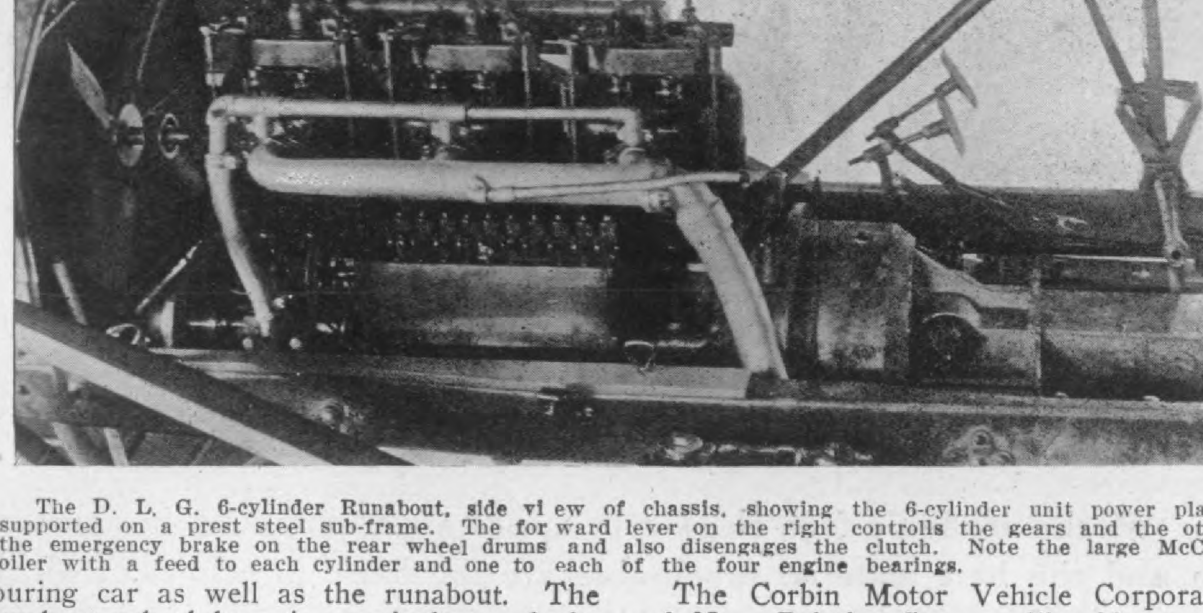

The D. L. G. 6-cylinder Runabout, side view of chassis, showing the 6-cylinder unit power pla supported on a prest steel sub-frame. The forward lever on the right controlls the gears and the ot the emergency brake on the rear wheel drums and also disengages the clutch. Note the large McC oiler with a feed to each cylinder and one to each of the four engine bearings.

ouring car as well as the runabout. The unabout wheel base is 113 inches and the ouring car 130 inches. The runabout seats and weighs 2,000 pounds, price $4,000. The ouring car seats 7 and will sell for $4,500.

News Items

The Copenhagen (Denmark) International utomobile Show will be held from Sep- ember 28 to October 7.

Roger J. Sullivan, secretary and treas- rer of the Wayne Automobile Co., Detroit, as buried in that city, Thursday, July 4th.

The Gearless Transmission Company, of ochester, N. Y., makers of the gearless ar, were admitted to membership at the st meeting of the Committee of Manage- ent of the American Motor Car Manu- cturers' Association.

Mr. John A. Walker, vice-president and easurer of the Joseph Dixon Crucible Com- any, died at his home, Jersey City, N. J., n May 23, at the age of 70. He had been onnected with the Dixon Company since 867.

The Continental Caoutchouc Company nounces a change in its representation Buffalo. W. A. Rutz will manage the anch in that city at No. 729 Main street, ucceeding F. M. Parker, who has severed s connection with the company.

Mr. J. B. Kavanaugh, who for some time as been manager of the Cleveland branch the Hartford Rubber Works Co., has re- gned and has been succeeded by Mr. P. . Goodall, who for a number of years has een traveling in the Ohio territory for the artford Company.

Graves & Congdon, Amesbury, Mass., hose auxiliary tonneau seat was describ-

The Corbin Motor Vehicle Corpora of New Britain, Conn., will add a wa cooled car to their product for 1908.

The ranks of the American Motor Manufacturers' Association has again increased by the election to membershi the Simplex Motor Car Co., of Mishaw Ind., and the Welch Motor Car Comp of Pontiac, Mich. This makes a tota 43 member in the American Associatior

The American Motor Car Manufactu Association, working with the New Y Automobile Trade Association, claim have discovered that there is no opposi from the Board of Fire Underwr against having gasoline motor vehicles the steamship and railroad piers of York. It is said that they granted the p lege more than a year ago, as a result recommendation from the New York Insurance Exchange, under date of Jan 11, 1906. A conference is being arran between the Fire Underwriters and E Stratton, of the Trade Association, Alfred Reeves, of the American Asso tion, which it is hoped will result in throwing open of the docks.

Continued Increase in Exports

For the month of May, 1907, the exp of automobiles and parts amounted to $6 450, an increase of $170,909 over that of corresponding month last year:

	—May—	
	1906	1
Exported to—		
United Kingdom	$138,109	$23
France	55,221	8
Germany	22,366	1
Italy	17,770	3
Other Europe	35,397	1
British North America	120,159	15
Mexico	48,690	6
West Indies and Bermuda	12,588	

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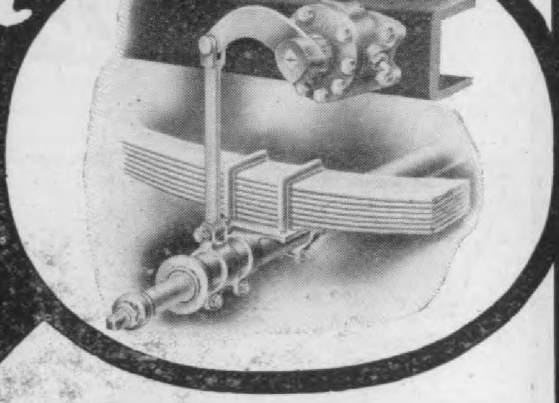
...s a chance to "make good"



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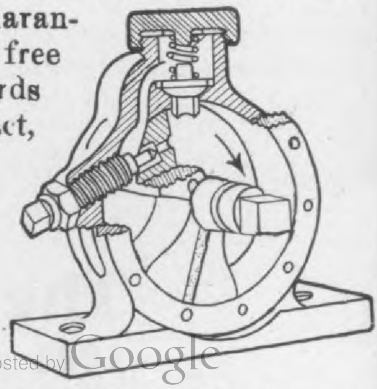
I have been telling you for several years that my Anti-Jolt Device was the first and only device thoroughly guaranteed to eliminate all jar, shock or jolt. Now, I want ***you*** to give me a ***fair*** opportunity to ***prove it.***

I am in a position to let you try a Hotchkin Anti-Jolt Device for 30 days—absolutely at my risk, and if it fails in any of the essential virtues enumerated below, the trial will not cost you ***a cent.***

I guarantee that a

HOTCHKIN ANTI-JOLT DEVICE

will take your car ***at full speed*** over a spring-breaking bump and you will scarcely feel it. I guarantee that there will be no throw to your car—my device eliminating all uneven movement. I guarantee it to be the only device that allows the springs free play on the down, or compressive, motion and retards the coil easily and safely. I guarantee them compact, small, and not affected by dust, mud, oil or water. I guarantee them to give you a lasting satisfaction impossible with ***any other*** device.



Send for detailed description—how to be certain of being satisfied—how to try my device for 30 days—at my risk. A postal will do. Write quickly. Address me—P. M. Hotchkin, Pres.

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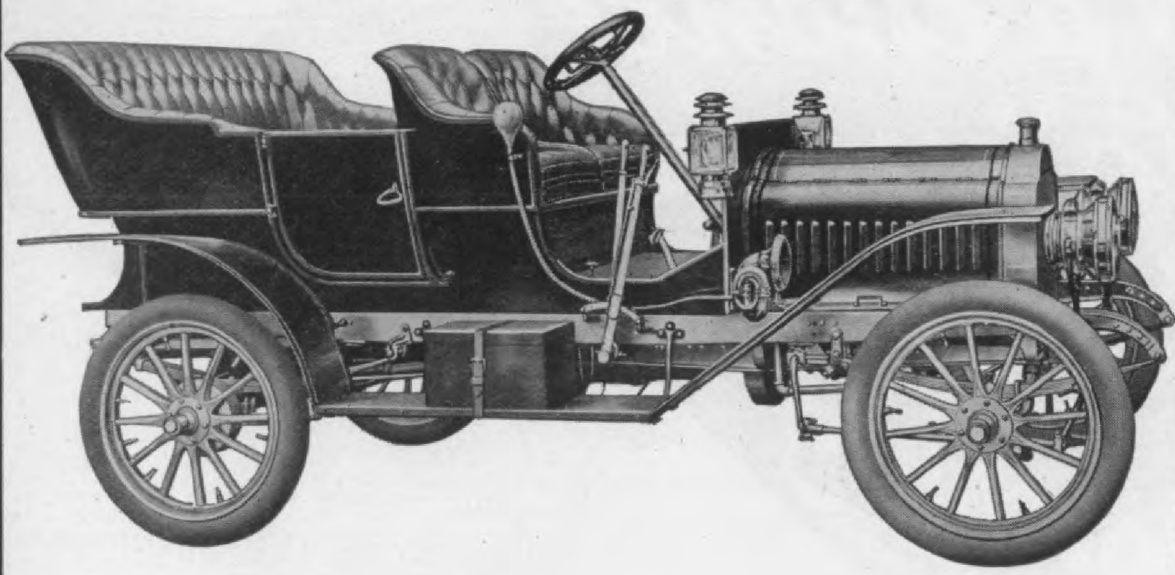
HOTCHKIN MFG. CO. 1265 Michigan Blvd. Chicago

Valveless 2-Cycle



As Usual— Something Unusual

Only 3 seconds variation per mile in a race of 50 miles.

"What!" you ll say, "only 3 seconds in 50 miles?" Yes indeed—and better than that—the two-cycle **Elmore** won the event hands down, beating a number of cars of much greater horse-power.

Yes indeed—and better than this, the **Elmore** jumped right from this first fifty-mile race into another five-mile race with a 50-60 H. P. car and won the second, hands down.

Yes indeed—and better than **ALL** this too—the victorious **Elmore** was just a demonstrating car which had just passed through one of the most trying trips imaginable over the worst roads and fords of California. All this, mind you, without a stop for overhauling or a halt for breath.

It's the evenness of the performance, of course, that's remarkable—and directly due, of course, to the valveless two-cycle construction and its resultant continuous flow of power.

Our interesting literature, called "Our Daily Mail," will furnish you with further facts.

Will you write for it.

The Elmore Mfg. Co.

1004 Amanda St., Clyde, Ohio

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MEMBERS A. L. A. M.

MECHANICAL AND TECHNICAL Department

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our dedartment editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

GRADUATIONS ON GRADOMETERS.

Will you kindly advise me at your earliest convenience what the graduation on a gradometer represents? The one I have is graduated to 30 per cent. What does 30 per cent. stand for, or, rather, 30 per cent. of what?—T. J. MENTEN.

The usual graduation on a gradometer is in "per cents." as you have stated. This means parts of a hundred and 5 per cent. grade is one which rises 5 feet in 100 feet distance; 30 per cent. is a hill which rises 30 feet in a horizontal distance of 100 feet. The road surface of such a hill is longer than 100 feet, for it is the hypothenuse of the triangle having a base of 100 feet and an altitude of 30 feet.—C. E D.

IGNITION OR CARBURETOR TROUBLE?

Sharon, Pa.

I own a 2-cylinder, 22 H. P. Buick, which is giving me a lot of trouble, principally with the ignition. One day the rear cylinder will refuse to ignite. Then when I get it to working, the front one will refuse to work. I have tried the spark on each and they seem perfect.

Then I find I have numerous explosions in the carburetor, flame immediately shoots out of the air intake pipe nearly 4 inches in length when the motor slows down. Any advice will be gladly accepted.—C. G. MOORE.

Make sure that your compressions are good and your valve actions properly right and positive. A sticking valve might cause your trouble. The probability, however, is that your carburetor is at fault. With a good gaseous mixture even a weak spark will fire, but if the mixture contains large drops of liquid these will continue to burn until the next charge is coming in, when they will ignite this charge and it explodes in the inlet pipe. This of course interferes with the next charge in the other cylinder, and destroys the power. Probably heating the air supply or heating the carburetor or heating the pipe between the carburetor and the engine will vaporize the liquid and make a mixture sufficiently quick to avoid back firing. The tendency of oil dealers is to supply a lower grade fuel than in the past and this is making the labor of the carburetor much more difficult. Carburetors have never been very perfect and the low grade fuel is decidedly demanding something better than at present on the market. A carburetor should have an air adjustment so arranged that the vacuum in the suction pipe is practically constant and the same at low speeds as at high. This relieves the variations in pressure on the gasoline supply now commonly found. Next, the gasoline should be adjustable at both extremes and should vary automatically between these points as the speed of the engine varies. The average carburetor has a gasoline adjustment for one speed only and attempts to secure results at other speeds by adjusting the amount of air admitted which is a sort of adjustment of the amount of vacuum. This method seems entirely too inadequate. I have built carburetors that meet these requirements and will describe same in the near future.

If the flame from the intake opening is light yellow the trouble may be caused also by too weak a mixture, which is also very slow burning. This may be due to carburetor adjustments, but if, after going over the ignition system particularly, the vibrator points on the coil the trouble still continues, look for leaks in the inlet pipes, as this will cause the same trouble.—C. E. D.

BALANCING ALTERED 4-THROW CRANK SHAFT.

Bridgeport, Conn., June 3, 1907.

I have a two-cylinder, four-cycle locomobile auto. five-inch stroke, four-inch bore. I have had a new shaft made, with both cranks on the same side. Originally they were opposite.

My trouble is to get the counter balance right. I first put on a weight of 15 pounds, but this seemed to be too heavy, and then gradually cut this weight down, to about two pounds. At this weight the engine runs the smoothest, but there is still too much vibration to suit me.

What I would like to know is, how much weight I should use, and how far it should be placed from centre of shaft?

The reason I placed the weight on the fly wheel is because there is not room enough to fasten it to the shaft. The distance from centre of shaft to inside of arm of fly wheel is 7 inches. The weight is placed close to rim.

H. C. SHERWOOD

You have in effect converted your engine into a single cylinder so far as balancing the moving parts is concerned. It cannot be perfectly balanced. The necessary weight is less as the distance from shaft is greater and you have probably done the best possible. If you balance the pistons a violent crosswise vibration is caused by the heavy weight, so the light weight is best even tho it does not properly balance the pistons.

A two-cylinder opposed engine with opposed cranks is capable of almost perfect balance. If twin cylinders are used the explosions do not balance. Because of these facts the single cylinder is little used and preference given to 2-cylinder opposed, triple and quadruple cylinders. C. E. D.

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VARIOUS INTERESTING QUERIES.

Providence, R. I., June 10, 1907.

Will you please tell me if a rich mixture is better for pulling at slow speeds than a perfect one would be? Is it the amperage or voltage or both that increases when a set of dry batteries are connected in series, and is the power doubled when two sets are connected in multiple? What would make a two-cylinder opposed engine run backward five or six revolutions after the switch had been turned off? Does an alcohol carburetor require more or less air than a gasoline carburetor and does it require more heat? Why is a vibrating induction coil for a jump spark better than a non-vibrating coil? SUBSCRIBER.

The strongest fire is not when the stove is choked with fuel nor when it is starved, but when it has all the fuel the air it gets will burn; so a gas engine is strongest when its mixture is full rich, but not over rich or fat. If your carburetor has an adjustment which you can vary as you drive as all carburetors should you will find the point of greatest power easily. You will also find that a little reduction in power will follow a considerable reduction in the amount of fuel, but that by using a mixture less fat than that required for maximum power you will save fuel, avoid odor and soot and get better results. I think this is true at all speeds, but your carburetor may not give the same mixture at differing speeds so you may not be getting the mixture you think. More cells in a series increases the voltage proportionately and this increased o. m. f. or pressure will force some increased amperage or quantity of current thru the resistance. Connecting two batteries in multiple doubles the amperage, but does not change the voltage. Battery makers and auto users have tried to get along with few cells with the result that they have been short lived. Thus four cells will give six volts and make a good spark drawing one ampere of current or ¼ ampere each. With a proper coil 8 cells will give 12 volts and need only draw ½ ampere total or ⅛ ampere each and yet the coil gets the same number of watts (6). A cell cannot give more electricity than there is in it and will last more than twice as long if ⅛ ampere is drawn than if ¼ ampere. Further, a cell unable to give ¼ ampere still has quite some life at a lower output so that a larger number of cells is much more economical, provided the coil is wound for them. To increase the voltage above that intended for the coil is wasteful of current. When cells are new, less than the specified number can be used. A hot engine will ignite spontaneously by the heat and compression and reverse itself. Cut off the fuel first and it will not do this.

Alcohol is harder to spray so the air openings should be smaller. More gallons are used in a given distance so less air is used. More heat helps the spraying and vaporization. A vibrating coil saves current, for it will not remain on a short circuit, but buzzes. Some makers prefer the other coil. C. E. D.

MAKING A 1¾X2-INCH 4-CYLINDER MOTOR.

1107 Scott st., Baltimore, May 11, 1907.

Have read a great deal about gasoline engines in your Mechanical and Technical Department, and am in the auto shop myself, but have never read anything of an engine air-cooled with 4-cylinders, 1¾-inch bore x 2-inch stroke, which I contemplate making. I wish to have a little advice on this matter. What size valves both inlet and exhaust would you recommend, the former to be automatic? What weight of flywheel would you recommend, the size of rim, and the diameter of wheel? About what compression? I wish to get about 1000 to 1200 revolutions, as I intend it to be for cycle purposes. I wanted to bring the weight between 20 and 30 pounds. The weight of four cylinders rough is 8 pounds. Any additional advice that you can give me will be greatly appreciated by an old reader. F. W. GROSCHE.

The motor you propose is so small that the heat loss to the walls will be large and the power small. Still if it is carefully made and friction avoided in the bearings and pistons, it may be made to give you good service. Suction inlets will serve. Make the fly-wheel as large as you have room since the larger it is the lighter it may be. I would use a pretty high compression with compression space ¼ of the total cylinder contents. I think a 10-pound fly-wheel should serve. C. E. D.

PROPER COMPRESSION FOR AIR-COOLED ENGINE.

Auburn, Maine, June 17, 1907.

I am building a 6-cylinder, air-cooled engine, 4¼-inch bore, 4-inch stroke, and want a compression of approximately 60 pounds. Will you kindly tell me thru the information columns in your magazine how much space I would need between the piston and the cylinder head to obtain this compression, not taking any account of the cubic contents of the valve chambers. Is 60 pounds about the right compression for an air-cooled motor? A. H. STEVENS.

I think 60 pounds high compression for an air-cooler; air comprest to 60 pounds without loss of heat has a volume of 30 per cent. of the original volume. Therefore, let the piston movement be seven parts and the compression space. 1-7 of 4-inches equals 1-7x3 equals 1 5-7 inches for length of compression space. C. E. D.

Steam Vehicles

J. A. KINGMAN

STEAM PLANT FOR MAIL ROUTE AUTO.

Box 762, San Angelo, Texas, June 12, 1907.

The writer operates a 70-mile mail route, used four different autos on same and am now driving a four-wheel drive steamer for hauling purposes, speed eight to ten miles per hour. Kindly advise me as to best and most reliable steam outfit people. Have car nearly ready for power plant and tho I have quotations, etc., am in a quandry. Will you answer this question, please: Would a 25-H. P. August Ofeldt Boiler and a 3-cylinder 20-H. P. Dieter steam engine be a reasonably efficient and reliable plant? Does Homan's book on autos treat steam also? Am experienced with gas and only slightly with steam.

Will you kindly advise me on a steam plant maker, etc? I expect to build other machines if this proves successful, as I must have reliable hauling machines to supplement my horse service and am and have been trying to solve the overland transportation problem. Had reasonable success only so far. E. R. AMES.

Cannot give you any information about the engine to which you refer. The boiler would undoubtedly be a thoroly practical article, as the builder has had long experience with this form of apparatus for automobile work. Theoretically speaking, there is no such thing as the horse power of any boiler, so that not knowing the weight of your vehicle, the dimensions of the motor and the heating surfaces of the boiler, it is not possible to give definite information.

The book you mention refers to steam cars to some extent, but being a general work rather than a technical treatise would probably not help you very much.

In building your car you would probably not be able to get any apparatus from regular manufacturers of steam cars, but it would do no harm to drop them a line, giving them the weight of your car, speed at which you intend to run it, and ask them if their apparatus would be suitable and if they would care to sell it. J. A. K.

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HARTFORD MIDGLEY TREAD TIRE
Clincher or Dunlop

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¶ From these pictures you'll get a good idea of the tires that has created a veritable sensation in all Motordom.

¶ Eminent experts like Hiram Percy Maxim, Henry Souther, Herbert Lyttle, Owners who drive, Drivers of Track, Road and Endurance Contests, Chauffeurs—all agree that it's the greatest tire invention of the age.

¶ Think what it means to buy a tire—a tire mind you—not a separate device—that will never slip or skid, even on ice. Think of 200 little spikes—like cat's claws, in each tire—that grip the ground continuously, yet that detract not one whit from fastness or resiliency.

¶ Why be satisfied with any other tire equipment? Act now. Insure the safety of your car and its occupants by putting on Hartford Midgley Tread Clincher or Dunlop Tires. Better have MIDGLEY UNIVERSAL RIMS, too. You can then use Clincher or Dunlop Tires at your option.

Millimeter Sizes for Foreign Cars

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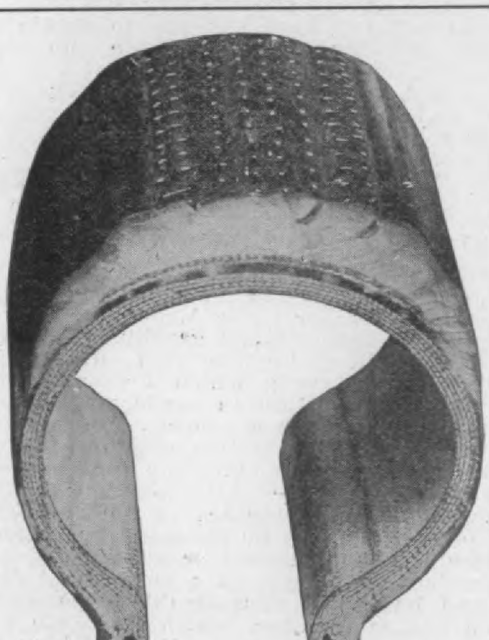
HARTFORD - CONNECTICUT

Showing Section of Midgley Universal Rim



Showing Actual Condition after 3,400 Miles use. See the "Cat's Claws?"

New York—88 Chambers St. and 1769 Broadway. Chicago—83 Michigan Ave. Boston—494 Atlantic Ave. and 1020 Boylston St. Cleveland—1831 Euclid Ave. Detroit—256 Jefferson Ave. Denver—1564 Broadway. Philadelphia—138 North Tenth St. Buffalo—725 Main St. Atlanta, Georgia—55 Auburn Ave. Los Angeles—1505 South Main St. San Francisco—423-433 Golden Gate Ave.

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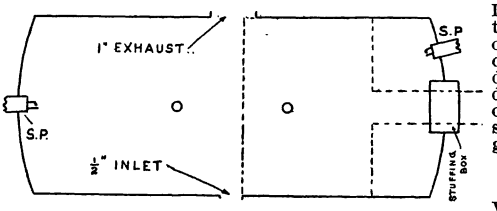
2 Cycle Engines

DOUBLE ACTING 2-CYCLE CYLINDER.

For the last few months I have read your articles on 2-cycle construction in the "Journal" with interest. I have finally got the craze myself. I have a pretty good lathe and am going to get some castings and finish them. This rough sketch will show you my idea of a two-cycle engine. I have the centers of inlet and exhaust valves directly opposite, but the exhaust has a lead of ¼-inch and opens at widest ¾-inch and ½-inch for inlet. These ports will each extend half around the cylinder. As you see I intend to have the cylinder closed at both ends and use piston with outside driving shaft to fly-



wheel. I want to use Schebler carburetor and Kingston muffler. Will one muffler work it without back charging? What size carburetor and muffler are required? I am going to try to cool with air. Can I get a magneto to work it and will it work without coil or timer? Will two small sight feed oil cups give lubrication enough.

JOHN W. JOLY.

You will find that your double-acting 2-cycle cylinder will be hard to cool, and you will have to do something new in the way of packing your piston rod, to make it stand the heat. Remember that the inside of a gas engine cylinder is full of flame during the working stroke.

You do not say how you are to obtain your charging pressure. You can fire the charge with a magneto, coil and commutator, or with magneto and hammer spark. The sellers of carbureter and muffler will tell you about sizes.

Think your scheme over carefully before you go to work on your motor.

HUGH DOLNAR.

TWO-CYCLE MOTOR IMPROVEMENTS.

7 Seminary St., Danville, Ill., May 19, 1907.

Mr. C. E. Duryea:

In looking over the C. & A. Journal I noticed your name as authority on gasoline engines and also as M. E. in connection with an association of auto manufacturers, which I thought would place you in a position to render me some assistance in having some concern interest themselves in a type of gasoline engine I have invented. I have never built one for the reason that I have never been in a position to do so, but have built many engines on the lines of the piston construction to be operated by either air or steam, which operated successfully.

My business has been as a mechanical draftsman, and have had considerable experience in gasoline engine practice, which leads me to believe that an engine built on lines of blue print is particularly applicable for auto use, altho the print illustrates a stationary type.

The data on print taken with the short description of the cycle of operation, will enable you to see that a two-cycle with one cylinder will have the efficiency of two cylinders of the four-cycle, as a positive and predetermined charge is delivered to the explosion chamber above the hollow piston at each stroke, this is attained by the use of an induction valve in the lower cylinder head, thru which a charge is drawn on the upstroke into the interior of the hollow piston, then comprest within the same on the downstroke, and delivered into the explosion chamber thru the induction valve in the top of the piston head when the latter regulates with the exhaust port for release of the average charge. The gas on the inside of the hollow piston head will be under high pressure and will enter the explosion chamber quick behind the burnt charge or up thru the center as indicated by arrows. CHARLES PICKLES.

The best way to help you is to get your device before the public in the hope that the people who are looking for a device like yours will see it and get in touch with you. The type of engine you show is not strictly new, altho I have never seen it in just this form before. It is well-known that most engines do not get full charges in high speeds, and this your device is well arranged to do. It also permits having exhaust ports all the way round the cylinder instead of at one side as is customary. It is somewhat more complicated than the usual two-cycle, but advantages cannot usually be obtained without some cost. The interior cylinder being smaller than the working one, does not permit so large a charge being introduced, but the positive introduction of the charge at high speeds will more than compensate for this. It certainly shows much ingenuity. C. E. D.

WANTS 2-CYCLE MOTOR FOR AUTOMOBILE.

Selma, Alabama.

I have been very much interested in the development of the 2-cycle engine and will be glad if there is a prospect of a motor of that type being marketed at any time at all soon. I have an old machine in which I wish to put a new motor and would like to use a 2-cycle if possible, but do not find anything in the market that looks like any improvement in the 4-cycle. Further than this the manufacturers seem unwilling to give any definite information as to the details of their designs and I do not care to purchase without at least seeing the design, as glittering generalities in catalogs count for little.

R. S. ELLIS.

I know of no 2-cycle motor on the market that is the right shape to go in a car without a good deal of trouble.

The Atlas Motor Co., Springfield, Mass., make a motor which might do you, if they would sell you a motor only.

The Reliance Motor Co., Detroit, Mich., could supply you a larger motor than the Atlas, if they would.

The Okey Motor Co., Columbus, Ohio, are making a fine 3-cylinder, 2-cycle motor, but probably would not sell a motor only, as they have only a small place and are building a first lot of cars.

You might write to the Du Brie Motor Co., Detroit. Without doubt the 2-cycle motor can drive a car. H. D.

QUESTION OF HEATING UP OF 2-CYCLE, DOUBLE-ACTING MOTOR.

Webster Groves, Mo.

Will you kindly answer the following questions in the next number of the Journal? Would a double-acting, 2-cycle, get too hot to run? I mean a gasoline motor with an explosion on each side of the piston every time the flywheel turns, same as a steam engine. I have a design for such a motor. This motor has large exhaust port openings, which I think would help a great deal towards keeping it cool, and there is the two charges of fresh gas to help the cooling also. WM. F. SCHOENHARD, JR.

Write to De La Vergue Co., Port Morris, New York, for a circular or catalog of double-acting, 2-cycle engines. Double-acting, 2-cycle motors, water-cooled, are now the leading European prime mover, and are made in very large sizes, up to 8000 H. P. or more. Do not throw away money on experiments until you inform yourself as to what has been done. You cannot, probably, make a small double-acting, 2-cycle motor that will run well, without more knowledge of the art than can be given you in this place.

H. D.

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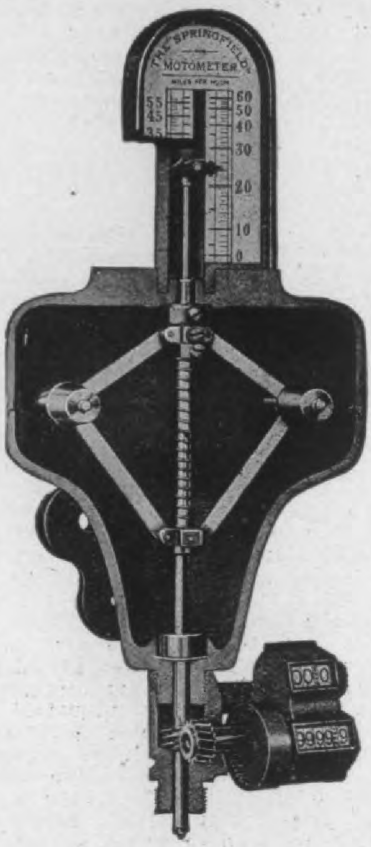
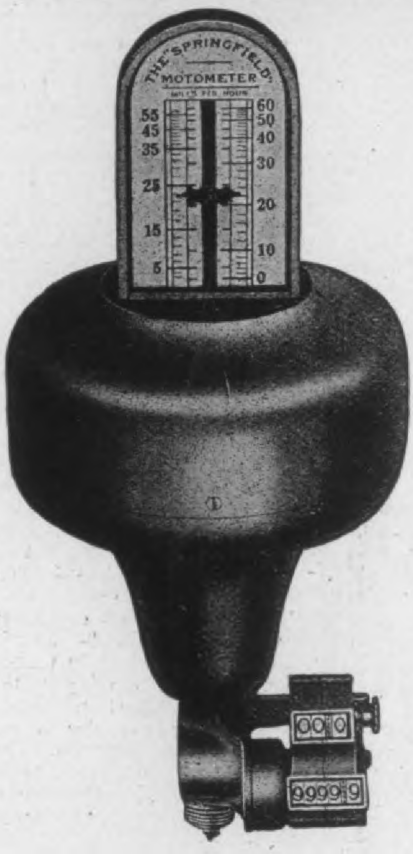
THE SPRINGFIELD MOTOMETER





"The Speedometer That Proves It."

Are you satisfied to guess how fast you are going and how far you have gone It isn't safe. It isn't economy. You ought to know. How else can you chec the performance or wear of your car?

You need a Speedometer, but unless it is accurate and stays accurate it is wors than none. The Motometer is accurate and we have proved it. It is durable—stay accurate—we have proved that.

It has reputation gained by wide use. It is mechanically correct. We show yo our movement in every ad. Find fault with it if you can. Compare it with othe —if you can get the chance.

Finally, consider the price. A fair price, which buys the best we can buy- both material and skilled workmanship.

SPECIFY THE MOTOMETER

If in doubt, send for Catalog B. S. and "Facts."

50 mile instrument, $45.00
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TESTING 2-CYCLE COMPRESSION BY THE GAGE.

I want some information regarding a 2-cycle engine which I have in an automobile.

First of all the compression registered by a steam gage while cranking engine as you do when starting engine is 85 lbs.; then while having gage on one cylinder and running the other by its power, the pounds register on the gage are 125 lbs.; understand there is no explosion in cylinder upon which gage is fastened.

What I would like to know is the number of pounds the gage should show when applied as stated above, that is the number of pounds when cranking and number of pounds when running the other cylinder by power; also compression space in inches, cylinders having no pockets.

The sizes of the cylinders are 4½-in. dia. x 6-in. stroke, and they develop 12 brake horse power.

The explosion in the cylinders judging from the action of the engine must be very violent.

What pressure will there be in the cylinder at the time of explosion with the compression I have; also what pressure when exploding with proper amount of compression?

Had the exhaust of the engine ought to be heard in the exhaust pipe? J. W. O.

With a good muffler there should be no noise in the exhaust pipe. With no muffler there will be plenty of noise.

Your cylinders are probably packed with snap rings, ordinary pattern, with cuts right thru them, which are next to no use at all when the piston moves slowly. The holes thru the rings are not very big and when the piston moves fast the air cannot escape as rapidly. Ninety lbs. is about as much as your gage should show, and is much higher than usual in 2-cycle engines. Pack your pistons with ordinary, 3-ring, steam-engine piston rings, so they will be tight, and the gage will show the same whether you crank the motor fast or slow. At speed the hand will jump, its highest reading is not correct.

For 6-inch stroke from inside edge of exhaust port, cylinder bore all one diameter to the head, a cylinder about 6¾ ins. long, not deducting any space for the exhaust port, should give you 90 lbs. compression when you have tight pistons. The working pressure is supposed to be 3 or 4¼ times the compression. Your pistons are 6-in. stroke—you do not give the exhaust port length so your question cannot be definitely answered. H. D.

BENT RADIUS ROD DUE TO BRAKING.

New York City.

As a subscriber and reader of your Journal for the past three years, I desire to ask your expert opinion on the following:

I have a 30-60 H. P. car of American make, chain driven, and yesterday was informed by the garage that the right radius rod, running from the sprocket to the rear wheel, was so bent at the double-threaded extension joint as to necessitate the same being reforged and rethreaded. On examination I find the rod bent up nearly three inches. The explanation offered was that in backing the car at some time the brakes had been put on too suddenly and thus the weight of the car and its momentum had fallen on the radius rod and caused it to buckle. On my inquiry why braking the car when it was running forward did not have the same effect, I was informed that when the car runs forward and brakes are applied, the radius rods are under a pull (or tension) and hence kept straight, but when the car runs backward and brakes are applied, the radius rods are under a push (or compression) and hence would buckle. This explanation does not seem reasonable to me. The radius rods are always under both a pull (or tension) and a push (or compression) at the same time, and whether the car is running forward or backward makes no difference on application of the brakes. The function of the radius rods is to overcome any variation of the distance between the driving sprocket and the rear axle, which might be caused by the up-and-down motion of the rear springs, or possibly by the tightening or slackening of the chains. The running of the chain, either backward or forward, and the braking of the car, stopping said chain running, has little or nothing to do with the radius rods, as I understand it. Moreover, such explanation for the buckling of the rod should affect both rods, whereas it only affected the right rod on my car.

Can you give me a reasonable explanation why a single radius rod, 1 inch in diameter, should buckle at the double-threaded extension joint, when the car has no hard usage, accident or sudden braking? Could the rod have been too far extended in order to tighten a chain which had much better been tightened by removing a link? G. AUSTIN MORRISON, JR.

Without a sketch I do not understand how the radius rod can be under both tension and compression at the same time. Possibly each rod is composed of two members forming a V so that one member is pulling while the other pushes. In this event it would seem that the brake action would be the same either way and as liable to bend a member when going forward as to bend the other member when going backward. However, a single rod of ordinary design is under tension when brakes are applied going forward and under compression when brakes are applied while backing. The strains on radius rods and torsion rods are not well understood by me and I have not found good explanations why one man will get along with a rod 9-16-in. diam. when on an identical machine another man will bend a rod ⅞-in. diam., yet I have seen this result. Brake action is probably responsible for it. A brake that chatters has a very destructive effect, for it grips and lets go and grips again with a series of jerks that are likely to bend or break something. A chain will sometimes climb the teeth of the sprocket and relieve itself by doubling up the radius rod. In such a case it is a question simply of chain or rod giving way. The sudden application of the brake will throw the slack of the chain toward one sprocket and may cause it to climb just as the braking strain is greatest on the rod and the two strains are more than the rod can bear. This seems to me to be the most likely solution. That one rod should bend and not both is easily explained by the fact that when one bent the strain was relieved and this saved the other rod. It is reasonable to suppose that the weakest one went first. If the threads are damaged it is because the rod has been adjusted out too far, otherwise not. Backing one wheel against a curb or obstacle often bends a radius rod and I would inquire on this point.

C. E. D.

The Italian Touring Club, of Italy, is distributing gratuitously to its members corographic maps of Italy, arranged according to the most modern process used for maps, being especially interesting for tourists, giving distances, descents, widths of roads, planimetric difficulties, curves, zigzag crossings, etc., as well as indication of monuments, interesting point of views. The set embraces all Italy, the bordering territories and the islands, and consists of 58 sheets.

Five of the seven events of the race meet of the New York and Brooklyn motorcycle police squad at Empire City track on Saturday, June 1, were won by Sergeant Howe, of the Bronx. The mile championship of the Manhattan and Bronx squads was won by Sergeant Howe; time, 1.39. The one event in which plenty of excitement entered was the one-mile championship of the Brooklyn squad, and was won by Sergeant Tom McDonald, in 1.52 3-5.

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Absolute Guarantee

WE guarantee each Stewart Speedometer against everything but misuse for a period of five years from date of purchase. This guarantee and warrant covers materials, mechanical construction and accurate operation of the instrument, flexible shaft and all connections. Each instrument is calibrated tested and sealed before leaving the factory. Any instrument returned to us, at our factory, charges prepaid, with seal unbroken, that has failed to give proper service, or failed to register accurately, or which has otherwise proved defective in material or construction, within above mentioned term, will be repaired or replaced free of charge.

No. 3.	Combination	Speedometer-Odometer,	full	size	dial,	(4-inch)	50-Mile,	$	40.00.
No. 4.	"	"	"	"	"	"	60-Mile,		60 00.
No. 5.	"	"	"	"	"	"	90-Mile,		75.00.
No. 6.	"	"	"	"	"	"	100-Mile,		100.00.

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Stewart & Clark Manufacturing Co.

he illustrations herewith are from the Price car, which was placed on the l May 5, 1907, and was finished in haste irst cars commonly are, and therefore vs lever-steering instead of the wheel ch will be regularly fitted. Otherwise "belt-driven Price" was a very fortunate struction indeed, and will go into exten- manufacture almost precisely as here vn.

he car here shown is really the second -driven runabout invented, built and pat- d by Mr. W. C. Price, who has been ely connected with the manufacture and of low-cost motor cars for some years. r. Price believed that advantages of high ortance could be gained by placing a mo- in front, lengthwise of the chassis frame, ing distance of the crank-shaft from th counter-shaft was 30 ins., the crank-sha pulley was 5½ ins. diameter, the counte shaft pulley was 9 ins. dia., and the leath endless-belt was 3 ins. wide. The moto was a "Beaver" opposed pair of 4x4½-in cylinders, giving 12 H. P. at 900 R. P. M The counter-shaft sprocket had 12 teet inch-pitch chain to a 22 tooth sprocket o the rear axle. The rear wheels had 34 1½-in. solid tires and the front wheels we 30 ins. with 1½-in. solid tires. The whe base was 72 ins. The total weight of th first belt-driven runabout was about 8 lbs., the reduction ratio from the motor the drivers was 3 to 1, and the car cou make 30 or 32 miles. The belt drive w very satisfactory indeed, giving a gradu

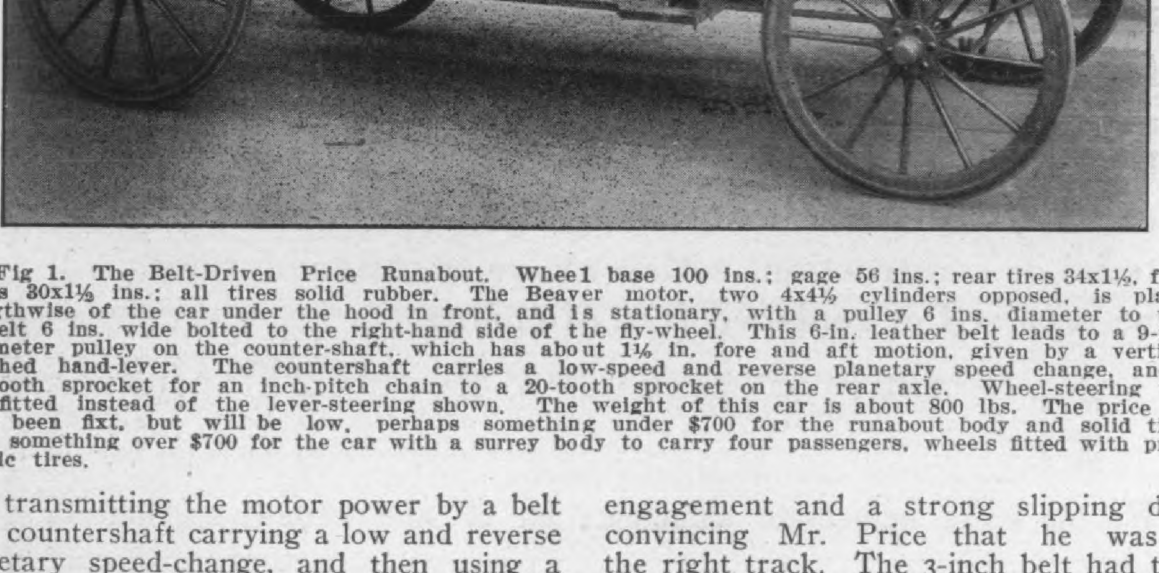

Fig 1. The Belt-Driven Price Runabout. Wheel base 100 ins.; gage 56 ins.; rear tires 34x1½, front s 30x1½ ins.; all tires solid rubber. The Beaver motor, two 4x4½ cylinders opposed, is placed thwise of the car under the hood in front, and is stationary, with a pulley 6 ins. diameter to take elt 6 ins. wide bolted to the right-hand side of the fly-wheel. This 6-in. leather belt leads to a 9-inch neter pulley on the counter-shaft, which has about 1½ in. fore and aft motion, given by a vertical, hed hand-lever. The countershaft carries a low-speed and reverse planetary speed change, and a ooth sprocket for an inch-pitch chain to a 20-tooth sprocket on the rear axle. Wheel-steering will fitted instead of the lever-steering shown. The weight of this car is about 800 lbs. The price has been fixt, but will be low, perhaps something under $700 for the runabout body and solid tires, something over $700 for the car with a surrey body to carry four passengers, wheels fitted with pneu- lc tires.

transmitting the motor power by a belt countershaft carrying a low and reverse etary speed-change, and then using a cket and chain drive from the counter- t to the full-length rear axle and sleeve, an interposed rear-axle balance gear.

this new linkage the belt takes the place ne clutch, and must be controlled in some so as to make it drive the car or else he motor run free, or nearly free.

his first car his entire motor had a and aft travel of 4 ins. by means of a engagement and a strong slipping driv convincing Mr. Price that he was o the right track. The 3-inch belt had to b very tight to carry the full power of th motor, and the short wheel-base made th car uneasy on rough roads, altho th body was carried on four, 30-inch, full e liptic springs.

The principal faults with this first Bel Driven Price car lay in the difficulties finding wholly satisfactory means for sup plying the motor with gasolene, lubrica

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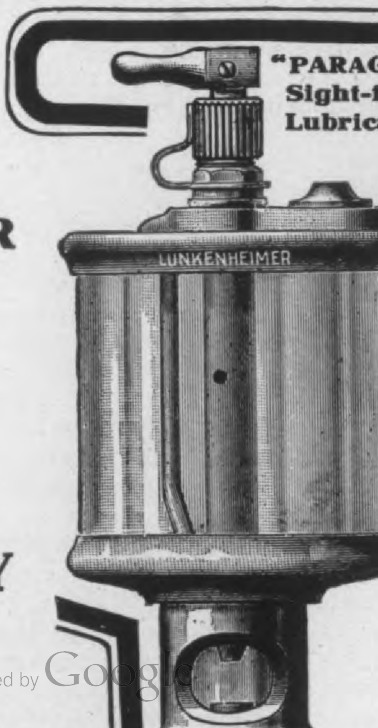
"PREMIER" Sight-feed Lubricator

Maintain the highest reputation for durability and practicability. They are easily filled and can be regulated to feed any quantity of oil.

The sight-feeds are large and the oil can be clearly seen feeding at all times.

Impossible for the back pressure from the cylinder to interfere with the proper formation of oil drops and cause the sight-feed glass to become oil-splashed.



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THE LUNKENHEIMER COMPANY

Largest Manufacturers of High Grade Engineering Specialties in the World.

GENERAL OFFICES AND WORKS:

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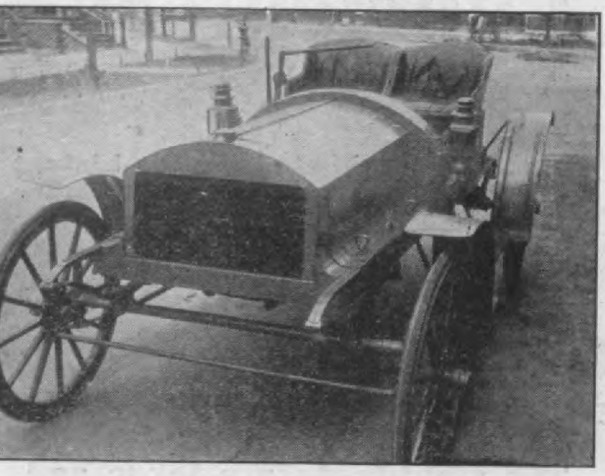
ve for these connection troubles it is
aimed the car was very satisfactory, and
ere are points in favor of shifting the
otor to tighten and loosen the belt rath-
than to move the counter-shaft and rear-
heels, but after extended road trials the
st car was laid aside and the drawings
r the car here shown begun in February,
07, and the car, as shown in Fig. 1, was
aced on the road, as before stated, early
May.



ig. 2. Belt-Driven Price Runabout, front and left
e, showing front axle.

THE BELT DRIVE.

The first motor car to make much of a
ccess, the Benz, was belt-driven, with
o belts, one open and one crost, and
e belt drive in various forms has been
vented" over and over again in the last
or fifteen years, and has been tried out
d invariably discarded, save possibly in
e case of some of the "high-wheelers,"
ere it has taken the place of chains to
e rear wheels. In view of the generally
successful past use of the belt-drive in
otor cars, it would seem to require con-
erable courage to venture on a revival
the belt-driven motor-car in this day
d age of good and cheap chain and gear
ven automobiles.

Mr. Price reasoned that the endless open
t of ample width, on pulleys of sufficient
meter, was an extremely simple and
rable element, of comparatively low cost,
able of soft and easy gradual engage-
nt, and also capable of transmitting all
e power needed to drive a motor-car,
vided that the belt could be easily made
ht or loose without employing objec-
nable means. Mr. Price was well aware
t no tight and loose pulley arrangement
d no tightener or "Jockey pulley" could
made to give satisfaction. This leaves
y one other well-known means of belt

In the second model Mr. Price pla
the countershaft and the rear springs o
rear subframe, guided to slide fore and
between angle iron surfaces bolted to
under edges of his wooden chassis fra
sides, and linked this counter-shaft a
spring-carrying sub-frame to a vert
hand-lever, as previously specified. T
arrangement leaves the motor standing
its fixt chassis-frame position, and pus
the sub-frame carrying the counter-sh
the springs and the rear axles to the r
to tighten the driving belt, or pulls t
sub-frame forward to slacken the belt. B
the belt pulleys are flanged on each si
and the pulleys are also slightly crown
so that the belt runs without touching
pulley flanges when tight.

This belt drive makes an ideal clut
and also serves as a brake to keep
motor from racing. On a level good-r
surface the slack belt has drag enou
from its own weight to drive the
about 2½ miles per hour, and if the
is held by the brakes with the motor r
ning, the idle-belt friction holds the mo
down so that it never races.

The drive is as nearly as direct on h
gear as can be had by any of the comm
ly recognized motor-car propulsion li
ages, all of which employ at least one
termediate element between the cra
shaft and the rear axles.

In the Price belt-drive this intermedi

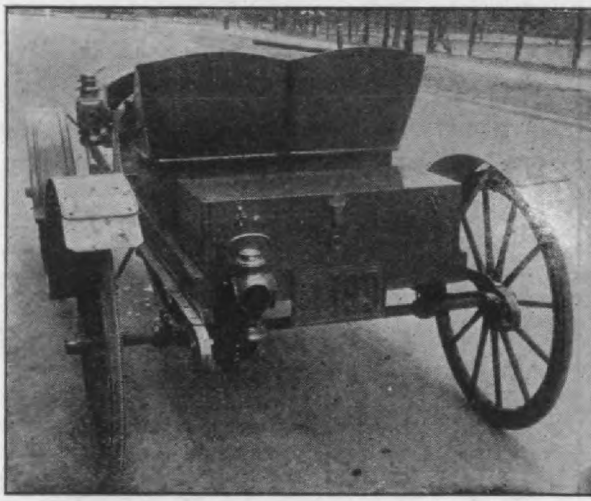


Fig. 3. Belt-Driven Price Runabout, rear of
showing rear axle and temporary springs.

element takes the form of a counter-sh
only on high gear, with a sprocket a
chain drive from the counter-shaft to
rear axles, and does not include the be
gear at any transfer of power.

It thus appears that the Price belt-dr
is one of the very simplest and lowe

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by all who have tried it.
Where greatest power is wanted.
where all others have failed.
five thousand miles.
ten thousand miles.
thousands upon thousands of miles.
by thousands of wise automobilists.

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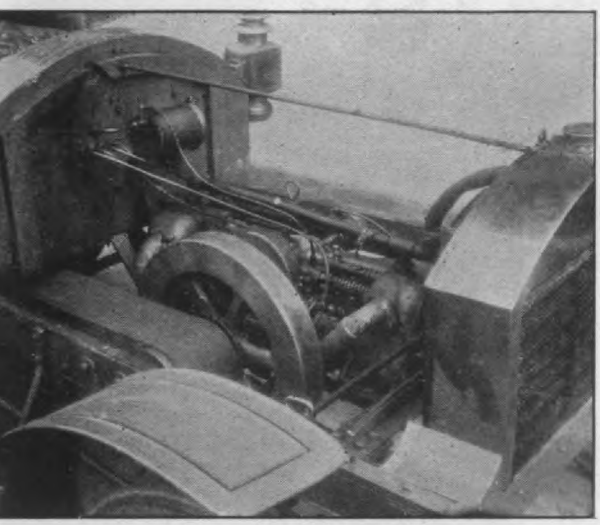
The belt used in this present car is uble-leather, 6 ins. wide, and is made up endless form, obviating the necessity of cing. The cost of the belt is about $5.00, anufacturer's prices. An endless cotton



'ig. 4. Belt-Driven Price Runabout. Right side motor, showing the 6-inch leather belt, leading to r from the 6-inch diameter pulley on the opposed inders motor fly-wheel.

lt, same length and width, can be had r about $4.00, and in either material the lt should last at least a year, and probly would last several years if cased in. oth belts and chains should be cased to

had by a planetary speed-change of u form, all steel gears, and the reverse be used as an emergency brake.

The front wheels are on ball beari and Lemoine type stub-axles. The r axles are on roller bearings. This en construction is of the very lowest cost, good and commonly accepted compone and there can be no question as to probability of long life.

POWER ECONOMY.

This car can make over 40 miles an ho and is a strong hillclimber with two p sengers. The motor is 2-cylinders only in. bore x 4½ in. stroke, and the car sho have a large per-gallon mileage. springs in this first car are not regu and are not good enough to make an tended run on with any kind of comf On pavement the car makes 12 or 15 m with the throttle barely open.

CONTROL.

The control of the Price Belt-Dri Runabout is extremely simple and v certain. No clutch troubles are possi and the planetary speed change and verse are, of course, by friction enga ment. The writer had several rides crowded Chicago streets on this car, the case of control leaves absolutely no ing to be desired.

The coropration already formed to m ufacture the Belt-Driven Price Runab

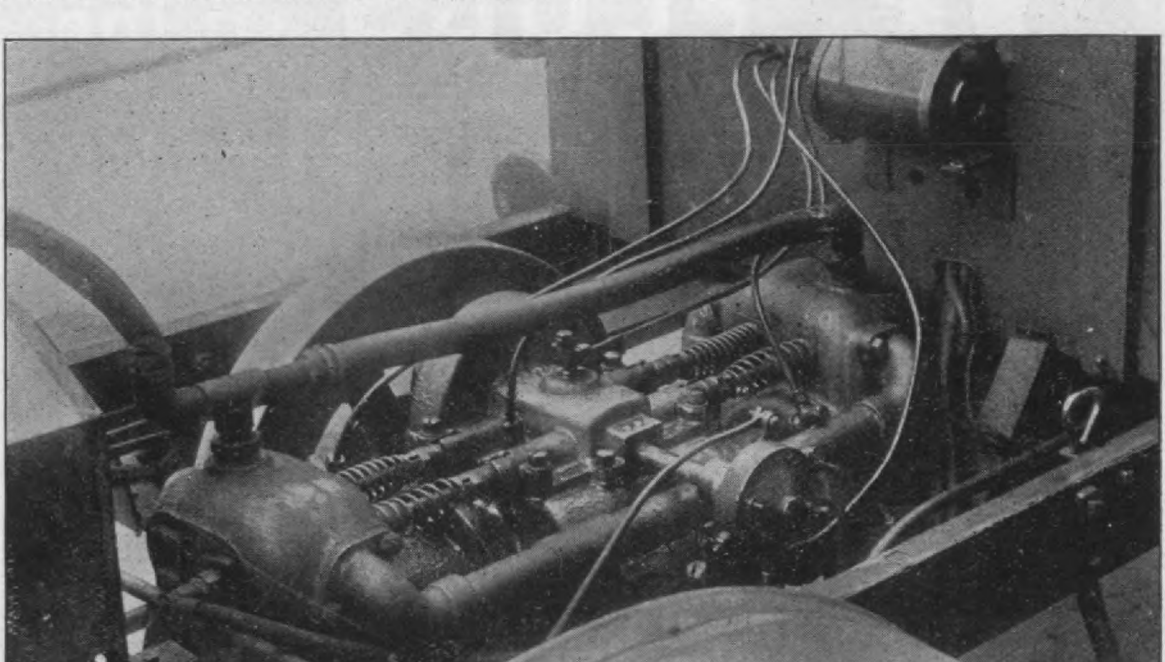


Fig. 5. Belt-Driven Price Runabout. Left side of motor. "Beaver" opposed cylinders, 4x4½ ins. set lengthwise of car, under a hood in front.

otect them from dust, mud and water, en applied to motor cars.

has $300,000.00 capital stock, and will once erect a commodious factory

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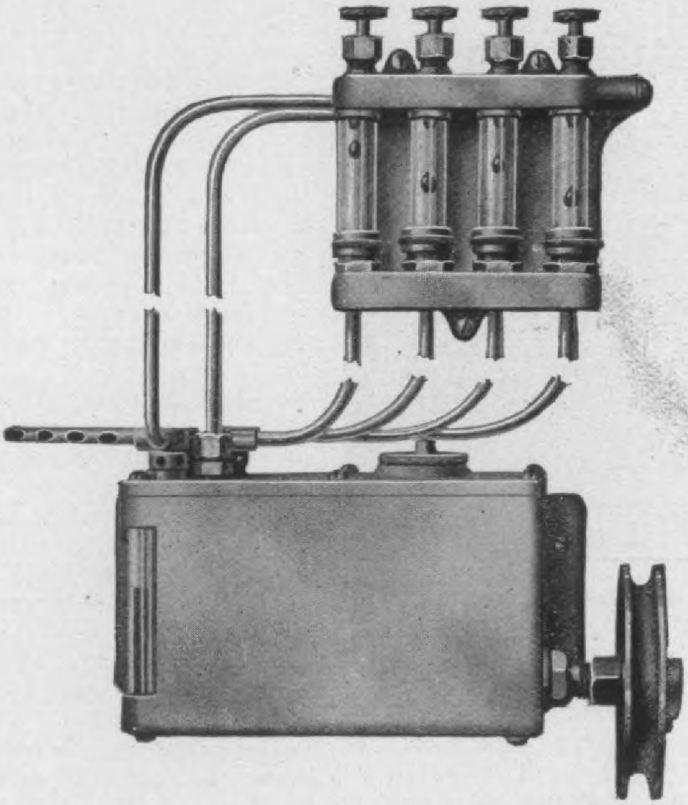

Set of Sight Feeds and Pump Reservoir separate so that each can be located at most convenient point. Can be furnished with any number of feeds required.

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ont axle is good, and is abundantly rong for a car of this weight.

REAR AXLE.

This is Price's own construction, and is solid steel-axle, 1½-in. diameter, to hich the right hand wheel is applied by iding it on and retained by a nut on the utside end. Turning of the wheel on the xle is resisted by two keys, 180 deg. apart, razed on to the axle. These keys are ¼-.x⅛-in. above the shaft, are about 2 ins. ng, and enter key-ways cut in the inside nd of the right hand wheel hub. This xle is on Hyatt roller bearings at the ght side, and is carried clear thru e left hand rear wheel hub, which is ronze bushed, and has a long sleeve-hub,

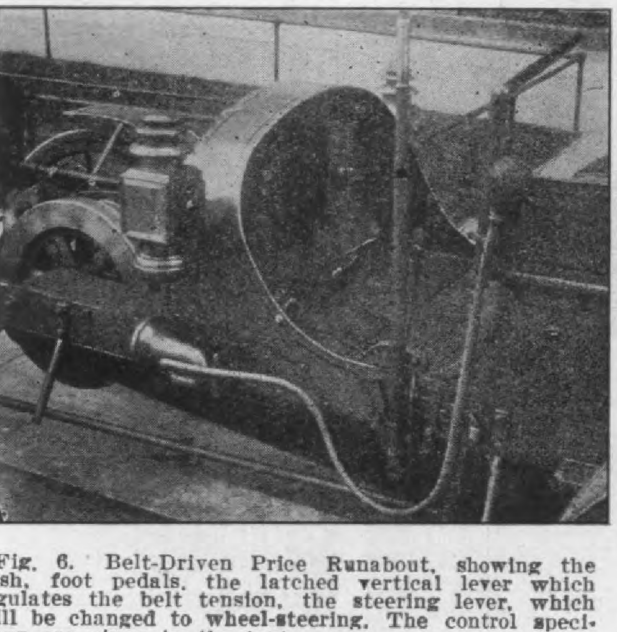

Fig. 6. Belt-Driven Price Runabout, showing the sh, foot pedals, the latched vertical lever which gulates the belt tension, the steering lever, which ll be changed to wheel-steering. The control specions are given in the text.

hich runs on Hyatt rollers in the left nd spring perch. The rear sprocket is t from a solid steel plate. The balance ear here shown has 8-spur pinions.

THE COUNTER SHAFT.

This is a solid steel shaft, 1¼ ins. diamer in plain bronze boxes at each end, xes split horizontally. At the right hand is counter-shaft carries a grey-iron, doue-flanged pulley, 9 ins. dia., to take a inch belt. The pulley is fixt to the aft by a key and set screw. Next inside e pulley is the planetary sliding-cone ıtch, then the planetary gear, low speed d reverse, at the left, with the chain rocket. The planetary brake-bands are ed with Gandy belting. The planetary aring is external and internal, all spuraring, all steel, reverse slower than low ar.

THE CHASSIS FRAME

and inside member vertical, joined at corners by angle pieces 1¼x2½x¼-ins., plied to the inside of the angle steel fr and fixed with 2 rivets 5-16-in. dia., in hot, in each end of each angle p This lines the whole inside of the woo chassis-frame with the underneath steel gle member, 1¼x1¼ ins., and 3-16 thick.

The motor is carried on two crossg of inverted T-section steel, lower men horizontal, 2½ ins. x ¼-in., vertical m ber 1¼ ins. x ½-in., ends bent and riv through to the angle steel chassis-fr underneath member.

THE SLIDING FRAME.

This is all made of the same 1¼ in ¼-in.x3-16-in. angle steel, and consist two side members 60 ins. long, with t cross-members of the same, riveted to side members, the side members having outside member vertical and of a widt slide inside the chassis angle frame. wooden chassis-frame is 30 ins. wide about 116 ins. long, over-all measureme The sliding frame, which slides fore aft about 1½ ins., hand lever action, in the chassis-frame, has three cross-girts, ins. x 1¼ ins. x 3-16-in., angle-steel, member horizontal and bottom men vertical and looking down, so that the of the sliding frame side and cross m bers come together and are fixt by eting. The front cross-member of the ing frame is 27⅛ ins. long, to slide in the angle steel chassis-frame. The in mediate and rear cross-members of sliding frame are 32½ ins. long and stand in 1¾ ins. outside of the chas frame to take the 1¼ ins. wide, half-e tic springs.

The side members of the sliding fr have the counter-shaft split boxes bo to their under sides, and these shaft b es are given universal movement by g ing to avoid binding.

The sliding frame is not fixt in length of 60 ins. inside the angle s chassis-frame, and is worked by a ha lever, latched, which is pinned and bra to a tubular rock-shaft, 1 in. dia., in bra ets bolted to the bottom of the chas frame. This tubular rock-shaft has arms, standing upward, pinned and bra to it, the top ends of these arms be linked to the front cross-member of sliding frame, so that the sliding fram handled at each side, and can be mo squarely against the driving-belt tensio

The sliding frame is not fixed in way to the underside of the chassis-fra

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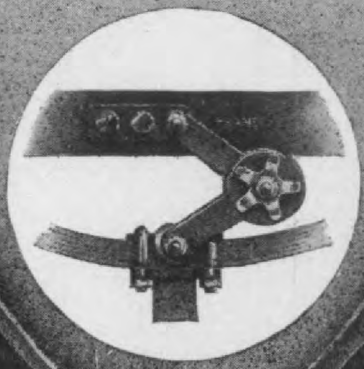
From the dangers and discomforts of riding on rough roads. They prevent the breaking of springs, save time, tires and trouble. They are an absolute necessity on any car and can easily be applied. It is not necessary to have a master mechanic put them on, we supply all the necessary fittings and furnish blue print without additional charge, provided make and model of car is given with the order. Seventeen prominent manufacturers use them as part of their equipment. Order them right now, you will not be disappointed. We guarantee them. Our booklet goes into the subject more fully.



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HARTFORD SUSPENSION CO

the sliding frame is free to come out under the chassis frame, except for the driving belt.

CONTROL.

The brakes as here shown in this first car, are one brake band on the balance gear drum and the planetary gear reverse band. This brake system will be changed to two brake drums, one on the rear axle, and one on the rear-axle sleeve.

The spark regulation will be by a rocking rod and notched-segment-retained hand-lever at one side of the steering post. The throttle is linked to the sliding frame, to increase throttle opening as belt tension is increased, and there is also an independent throttle control by pedal. The sliding frame is worked by a vertical, latched hand-lever. The left hand pedal gives the reverse. The next pedal to the right gives the slow speed. The third vertical pedal applies the rear axle brakes. A small horizontal pedal at the extreme right works the independent throttle action.

IGNITION.

Ignition is by dry cells, a 2-coil box on the inside of the front-board and jump-spark plugs.

LUBRICATION.

Lubrication is by a force feed oiler, with 4 leads, sights on the inside of the front-board.

ON THE ROAD.

The first Price Belt-Driven Car had a short wheel-base, and was on the general lines of the "High Wheelers." The Belt-Driven Price here shown has 100-in. wheel base, a long hood, small wheels and mud-guards and run-board in regulation form, so that it is a very attractive looking little car. Mr. Price had reasons of his own for placing this second model on the road at the earliest possible moment, and did not wait for the special springs designed for it, but placed springs, not of the right length, of form which were available, with the consequence of such hard riding as to make rough-road work a trying operation. A drive of some miles on Jackson Boulevard showed the car to be speedy, but was devoted mainly to demonstrations of the belt-drive control and the action of the belt-drive generally.

The belt-drive stands any kind of handling perfectly well. The most sudden movement that can be given to the hand-lever starts the car smoothly, without any "jerk" whatever. The slack belt gives the car a walking pace of 2½ or 3 miles an hour, belt slipping, which is yet quite a strong drive, so that the car keeps an even slow rate.

Tightening the belt gradually by one-notch advances of the hand-lever gives corresponding speed advances, making the rate as flexible as a disk friction drive. The belt when tight takes the whole power of the motor without slip, and the whole range of speed can be had by simply moving the vertical hand-lever without skill or caution, everything smooth and silent, making this little Belt-Driven Price car extremely handy and suitable for crowded street work.

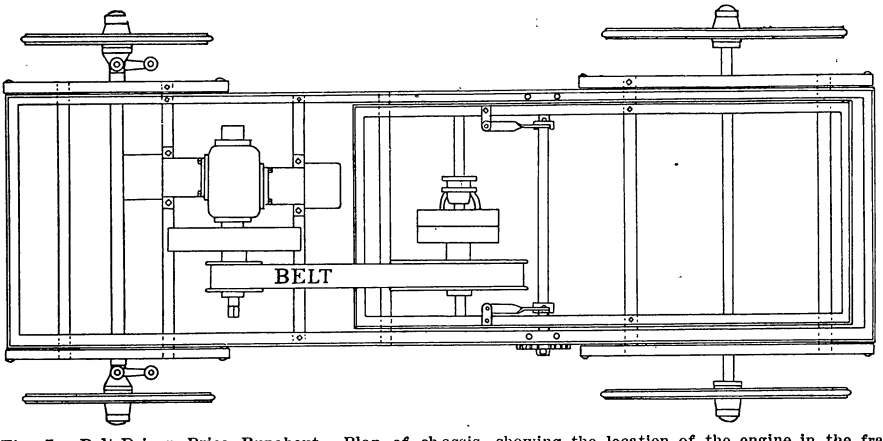

Fig. 7. Belt-Driven Price Runabout. Plan of chassis, showing the location of the engine in the frame and the arrangement of the belt drive to the planetary shaft.

Monarch Motor Car Company has secured a site of fifteen acres at Chicago Heights, Ill., and will build a large factory there.

The speedwell Motor Car Co., Dayton, O., has appointed Walter Keenan as their general manager. Mr. Keenan has for a number of years been general managed of the Standard Oil Co. interests in Dayton, O.

Hayden H. Eames, of Cleveland, Ohio, who for a number of years had the selling agency for the Garford Co.'s productions, has accepted the general management of the Studebaker Automobile Company, South Bend, Ind. Mr. Eames' business, of Cleveland, will be taken over by a newly-formed concern, known as the American Distributing Co.

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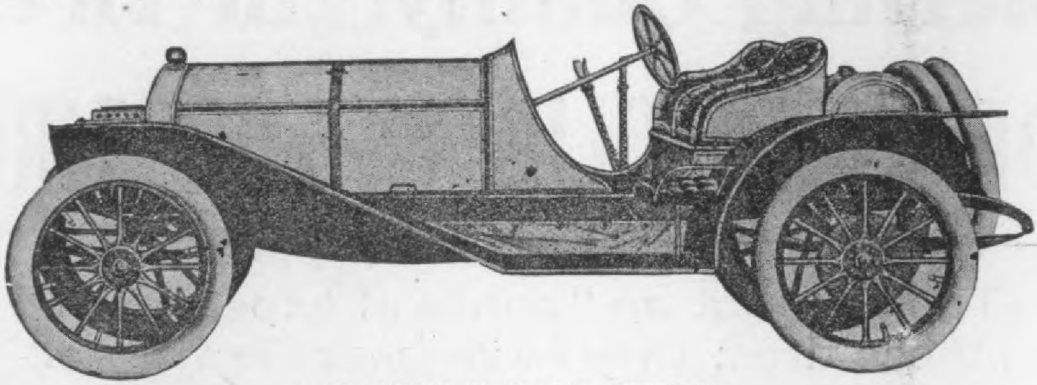
nabout, a car built on sound mechanical d up-to-date lines, and selling at a price the public which pays a fair percentage profit to the company. The six-cylinder otor in the Colt runabout is designed es- cially for them by the Howard Motor orks, whose chief mechanical man is W. S.

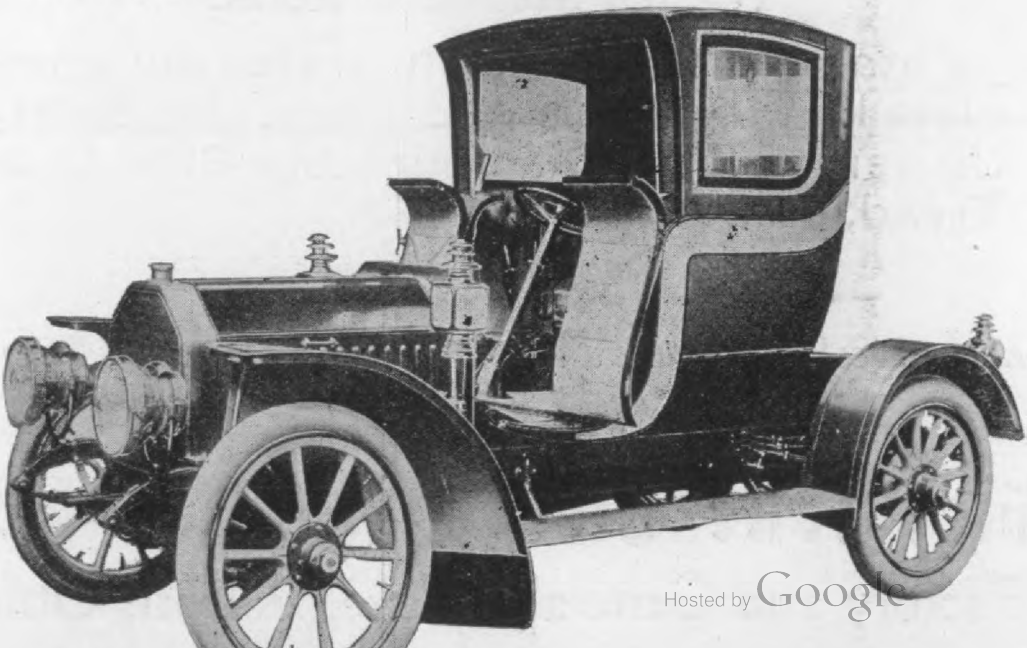


The "Colt" Six-Cylinder Runabout.

oward, formerly head of the motor de- rtment of the Gas Engine and Power Com- ny, and Chas. L. Seabury Company con- lidated. It is built on very fast lines with nple clearance and low centre of gravity. he body has no Rumble seat, the short rear d being utilized for carrying a 20-gallon soline tank, tools, extra parts and tires. A tachable mechanician seat is located the left hand running board. Wheel se is 105 inches. Tire dimensions are by 4 inches all around, making it ly necessary to carry one size and ift the worn rear tires to the front heels. Brakes are of the band and in- rnal expansion types, metal to metal. The ne clutch connects the motor with a three-

rear axle. The axles are very large, an the floating type. The cylinders in the tor, six in number, are water-cooled and cast separately. Bore 4½ in. and strok in., rated at 40-horse-power. Jump spark nition is supplied from storage and dry teries. The weight of the car with ta empty is 1800 pounds. Price f. o. b. Yonk or New York City $1500. The car is guar teed for six months. The output of six inders for this season will be 100 cars.

Hiram Percy Maxim, for many y chief engineer of the Electric Vehicle of Hartford, Conn., resigned August 1, 1 to follow out some new developments wh cannot be made known at this time. states that the greatest regret he has in signing is the necessity of giving up the sociations formed in the Mechanical Bra of the A. L. A. M., and the engineering b efits resulting from membership in that ganization.



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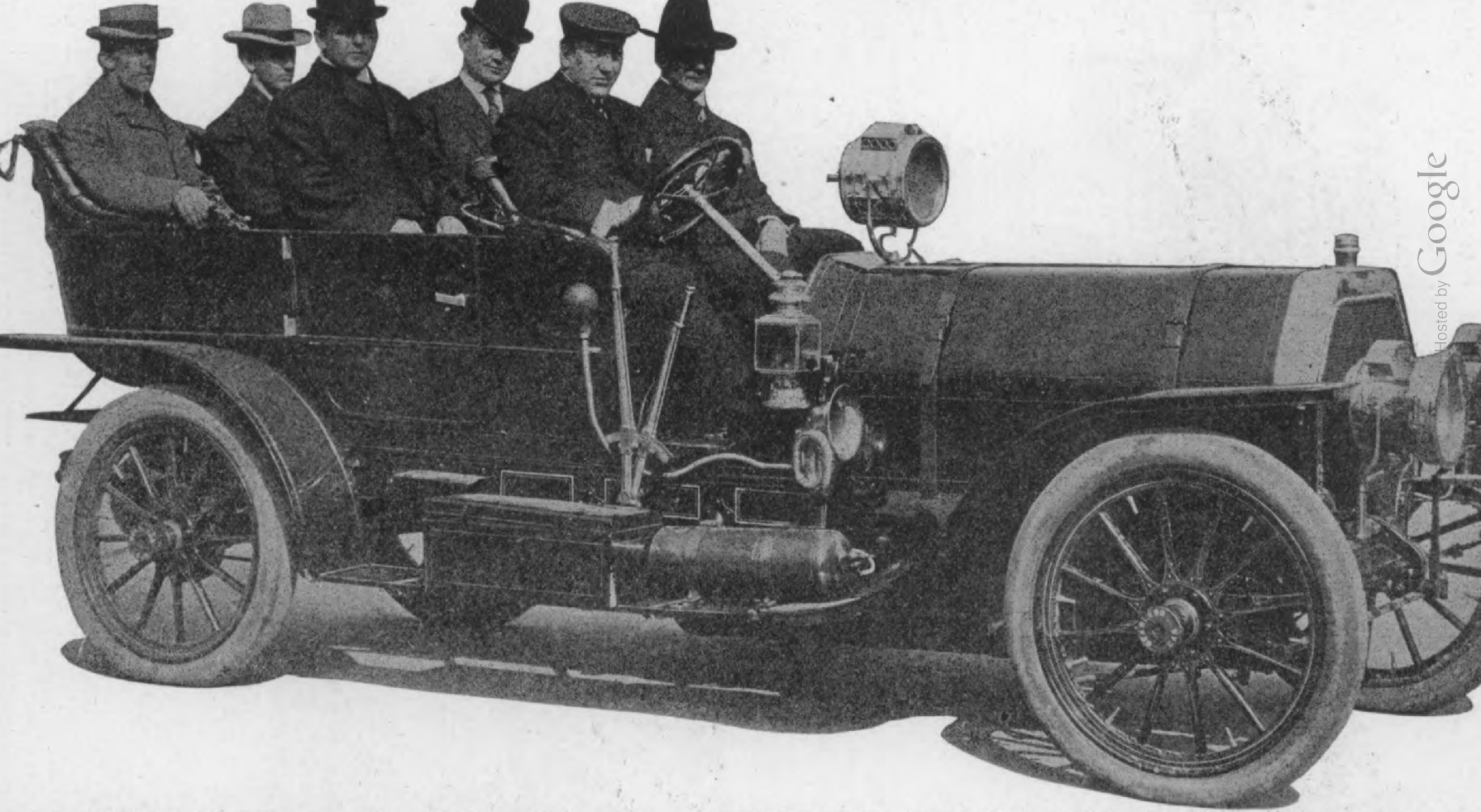

st ANOTHER proof of the fact that THE GEARLESS "Great Six" at $4000
H. P. is the "Best proposition on wheels"

GEARLESS TRANSMISSION CO., Rochester, N. Y.

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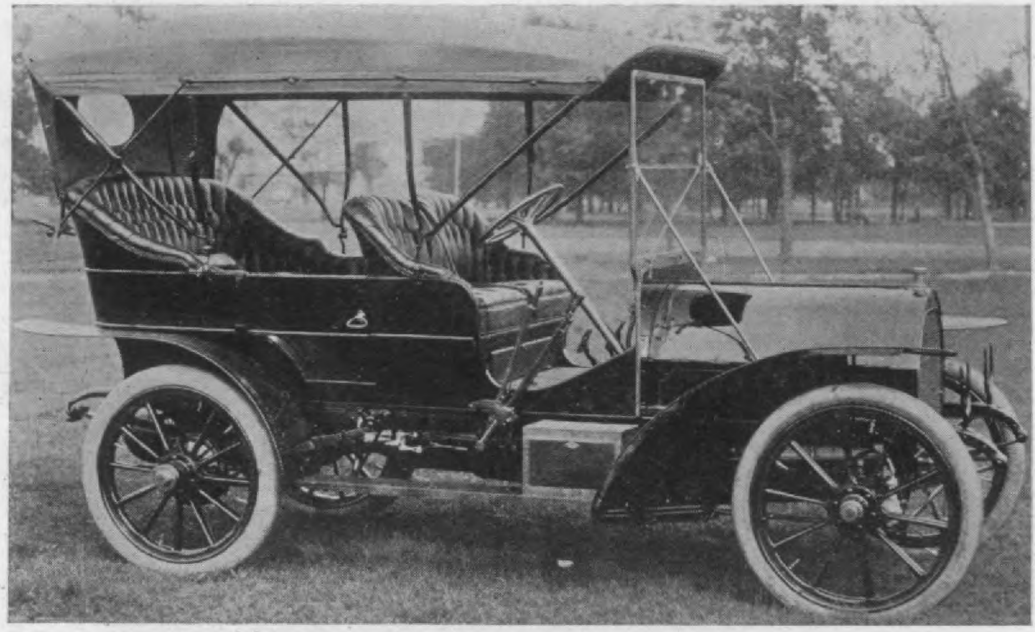
Craigh Station Shops February 11, 1907.

Ill., is building a self-starting, 5-passen- ouring car, which was briefly described 1907 form in the journal for March, 269. This story was written in Jan- and was not sufficiently illustrated, and, correct as far as it went, did not fully the details as constructed at that date.

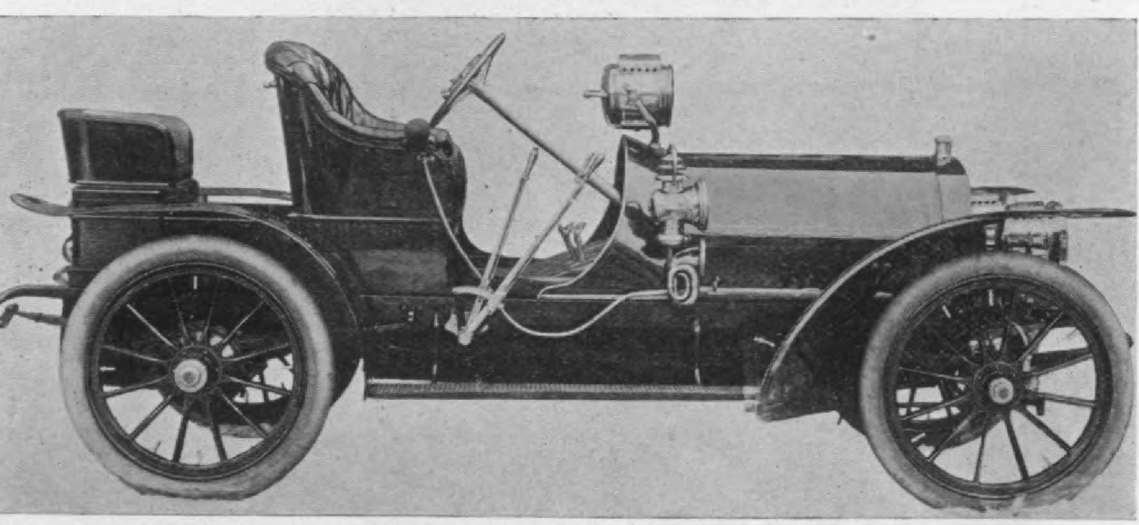
As at present arranged the pressure tank receives its pressure from the rear cylinder thru a valve loaded to resist 75 pounds cylinder pressure to the square inch; this valve load is given by a coiled spring, and is, of course, increased by whatever pressure of burned gases may be present in the pressure



ig. 1. Triumph 1908, 5-passenger touring car, wheel base, 113 inches; gage, 54 inches, to permit the to run in trolley tracks without injury. Tires, 36x4, rear; 36x3½ front. Motor, 4-cycle, water- d, four cylinders, 4¾x5 inches, 40-H. P. Single cam-shaft, valves all on one side, self-starting. eau body, side doors swinging to rear, to seat five passengers. Weight about 2600 pounds. Price, .00, including five lamps, mats, horn and tools, ready for extended touring. Cape top, extra.

pressure tank was placed under the r's seat and the two forward cylinders e 4-cylinder motor were used as com- ed air driven motors to start the two cylinders as a 4-cycle gas engine.

tank. The Triumph motor compression is 70 pounds. With the spring load, as stated, the pressure tank, now carried under the chassis frame at the extreme rear, is filled with burned gases from this rear cylinder



ig. 2. The 1908 Triumph Runabout. Wheel base, 108 inches; gage, 54 inches, to permit tires to run in y tracks. Tires, 36x4 inches, rear, and 36x3½ inches front. Motor and self-start same as touring Weight, 2400 pounds. Price, $3200.00, includ ng same equipment as the touring car.

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1908

The sale for Cadillac cars has always been so great that our factory has never been able to fully meet the demand and we have, therefore, not been in a position to take on many new dealers.

We have, however, recently enlarged our manufacturing facilities and shall be in a position to make arrangements with a limited number of new dealers in unoccupied territory.

It is not necessary here to go into details about Cadillac cars. They are the most popular and easiest cars in the world to sell. Their unequaled dependability and economy of operation and maintenance is so universally known that the Cadillac usually receives the first consideration of a prospective purchaser, the question being whether he could get one.

If you are an automobile dealer or expect to take up the business, your success depends upon handling cars that give satisfaction and that you can sell in increased quantities year after year.

Cadillac dealers, as a rule, are the most successful dealers because they can sell more of them than any other and because it takes less effort and less expense to sell a Cadillac.

The line is as follows:

10 H. P. Runabout	**$ 800.00**
10 H. P. Four Passenger Car	**$ 950.00**
10 H. P. Enclosed Coupe	**$1350.00**
20 H. P. Four Cylinder Runabout or Touring Car	**$2000.00**
30 H. P. Four Cylinder Touring Car	**$2500.00**

Now is the time to get ready for 1908 by selling some Cadillacs this Fall and getting trade started which no other car can take away from you.

Cadillac

Cadillac Motor Car Co., Detroit, Mich.

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300 pounds to the square inch. The maximum tank pressure can be varied by varying the spring load of the tank-charging cylinder valve; the heavier the valve spring the lower the maximum tank-pressure and the lighter the valve spring is the higher the maximum tank-pressure becomes. The tank pressure is piped to a gage on the inside of the dashboard, under the driver's vision. The tank-charging valve is spring loaded, so as to give a maximum tank-pressure of about 150 pounds, and the tank gage will commonly show somewhere from 100 to 125 pounds The highest possible tank pressure is obtained when the motor is doing its hardest work, and so has its highest cylinder pressure.

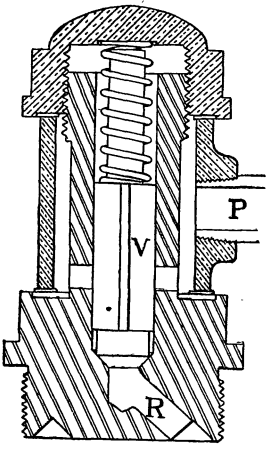

Fig. 3. Pressure-valve, screwed into the top of the rear cylinder compression chamber. The Triumph motor compression is 70 pounds gage, and the pressure valve is spring-loaded to something more than the motor cylinder compression, so that the valve cannot be lifted by compression of a full charge, nor by the fired pressure of a very much throttled charge, hence nothing passes from the motor cylinder to the pressure tank thru the pipe, P, save when the motor is working under load. The valve is not water-cooled, as now used in the 1907 Triumph motor. The passage, R, from the compression space to the valve, is oblique. It was first made vertical, and the valve then became injuriously hot. The passage was then given a right angle turn and the valve then did not give satisfactory tank-pressure. As here shown, with a large V-groove in the bottom of the valve body, and an oblique passage, R, from the V-groove to the valve-seat, the valve does not over-heat and the tank-pressure is quickly gained and is always sufficient to start the motor See Fig. 4. Triumph 1908 water-cooled pressure valve construction.

The pressure tank has only one opening in it, that which takes the ½ inch pipe to and from the tank. This pipe either conveys the products of combustion from the rear cylinder to the pressure tank, or else leads pressure from the tank to the intake valve of the two rearward cylinders when starting the motor. There is no provision whatever made for giving the tank an initial charge of compressed air, and the motor is fitted with the usual starting crank, by which it must be started when there is no pressure in the tank. When the motor is started by the hand-crank and the car is driven on the road so as to give the motor some work to do, the tank gage will commonly show 100 pounds, at the end of the first ten minutes or so of running, and the harder the engine is worked the sooner the tank pressure is gained.

The motor will start with about 20 pounds tank-pressure, and with 100 pounds tank pressure, car standing still, it is claimed the motor can be started ten times before the pressure will fall too low. The tank gage drops from 5 to 10 pounds, more or less, each time the motor is started and the tank

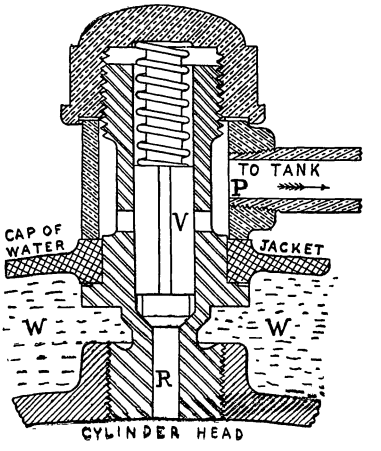

Fig. 4. Triumph self-starter pressure valve, water-cooled, direct passage, R, from compression chamber to valve, V. W-W is cooling water, V, valve; P, pipe to pressure tank. R, direct vertical passage from the cylinder compression chamber to the valve, V. The body of the valve is squared to prevent passage of burned gases to the tank-pipe, P. In this description the pressure is mentioned as "air" pressure, but it is, of course, not atmospheric air, but the burned product of charge combustion in the cylinder.

pressure is not replenished by the motor running light, on a throttled charge, with the car standing still. The motor must be doing some work to have cylinder pressure enough to lift the tank supply-valve against its spring load and so begin to fill the tank. With a 4-cylinder 4-cycle motor, cranks

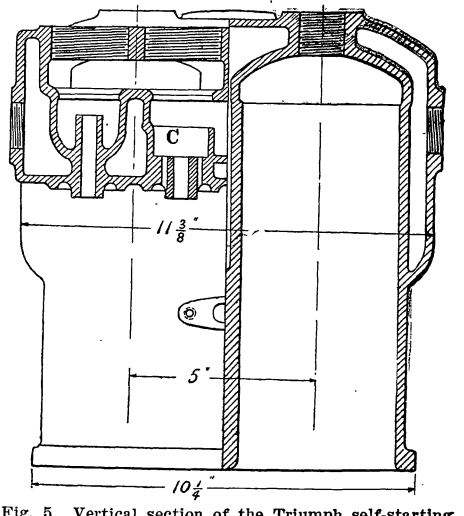

Fig. 5. Vertical section of the Triumph self-starting cylinders, the rear dual-unit of the 4-cylinder motor, in two planes, thru the middle of the rear cylinder, and thru the valve-seats of the left cylinder, both planes vertical. The chamber, C, below the right hand valve seat, takes the integral in-take valve. See Fig. 7. See also Fig. 6.

180 degrees apart, the motor may stop with the cranks on the center, and in this case the air-start cannot start the motor. This objection obtains in all self-start systems de-

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All my talking about the "Maxwell" is only the whisper of a breeze when compared with the whirlwind way the "Maxwell" talks for itself in actual performance.

Ever since the "Maxwell" was first designed—by Mr. J. D. Maxwell, the b automobile designer in America—and was put on the market, it has been speaki for itself by its deeds.

The "Maxwell" won endurance contest after contest, mountain climb af climb, won the Deming Trophy in the Glidden Tour, of 1906, then won the worl 3000-mile non-stop record—which it still holds—and so pursued its triumpl march of victory right up to its recent sweeping of the field at Wilkes-Barre a Bridgeport hill climbs, and its coming out with a perfect score in the fam "Sealed Bonnet" Contest.

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to you—to the man who wants an all-around, general, always-to-be-depend upon-utility.

The "Maxwell" is never known to fail its owners—over 7,000 deligh "Maxwell" owners throughout America will gladly testify to this.

Complete literature telling of all the splendid details of construction wh have made these feats of endurance possible, will be mailed you free if you w address Dept. 7. Also, if you will address me personally, I shall be glad to se you a personal letter of introduction to the "Maxwell" dealer nearest you.

Tell him to give you a ride in the "Maxwell" over the toughest piece country that you know—that will show you.

Benj Brisco

President, Maxwell-Briscoe Motor
Members A. M. C. M. A.

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pending on using elastic vapor from a pressure tank to start all or a part of the motor cylinders, where the cranks are 180 degrees apart.

This objection is not serious, however, for if the throttle is opened before the motor is stopt the motar will almost always, if not constantly, stop with a partly comprest charge in two of the cylinders with both cranks at 90 degrees from vertical, which is the most favorable crank-position for a comprest air start.

When the starting-cylinder cranks do stand still on the center, due to a sprung crank shaft or binding from other causes, then the crank-shaft must be given part of a turn with the hand-starting crank.

THE TRIUMPH SELF-STARTING ACTION.

The really automatic motor starting device must depend on some reservoir of power. Those "self-starting devices, so called, which depend on muscular power thru some linkage which can be operated by the driver without leaving his seat are not automatic, and are not here considered. In the Triumph two valves are placed in the pipe from the cylinder to the pressure tank; the first valve is close to the cylinder, opens from the cylinder to the tank, is spring-loaded and closes from the tank to the cylinder, and, save

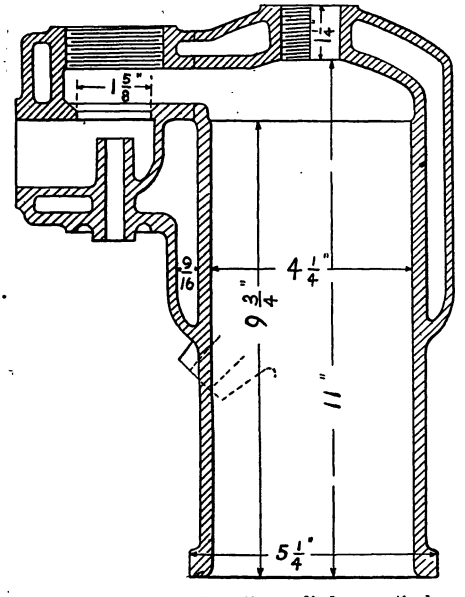

Fig. 6. Triumph self-starting cylinder, vertical section thru exhaust valve. See Fig. 5.

for the spring load, would always open from the cylinder to the tank and close against passage of fluid from the tank to the cylinder. A stop-valve, hand-actuated, is placed in the pressure-pipe, accessible thru the driver's floor space. This valve is opened and closed as may be desired, principally to certainly retain tank pressure where the car is to be laid away for a time, and will not be considered hereafter, as it has no functional relation to self-starting.

The cylinder-valve load is important. Suppose the maximum cylinder pressure is 250 pounds. Then with no valve-load the tank pressure would rise to 250 pounds, and would remain at that pressure until the tank was opened to discharge some part or all of its contents. Hence, the smaller the valve-load the greater the tank pressure. Sup-

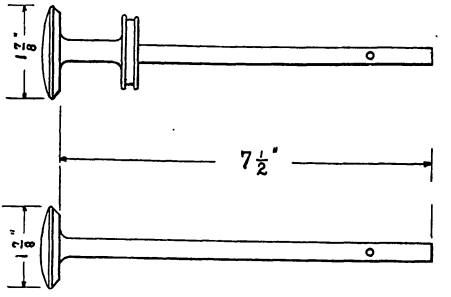

Fig. 7. Six of the 8 valves for the 4-cylinder motor are of ordinary form. The intake-valves for the starting cylinders are made with an ordinary valve head on top and a piston valve with one eccentric packing ring is formed, integrally, 1¼ inches below, on the valve stem. The piston valve slides in a cylindrical chamber below the valve seat, the space below this piston being open to the air. The comprest air from the tank enters between the intake-valve head and the piston valve, so that the air pressure does not tend to much lift the intake valve, and so avoids the necessity for a very heavy closing spring on the air-intake valve stem. See Figs. 5 and 6.

pose, now, that the cylinder pressure maximum is 250 pounds, as before, and that the valve is loaded to 125 pounds. Then the tank will be filled to 125 pounds pressure by continued working of the engine at maximum cylinder pressure and after that nothing more will pass from the cylinder to the tank, because the spring-load of 125 pounds and the tank-pressure load of 125 pounds, taken together, equal the maximum cylinder pressure.

To use this tank-pressure for starting the motor, communication is opened between the pressure-tank and the intake valves of the two rearward cylinders of the 4-cylinder motor by means of a pedal-actuated pressure valve. This starting pedal is placed about the middle of the driver's floor space, and when pushed forward the pedal opens a valve against the tank pressure and admits this pressure to reach the intake-ports of the two rearward cylinders. To prevent the tank-pressure from blowing through to the carburetor, a carburetor pipe-valve is provided and the starting pedal is so linked to the two valves as to first close the carburetor pipe to the two rearward cylinders, and then, by continued forward motion of the starting pedal, the tank-pressure admission valve to the two rearward cylinder intake valves is opened. These two intake-valve cams must be changed so as to admit tank pressure throughout the entire down stroke of each of the two rearward pistons, and the exhaust valves for these pistons must be open to the atmosphere thru the entire upstrokes of these same pistons.

The intake-cams of the forward pair of cylinders are unchanged for starting, but the

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THE FIRST REQUISITE of an enclosed car is comfort; second is elegance. The Pierce Great Arrow Suburban is last word in the appointment of a car for city use. It is upon the Great Arrow Chassis, which means perfection in runn The body is built in our own factory—that new factory which so much to our facility to produce good cars. Most of the bo aluminum, which is far better than wood, not only in looks and wear, but also in resistance to shocks. The inside of this car has every appointment that good taste, convenience and ingenuity can suggest. It offers the advantages of a well-equipped city carriage combined with a long-distance touring car, each perfect in itself, each doubly perfect in combination.

All Pierce dealers will be able to supply the latest models of enclosed cars after August first at the following prices:

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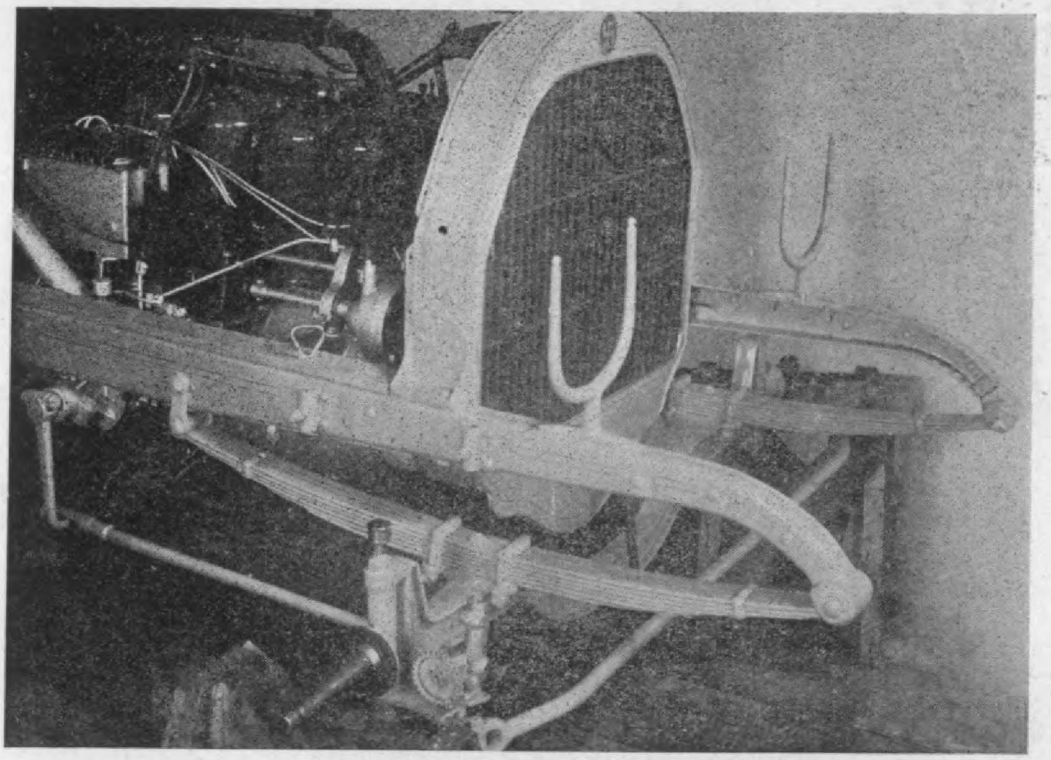
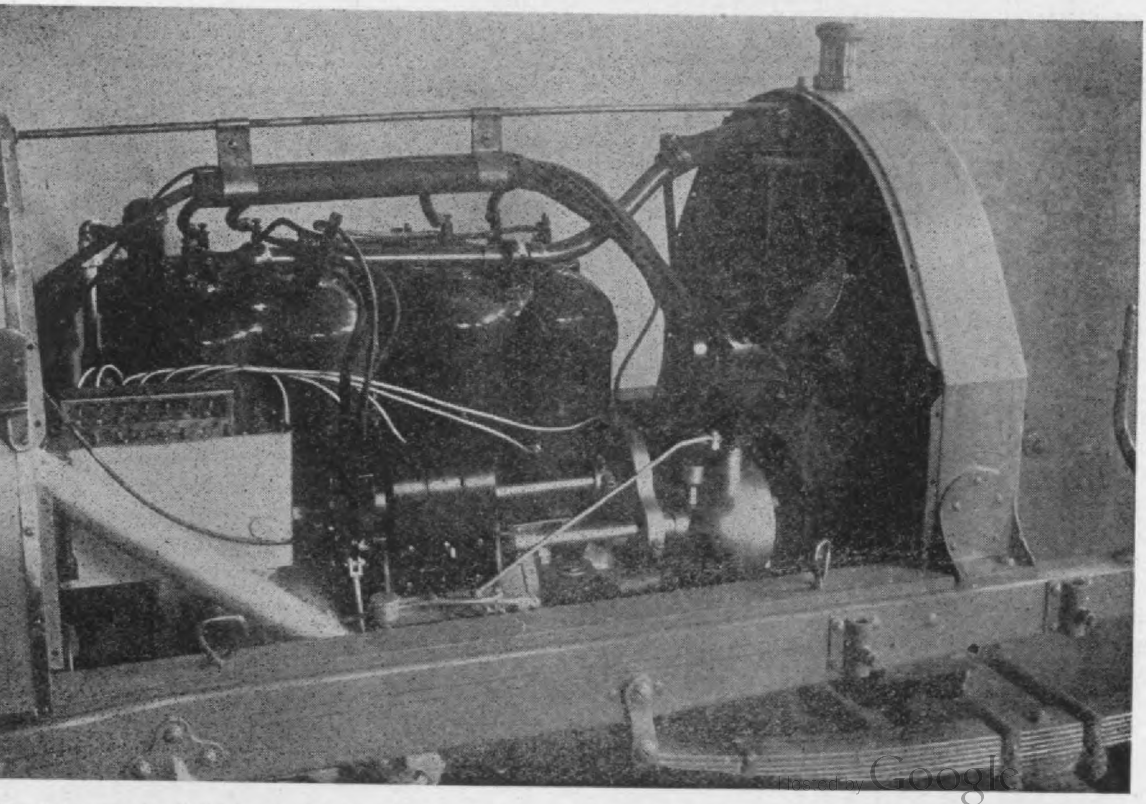


Fig. 8. Triumph self-starting car, front springs and front axle.

ch cam. These cams all have faces of e the usual width and the cam-shaft wo endwise positions, one normal, in the valves of all the cylinders are sim- returns the cams to their extreme rear position, first closing the pressure inlet to the cylinder intake valves and then opening the two rear cylinder intakes to the carburetor.



9. Self-starting Triumph, right side of motor, showing the oiler, magneto and centrifugal water

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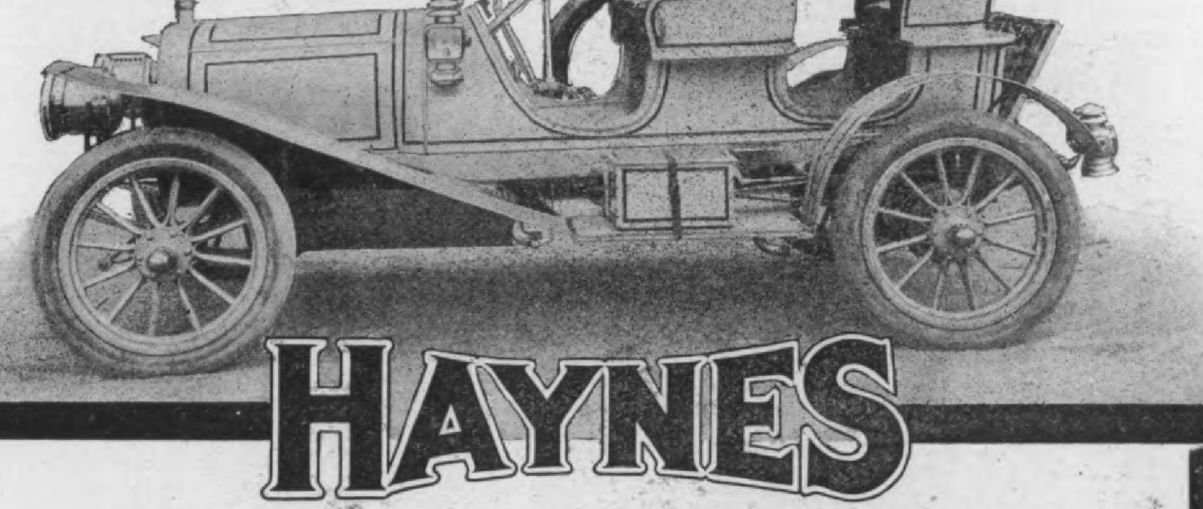

The New Semi-Racer Proves Itself

After it had been on the market less than a month the new Haynes Semi-Racer won its first competitive test in the 200 Mile Endurance Run of the New York Motor Club, June 6th. Over roads which recent rains had put in horrible condition, under conditions that required an average of 20 miles an hour, a very high average for touring, this Haynes Runabout won in its class. It reached its destination at Albany ahead of time, and in fact through a mistake of the timing was permitted to cross the line too early and was penalized. Experienced drivers said that the run was the hardest endurance test which had ever been held in this country for stock cars.

The Haynes led all the cars during most of the race, beating the high powered touring cars at most of the controls.

The chassis of this car is the same as our Model "S" touring car with all the improved and advanced features which have made our 1907 models famous. It has the patented roller pinion and sprocket direct drive, solving satisfactorily the old problems of rear-axle strains.

It is impossible for the driver to injure the car by careless or rough handling, because the master clutch cannot be made to take hold otherwise than softly, and the exclusive transmission control allows change of gear without releasing the clutch by a single movement of the hand with no possibility of burring or stripping the cogs. The Haynes positive cooling system makes overheating unknown.

Unlimited speed, perfect comfort, a silent engine, a transmission, and snappy style, and a name that is thirteen years old—these are what can be had in this new semi-racer.

No one can doubt the supremacy in its class of **"the latest model from the oldest maker."** Price $2,500.

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HAYNES AUTOMOBILE CO., Kokomo, Ind.

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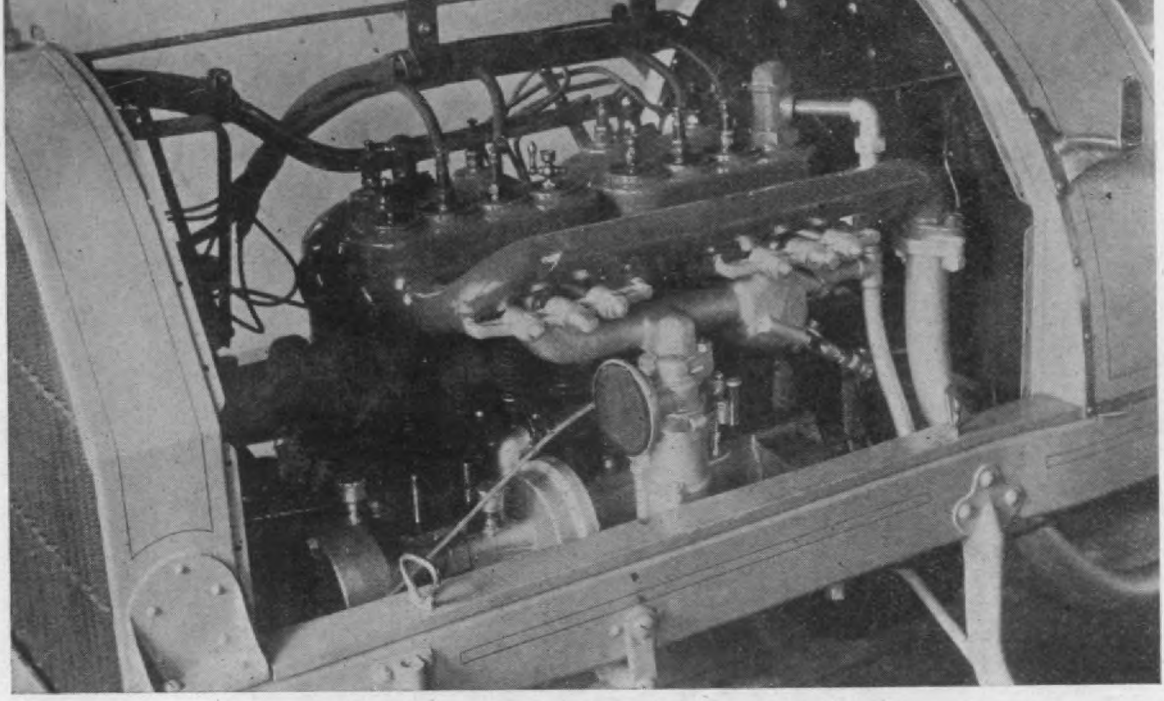
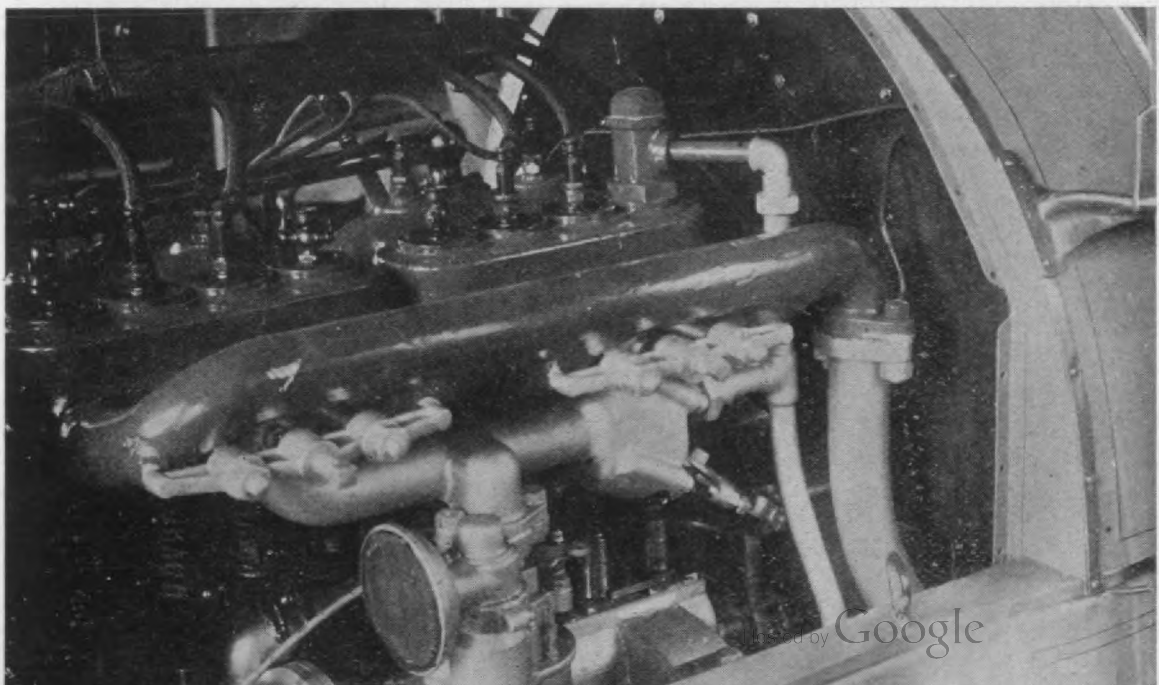


Fig. 10. Self-starting Triumph. Left side of motor, showing pressure obtaining valve from the cylinder, the carburetor, and the cylinders supply pipe, with an inclined valve chamber at the which contains the carburetor, shut-off valve closed to keep comprest air from going to the carbur while starting.

essure to the intake valves of these cylin-
ers; this same forward pedal movement
ifts the cam-shaft forward so as to work
e rearward pair of cylinders single acting
tank-pressure, while the forward pair o
linders work at half-compression, as a 4-
cle gas engine. The two forward cylinders
mmence working as soon as the pedal is
full forward, and the driver at once rele
the starting pedal, which is drawn back
rear position by its return spring, which
off the tank pressure and pulls the cam-s
back to its normal position and opens
carburetor to the rearward pair of cylin
intake valves, all in such wise as to cause
motor to run 4-cycle.

The Triumph Company will offer two m



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ar chassis has 113 ins. wheel base, and the unabout has 108 ins. The motors, self-start nd control are the same in both models.

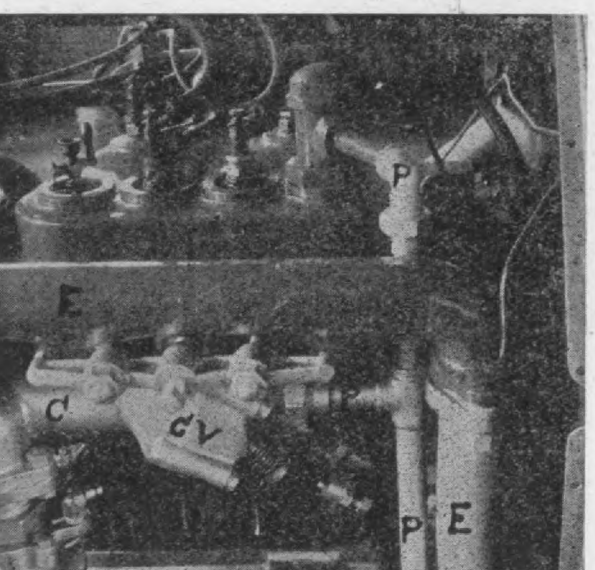


Fig. 12. Self-starting Triumph motor, left side of p, part of the rearward pair of cylinders, showing e pressure obtaining valve in the top of the rear linder, pressure pipe, P, exhaust pipe E, E, car-retor pipe to cylinders, marked C, and carburetor pe stop-valve chamber, marked CV. Pressure from e pressure tank is admitted to the carburetor pipe ar end, and this pressure must be kept away from e carburetor by the valve located in the chamber CV. his valve is shut before the pressure valve is opened start the motor.

AXLES, BRAKES AND SPRINGS.

The axles are by the A. O. Smith Co., fit-ed with Hess-Bright annular ball-bearings, egular construction.

Rear 55x2 ins., 8 leaves, tongued grooved and banded, perched in the mid jointed in front and linked in the rear

TORSION ROD.

This is of steel tube, forward and glo and placed between globed washers and ed springs in the cross-girt bracket. radius rods are used. The cardan shaf solid steel, 1½ ins. dia., with "Hartfo universal joints at each end.

CHANGE GEAR.

The change speed gear has four forw speeds and a reverse, Mercedes type, sli and selective, gear-shift lever in an H- All gears are hardened, line and side sh on plain bearings in bronze half-boxes, oil-pool and box-pocket lubrication. A w bler with ends 1½ ins. square, is placed tween the clutch and line shaft. The w bler ends are hardened and work in h square sockets.

The clutch is a reversed aluminum c 14 ins. dia., 11 deg. angle, leather fa with cork inserts, single coiled spring.

MOTOR.

The motor is Triumph's own build. ports are all 1⅞ dia., valves all integral d forgings of steel. The cams are applie the cam-shaft, held with two pins in e The pistons have four eccentric rings, above the piston-pins. The pins are 1¼ dia., with ¾ holes clear thru. These are retained to the connecting rod by pi ing in the split top-end of the rods, as pins turn in the piston bosses. The rods steel drop-forgings, with marine lower e

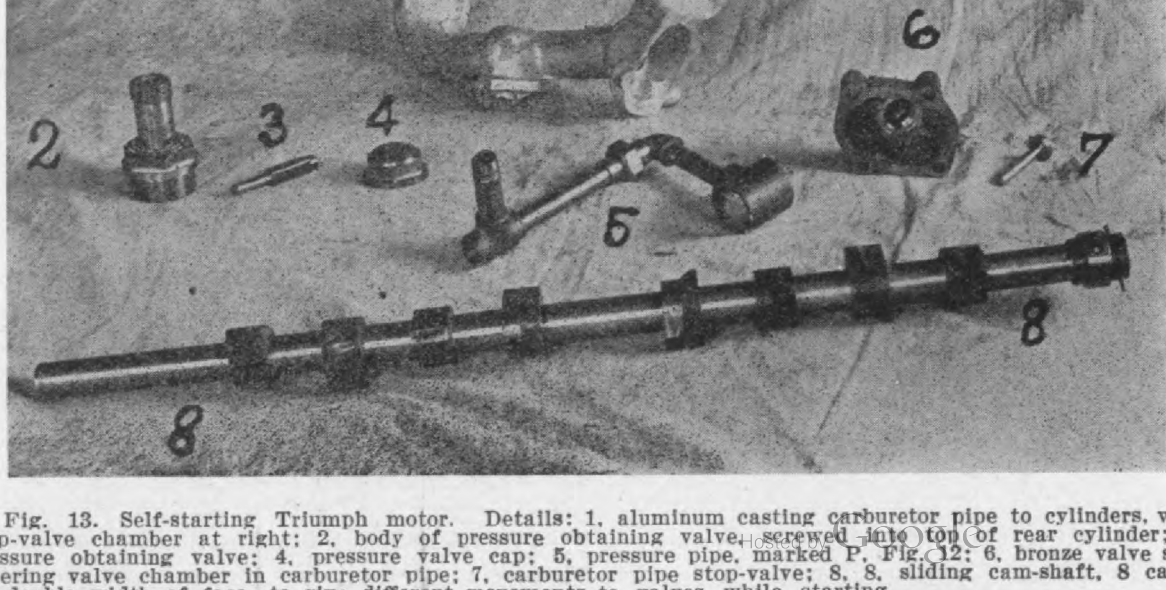
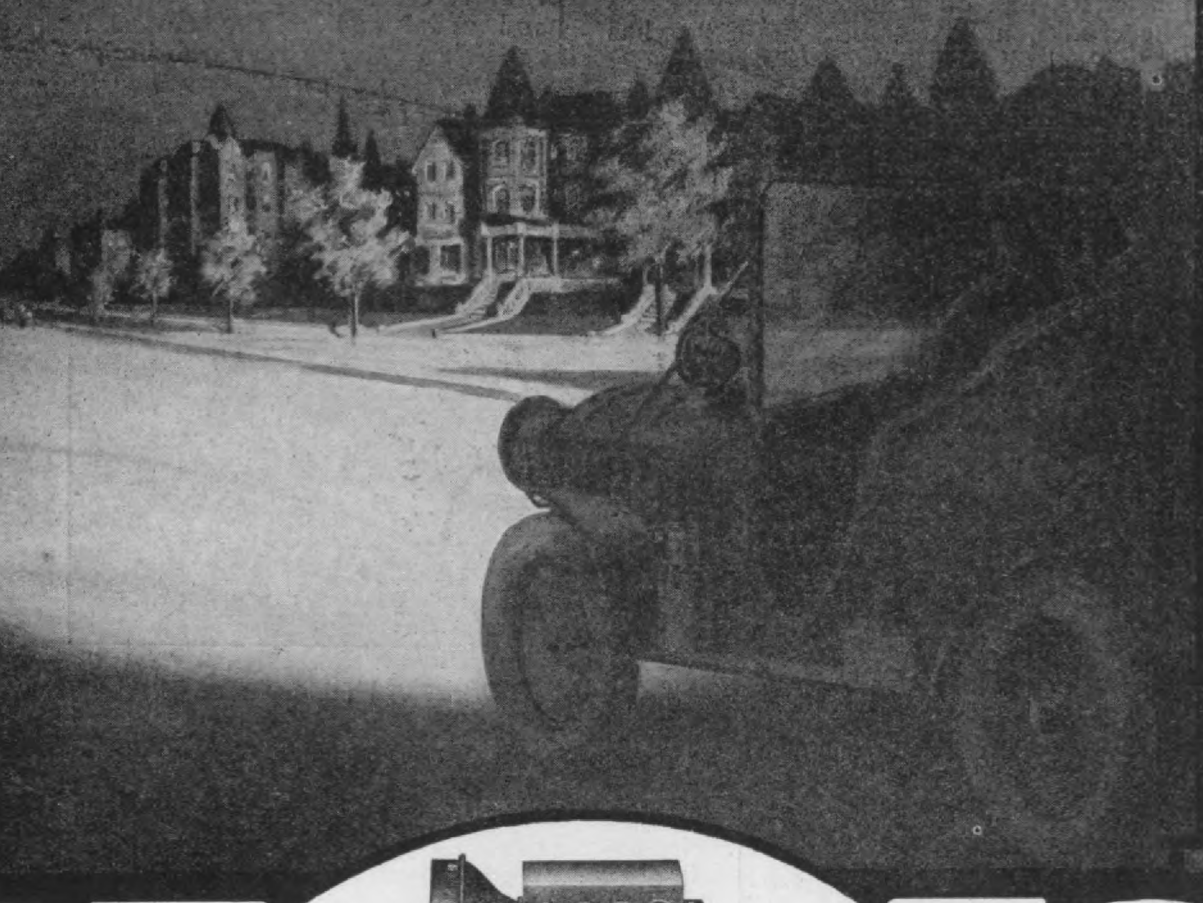
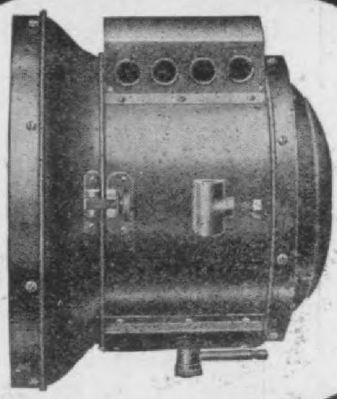


Fig. 13. Self-starting Triumph motor. Details: 1, aluminum casting carburetor pipe to cylinders, w stop-valve chamber at right; 2, body of pressure obtaining valve, screwed into top of rear cylinder; pressure obtaining valve; 4, pressure valve cap; 5, pressure pipe, marked P, Fig. 12; 6, bronze valve s covering valve chamber in carburetor pipe; 7, carburetor pipe stop-valve; 8, 8, sliding cam-shaft, 8 ca





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SOLARS are not only of simple, strong construction, but made of strongest material—heavy drawn brass. Their few parts add to their solidity. The way these parts are put together—riveted and screwed—never soldered—further fortifies Solars against the hardest knocks and jars on the road. ¶ Their construction is not only strong, but scientific. ¶EXACT FOCUS that utilizes ALL the light. ¶Each lamp thoroughly inspected before shipment. ¶SOLARS ARE THE STRONGEST LAMPS MADE AND GIVE THE STRONGEST LIGHT.

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rank-wrists, and oil is picked up by scoops n the crank-pin boxes. Each cylinder has s individual oil-lead, always covered by the iston. The cylinders and pistons are fin-hed by grinding, and the piston-pins are ardened and ground. The crank pins and

hand pedal applies the external ordi brake-shoes to the rear hub brake drum

THE CHASSIS FRAME.

This is of prest steel, by the A. O. S Company, general thickness 3-16 of an i

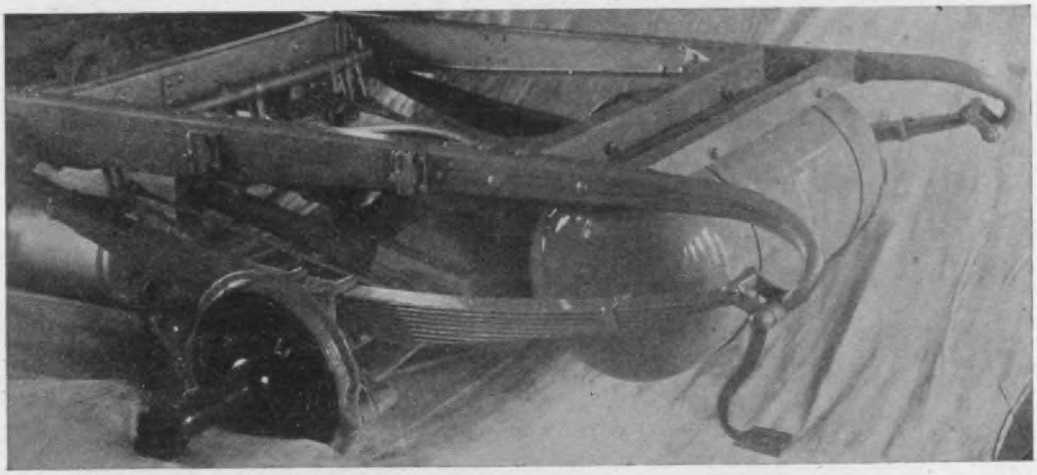

Fig. 14. Triumph self-start, chassis left rear oblique, rear axle and pressure tank.

ournals are all two ins. dia. The crank-haft is a steel drop forging, finished and round by the Triumph Company. The lu-rication is forced feed thru 7 leads with ights on the oiler tank. The water circula-ion is by a gear-driven centrifugal pump on

34 ins. wide in rear, 32 ins. wide in f No sub-frame is used, the motor base gear-box lugs reaching across and restin top of the chassis frame sides. The ch frame is hot riveted thruout and greatest depth of the sills is 4½ inches.

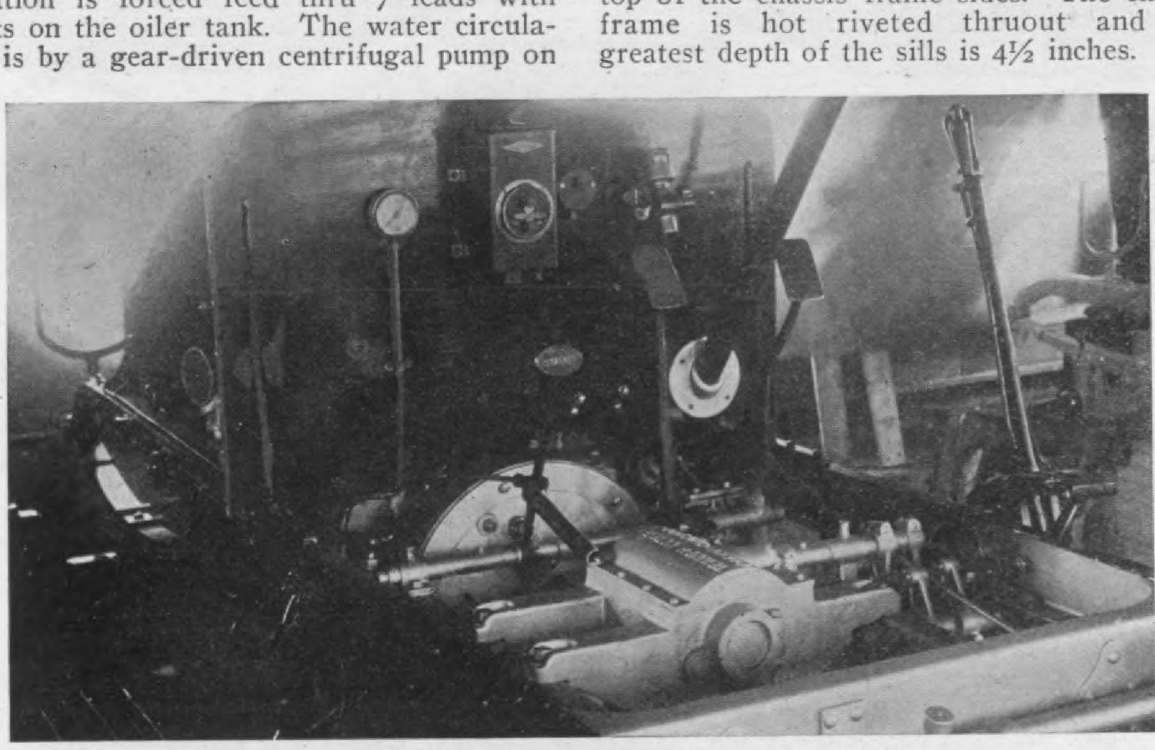

Fig. 15. Self-starting Triumph control; and middle part of chassis. The pressure gage on the f board shows the tank pressure, usually from 100 to 125 pounds or more. The left-hand pedal is pushed ward to start the motor. The control is described in the text of the story.

he magneto shaft. The ignition is a com-plete double system, Simms Bosch magneto, ump-spark plugs, storage battery and coils.

CONTROL.

running boards are Stanwood prest and are connected to the front and rear guards. The front mud guards are ca down to the chassis frame inside.

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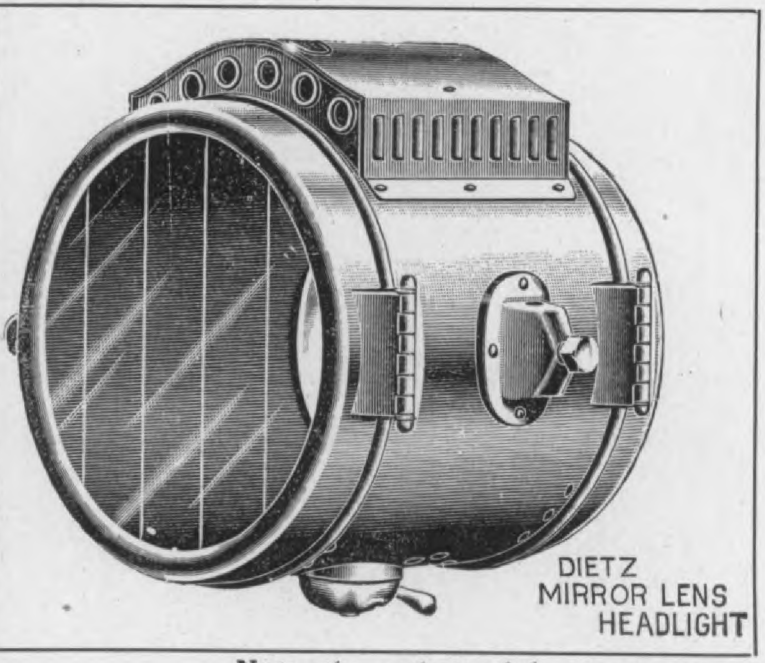

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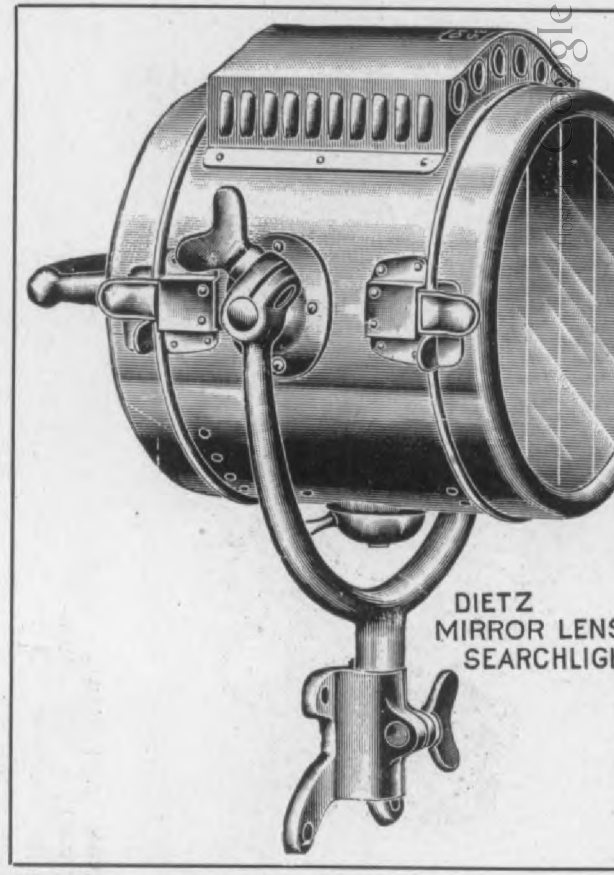

Note the substantial appearance and hinges front and back affording access to all parts

R. E. DIETZ COMPANY

LARGEST MANUFACTURERS OF LANTERNS IN THE WORLD

LAIGHT STREET — Established 1840 — NEW YORK, U

oard. It was the first really warm day and southwest wind blew warm in our faces as e wallowed thru the bottomless quag-ires which lead from Cragin Station to avement on a run to Elgin to see how the lf-starter works on the road. We drove eadily at 25 to 30 miles where unlimited, ver the rough, crooked, hilly road, and save or rather stiff rear springs and no toe-oard and occasional dashes of rain stinging ur faces, the run was a faultless demonstra-on. The 1908 Triumph motor will be four linders, 4¾x5 ins., much more powerful an the 4¼-inch cylinders which pushed us Elgin and back.

As the car had no inside mud-guards in ont and there were plenty of puddles on e way we were well splashed, tho it is nly fair to Mr. Halladay to say that he rotected the Observer's seat from mud and ater as much as he could.

The starting-tank gage showed 60 pounds the shops, and it was soon raised to a undred on the road, and there was always om 100 to 125 pounds shown by the gage. he motor was started with the car standing n the factory floor by a push of his hand n the starting treadle, which the observer id not see, altho standing close beside e car. Twice, in wallowing thro the ottomless mud, the motor was killed, and the motor was stopt by the switch self-start was prompt. We made a nun of trials of the self-starter on the re run, and in every instance where the m was stopt by switching off the current self-start was prompt.

When the motor is "killed," however, the clutch in there is a chance that the en may stop on center, in which case, of cou it would have to be slightly moved be the tank pressure would start it. But a condition is rarely met and need not considered.

With 100 pounds pressure in the tank, standing still on the road, we made successive starts of the motor, stopping motor with the switch, all of these six st were prompt. At the seventh attempt crank-shaft stopt on the first center, the self-start was completed by tank-pres as soon as the crank-shaft was moved the hand-crank off the center. The gage index dropt about 10 pounds o for each successive start. Taken altoget the self-starting arrangement showed to g advantage, and fully confirmed the observ previous opinion of its merits, and also convincing evidence of the very great venience and practical value of such a de for car-motors.

The "Stilson Six"

The "Stilson Six" is a new creation recent- brought out by the Stilson Motor Car o., 92 Renne avenue, Pittsfield, Mass., a orporation organized under the laws of the tate of Massachusetts. This car was de-gned by Clarence P. Hollister, a practical utomobile man, and financed by H. M. Stil-on, a successful business man of Pitts-eld.

room type, are placed on opposite side cylinder and are claimed to be absolu noiseless. Carburetor is of the autom float feed type. Ignition is by the jump sp system from either storage battery or tension magneto. Lubrication is by f feed, gear driven, mechanical oiler. A type of intake pipe is used which insure equal flow of gas to each of the six cy ders at the same time. Steering is by versible gear, adjustable to wear. The s

The "Stilson Six" cylinder car, 50-60 H. P., jump spark ignition; irreversible steering; tires 34x4 fr

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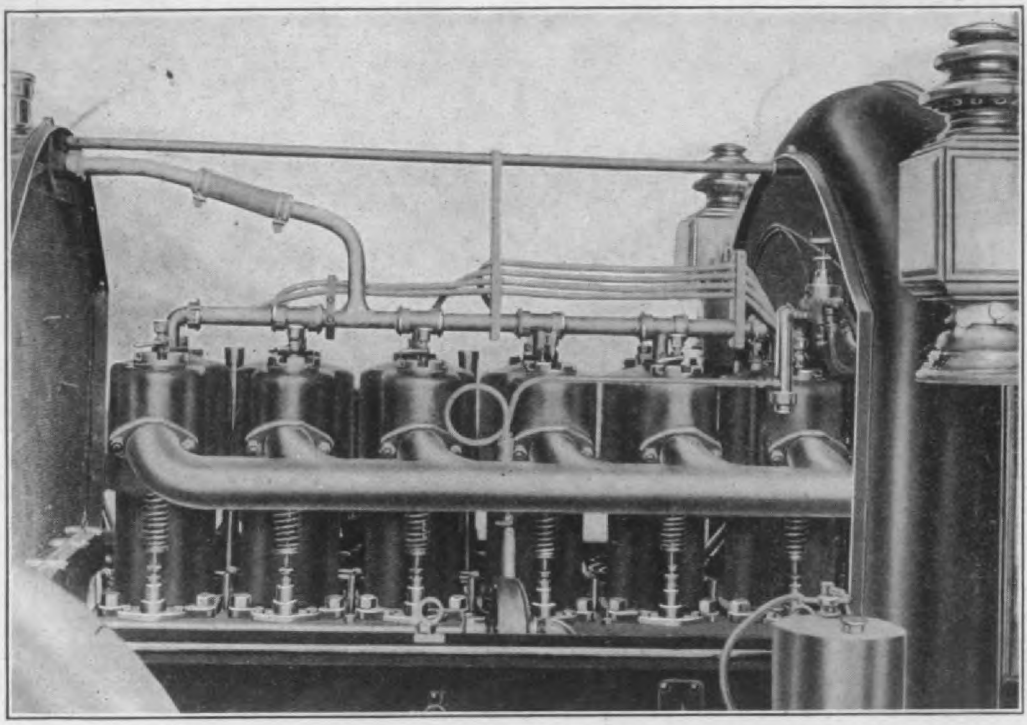
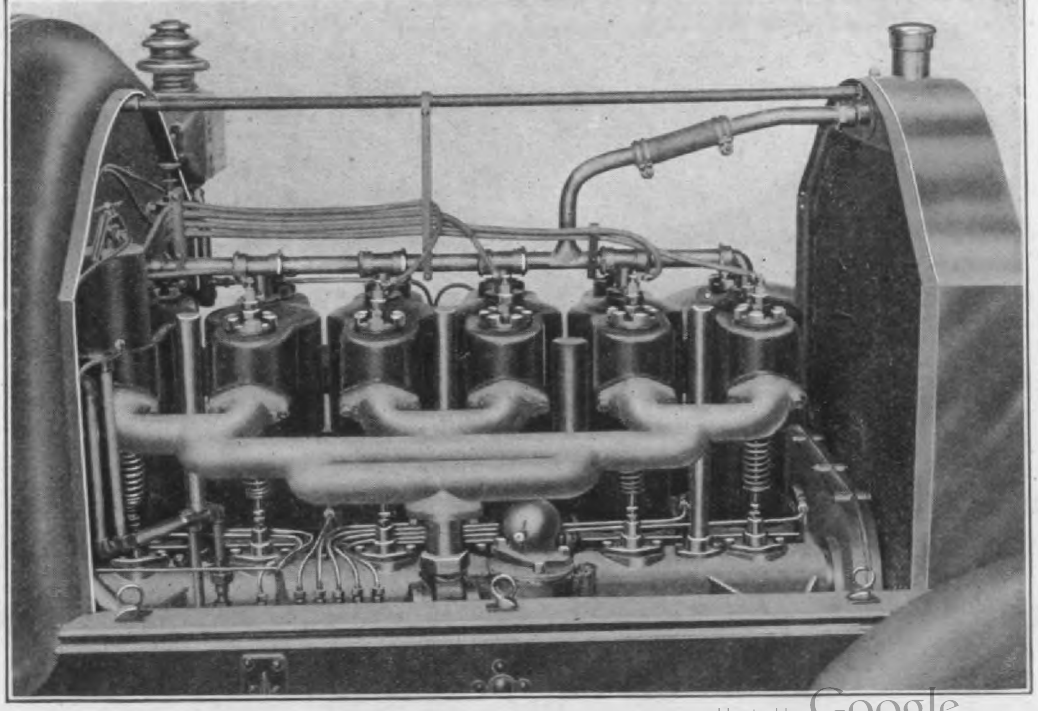
front axle is of I-beam section, nickel trimmed with black unless otherwise spec



Intake Side of the "Stilson Six."

reversed Elliot type steering knuck-
oil-tempered ball bearings. A foot pedal
ated brake is applied on rear hubs; side
operated emergency brake, and internal
nsion brake in drum on rear wheel,

fied. The price is $4500, including two larg
acetylene headlights with B. & L. mirrors
generator, two square oil side lamps, wit
red and green stripes on top of glass, o
rear lamp, autochime, clock, pump, jack, fu



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Exhaust Side of the "Stilson Six."

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THE CONOVER MOTOR CAR CO.

ng completely assembled. This "run-" operation consists of driving the

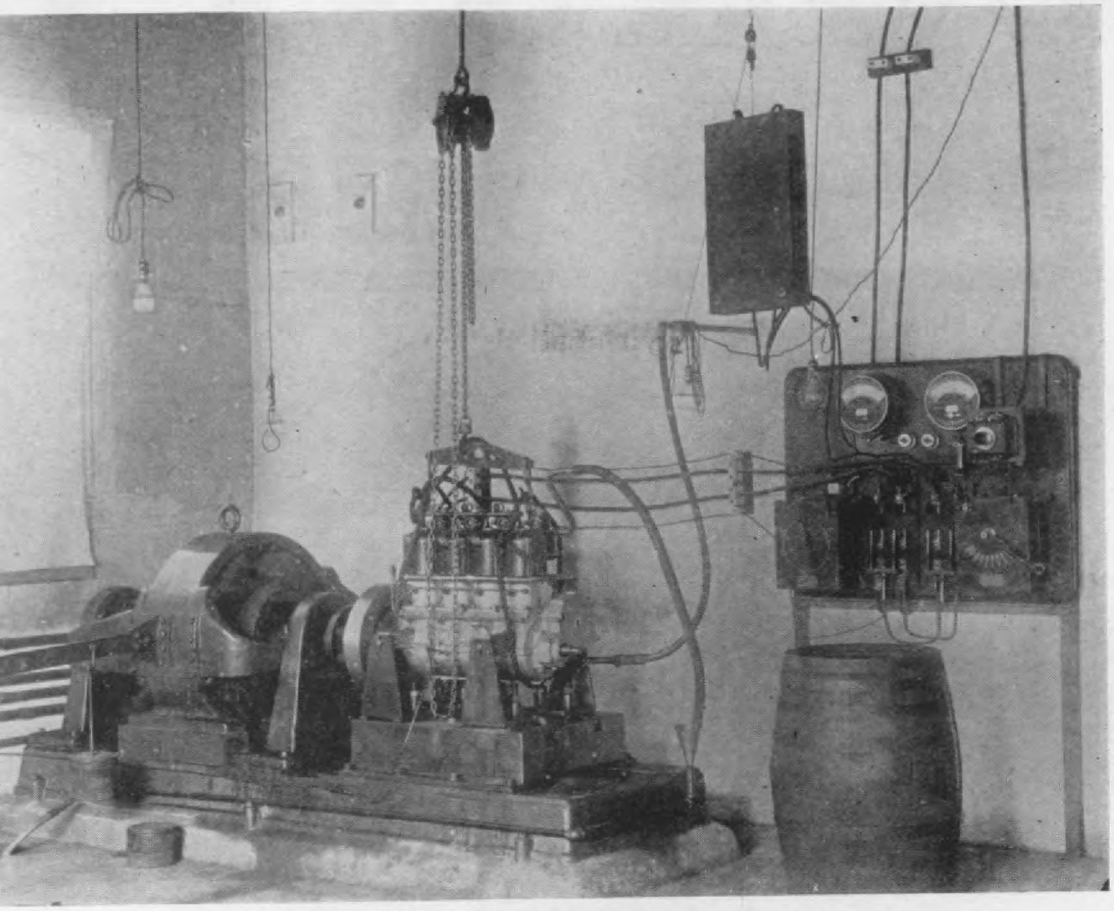
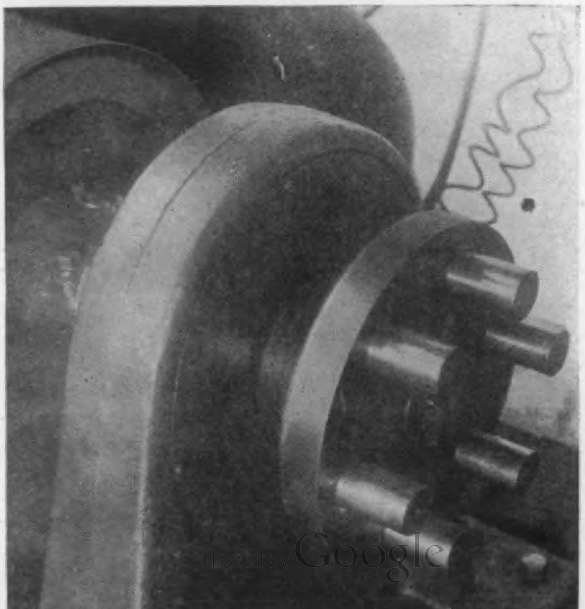


Fig. 1. Sultan Motor Testing Outfit complete with switchboard.

ted motor, often by a belt on the fly-
long enough to smooth the pistons
inders and make the whole assembly
ely and quietly. Some shops lubri-
e cylinders and pistons with pure oil
hile running in. Other makers use
brasive with the cylinder lubrication,
and ground glass being employed for
rpose. Water and oil have been used
r, in flooded supply. Pure oil is the
actice, probably.

running in, the motor may or may
pulled apart, parts wiped up and re-
led, but the next step is to start the
working itself, and adjust things so
will respond to throttle control and
iming, and then let it run for a great-
ess length of time, correcting what-
eems to need attention, and, finally,
he "tester" thinks the motor runs
ough, passing the motor over to the
assemblers without more ceremony.
ultan motors are rated at "24-32,"
none are past until after showing
H. P. at 1250 R.P.M., continuously
considerable period of time, actual

power of the motor really was, and the sales agent is equally ignorant of course, but can say "20-24" just as glibly as if he really had seen the motor doing at least 20 H. P. actual work for a greater or less time, and had hopes that when it smoothed its lumps



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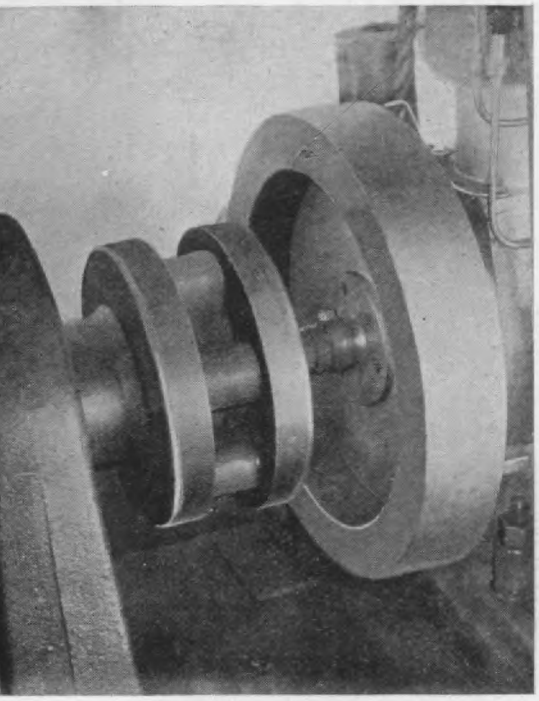
rs for a few minutes at a time, as long
e brake will run without burning.

few shops have good, water-cooled brake rigs and can really make a brake of a motor.

ne other shops have dynamos that can



ig. 3. Sultan testing plant, motor and dy-no belt-drive in working condition.

rned by the motor under treatment, ave various resistances in the way of r water rheostats.

e Sultan brake plant is shown in Fig. 1. o H. P. dynamo is journaled in a gray yoke, which in turn is on two circles of

started running, and when it responds well to control, it is coupled to the dynamo shaft and drives it against the loads hung on the weight arm. As there is no mechanical friction resistance, nothing but the magnetic resistance of the armature passing the fields, the dynamo can be driven any length

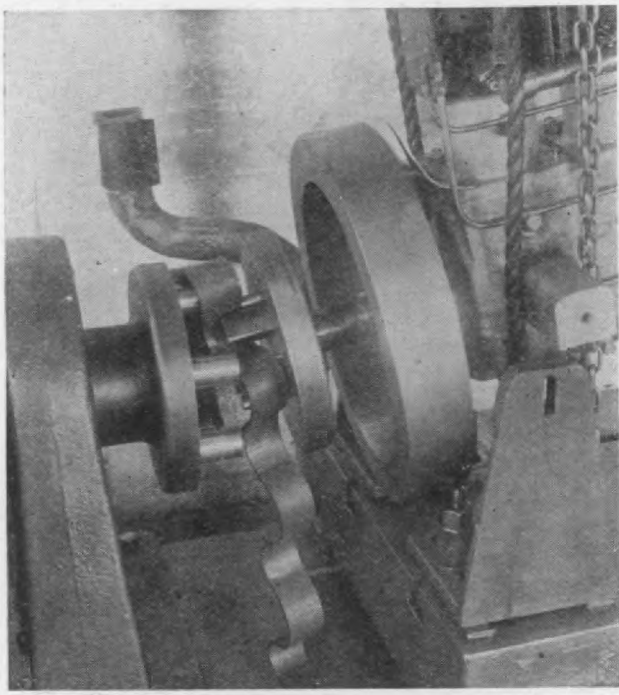


Fig. 4. Sultan motor testing plant, motor and dynamo driving members separated, and belt unlaced and hanging on the driving studs.

of time, and the motor can be given a real brake test.

The coupling between the motor crankshaft and the dynamo shaft is six round studs in one circumference in the dynamo disk, and six other studs in one smaller cir-

FRENCH	0	1	2	3	4	5	6	7	8	9
	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.	H.P.
0	0.000	9863	1.9726	2.9589	3.9452	4.9315	5.9178	6.9041	7.8904	8.8767
10	9.863	10.849	11.835	12.822	13.808	14.794	15.781	16.767	17.753	18.739
20	19.726	20.712	21.698	22.685	23.671	24.657	25.644	26.630	27.616	28.602
30	29.589	30.575	31.561	32.548	33.534	34.520	35.507	36.493	37.479	38.465
40	39.452	40.438	41.424	42.411	43.397	44.383	45.370	46.356	47.342	48.328
50	49.315	50.301	51.287	52.274	53.260	54.246	55.233	56.219	57.205	58.191
60	59.178	60.164	61.150	62.137	63.123	64.109	65.096	66.082	67.068	68.054
70	69.041	70.027	71.013	71.890	72.986	73.972	74.959	75.945	76.941	77.917
80	78.904	79.890	80.876	81.863	82.849	83.835	84.822	85.808	86.794	87.780
90	88.767	89.753	90.739	91.726	92.712	93.698	94.785	95.671	96.657	97.643

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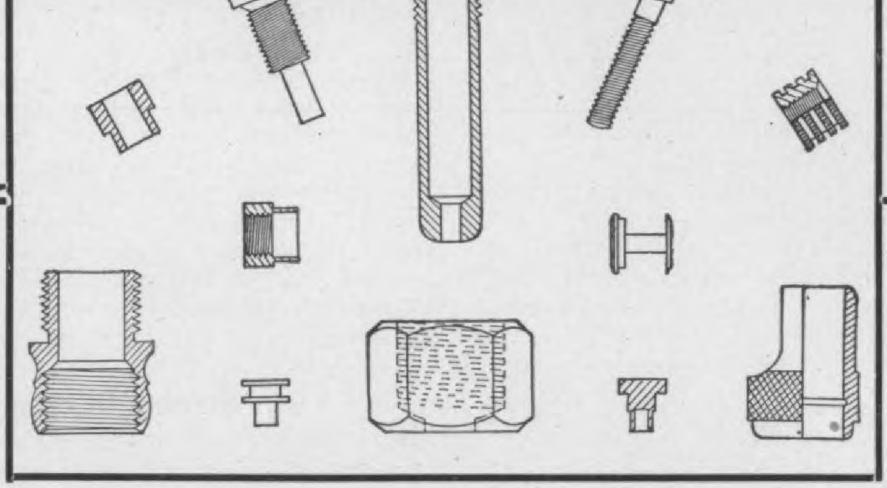
The ACME



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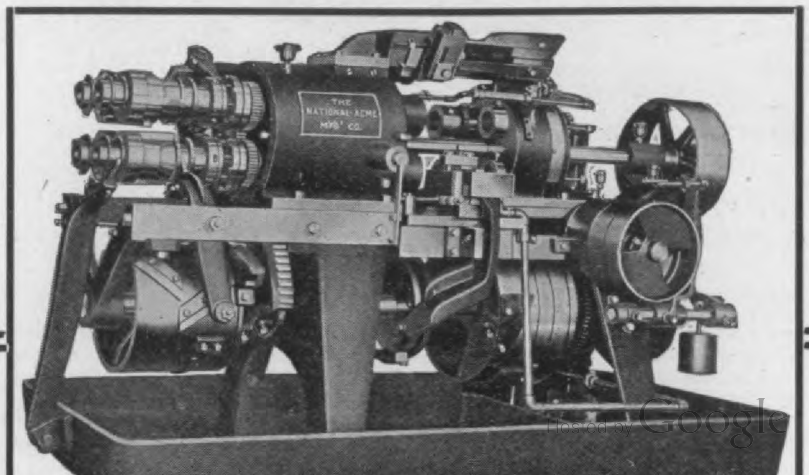

Multiple Spindle Screw Machine

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motor studs, and a leather belt is loopt around the dynamo and motor studs alternately and laced together. This makes a soft, silent drive from the motor to the dynamo, or from the dynamo to the motor.

After the Sultan motors show 32 horse power at 1250 turns a minute they each have 10 hours of run at that speed, turning the dynamo against the weight resistance, and if the motor goes thru this all right it is then past to the chassis assemblers.

The French horse power is 0.9863 of an English or American horse power, and the table here given, from a Sultan shop's blue print, translates French motor ratings into English H. P. equivalents.

This Sultan motor testing equipment was built by the Otis Elevator Company, Springfield, Mass., who are prepared to supply the trade.

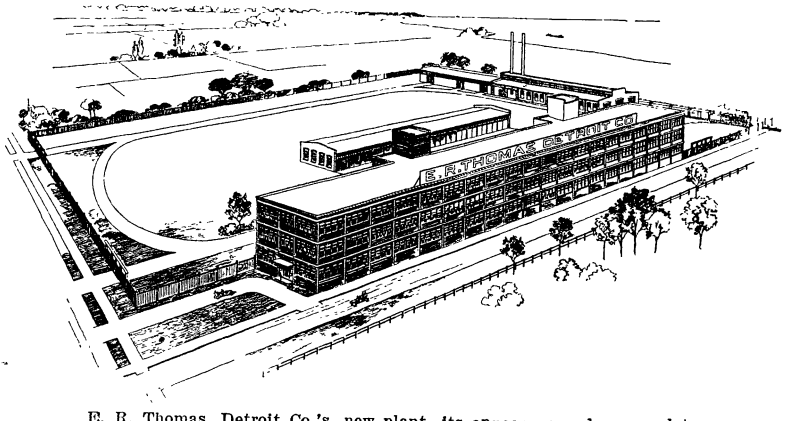
Every car-motor builder should know what his motors can really do, and with such a testing plant as is here shown there is no difficulty in finding out what a car-motor horse power really is.

Thomas to Build Entirely New Detroit Plant

The E. R. Thomas Detroit Co. recently celebrated its first anniversary by the announcement of completed plans for the erection of an entirely new plant about four miles from the present plant, which, tho in operation but one year, has been enlarged from time to time to keep the output up to the demand for Thomas Forties. The new plant will be ready for occupancy September 1, and will cost, fully equipt, $250,000. It will stand on Jefferson avenue on one of the best spots in Detroit for manufacturing purposes, and the company will have plenty of room for future enlargements. Reinforced concrete construction will be employed thruout and the unit system of building will be followed so that new units can be added as needed. The main building will be 400x60 feet, 3 stories high.

Then there will be a separate power plant of large dimensions, a stock building and a testing building, besides a large garage, thoroly equipt. In all there will be about 100,000 sq. ft. of floor space.

The accompanying reproduction shows what the new plant of the E. R. Thomas Detroit Co. will look like when complete. The Thomas people own two city blocks of frontage on Jefferson Ave., where the new plant is being built and is well under way. The construction is all of reinforced concrete. They expect to finish the plant and have machinery running by the first of September. They inform us that this year's output of Thomas Forties is now practically complete, as the last car of the season's production of 503 runabouts and touring cars will be shipt on the 15th of June.



E. R. Thomas, Detroit Co.'s, new plant, its appearance when complete.

"Reno" Fillers

Reno Brothers Paint Co., Pulaski, Penna., are manufacturing a high class filler for use by automobile builders for priming, lead coating and as a rough stuff. It is made in two grades, viz., raw and burnt. It sand papers freely, giving a perfectly non-porous surface and allows the varnish to retain its lustre for a great length of time, it is claimed. The burnt is made by roasting it several hours in ovens, at a high degree of heat and makes a very desirable ground for lakes, carmines, vermillions, etc.

Motorists in taking their own cars apart should be careful to mark every bolt and nut so as to put it back in the place it was taken from. It does not do even to mix bolts of the same size. For the small parts envelopes afford a convenient means of keeping them separate for identification, but the use of shipping tags is safest for most parts. The projecting ends of bolts should be wiped before taking off the nuts. Unscrewing and screwing with dust and sand on the thread is bound to result in cutting down the thread and may be the cause some day of an unfortunate breakdown. Before mounting the nuts a rag should be passed thru them, and, as a further precaution, a drop of oil or a little grease should be put on the ends of the bolts.

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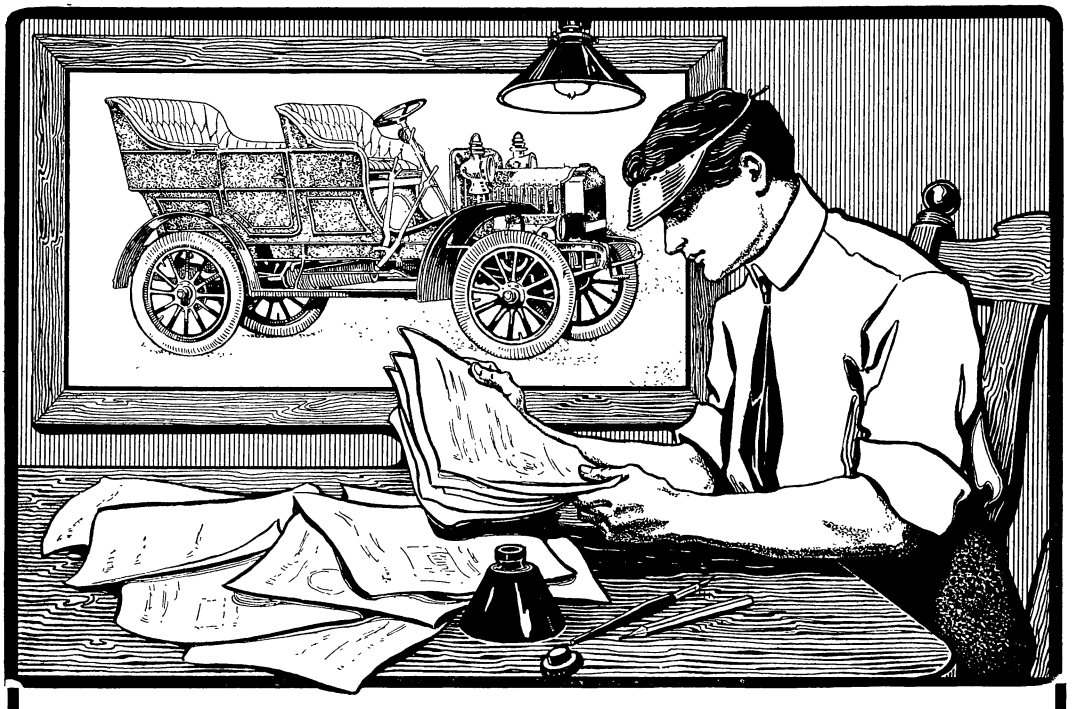

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The success of these lectures has been so pronounced, since we first announced them in this publication a short time ago, that we have had a hard time in keeping up with our orders.

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These lectures embody advice worth a lot of money to anybody interested in an automobile.

An unusually valuable feature about this series is that they are illustrated with about **fifty original drawings** of motors, parts, etc. No automobile owner, driver or student of automobile construction can possibly afford to be without this remarkable set of lectures.

Instead of costing from $25 upward, as the ordinary course in a correspondence school does, and instead of requiring many weeks for completion, this course may be obtained **complete, for only $5,** and take only so long to learn as the student chooses to take in learning them. Accompanying the course is "The Making of An Automobilist," by H. A. Grant. It is a fine book of 141 pages, fully illustrated and bound in Morocco.

We make a special offer to owners of Maxwell cars who will write to us giving the number of their car, and date of purchase. To such owners we will give the complete outfit for only $3.00, to cover cost of printing, binding and mailing.

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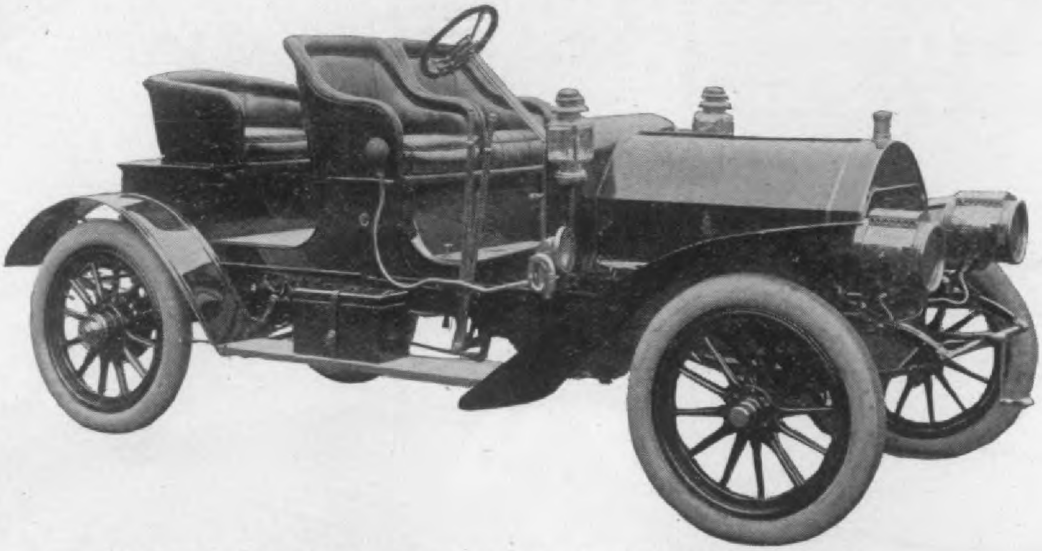
umble seat runabout and two touring cars. The new type of three-passenger rumble eat semi-racer runabout is of very hand-ome design and rear seat is so located that s occupant is relieved of any unnecessary

The construction and adjustment of shaft prevents undue noise. The fram heavy prest steel. The transmission is simple and bolted to the flywheel hou The gears are of chrome nickel steel, e



St. Louis Semi-Racer. Same chassis as Type XVII touring car.

r caused by the mechanical placement of rings. Enclosed mud guards are fitted. he rumble seat is securely fastened to a ox which is used for tools, etc. The fin-h is cardinal red striped in black.

St. Louis Type XVIII is a light five-pas-enger touring car with twin cylinders, water ckets integral extending around valves;

large face, three speeds forward and reverse being provided. The front axl the I-beam type, heavy steel forging; knuckles are extra heavy, Elliott patt The steering gear is of the rack and pi style, successfully used for last five ye The rear axle is floating type constru in their factory.

St. Louis Type XIX touring car; 50 H. P., 4½x5½, 4-cylinder motor.

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General Agents for Central Pennsylvania

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Gentlemen:—In our recent Endurance Run, pulled off under the most trying circumstances, the roads being notoriously bad, and the weather worse if possible, we had on the White Steamer, Car No. 6, a valuable demonstration of the advantages of the Q. D. Rims. The time required in repairing our first puncture was not measured accurately, but we repaired the second one, and were again in the race, after four minutes. We next found a ten-penny wire nail driven in clear to the head. In this case, we took the tire off, put in a new tube, inflated it with the air pump of the car, in three minutes by the observer's watch, which we believe was "going some" in this line of work. *Our less fortunate competitors were, in many cases, three times that long in doing the same work.* Some cars in this run suffered as many as eight punctures and blow-outs, which accounts for the many bad scores shown on the Official record, and we considered ourselves fortunate in having Goodrich Q. D. tires.

Yours respectfully,

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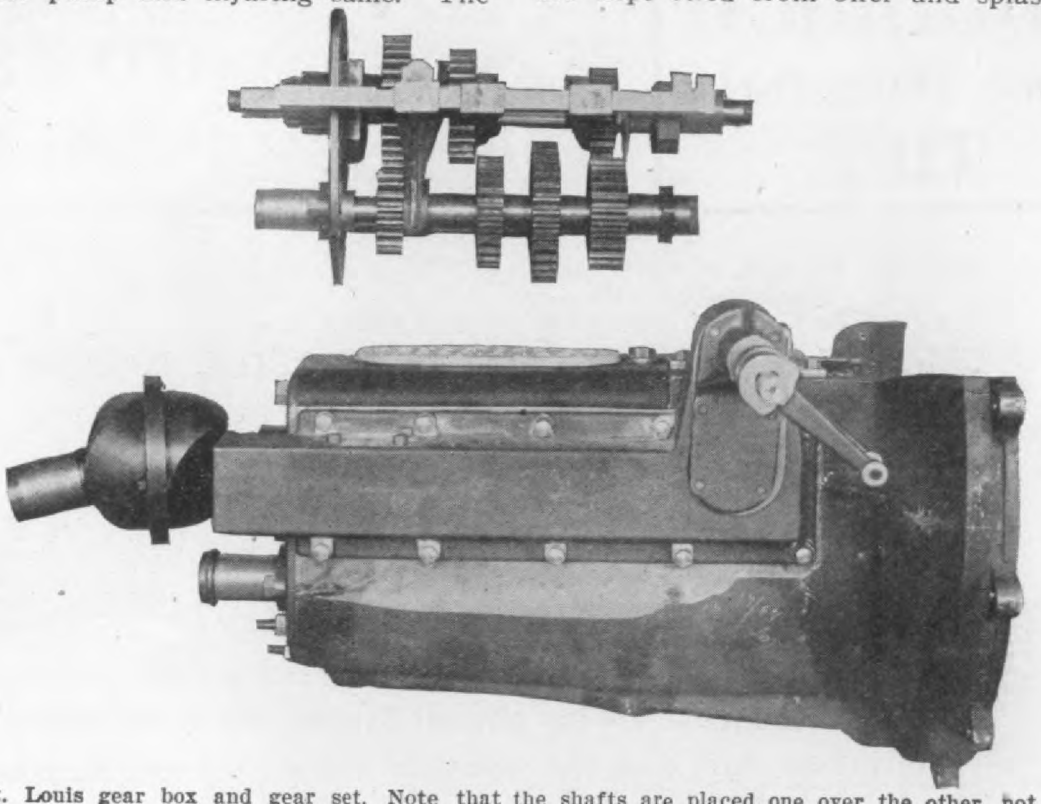
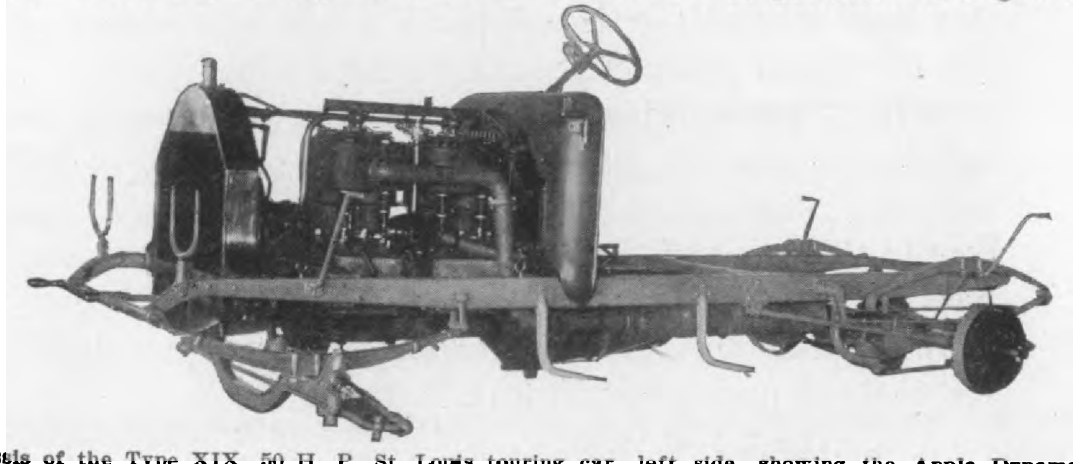
is strained in radiator and just ahead of pump which prevents any foreign particles getting into pump and injuring same. The crank case. Both front and rear bearin of the ring oiler style. All working are kept oiled from oiler and splash



The St. Louis gear box and gear set. Note that the shafts are placed one over the other, not in same horizontal plane as is usual.

gears that operate cam shaft are encased and run at all times in oil from the splash system. The pistons are all hand scraped and crank shaft is of special high-grade carbon steel made from solid slab, sawed to shape and ground to finish. The connecting rods are of steel, H type, made especially for the St. Louis. All bearings thruout are of case. The connecting rod bearings scoops located at the bottom which g oil and forces same into bearings.

The ignition is by high tension cu from a storage battery on the running thru a multiple unit coil placed on the All cable is encased in fibre tubing. engine is well protected from grit and



Chassis of the Type XIX, 50 H. P. St. Louis touring car, left side, showing the Apple Dynamo, ball bearing, flexible driving shaft and the scroll end full elliptic rear springs.

of Parson's white metal bronze and all extra large diameter and length giving free movement to all parts.

The crank case is of the one-piece type made accessible by the large hand hole cov- by a metal pan.

SPEED CHANGE GEAR.

The transmission gives three speeds ward and reverse and is of the sel type with extra large face gears of ch

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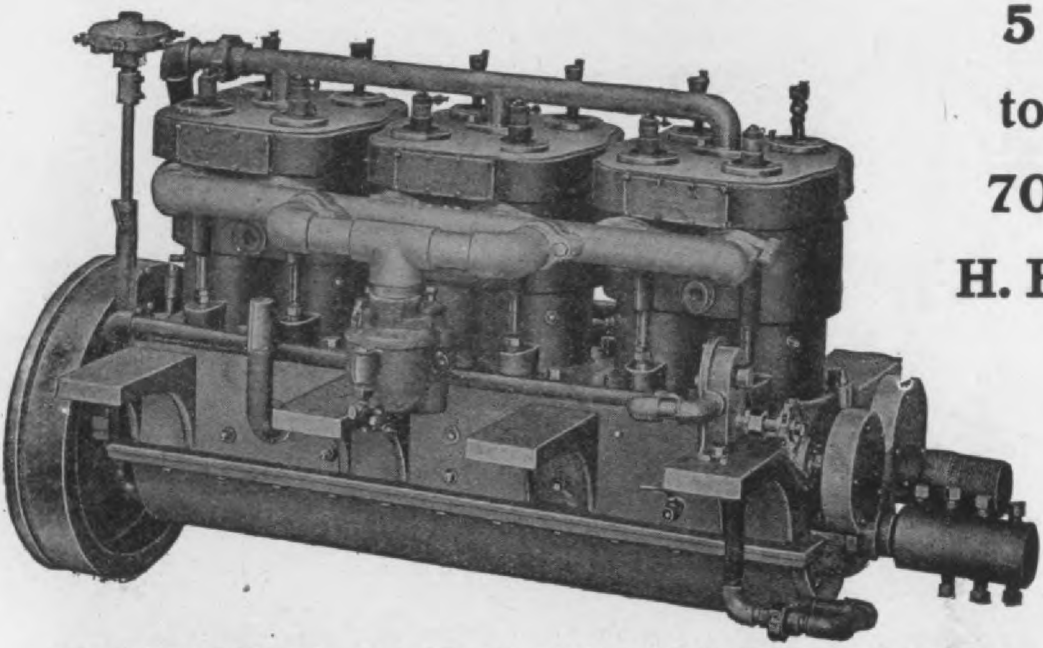
Motors

5 to 70 H. P.



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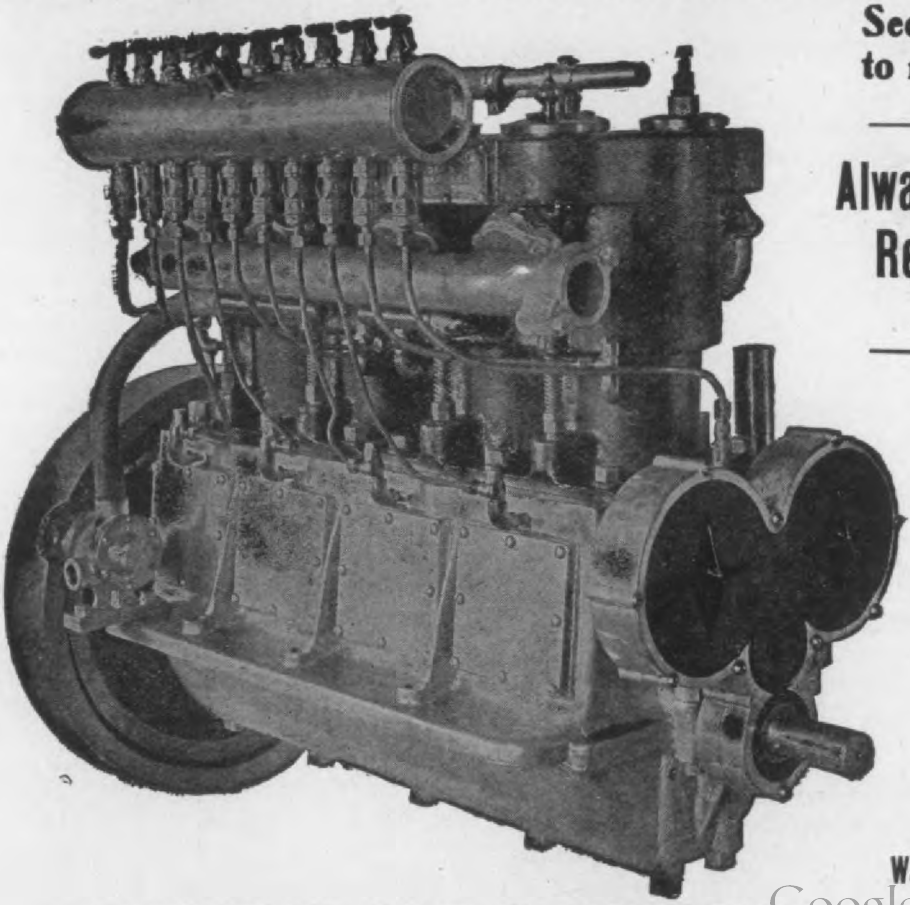
Always Reliable



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Air and Water Cooled.

4 CYLINDER, 35 H. P. MARINE MOTOR.

TRANSMISSIONS and CLUTCHES for AUTOMOBILES and MOTOR BOATS

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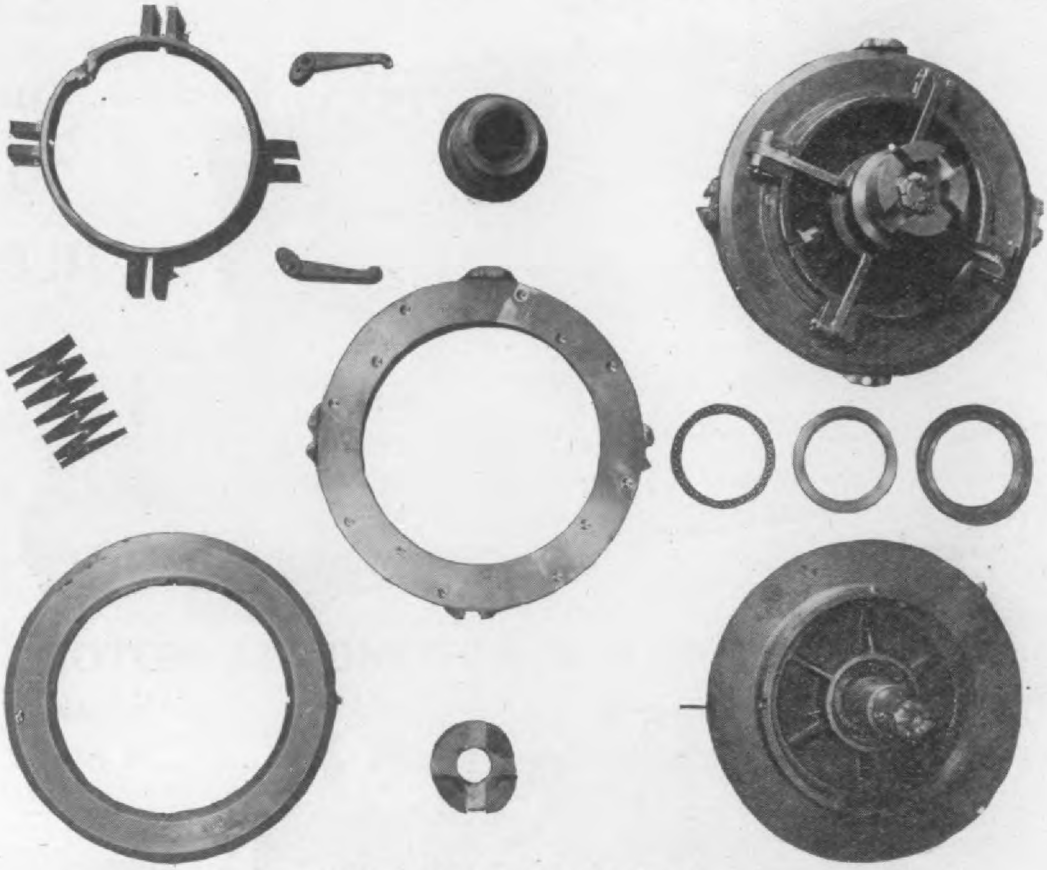
rge self-contained spring which forms ressure on dog arms causing outside steel lates to clamp bronze plate when motion f car is desired. It is positive under all

rear by scroll elliptics, 8 leaves, 40 in long, 2 inches wide. Drive is by shaft ec at transmission and rear axle ends Hartford Universal joints. Wheels are x4½ equipt with any standard make



Details of the St. Louis Clutch.

nditions and instantly releases if necesry. Wear is taken care of in the conruction of the plates. Large ball thrust llars are placed on shaft to relieve end rust. The foot pedal in releasing clutch plies brake on transmisison so that should ange of speed be desired the spinning on

tires. The brakes include transmission b brake, also double rear axle brake, b internal expanding and external contrac brakes, acting on inner and outer faces drum. The rear axles are special Tim construction, front of drop forging, I-b type, extra strong knuckles.

Bevel-Edged Front Glass

Having recently ridden on a fine car, inded to be elegant throughout, in which e front glass, in front of the driver, was veled for about an inch all round inside e sash, it seems needful to mention this ror, as thick panes of glass are so genally beveled, and the beveled edge adds so uch to the appearance of the window that hers may once make the same blunder, ough no one would be likely to do it twice. am not very familiar with front-glass cars, t have never before noticed the bevel edge ywhere, and presume that the flat pane of ass is the rule, and it may be that the vel edge has never been placed on the

tions, and is therefore highly objectional

The front glass should be perfectly p flat plate, as life often depends on driver's correct judgment of the distance tween himself and other objects, either tionary or in motion, and anything wh misinforms the driver as to the true loca of objects on either side of him should carefully avoided, and instantly remo when discovered. I may add that the signer of the particular car referred to not seem to regard the beveled edge of front glass as a serious matter, hence warning may be useful to others who do fully appreciate the possible results of a driver's misplacement of objects with wh

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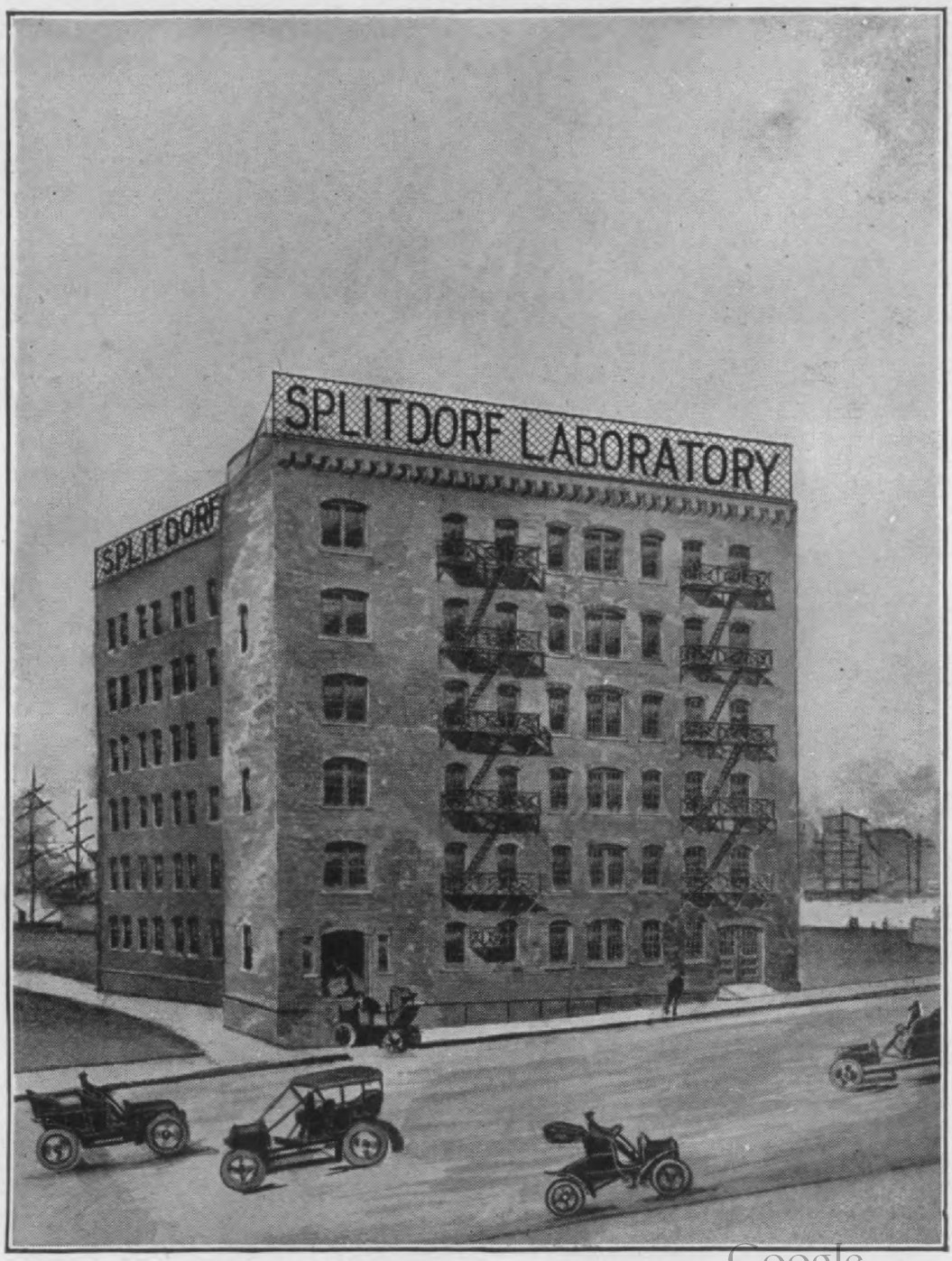
The Most Complete of its Kind in the World.

We have removed to our new factory, built especially for us, containing over 50,000 square feet of floor space, and equipped with every modern appliance for the production of the famous SPLITDORF PRODUCT on a larger scale than ever.



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C. E. SPLITDORF

Ford Motor Co.'s Factory—Assembled 6-cylinder Ford Engines with transmissions ready for the Assembling room.

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All Tests Show That Our

ALUMINUM

CASTINGS

are Superior in every respect

High Tensile Strength.
High Elastic Limit.
Greatest Resistance to Vibration.
Low Specific Gravity.

We also make Manganese Bronze Castings from Parsons or our own Alloy.

Syracuse Aluminum & Bronze Co.

530 LEAVENWORTH AVE.,
SYRACUSE, NEW YORK

Thomas J. Wetzel, Eastern Sales Agent, 29 W. 42nd Street, New York City.

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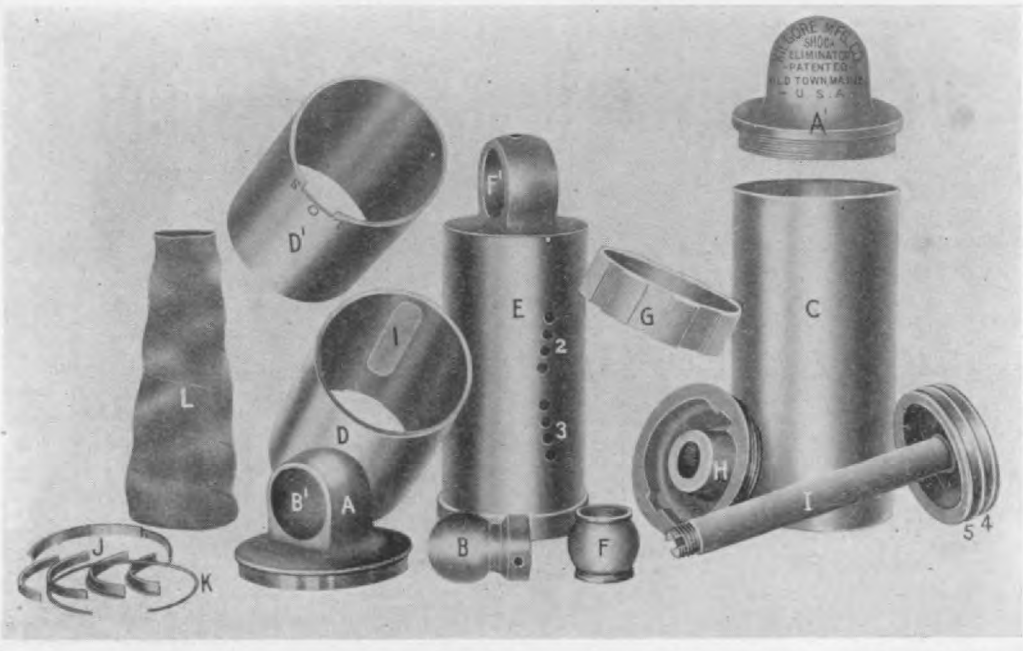
changed and improved. This air-oning device, as described in our issue n., 1907, page 324, consists of an air-tight ze cylinder, in which a piston moves ward and upward with the action of springs, the inclosed air by-passing end to end after cushioning and ab-ng the shock. On smooth roads the ssing action is unimpeded, allowing prings free action, but for excessive ons the cushioning effect increases ressively. By the new arrangement y-pass holes the instrument can be ly adjusted, not only to the load or nt of car, but to match the strength ength of stroke of the springs.

e constructional changes will be ght out in describing the action of the ument as now put out. In the accom-

But if the piston is forced down by heavy shocks so as to cover some of the holes, then its downward motion progressively cuts off the air exit and increases the resistance to motion in proportion to the spring compression. If the shock is severe enough to force the piston below the last hole the confined air acts as an elastic cushion, preventing the spring from going too far, thus taking the place of the usual rubber bumper. On the return the comprest air at the bottom first assists the upward motion, but only enough for the springs to open sufficiently to take another shock if there should immediately be another; then the upward motion is resisted, preventing the unpleasant and destructive upward toss so often noticed by tonneau passengers. This action is ef-



Parts of 1908 Kilgore Pneumatic Shock Eliminator. A and A' upper cap. B steel ball, which rests B', the socket of hard white bronze. C, outer shell, which screws to A. D and D' views of adjustable ve for regulating air vents. The by-pass slot in it is shown at I. E, working cylinder. F, steel ball r attachment, and F', its socket of hard white bronze. G, wooden guide ring. H, cylinder cover. iston. J, one of the sectional piston rings. K, piano wire piston ring spring. L, flexible piston rod protector. 2 and 3 are the new by-pass holes in the piston E.

ing cut C is the outer sleeve, into the of which the cap A, which carries the ened steel ball B, screws. The bear-for this ball joint, which replaces the universal joint previously used, is of white bronze. The ball B is carried fixture on the automobile frame and pivotly supports the outer casing C. piece E is the actual cylinder, in h piston I moves, the piston stem be-guided by the heavy cap H, which vs into the end of the cylinder. In ide of E are two sets of four by-pass 2 and 3, which take the place of the

fective, as only one hole at a time is open ed, to allow the confined air at the top egress into the bottom of the cylinder, but as the motion is checked and the spring tension is gradually reduced, the holes are also gradually uncovered.

It will be noticed the holes are not drilled along an element of the cylinder, but in a slight curve, so the by-pass slot I can be so turned by moving sleeve D that the end holes are covered, thus giving the piston only a short stroke before confined air of the ends is encountered, or if set so the middle holes are first covered, a long

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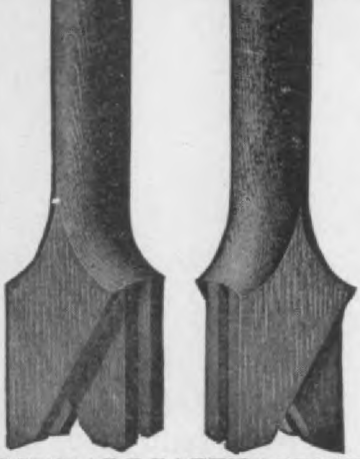

SCHWARZ PATENT SPOKE

The SCHWARZ WHEEL

FINISHED WOOD WHEE

The tenons of the spoke are grooved and mortised for interlocking.

They are put together at one time, under pressure.

WHEEL COMPLETE

The whee can be mad complete an shipped withou the hub.

For Automobiles and Heavy Vehicles. The best and strongest artillery wheel made. Spokes can never loosen. Wheel wil stand where every other fails.

APPROVED AND ADOPTED BY LEADING AUTOMOBILE MANUFACTURERS

Send for illustrated booklet.

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it outward. These rings have been ly tried out, and found successful in ock-absorber for saw-mill platens or ages. The piece L is a flexible leather protector, which prevents the en- e of dirt, and G is simply a hard- l guide, which slips over E and slides at the same time acting as a dead- to any metallic sound of the cylinder.

he "Comstock" Shock Absorber

e accompanying cut shows the "Com- " hydraulic, automatic, self-adjusting absorber, manufactured by Herbert omstock, 1775 Broadway, New York its most important feature being that l take up and completely neutralize the or expansion of the springs which vs immediately after the down shock ompression. It also permits perfect om of springs on good roads, being ght into play only when springs are itted to abnormal strain.

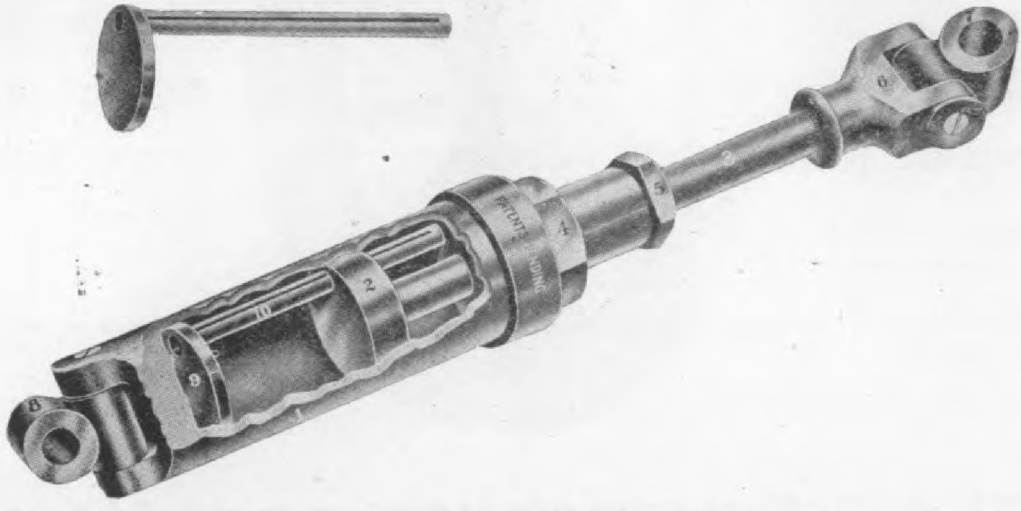
shock is entirely eliminated. The action of the recoil which starts the plunger up again forces liquid downward thru top of, and slot in valve tube, and as there is a space of about ¼ inch between the top of valve tube and bonnet or cylinder top, the oil being forced beneath recoil valve unseats it, and permits the plunger to return quickly enough to entirely eliminate the recoil.

It is claimed to work perfectly on any and every type of car made, if properly applied at the correct angle of 45 degrees.

"Marceline" High Speed Tool Steel

The Marceline Tool Steel Co., 20 Vesey street, New York City, are offering automobile manufacturers a new product known as Marceline High Speed Tool Steel.

The main advantages claimed for this steel are a considerably lower hardening temperature than has been heretofore obtained, a toughness in the structure which makes it extremely desirable for all formed



The "Comstock" Hydraulic, Automatic, Self-Adjusting Shock Absorber. 1, cylinder; 2, plunger; 3, plunger rod; 4, bonnet or cylinder top; 5, packing box; 6, top knuckle connection; 7, top universal knuckle; 8, bottom universal knuckle; 9, recoil valve; 10, recoil valve tube, (open at top.)

e shock absorber is fitted to the car by s of specially designed attachments and ed with universal knuckles at top and n, to prevent attachments breaking un- ide-sway of the car.

e device consists of a cylinder (1) in the plunger (2) moves back forth. Near the periphery of the er (2) is a hole thru which the slotted valve tube (10) passes. The area of pening in top of recoil valve slotted (10) is equal to about one-half of the of the entire slot. The diameter of the valve (9) is slightly less than that of

tools, and the softness of all shapes which would be made into milling cutters, drills etc., at a correspondingly great saving in manufacturing. It requires no special treatment of any kind, so that any tool maker can produce high grade tools without special instructions. This stock is furnished so that it can be readily cut with a cold chisel. It is uniform in quality and be hardened equally well by air, in oil, or air blast.

Breeze Carburetor Co., Newark, N. J. have removed from 28 Maine street to 276 Halsey street. The Breeze Carburetor

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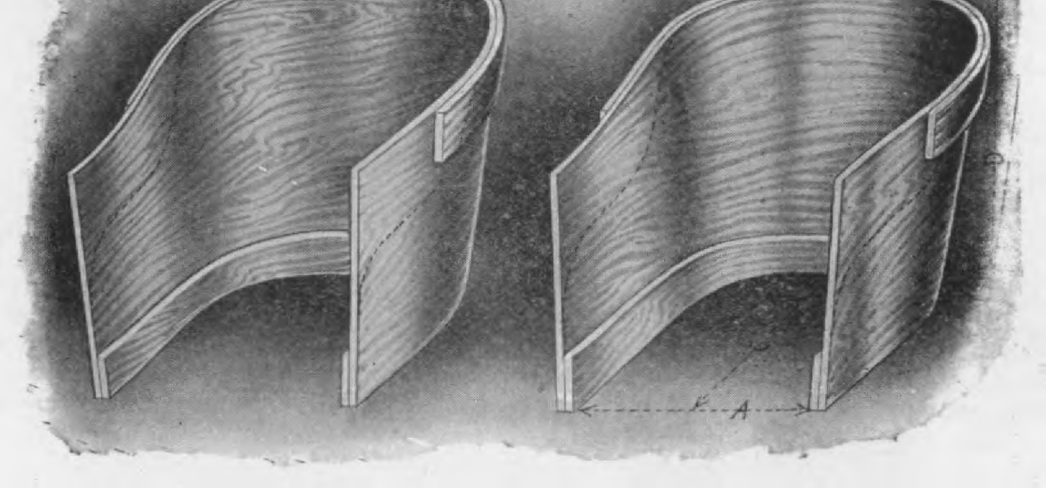

BENT SEAT PANELS

The LIFE of your Automobile Body is es sential—and the CONSTRUCTION the Essen tial of its Life.

¶ Our Bendings constitute nearly one-thir the entire construction of the Body. What coul give you better service than solid one inch popla bent in your own seat shapes?

¶ In One Piece Panels there are no joint to open.

We are now contracting for next season's deliveries. Let us hear from you.

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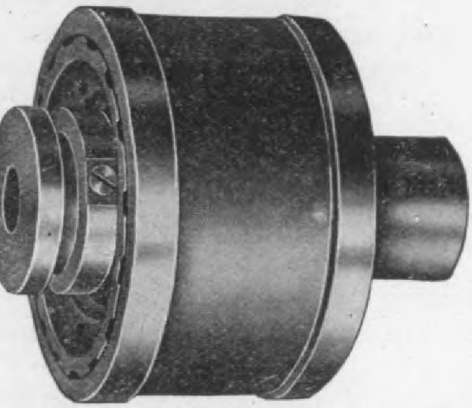
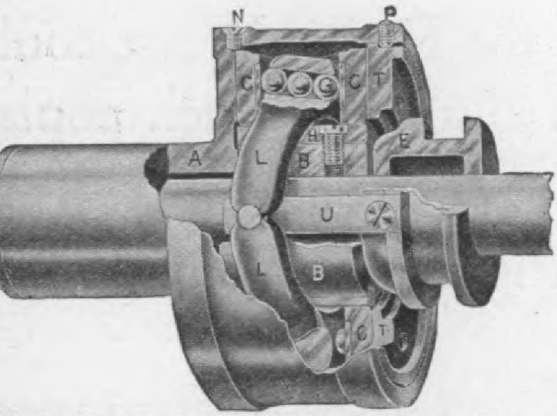
kron Clutch Co., Akron, Ohio, offer utch herewith illustrated. The double rictions with the roller toggle operat- evice are the principal working ele- contained therein, of which they claim ller toggle principle to be an entirely feature of clutch construction with



The "Akron" Clutch, exterior view.

construction and operation of the is as follows: The clutch consists of m "A" carrying a hub to which pul- ears or sprockets may be keyed. One "T" of the drum is separate The may be adjusted by means of the te head, which is screwed into lrum nd provided with notches into which int of locking screw "P" may engage. itch of the thread and the number of s are so proportioned that an adjust- of one notch corresponds to a lateral ment of 1-200 in. between the friction es.



kron" Clutch. Sectional View. Caption in Text.

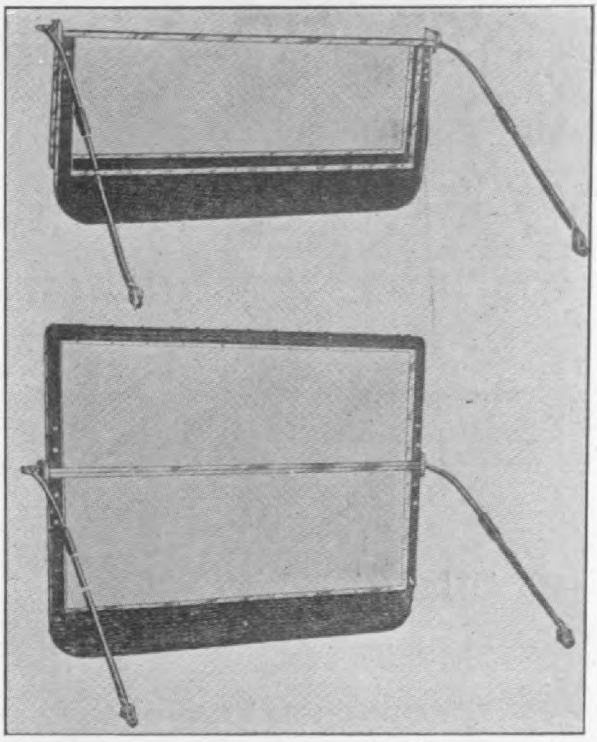
hin the drum are arranged two iron discs "C," which keys "H," sunk into driving member "B," force to rotate he shaft. Discs "C" are free to move ly on keys "H." The clutch depends power transmitting capacity upon the between friction discs "C" and the onding friction surfaces of drum "A" friction discs and the latter are prest into contact with the friction discs "C" with immense force. The wear of the rollers against the inside of friction discs "C" is taken by hardened tool steel discs let into their inner surfaces. The inner ends of the forked levers are connected by steel links to a sliding collar "E" by means of which the clutch is operated.

Drum "A" is filled with oil, into which the friction plates and operating mechanism dip. The oil may be renewed by pouring it in at oil hole "N."

Different sizes are made to suit the respective horse-power. Each clutch is guaranteed for one year and all defects in material and workmanship will be replaced free of charge within that time.

The "Meyer" Windshield

Morris F. Meyer, 65 E. Woodbridge st., Detroit, Mich., has brought out a new wind shield, which folds in the center with a lock hinge, using only one straight brace rod. A lock key is furnished which holds the upper end of the brace when either open or folded, thus preventing any rattle on lock or braces.



The "Meyer" Windshield, folded and open.

It is made of high grade materials and has adjustable brace rods, made to fit any make of car. All fittings are made of highly polished yellow brass, frames are made of birch or mahogany finish (unless otherwise

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PANHARD
CYLINDER OIL

The oil that will not char

A gasolene engine is very sensitive. It is injured easily by poor lubricating oil—especially oil that chars and carbonizes. Paying $4,000 for a car and using cheap and inferior oils that will cripple its motor power is poor economy.

If you'll insist upon getting the best—

then you'll

Insist upon getting

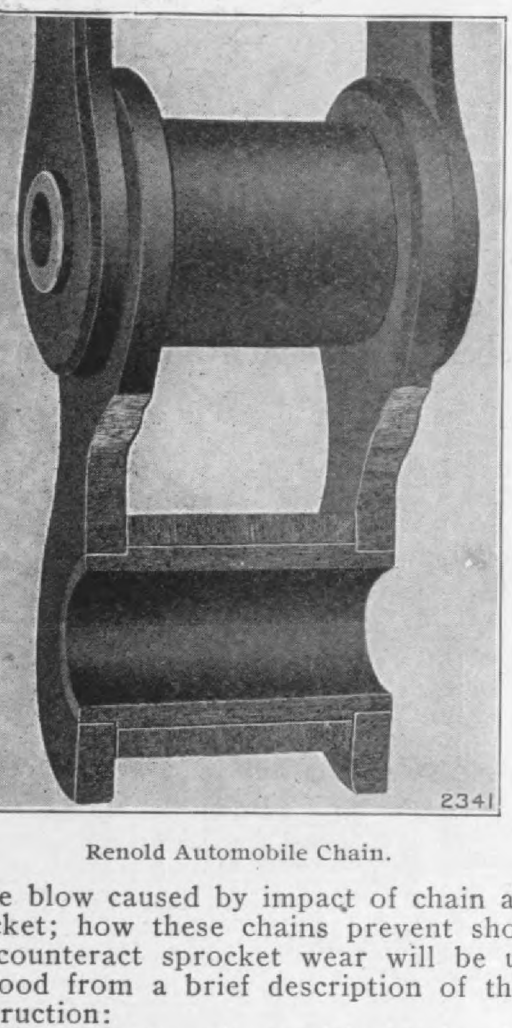
"PANHARD"

The oil in the checker-board can

GEO. A. HAWS

ransmission on all types of motor ve-
s, from the light runabout to the heavy
k, that the news of their use on cars
lomestic make is not alone pleasing,
is evidence of the American manufac-
r's determination to keep step with
oreign competitors, many of whom have
years used the Renold Silent and Roll-
Chains.

drive-chain's term of usefulness,
her on motor cars or other devices,
nds on the character and quality of its
ing surfaces. Following the efforts to
ove the construction of the joint con-
ons, many attempts have been made
the object of lessening the severity



Renold Automobile Chain.

e blow caused by impact of chain and
cket; how these chains prevent shock
counteract sprocket wear will be un-
ood from a brief description of their
ruction:

de thruout of special steel, they
composed of a series of side-bars, or
held together by bush-protected steel
on which the rollers revolve. The
are driven into the side-bars and the
riveted over; the joint-connection be-
so nicely made that the links move
at all times with entire absence of
ing" or "wobble." The pins, bush-

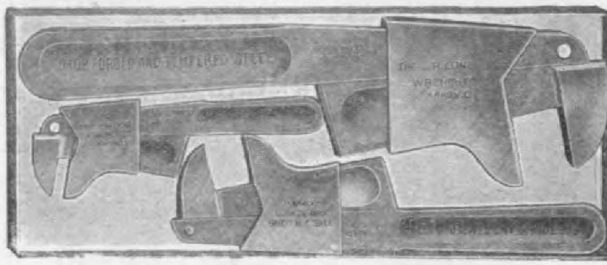
teeth in mesh-approximately one-half th
number contained in the periphery of eac
wheel. This chain will run on very shor
centers, as instanced by drives where th
sprocket wheels almost touch each other

Both types were designed by Mr. Han
Renold, of Manchester, England, and ar
handled exclusively in America by th
Link-Belt Company, and it is sufficient t
say that Mr. Renold has given to the cre
ation of these chains the same care tha
marked his work in the manufacture o
bicycle chains.

The "Long" New Departure Wrench

The accompanying cut shows the Long
New Departure Wrench, manufactured b
the J. H. Long Wrench Mfg. Co., Akron
Ohio.

Some of the main claims made for th
wrench are quickness of manipulation, sim
plicity, and instant and sure grip. The wrenc
is made of high carbon steel thruout an
is furnisht in four sizes, viz: 4, 6, 8, and 1



The "Long" New Departure Wrench.

inch, listing at 25c, $1, $1.25 and $1.75 re
spectively, in nickeled finish. The 6, 8 an
10 inch sizes in black finish lists at 75c, $1.0
and $1.50.

They put up the 6, 8 and 10 inch wrench-
es, nickel finish, in a box specially for th
automobilist, called the "Auto Set," which
lists at $4.00.

The "Weiss" Siren Horn

The "Weiss" Siren Horn, except for two
exclusive features, differs very slightl
from the regular French sirens. It i
marketed by the Motor Accessories Co.
No. 14 Dutch street, New York city.

One of the important features of thi
horn is that the revolving wheel is ver
light, thereby, it is claimed, preventin
all vibration and also eliminating all strai
on the shafting. The list price of the hor
is $35.

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Lovell-McConnell Mfg. Co., manufactur

Empire Tires

WEAR LONGEST

EMPIRE AUTOMOBILE
TIRE COMPANY

TRENTON, N. J.

NEW YORK, 148 Chambers Street, and 2230 Broadway.
CHICAGO, 20 LaSalle Street, and 1615 Wabash Ave.
BOSTON, 292 Devonshire Street.

Empire Tires

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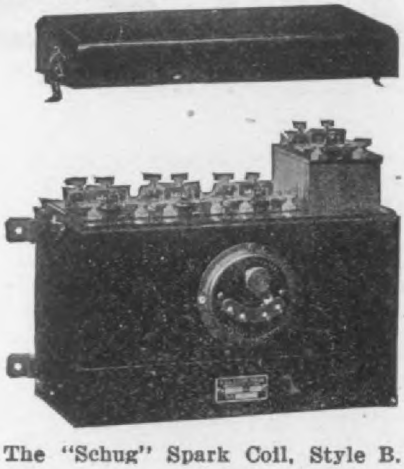
ain street, Detroit, Mich., are offering two ew ignition specialties, a Lacoste type timer nd a new type of Schug Spark Coil.



The "Schug" Spark Coil, Style B.

The chief feature of their Style B, Spark oil, is a new hammer vibrator, which is ery simple and is designed for high speed ork. It consists of a plain metal strip with block attached to one end, which vibrates etween the core and the contact screw. The emainder of the coil is of standard con-

The "Schug" Timer, Lacoste Type.

ruction, with high grade silk covered wire inding and insulated thruout.

Their timer, which is of the Lacoste type, made with tool steel contacts set in fibre nsulation. The case is aluminum, with a crew cover fitted with beveled glass, which ermits the action of the device to be noted

piece of wire of metal cannot be used place. A small lever is used to throw two sets of batteries in multiple.

Goettler's Auto Goggle Cap

The M. Goettler Hat Co., 1260 S Broadway, St. Louis, Missouri, are offe to the trade Goettler's Auto Goggle which we show in the accompanying showing the goggles in use and also fo back in the brim.

Goettler's Auto Goggle Cap, Showing Goggles In

It is uniquely fitted from the inside specially devised goggles, which fold into the brim when not in use, without terfering with the comfort of the weare it conforms to the head. It has extra patent leather visor, green underneath

Goettler's Auto Goggle Cap, Goggles Folded Back the Brim.

shade to protect the eyes. It is mad ladies' and gentlemen's styles, of soft, ble Russian waterproofed leather and inside with best quality silk. The list is $3.00.

The Willyoung Appliance Co., Lu Station, Yonkers, N. Y., have rece absorbed the George J. Shultz of New York City, manufacturers the Diamond spark plug. This mond plug, which is now being m factured by the Willyoung people, was scribed in our 1907 May issue, page They have leased for a term of years a story factory at Ludlow Station, Yon

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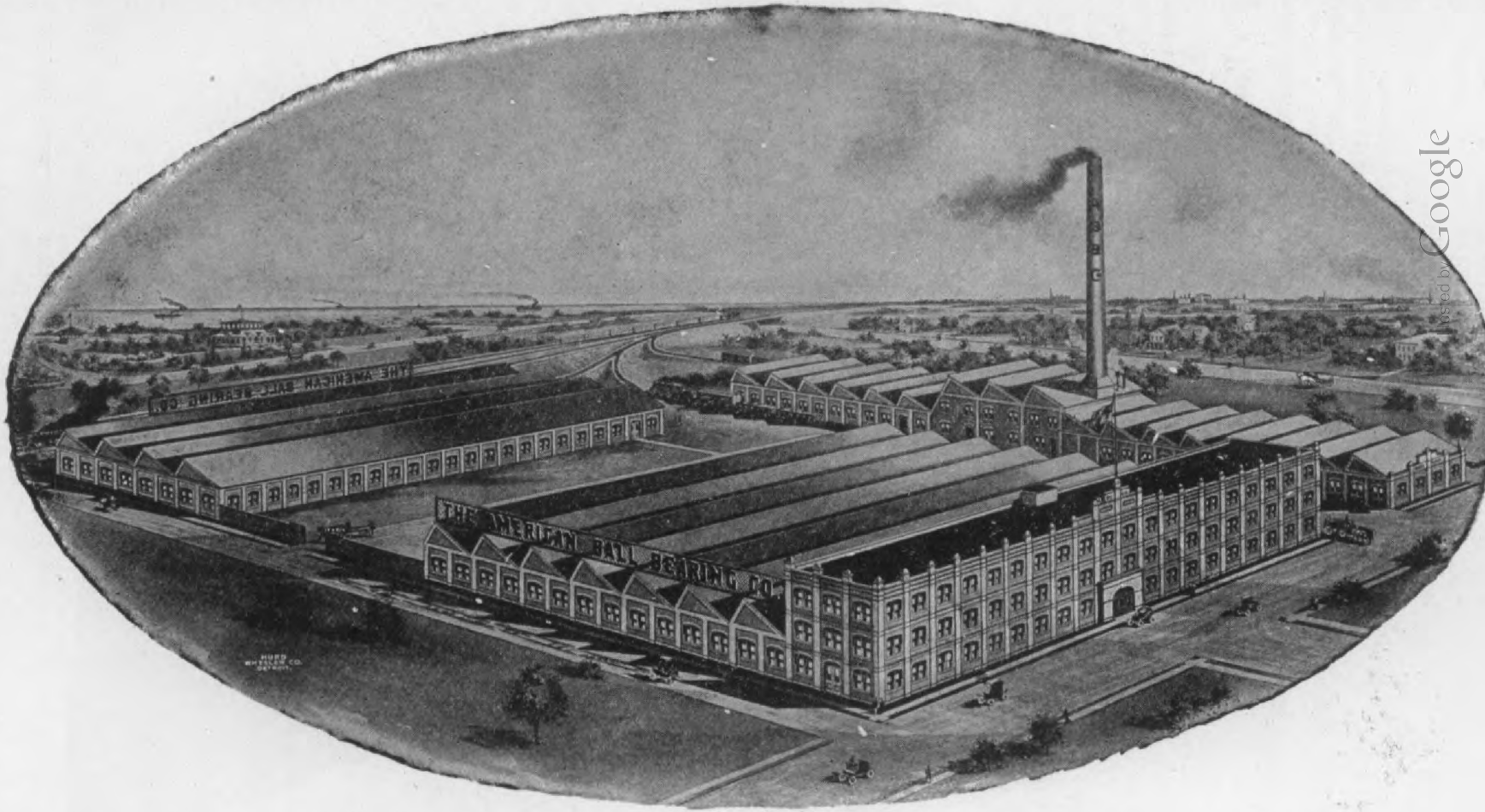

The output of complete Front and Rear Automobile Axles of this plant exceeds the capacity of all competition combined.

The American Ball-Bearing Co.

L. S. & M. S. Ry. & Edgewater Pa
CLEVELAND, OHIO, U.S.

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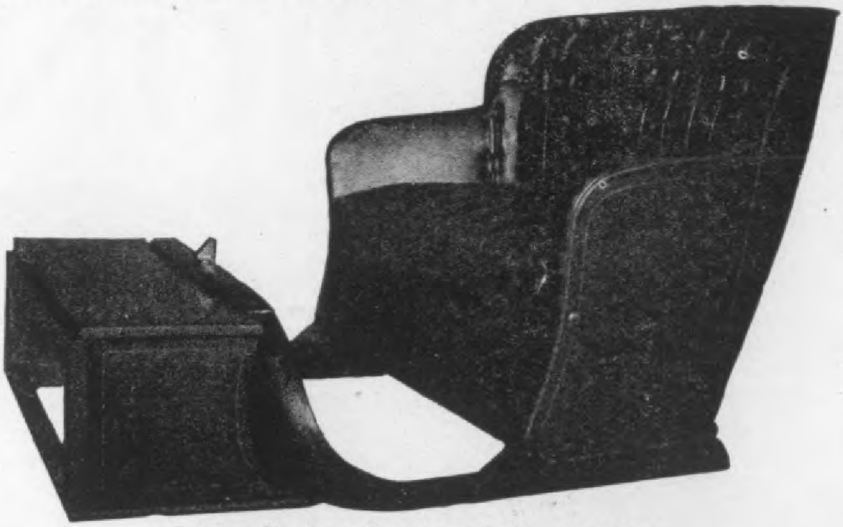
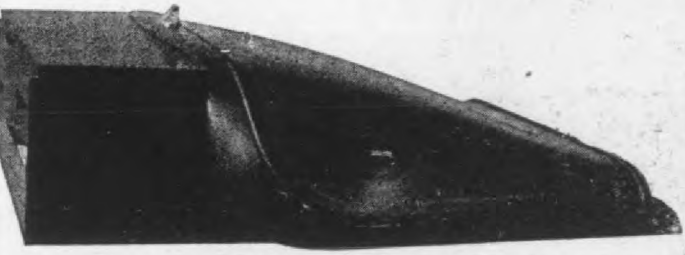
orth Main st., Dayton, Ohio, have just ought out a folding tonneau for the Ram- er 22 that fits on to the car body in place the regular deck box without altering the



Dayton Tonneau for Rambler 22, opened up.

r body in any way. The extension front at was put on to fill out the lengths of the ck fronts has convenienced enclosed car- ing space, and would with a cushion on it a convenient place to carry several chil- en.



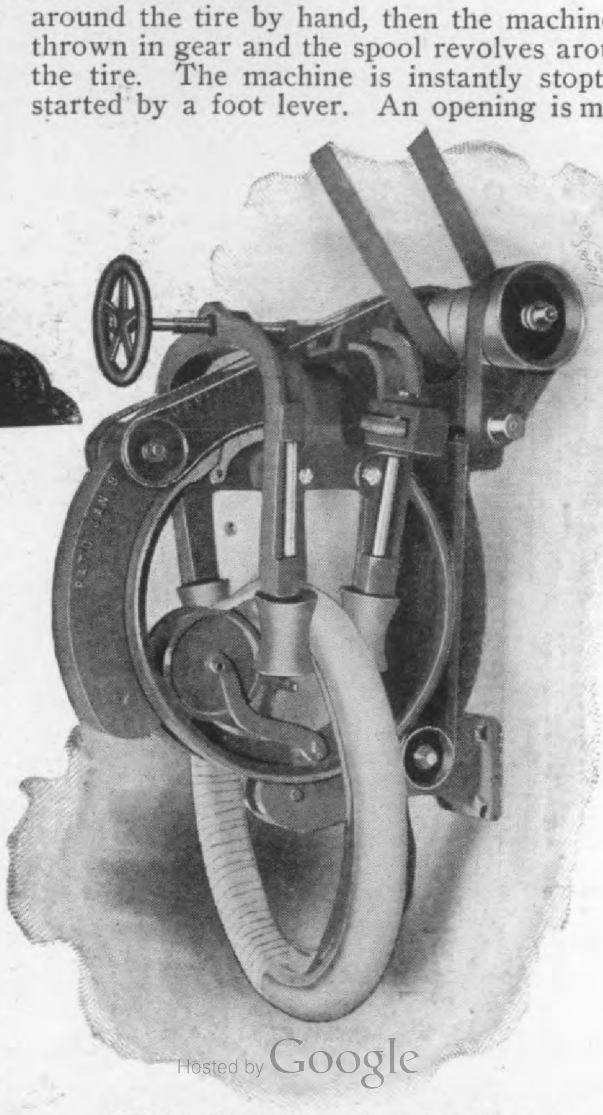
yton Folding Tonneau for Rambler Model 22, folded.

The latch on top to hold the box down nen the tonneau is closed is a new feature, that it prevents all clatter on bumpy roads. ne makers admit that when open it is not wholesome as a big side door tonneau, but is just as comfortable to sit in, and it does t have to be open when not occupied. This a very desirable feature on a car that is ed mostly as a runabout.

iller's Power Tire Wrapping Machine

The accompanying cut illustrates a new wer tire wrapping machine manufactured Chas. E. Miller, Anderson, Ind., the ief advantage claimed for it being that it ll wrap much tighter and evener than is ssible to wrap by hand.

As seen from the illustration the machine nsists principally of a revolving ring upon ich is mounted a roller carrying the cloth tight or loose as desired. It is necessary have a number of spools so that whe spool is empty a full spool can be quickly in place. The end of the cloth is wrapt o around the tire by hand, then the machin thrown in gear and the spool revolves aro the tire. The machine is instantly stopt started by a foot lever. An opening is m



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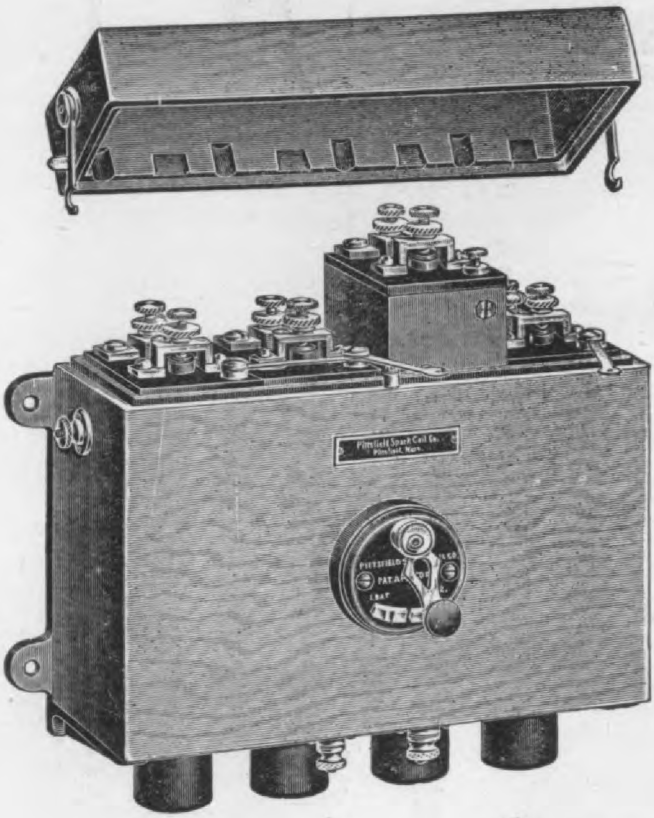
PITTSFIELD IGNITION



not the cheapest, but the best. Good ignition systems, like every other good thing, cost a trifle more money. It is this difference in price, however, which means a saving in the end.

Get PITTSFIELD SPARK COILS, PITTSFIELD TIMERS, PITTSFIELD MAGNETOS and MICA SPARK PLUGS.

They will repay you in increased service and freedom from trouble and worry.

Let us send you descriptive matter

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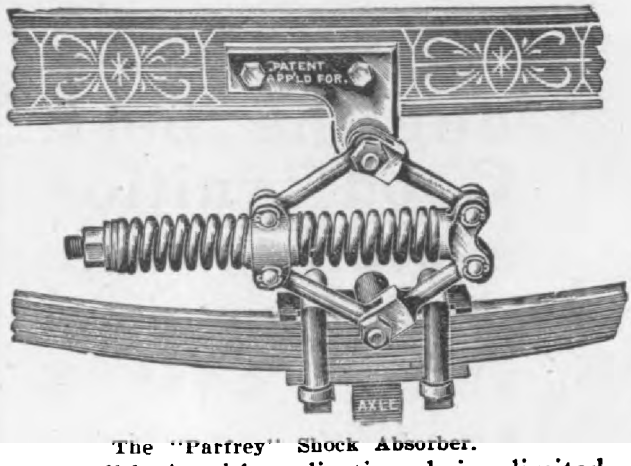
Pittsfield Spark Coil Co.

Vest st., New York City, who claim it to e simple and perfect in operation and that here are no parts to wear out by friction.

The absorber, which is here illustrated, onsists of a shaft, a head on one end, a sl·d-ng sleeve in the centre, a coiled spring be-ween the head and sleeve, and a second pring between the sleeve and the adjusting ut at the end of the shaft. The sleeve is

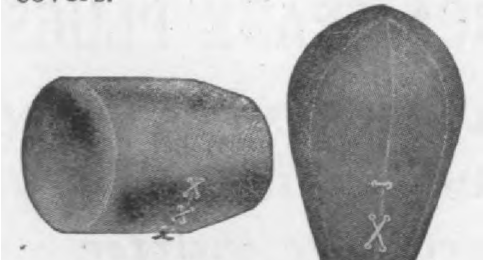


The "Parfrey" Shock Absorber.

ree to slide in either dirction, being limite·l nly by the action of the springs, the ten-ion of which may be increased or diminished y simply turning the nut on the end of the haft. The sleeve and head are connected vith the chassis and with the axle by piv-ted levers, so that should the shock throw he wheels of the vehicle upward, the outer pring will absorb the shock, while the spring. etween the sleeve and head will prevent a iolent recoil, and also prevent the wheels rom dropping down suddenly.

N. Y. M. F. Co.'s Lamp Covers and Tire Cases

For the thoro protection of lamps and pare tires from dust and water the New ork Motor Fabric Co., 32 Union Square, ew York city, are offering their lamp overs and tire cases, employing the best rade of melodian rubber cloth for their amp covers.



N. Y. M. F. Co.'s Lamp Covers.

In manufacturing this cloth it is stretch-

fastened tire case is the flap, seen in cut, which insures perfect protection f water. This style is made in black ena

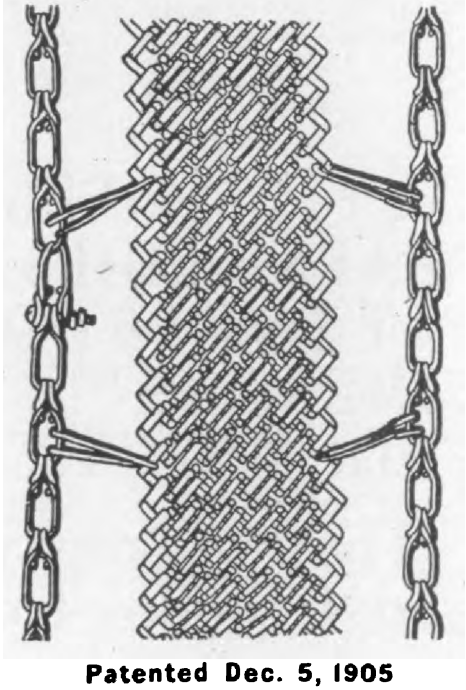
N. Y. M. F. Co.'s Button and Lace Tire Case

cloth at $3.25 each; in colors, $3.75, an artificial leather at $4.50.

The lace tire case is made of same terial as the button cases, but is fast with laces. It lists at $2.50 in black ena cloth; in colors, at $3.00, and in arti leather at $4.25.

The "Canne" Flexible Metallic Tire Shoe

The "Canne" Flexible Metallic Tire is the product of H. L. Canne, Milford, County, Pa., who claims it will not injur tire in any way and not to affect the iency.



Patented Dec. 5, 1905

The "Canne" Flexible Metallic Tire Shoe; larged section.

It is easily adjusted to the wheel and be put on by any one anywhere with a

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THE NEW RUSHMORE FACTORY

will more than double the capacity of the present plant, and will enable us to make

Prompt Deliveries

for the season of 1908. Built after the most modern standards of factory design, of reinforced concrete throughout, splendidly lighted, with separate power house and foundry, it will be ready for operation in the early autumn, and will enable us to uphold fully the Rushmore prestige and the high standard of Rushmore workmanship during the year to come.

Rushmore Dynamo Works

PLAINFIELD, N. J.

LONDON PARIS CHICAGO

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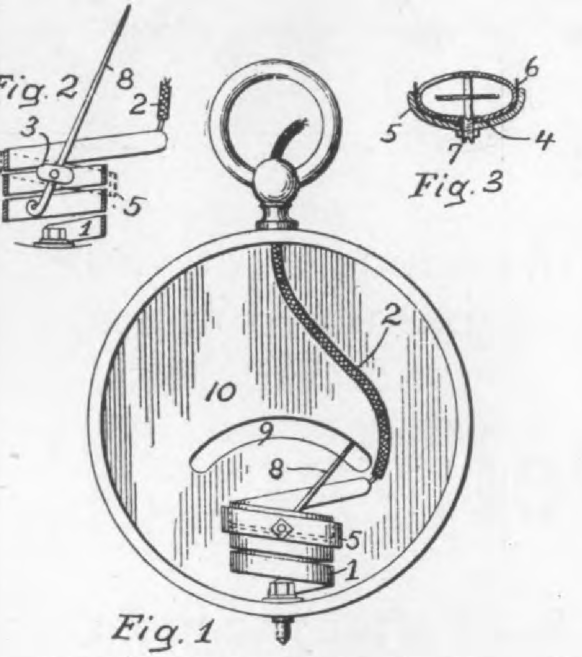
, 50 Shelby street, Detroit, Mich. This trument is used principally to show the ount of current contained in an ordinary cell. The principal working part of the nmeter consists of a coil 1, formed of a ge ribbon like diamagnetic conductor. The l is flattened and composed of a few con- utions which are separated from each oth- by air spaces sufficient to electrically in- ate them. To the inner end of the coil is ured an insulated conductor 2, which sses out thru a hole in the pendant of the ing and has a free end to which is at- hed a contact stud enclosed in an insulat-



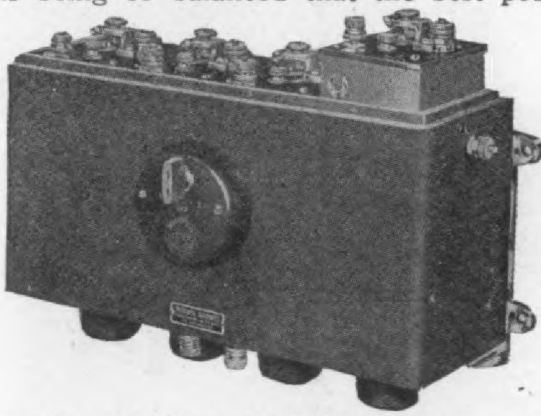
ne "Robert" Pocket Ammeter. Fig. 1 is a rear ation of the instrument with the rear wall of the e removed, showing coil, magnet, etc. Fig. 2 is a ached vertical section thru the coil. Fig. 3 is a zontal section of the coil.

finger piece. Supported in the coil is an nature 3, of elongated shape provided h pivots 4, supported in suitable bearings, owing the armature to oscillate in the ax- plane of the coil. Upon the outside of coil and extending parallel to the con- ution thereof is secured a permanent mag- 5, which extends a sufficient distance und the coil to form a magnetic field for armature. This magnet is screened m the coil by an interposed strip of rub- cloth 6, and is secured to the coil by a gle screw and nut 7. Attached to the nature is the balanced index hand 8, which nade of a thin strip of aluminum and ex- ds with its long arm thru a slot 9, in the l plate 10, and to the index carried upon dial plate and which is suitably calibrated indicate from zero up to the maximum ication for which the instrument is de- ned.

"Pfanstiehl" X-Ray Automobile Spa Coils

The Pfanstiehl Electrical Laborato North Chicago, Ill., have been experime ing for the past five years on induction co with a view to produce a flame instead the ordinary spark. This they claim to ha accomplished in their X-Ray coil, a fo cylinder type of which is shown herewith

The kind of spark produced by their co is what they call the "Caterpillar Flam which they claim is from 5/8 to 3/4 of inch long on six volts and one inch on high voltage. The secondary coil contains fo teen sections connected in pairs, of ve heavy wire, and the primary circuit a ve fine wire, these two compartments of coils being so balanced that the best pos



The "Pfanstiehl" Four-Cylinder Coil, with sw showing unit construction, cover removed.

ble results are obtained, viz.: a minimum current consumption with a maximum spa The armature is designed to give a sure a rapid vibration. Large contacts of Iri Platinum are used. The secondary windi is guaranteed not to burn out on any cu rent. Each coil is given a thoro test on volts of battery current. As a further pro of the intensity and volume of dischar they claim that X-rays can be produc with any one of their units in connecti with a small X-ray tube and ten volts battery current. Besides the four-cylind coil illustrated they also make them w one and two units in a box. Each coil provided with a switch lock to prevent o siders meddling with the coil when car left standing alone.

George Q. Hill Co., Boston, Ma makers of metal goods of various kin have establisht a Western office at 905 F mouth Building, Chicago, Ill., in charge Mr. William Pike.

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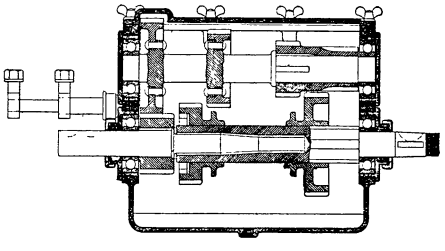
George W. Dover Company, 80 Cliff

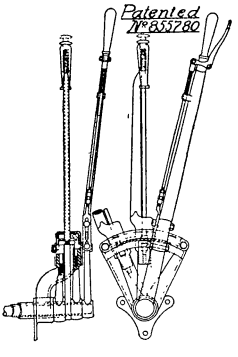
TRANSMISSION GEARS

Selective or Progressive Types, 1908 Models Now Ready for Delivery



Fitted With Cone Clutches Complete.

Selective and Progressive Levers
Our Selective Levers were the talk of the shows.



Steering Wheels
Steering Devices
Universal Joints

MACHINE WORK DONE TO YOUR BLUE PRINT

MUNCIE AUTO PARTS CO., 700 Elliott St., MUNCIE, IND.

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pany, of Detroit, Mich., manufacturers of auto chimes and marine whistles, etc., are placing on the market a very advanced combination muffler cut-out and safety relief which should appeal to every user of an automobile, as it is very practical and durable and may be quickly and cheaply attached.

The valve body, lever and bracket are made of malleable iron. The valve is ground and has three guides, thereby insuring a tight fit and positive seating at all times.

The safety relief feature is governed by a nut and oil-tempered spring. The spring,

The "Gray-Hawley" Combination Muffler Cut-out and Safety Relief.

being placed on the outside of the valve and never coming in contact with the exhaust gases, does not become heated and lose its temper. It should be adjusted so the valve remains closed under normal conditions, but will open whenever a charge is exploded in the muffler, thus saving the muffler from severe strains and possible destruction.

The bracket swivels on the lock nut and can be turned to any desired position by simply loosening and tightening this nut.

The lever is also reversible. This adjustable feature means that this cut-out may be very easily attached to any make of car without the use of bell cranks or pulleys. The cut-out is furnished in any size from 1 inch up to 3 inches, and the price ranges from $2.50 up.

The Universal Repair Bench

A very useful combination repair bench

wood top mortised and glued, makin joints absolutely tight, and mounted it a special bench block and univ swivel vise. The bench is 2 feet wi feet long and 3 feet high. In the lo part the Universal Repair Bench has drawers of two sizes, a cupboard plenty of shelf room for the placin tools, all kinds of oil, cans, repairing fits, rubber tires, attachments, etc.

The Universal Repair Bench, a handy tool fo garage repairman or experimenter. It is equipt a special combination bench block and a uni vise. Price f. o. b. Rochester, N. Y., $50.00.

The bench block is fastened to the end. This tool is entirely new in de being made specially for use with bench. It is a combination tool of g value in repair work, being used for b ing, straightening hammering or form metal. This block is sold separately $10.00. The specially designed swivel is reinforced for heavy work, but is cate enough to handle small pieces can be used in any position at any a and is locked in position by a hand cl operated by a bar similar to that opera the vise screw.

The outfit complete ready for shipm F. O. B. Rochester, N. Y., sells for $5

Noxal Automobile and Furnitur Cream

In addition to the NoXal Metal P what has previously been mentione these columns, NoXal Polish Mfg. 1238-42 Belmont avenue, Philadel manufacture the NoXal Automobile Furniture Cream, a very desirable po ing and cleansing agent for bodies of tor cars and similar highly finished surfaces.

It removes scratches, dullness

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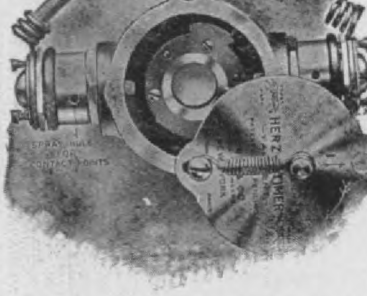
Toolsteel vs. Toolsteel.
Patented Snap-off
Contact.

USE ONLY HERZ PRODUCTS AND



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Sticking of Vibrators impossi

Forget Your Ignition Troubles

No Better Automobile Materials Made

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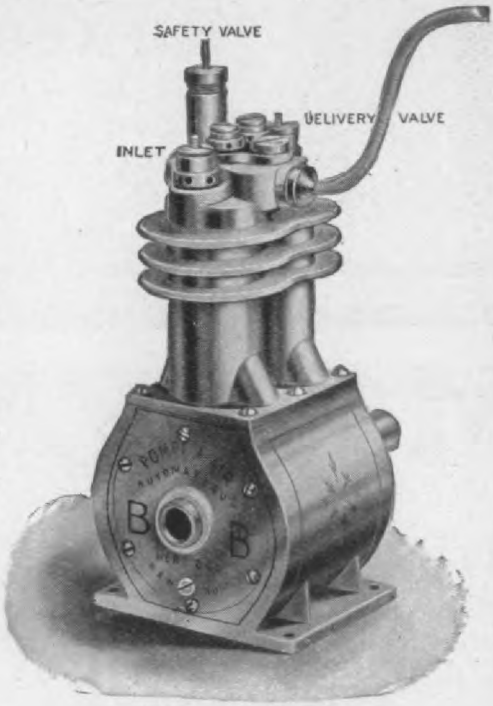
"Pater-Noster" The Ideal Shock-Absorber, fully maintains our reputation on two hemispheres

Moto-Whistle—Petticoat Double Chime. Complete with pump and whistle tank.

Herz Coil—The Cream of the European Market. Current consumption one-half that of any other coil. Enormous efficiency.

Wire Terminals—with groove. A necessity for proper wiring.

Detachable Terminals—3 sizes, ⅜ in., ½ in, ⅝ in.



B. B. PUMP

To Pump up Tires or Pressure Tank, Blow Whistle or Horn, etc.

A double-Piston Power Pump driven by gear, belt or chain. Equipped with Metal Piston Rings, Positive Lock Washers and Steel Crank Shaft. Guaranteed Pressure 100 lbs. Price of Pump $30.

We also furnish a special Cut-out Clutch, for turning on or shutting off the power at will. Price of Clutch $15.

Para-Gum Tire—Made in Austria. 99 9/10 per cent. of good pure rubber. Will outlast any 3 other tires on the market.

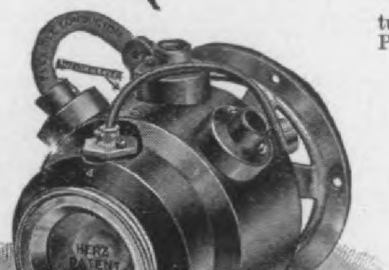
Oscillum—A spark gap; a spark intensifier. Makes any spark plug spark.

Battery Connections—Rubber and Copper.

Hagen Storage Batteries—the best ever made

Switches—A select line; unequalled

BOUGIE MERCEDES
The World's Best Spark Plug



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ne and automobile work. They are in-
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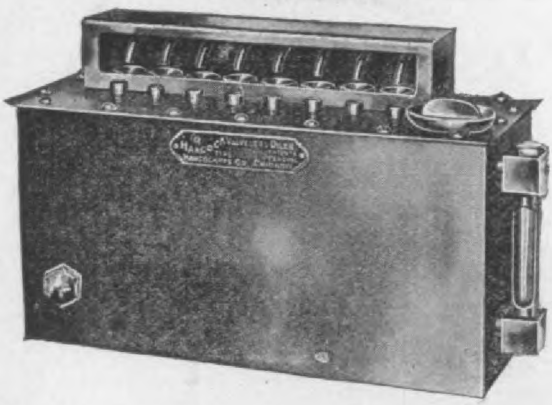
red to build, on contract, in large quanti-
s, either one, two or four-cylinder en-
nes, from special designs; or the regular
gines that any concern is using. They
nd cylinders, pistons and other parts that
y require grinding, and do high grade
rk. They are centrally located and have
od shipping facilities. During the spring
d summer they have been making a lot
engines for a big Detroit auto builder.

Mich., have recently started to manufact
automobile springs and axles. They ha
been manufacturing carriage and wag
springs and axles for 14 years, and feel c
fident that their automobile product w
meet with as much success as was accord
them by the carriage trade. They have
completely equipt forging plant running u
der the name of the Jackson Drop Forg
Co., and a fully equipt spring factory, a
have in stock springs and axles of all
scriptions or can make any type of spr
or axle to order.



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RELIABLE? Yes! Why? Nothing to get loose.—Heat, or Cold Oil, make no difference.—But we have'nt room here to tell all about the

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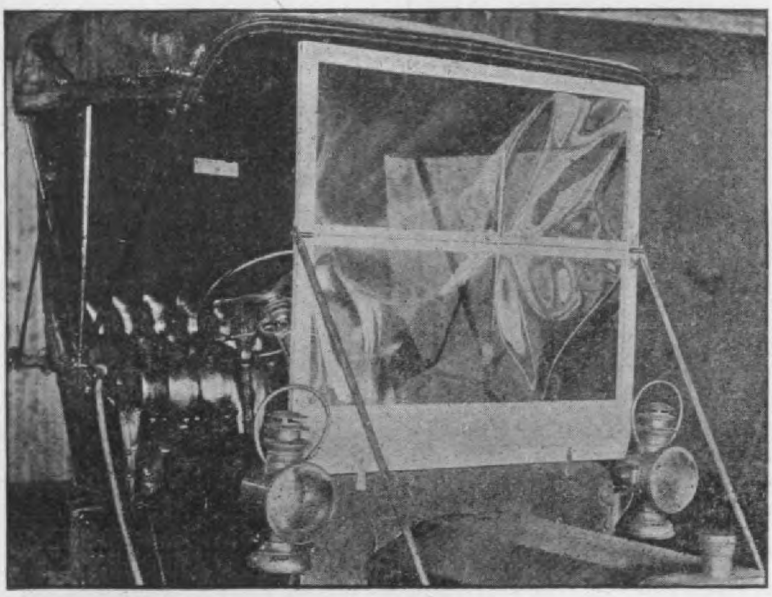
THIS WILL PUT **MONEY** IN THY PURSE



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NO GLASS TO BREAK. No vibration or strain on even the lightest dash.

Weight Only 5 Pounds

Shipped ready to attach to dash. New lights furnished by mail at $1.00 each.

Birch-Mahogany Frame, Solid Polished Hinges and Brackets, Solid Brass Tubular Braces, Heavy Celluloid Lights.

Just think of the price, $20 00, for a full size Folding Front for Ford.—Maxwell.—Reo or any runabout.

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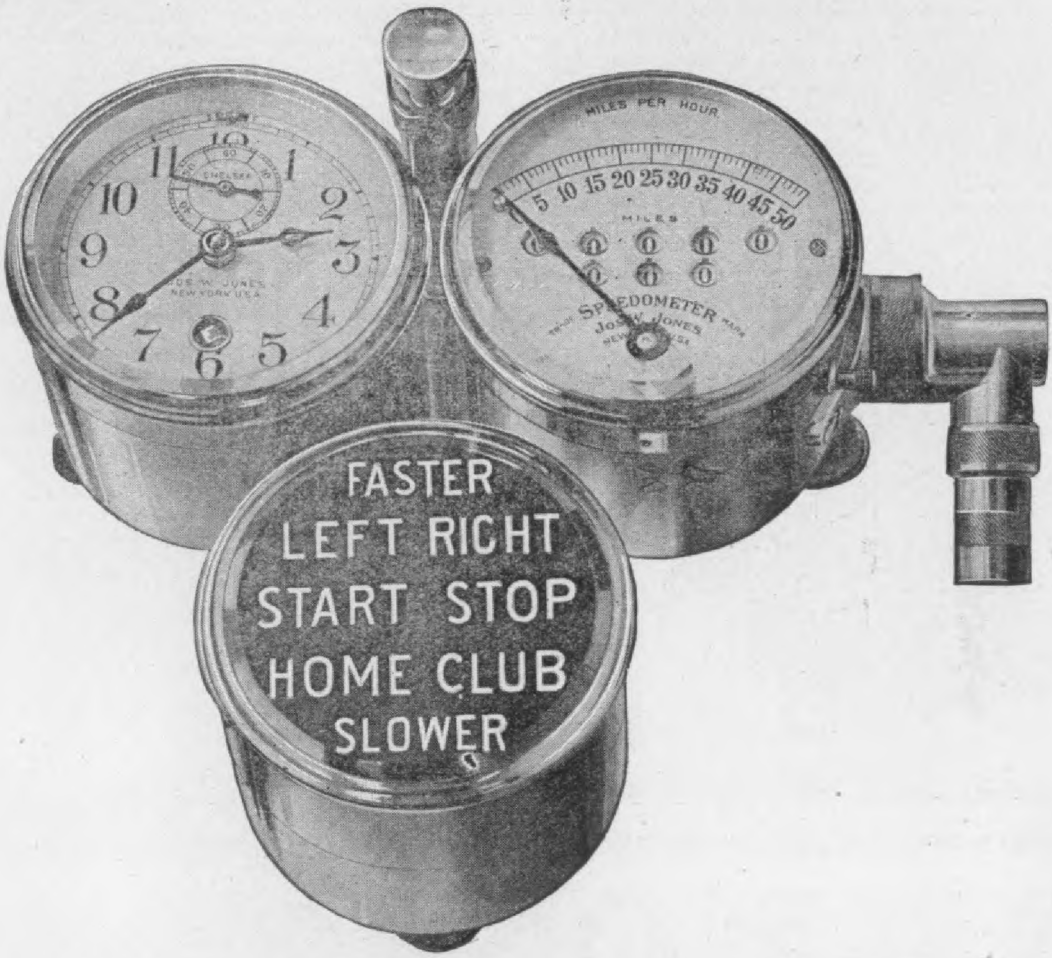

The combination known as the "Jones Triplets" is illustrat
erewith. It represents the highest achievement in the building of
otor car accessory, furnishing the driver with all information nec
ry to proper performance of his duties. With the characteris
eauty in design and finish of the Jones products it combines t

Jones 50 Mile Speedometer

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Jones Annunciat

ounted together with a small electric light.

The combination keeps the driver informed of Time, Speed, Total and T
ileage day or night, and affords the owner a dignified method of communica
y directions he may desire to give.

As a group the "JONES TRIPLETS" are attractive and harmonious, lend
the beauties of the car, instead of detracting from them, as is the case wh
veral instruments of different makes are used to give the information, which
e alone furnishes.

Write for The Speedometer Bulletin
No. 12, a magazine on speed subjects.

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The Holley 1908 Carburetor

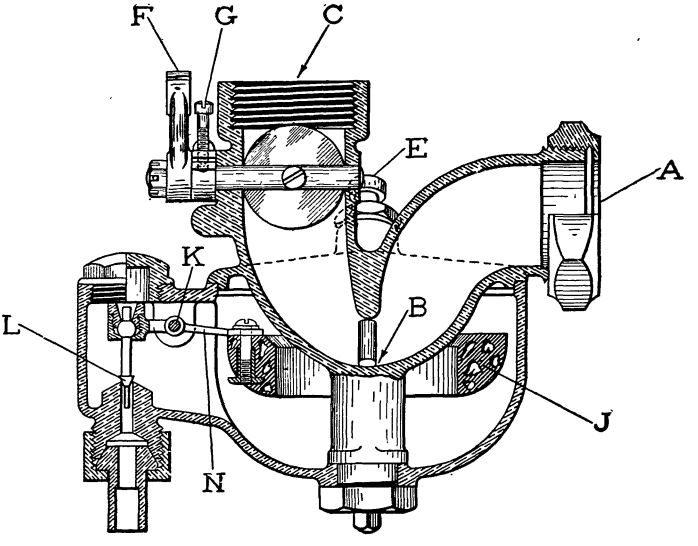
The Holley 1908 carburetor, which is claimed to be an automatic carburetor without moving parts, is manufactured by the Holley Bros. Co., Detroit, Michigan.

In the Holley carburetor a high air velocity is obtained in the mixing chamber by applying the principle of the Venturi tube. This feature, tho not itself original with the Holley carburetor, is important because it is seldom correctly applied, it is claimed. The true Venturi tube acts to discharge a liquid or gas with a velocity thru the smallest section of the tube greater than the velocity due to the head alone.

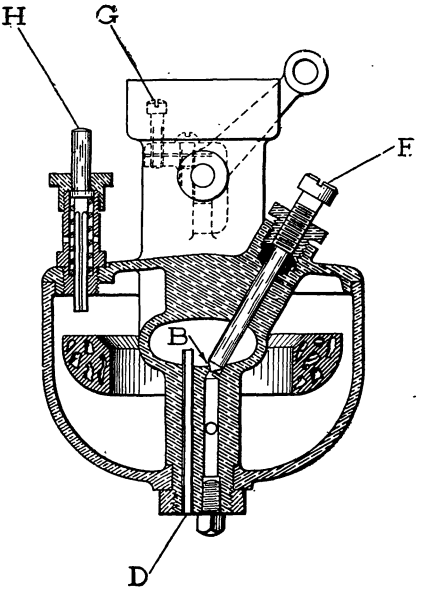
Referring to the sectional views, A is the air inlet thru which air passes downward and up thru a U-shaped tube, which is constricted at its lowest point. In the floor of the U is the gasoline orifice B, which is regulated by a needle valve, E. The carburetted mixture passes thru a butterfly throttle valve and on to the motor by the connection C. The float chamber surrounds the lowest part of the U, and has an annular cork float, J, which controls the gasoline valve L, thru a lever, N, pivoted at K. The U-shaped mixing chamber is merely the Venturi tube in a special form, allowing a very high air velocity to be obtained at B.

The gasoline level in the float chamber, instead of being slightly below the orifice B, is about one-eighth inch higher, and it is in this fact that a radical departure lies. In the new Holley carburetor there is a puddle of gasoline one-eighth inch deep in the bottom of the U when the motor is at rest. Consequently, when the motor is starting or running very slowly, the air does not have to lift the gasoline at all, but simply draws over the puddle and is carburetted by surface evaporation. As the throttle is opened and the air velocity increases, the puddle is gradually swept away by the strong air current over it, thus reducing the surface area of the puddle and maintaining constant proportions in the mixture. At the higher speeds the puddle is wiped out entirely, and a spray of the ordinary sort takes its place.

To start the motor, the float is deprest by the primer H. To prevent the mixing chamber from being flooded to excess, the drain pipe D is provided. The throttle valve is operated by the lever F, and the adjustable stop screw, G, permits regulation of the opening for minimum speed.



The "Holley" 1908 Carburetor; sectional side elevation.



The "Holley" 1908 Carburetor; sectional end elevation.

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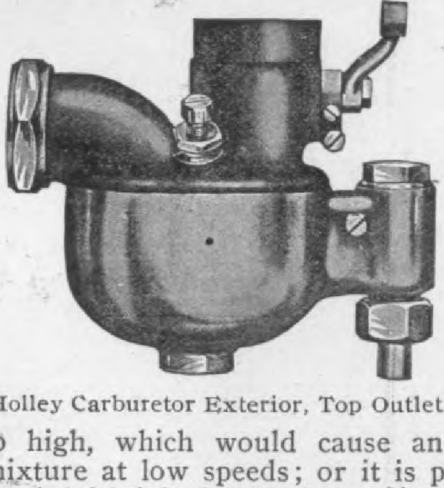
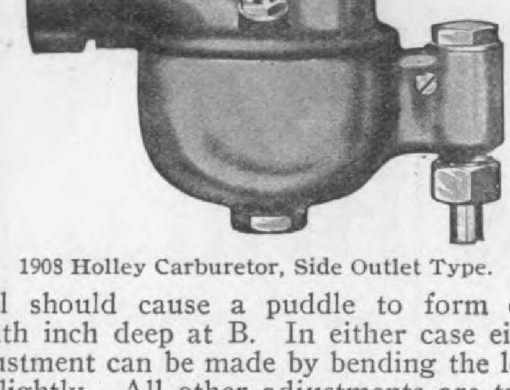


908 Holley Carburetor Exterior, Top Outlet Type.

too high, which would cause an over-
h mixture at low speeds; or it is possible
t the level might be too low. To remedy
s the lever is bent down to lower the
soline level and by bending the lever up-
rd the lever will be raised. The normal



1908 Holley Carburetor, Side Outlet Type.

el should cause a puddle to form one-
hth inch deep at B. In either case either
ustment can be made by bending the lever
slightly. All other adjustments are taken
e of by the needle valve E.

The "Rutenber" Carburetor

E. A. Rutenber, 800 Helm street, Lo-
nsport, Ind., the inventor of the well-

in turning corners. The gasoline valve
controlled by an improved lever type fl
which is claimed to prevent flooding. T
needle valve is located at the top of t
mixing chamber, which makes it very co
venient to adjust.

The mixing chamber is divided into t
parts, having two distinct openings, c
controlled by an automatic air valve a

The "Rutenber" Carburetor.

the other having a fixt air opening wh
allows a predetermined amount of air
pass the spray nozzle. The flow of air
mains practically constant at all eng
speeds.

The connection to the engine is bol
to a flange, which is placed at an angle
45 degrees, and by turning the same arou
the carburetor can be used as a vertical
horizontal outlet. The Rutenber Carb
etor is made of brass and is made in th
sizes, 1-inch, 1¼-inch and 1½-inch iron p
sizes, and lists at $15.00, $18.00 and $20
respectively.

"Kantryp" Auto Gloves

The Ellsworth & Thayer Mfg. Co., M
waukee, Wis., have brought out a new a
glove known as the "Kantryp."

In this glove the fingers are made w
two lengthwise seams, both at the back
the finger, away from wear. At that po
where the fingers spread the "Kantryp" gl
is reinforced against ripping by a pat
strap facing between the fingers. The thu
seam is also doubly reinforced by a lap
the leather and is double stitched.

The glove is made with a stout and co

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or Country

The Autochime

Pat. Nos. 821,358 and 797,681

The Original Single Tube Exhaust Blown Horn

Like all GOOD THINGS, is now being imitated. Our patents, however, cover the Vital parts which give the AUTOCHIME the Deep, Clear, Powerful and Pleasing tones all others strive in vain to equal. It is small, made of only 3 pieces and no solder is used in its construction. It is "Built for Service."

The AUTOCHIME is sold and recommended by the BEST DEALERS and JOBBERS. Some with questionable reputation and credit may claim that they cannot secure deliveries, and offer imitations with the usual remark, "It is just as good." Don't be deceived. Order direct, or write for name of nearest Dealer.

The AUTOCHIME for STEAMERS. Our New Steam VALVE gives perfect control over the high pressures carried by the modern steam car. The AUTOCHIME with this VALVE makes a SIGNAL that has no equal.

The AUTOCHIME for AIR. We also make a Special AIR VALVE. The stem is packed and no air is wasted—an important feature when storage tanks are used.

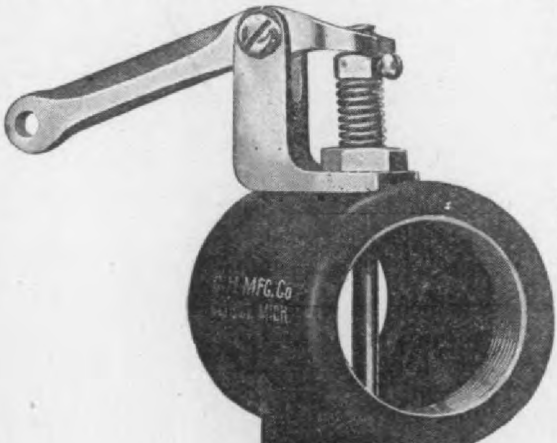
Something New

The AUTOCHIME JUNIOR—size 2x9 in.—is exactly the same as the AUTOCHIME excepting that it is shorter, giving the tone a higher pitch. Just the thing for small cars and motor boats. Can be blown by steam, air or exhaust pressure.

1908 Gray Muffler

Better Than Ever. Immediate Delivery

Made in sizes to effectively muffle all size engines. If you want a good, quiet, durable MUFFLER, order a GRAY.



The Gray Cut-Out and Safety-Relief

A simple, practical and well-made article at a reasonable price, having the advantages of a 'Cut-out' and 'Safety-relief' combined. The bracket and lever are adjustable and reversible, making it easy to attach to any car. Made for all size exhaust pipes.

Write for catalog F.

GRAY-HAWLEY MFG. CO.

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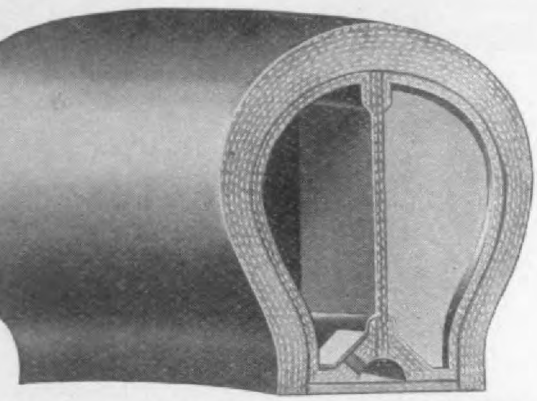
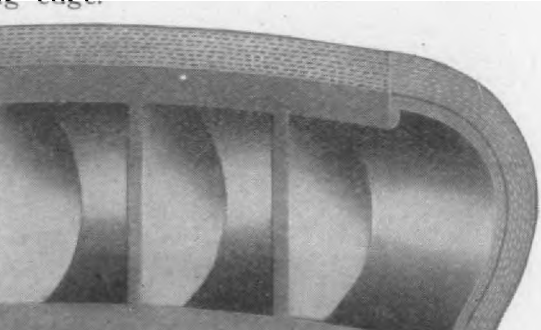
ield, Ohio. The tire is designed with ity of independent air chambers or com- ents, whereby, should the tire be punc- air will only escape from the punctur- amber, thus permitting the tire to be ntil a more convenient time for repair- e puncture.



American" Puncture Proof Automobile Tire.

tire is constructed of an outer rein- l tube or casing, having vertically dis- edges. In the outer tube or casing is ged an inner tube having an overlapping which carries the main air valve. The tube is made of two sections connected vertically disposed partition. The sec- are provided with inwardly extended s, which are secured to the lower edge partition. The flanges provide a com- ent or air conduct extending around the said compartment or air conduct com- ating with a main inlet valve connec- rranged at a suitable point in the over- g edge.



American" Puncture Proof Automobile Tire; sectional view showing compartments.

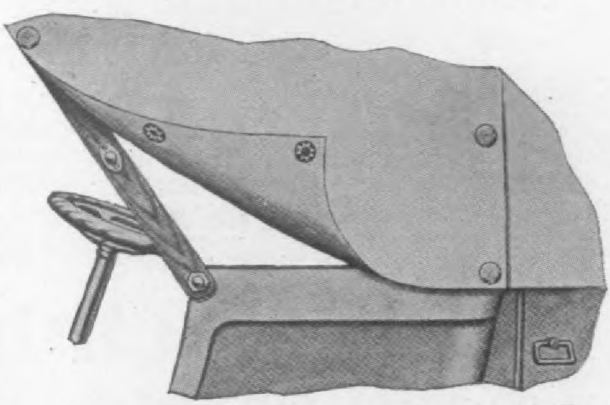
sections are provided with a plurality nsverse partitions dividing the tire cir- erentially into a plurality of compart- s. The air conduct communicates with umerous compartments thru the medium small opening, covered by diaphragms, ed upon the upper side of the flanges. hen air is forced into the compartment

of the other compartments to pass thru the punctured one, consequently half a dozen punctures in each wheel will not impair the utility of an automobile equipt with these tires, it is claimed. At present these tires are made in 28x3, 34x4½ and 36x4½ sizes. These tires are made of the best material and are fully guaranteed, and will be particularly adapted to the "Dunlop" rim and outer shoe for the present.

The "U. S." Curtain Fastener

The United States Fastener Co., 95 Milk street, Boston, Mass., are manufacturing the U. S. curtain fastener in brass and nickle-plated finish for automobile tops.

These fasteners are being used by a large number of automobile manufacturers for closing the tops, coverings and awnings on automobiles in an absolutely secure and suc-



The "U. S." Curtain Fastener; applied to curtain and disassembled.

cessful manner. They are also used for fastening rugs to the tonneau floor. The fasteners are fixt to the curtain by a fastening machine, for which a charge is made to customers unless 50 gross of fasteners are ordered.

The knob portion of the fastener is made in two styles, as seen in cut.

George N. Pierce Co., of Buffalo, N. Y. have established a supply depot in Paris at 11 Rue Scribe, in charge of N. S. Goodsil where they will carry a full line of Pierc parts.

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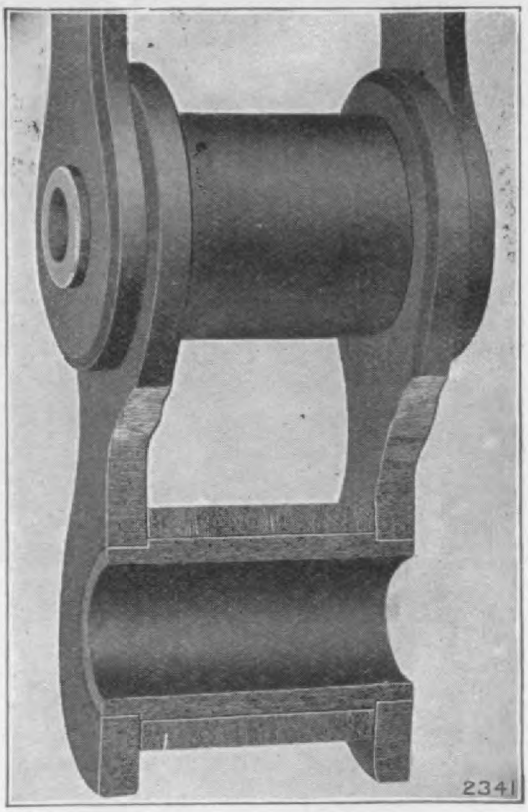
THE ONLY CHAINS USED ON FOREIGN CARS ARE

Renold Chains

That's a Pretty Good Criterion of the Value American Manufacturers see in Adopting them for Home-made Cars.



Renold Roller Chain is made of special steel, with pins, bushings and rollers case-hardened; entire construction makes for long service under the most rigorous conditions.

Take into consideration a drive that was found to be O. K. after running 7,900 miles with only one adjustment in the last 3,000 miles of travel, and you have a sturdy reason for European enthusiasm. Our home equipments are proving to be "just the thing" as the growth of Renold chain-drives demonstrates.

LINK-BELT COMPANY

Exclusive Sales-Agents

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tation for making goods possessing style, kmanship and great durability is world-.

"Taylor's" Combination Trunk.

or a number of seasons they have been ing auto trunks. Their trunks are the odiment of lightness, strength and con-ence. A very essential feature in an au-obile trunk is that it must be absolutely proof. Taylor's patent dustproof edge illustrated, is a feature of the line every trunk is thereby made waterproof, proof and odorproof.

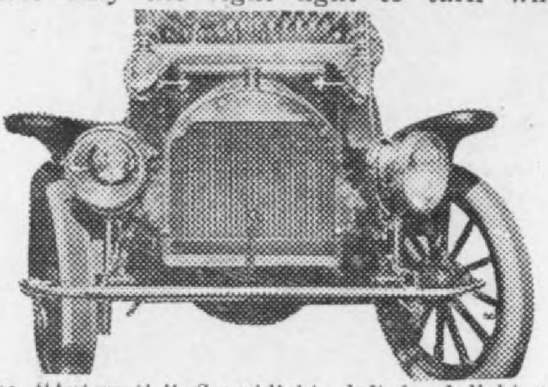
"Taylor's" Dust Proof Trunk Edge.

any are of the opinion that a trunk of style shown can only be used for an mobile journey and that its usefulness here, but decidedly this is not the case, will be found just as valuable in travel-by train or boat; it therefore becomes eful factor of every pleasure trip. This on's line is very complete, embracing a range of style ranging in price from to $100.

The "Automatic" Searchlight

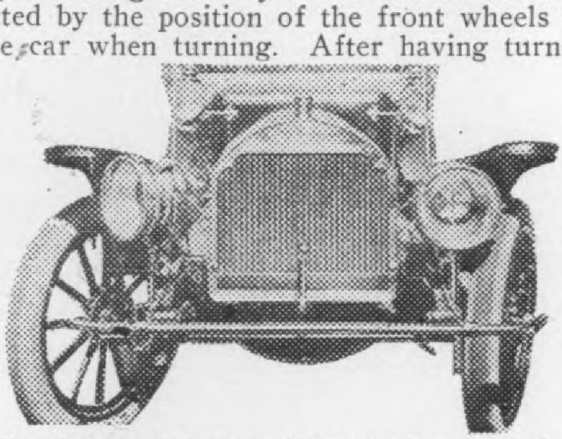
e automatic searchlight, manufactured The O. A. Halderman Co., of Marion, ana, is a recent invention in the automo-world, and promises to be of great as-nce in driving after night.

is a mechanical device, supporting the light and is adjusted to the car in the t position of the standard lamp equip-t. The bracket is made with a two-t bearing, forming the support for the



The "Automatic" Searchlight; left hand light ar wheels turned toward left; right hand light pointi straight ahead.

turning the car to the right, and vica versa thus leaving one light in the direction whic the body of the car is pointed, and the othe light blazing the way in the direction ind cated by the position of the front wheels o the car when turning. After having turne



The "Automatic" Searchlight, showing right ha light and wheels turned toward right; left hand lig in line with car body.

in either direction by the operation of th adjustable spring between the bearing point of the brackets, the lights automatically ad just themselves to their normal position, o the direction in which the car is going.

The entire equipment is made of Parson Manganesian bronze, fitted with dustproo collars and oil cups, and is fully guarantee

---

The Fedders Mfg. Co., Buffalo, N. Y., ar making ready to remove from their preser location, 1592 Genesse st., to their new fac tory, which they have completed at 57-5 Tonowando street, that city.

Messrs. Pirelli & Company, large manu facturers of cable and rubber goods, wit factories in Milan, Italy, have made arrange ments for an American branch of their tir department to be located at 296 Broadway New York City.

The Auto Improvement Co., of 316 Hudso street, manufacturers of "Ever Ready Speedometers, Tire Tools, Automatic Start ers, Vulcanizers, Carburetors, etc., hav

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NOTICE

IT HAS BEEN BROUGHT TO OUR ATTENTION

That certain unscrupulous dealers and top makers have been offering to the trade and public Automobile tops made of cheap inferior leather substitutes, representing them as

Pantasote

The name PANTASOTE represents a particular composition, which is, and for years has been, manufactured exclusively by us. It is thoroughly protected by copyright. We do not desire to create trouble, but for the protection of our own business, as well as that of our customers, we are forced to give notice that we will follow up and

Prosecute to the full extent of the law

all such cases as come to our notice.
If your are in doubt as to the genuineness of the PANTASOTE, request your dealer to affix one of our trade mark labels to the top or send us a small sample or one of the side curtains.

TO DEALERS

We are prepared to furnish upon application, free of charge, small celluloid trade mark labels, one of which affixed to a Pantasote top stamps its genuineness.

THE PANTASOTE CO.

NEW YORK, 11 Broadway

CHICAGO, 707 Fisher Building

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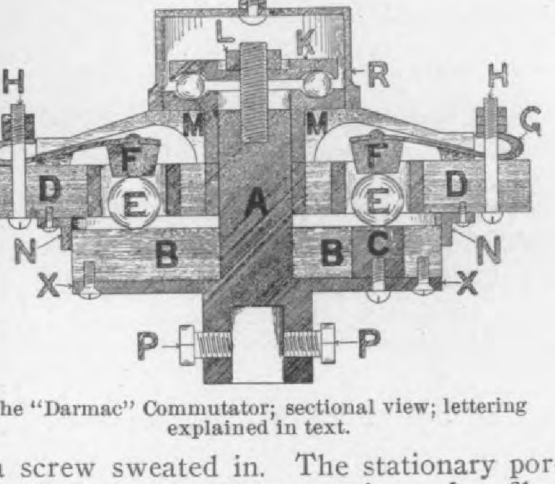
ly brought out by the Darmac Commuta-
Co., 220-222 East Fifth street, St. Paul,
n.

ne commutator is built entirely from tool
and special friction fiber. The revolving
ts of contact are self-cleaning, present-
always a new face of contact and prevent-
carbonization.

he following is a description of its con-
ction and operation:

ne revolving axle A is made with its
er end hollowed to fit any shaft, and is
ened in place by use of three set screws
This piece has a large circular flange X,
which is fastened the tool steel contact
k C, held in place in the fiber part B



he "Darmac" Commutator; sectional view; lettering explained in text.

screw sweated in. The stationary por-
of the commutator consists of a fiber
nework D carrying the binding posts H.
se to the centre of this frame are car-
the balls E, half inch in diameter, which
contained in steel sleves of practically
same diameter. Above the balls are short
steel plungers F, against the outer ends
which are fastened the flat steel springs
The springs hold the balls down to con-
with piece C in the revolving part of
device. The outer ends of these springs
curved into C shape so that by adjusting
ball thrust bearing K the pressure of the
s on contact piece is varied and then
ed at desired tension by lock nut L. To
lower surface of frame D is bolted a dust
N, and on top of frame is fiber covering
the two covering parts with cap R making
ustproof commutator. The balls E for
ing the contract are hardened and hav-
four bearing points offer little friction.
y are in constant contact with the top
iber part B, and therefore out of circuit
ept when passing over contact piece C.

he list prices are as follows: 1, 2, 3 and
linder timers, $20 each; 2, 3 and 4-cylin-
timers, with distributor, $25 each; 6-

pound material to insure proper vulcaniz
tion and strength. It may be inflated b
fore inserting in the shoe, being ampl
strong, and following the practice obviate
the danger of pinching or chafing. Th
makers claim that this tube does not elon
gate even after long use and can be take
out and replaced any number of time
without pinching. It is made seamles
triple calendered, spiral wrapt, has
smooth channel way, heavy walls and end
spliced by a special process. Prices rang
from $4.30 each for a 26x2½ to $19.70 fo
a 40x5.

This company also makes rubber ma
ting, which is furnished in 50-yard rolls i
several thicknesses from 3-32 to ¼-inc
weight ranging from 6½ lbs. to 19 lbs. pe
square yard.

The "Stero-Light" Gas Tank

The Motor Parts Co., 25 West Forty-se
ond street, New York City, have recent
placed on the market a new gas tank, know
as the "Stero-Light," which the manufactu
ers claim gives a pure white and brillia
light.

The "Stero-Light" Gas Tank.

The tank can be placed in any position.
is charged with purified gas and has a lar
capacity. They claim it costs less than ca
bide and is more convenient than a gener
tor. It is listed at $15.00. Empty cans c
be exchanged for full tanks at dealers f

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THE TEST of TIMKEN ROLLER BEARING

stock is, we believe unequaled, both for severity and thoroughness. The raw material is made to conform to a special chemical analysis, and forty-five per cent. or more of every ingot is rejected. Through all processes of manufacture of

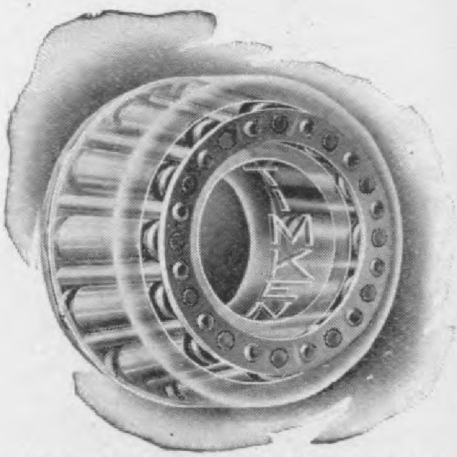
TIMKEN ROLLER BEARINGS

(from the ingot to the finished roll) tests are being made at every stage —gauging—cementing—hardening—tempering—even to acid etching, to determine the depth of surface conversion to high carbon steel.

It is this care and attention to detail that has established a standard for the makers of over **60** per cent. of High Grade American Automobiles, and **90** per cent. of the Trucks made in this Country, who recognize

The Timken Principle Correct
AND
The Timken Quality Supreme

We will be glad to convince you if you are a doubter—write us.



Timken Roller Bearing

The Timken Roller Bearing Axle Co.

Canton, Ohio

Eastern Branch: 10 E. 31st St., New York.
Western Branch: 429 Wabash Ave., Chicago.

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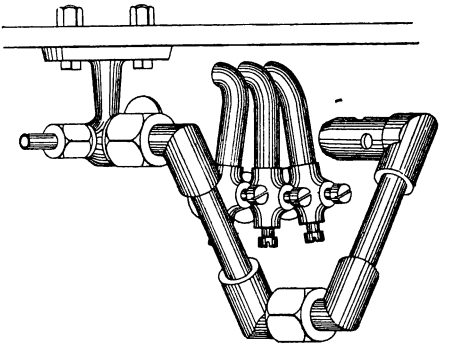
The "Eco" Acetylene Gas Torch

The accompanying cut illustrates the Eco Acetylene Gas Torch, for the initial heating of the vaporizing tubes of steam automobiles, and for lighting the pilot burner of same; or, in other words, for firing up steam automobiles. It is made by the Eco Manufacturing Company, of 53 State street, Boston, Mass.

In the illustration, the torch is represented as attached to the boiler of a Stanley automobile, with the burner of the torch in position to direct its flame upon the pilot vaporizing tube.

The torch consists of a stand which may be attached to the boiler or burner of an automobile, depending upon the style of same, which stand is provided with a swing or flexible joint, to which one of the swinging tubes may be connected, and with a union connection by means of which the



The "Eco" Acetylene Gas Torch.

stand is connected by suitable piping with the source of gas supply. Interposed in the piping is a needle valve, not shown, which controls the quantity and velocity of the gas as supplied to the burner tip. A second swing or flexible joint connects the burner tip by suitable tubing to the first swinging arm; the arrangement of the parts being so that the burner tip may have quite a large range of movement and may be positioned as desired. The swing joints are packed with suitable packing so that they will move with sufficient friction to hold the burner in any desired position.

The Eco Acetylene Torch is made in several different styles for use on the different makes of steam automobiles, with two swing joints for the Stanley, Ross and Clark steam autos; and with one swing joint for the White, General Electric and other makes having flash boilers.

Owing to the peculiar properties of acetylene gas the torch had to be constructed to furnish the gas under a pressure of ten or more pounds, and was found to work best when the gas pressure was about thirty pounds, so that to operate it satisfactorily it must be used in connection with a storage tank, or the Eco combined generator and storage tank, made by the Eco Manufacturing Company, manufacturers of the torch.

In operation the torch is swung so that the flame will be directed against the pilot vaporizing tube, and the flame allowed to remain on said tube from fifteen to twenty seconds; then the volume of the flame is reduced by the needle valve and the torch burner swung over until the flame is lighted in the hole in the burner casing provided to light the pilot burner, so that the flame will be projected in the path of the vaporized gasoline as it flows out of the pilot burner and lights the same.

The advantages claimed for the Eco torch are that the pilot vaporizing tubes can be heated and the burner lighted in from twenty to thirty seconds; that the flame of the torch is not materially affected by wind or rain, and that it is clean and safe to handle and is also very economical.

The "Jordan" Combination Tool and Battery Box

A handy and very useful adjunct to help the automobilist in keeping his tools and batteries in a safe and convenient place is the Jordan Combination Tool and Battery Box, manufactured by E. B. Jordan, Jr., No. 873 Union street, Brooklyn, N. Y.

This box is particularly suitable for high-priced cars and is constructed so as to be waterproof. It is made of seasoned lumber, strongly built, and can be bolted to the running board and serve as a step. At one end a space is provided for holding storage or dry cells. The remainder of the box consists of four drawers, so designed as to hold all the tools and small parts necessary for touring. The drawers are made in different depths from 1¼-inch to 2½ ins., so there is no waste room. The door over drawers and cover to battery box are provided with polished brass hinge hasps, each having a padlock. The size of the box is 24 inches long, 9½ inches wide and 9 inches high.

The box is painted in all standard colors, but will be painted to match any sample submitted to suit purchaser's car. The list price is $12 painted; $1 allowance is made if box is to be furnished unpainted.

W. T. Helfer, formerly New England manager for the Diamond Rubber Co., has connected with The Springfield Metal Body Co., of Springfield, Mass.

R. E. Olds, president of the Reo Motor Car Company, of Lansing, Mich., is spending two months in Europe establishing agencies.

The Heath Dry Gas Co., 1623 Broadway, New York City, manufacturers of the Heath dry gas carburetor, have informed us that they have entered into a contract with the Ohio Brass Co., of Mansfield, Ohio, by which the latter company has taken over the manufacture and marketing of the "Heath" carburetor on a royalty basis.

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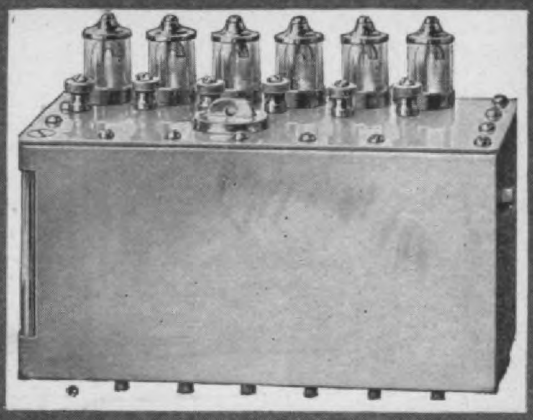
McCORD & COMPANY

1412 OLD COLONY BLDG.,

CHICAGO, U.S.A.

NEW YORK OFFICE, 24 BROAD ST.



McCORD

FORCE FEED LUBRICATORS

RADIATORS

CARBURETORS

WIRE BELTING

SPARK PLUGS

CIRCULATING PUMPS

McKIM COPPER ASBESTOS GASKETS

ard Mfg. Co., Chattanooga, Tenn.

eward's Dolan burner produces a flat e by one jet of acetylene thru one ing, similar to an ordinary gas burner. claimed that the burner cannot get out ignment, and that it increases the pow- the gas. In order to meet the demand for les, they have arranged a sample package aining four burners, sizes assorted as fol- : ¼, ½, ¾ and 1 foot, listing at $1.00 package. Single burners list at 25 cents; lozen, $2.75; per gross, $32.00.

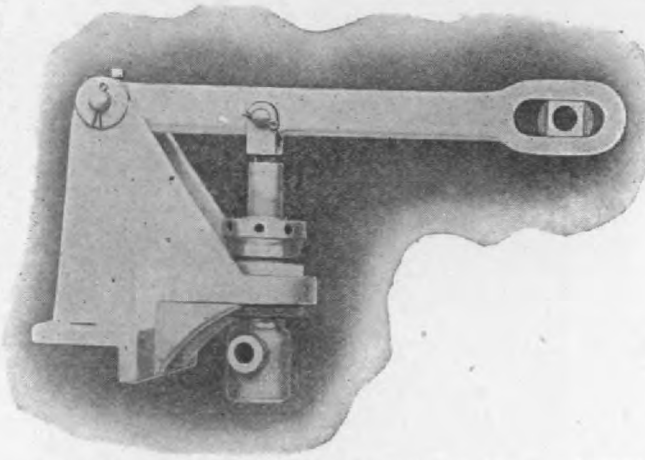
Steward's "Dolan" Burner

e gas under pressure passes into the er head and thence into a recess, pre- ly parallelogramic in form, and its in- r having the shape of a parallelopiped, then escapes thru a rectangular open- centrally located in the recess.

e pressure of the gas is primarily from end of the recess towards the centre, by this construction they secure direct- vo opposing streams of gas, which, es- g from the centre, take the form of t flame, at right angles to the recess, ac- lishing exactly the same hydrodynamic ts as is accomplished by directing the cylindrical jets against each other in orm of burners now in universal use.

e "Clark" Hill-Climbing Pump for White Cars

In the slot at the free end of the pump lever is a sliding block which is made to fit the pin in the engine cross head tha



The "Clark" Hill Climbing Pump for 1903 and 1904 White Steamers.

drives the air pump. This connection however, does not interfere with the reg ular pump connection. The by-pass i fastened to the dash. The pump is deliv

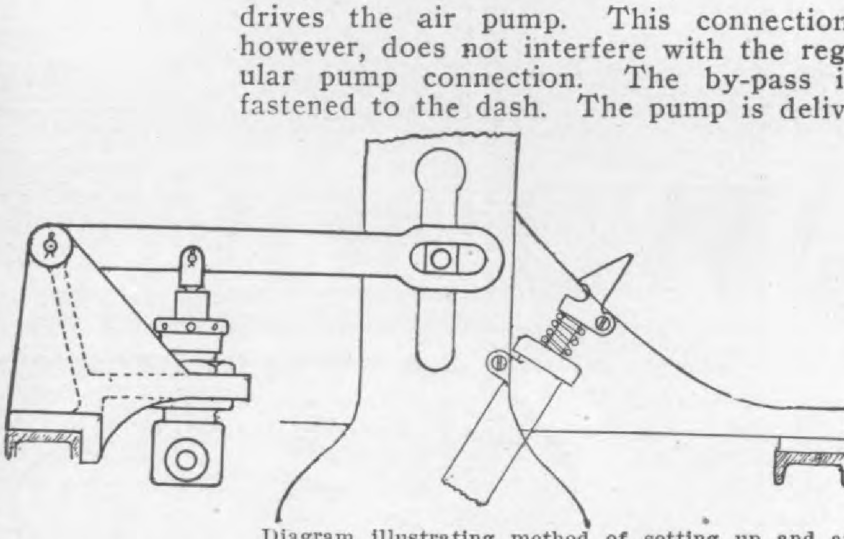


Diagram illustrating method of setting up and a taching the "Clark" Hill Climbing Pump on a Whit 1903 or 1904 Steamer.

ered with all fittings ready to apply afte the pipe threads are cut, which must b done to fit each car. Price of the pum and fittings complete is $25.

Grindan Valve Seating Compound

The Grindan Manufacturing Company, Al bany, N. Y., have placed upon the marke an excellent valve-seating compound know as "Grindan." This compound contains n emery to work into bearings and workin parts of the engine, and is put up ready mixed in both one-quarter pound and on pound cans, in four grades—coarse, mediun fine and extra fine, covering all classes o work. The price is 15c. per one-quarte pound can; 40c. per pound can, F. O. B Albany, N. Y.

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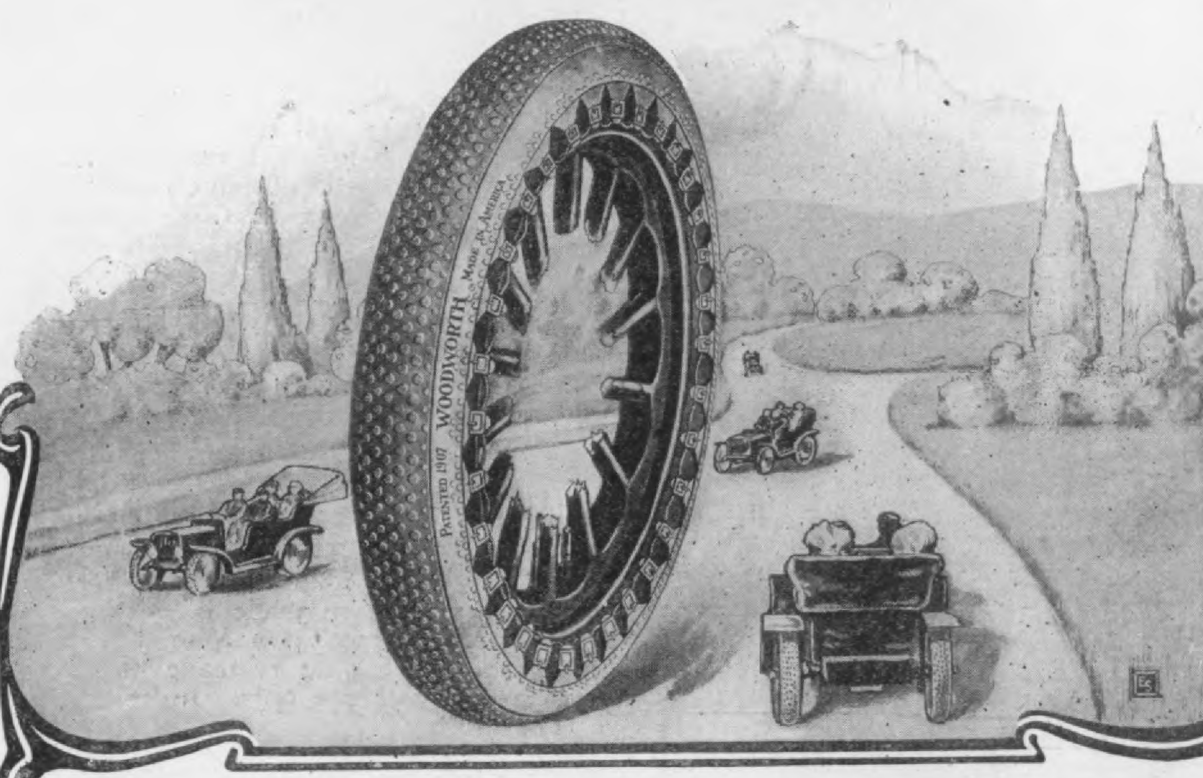

WOODWORTH

ADJUSTABLE TREAD DETACHABLE

The value of Woodworth Treads to the tires, the automobile and the automobilist cannot over-estimated. They protect the tires more completely, more positively and more economica than any other existing device can do it. In protecting the tires they give equal protection the automobile. They make punctures, skidding and sluing impossible. They make the car where it is sent and prevent accidents. In preventing accidents they also protect the persons, t lives of the occupants of the car. No automobile should be run for a single day unequipped wi Woodworth Treads. No car is complete, no car can be run economically, no car is safe witho Woodworth Treads. The magnitude of their importance is not to be forgotten as you val your tires, your car, your money and your own personal safety.

Woodworth Treads are made and carried in stock to suit any size, style or make of pneuma tire.

Woodworth Treads for Solid Rubber Tires.—Special Woodworth Treads are made to order solid rubber tires. In ordering give the outside circumference of your tire and rim, measured wi a tape measure; also the width of the tire tread where it rests on the ground.

Write to-day for booklet, "Safe and Sane Automobiling." Sizes and prices are as follows:

	Each		Each		Each		Ea
26 x 2	$ 8.00	30 x 2½	$12.00	32 x 3½	$16 00	34 x 5	$25
26 x 2½	10 00	30 x 3	13.00	32 x 4	18.00	36 x 2½	1
26 x 3	11.00	30 x 3½	15 00	34 x 2½	15.00	36 x 3	1
28 x 2½	11.00	30 x 4	16.00	34 x 3	16.00	36 x 3½	1
28 x 3	12.00	32 x 2½	14.00	34 x 3½	18.00	36 x 4	2
28 x 3½	14.00	32 x 3	15.00	34 x 4	19.00	36 x 4½	2
				34 x 4½	20.00	36 x 5	2

LEATHER TIRE GOODS COMPANY,

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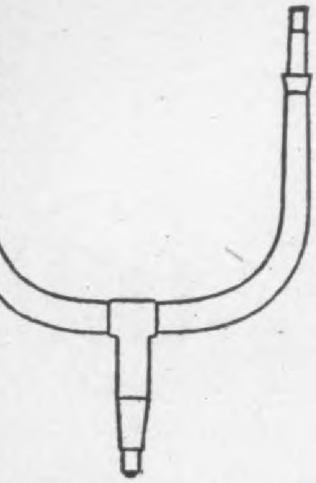
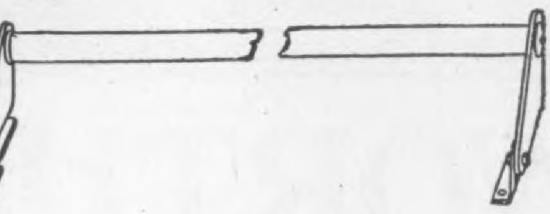
ed on the market a lamp bracket of



be Tubular Lamp Bracket.

ular form, being constructed after the e methods as a bicycle handle bar, a ice noted for its lightness and great ngth.



Globe Foot Rest.

his company also makes a tubular foot , consisting of a steel tube encased in rass tube and supported at the ends by nped steel brackets.

"Huff" Fireproof Garages

uff Portable Garage Co., 8760 Nineth street, Bath Beach, Brooklyn, N. make a specialty of portable garages of proof construction. These buildings are stically designed and serve as an ornat to a private place. While of excellent truction, prices are reasonably low. A e garage, with 7 feet 6 inches side wall, ng at $145. The 11x14 size lists at and the 12x18 size at $285. The frames of angle and tee iron and the covering orrugated iron. Sufficient windows are d to furnish all the light needed, and the ding is ventilated thru the roof. These ges when painted to harmonize with oundings are highly attractive.

he Novelty Tufting Machine Co., of ago, inform us that more than two-thirds ll the cars to be built during the coming on in the United States will be equipt

new spark plug and timer are here d scribed.

The insulation in their spark plug is com posed of the finest East India transparen white mica, fitted and compresst over a ve tical mica wrapping which renders this spar plug, it is claimed, absolutely leak, crac and soot-proof regardless of compressio

The "Robert" Spark Plug.

and temperature conditions.

The contacts are made of non-corrosi platinette, a composition alloy not affect by heat. The plug is made in ½ in standard thread size only. It lists at $1.5

The "Robert" Timer is of the roller co tact type, and presents a neat and finely fi ished appearance. The case is of aluminu and is furnished with solid metal top, beveled plate glass top. Its shaft runs ball bearings, guaranteeing longest possib life. This timer is made for single, doub triple and quadruple cylinder motors a lists at $8.00, $8.25, $8.50 and $8.75 for sol top and $8.50, $8.75, $9.00 and $9.25 f glass top.

The Rutland Battery Box

A new form of battery box was recent placed on the market by Rutland Motor Sp cialty Company, 74-78 West street, Rutlan Vt. This battery box can be made for tw sets of six each of any of the standard make but at present is made in the size adapt to No. 6 Columbia cells, in two shapes, o of which will take 12 cells in two rows 6 each, and the other 3 rows of 4 each.

The special feature of this device is th the cells are set into the box with the out connection in a certain direction; all the co nectors are secured to the cover and are r moved and replaced with the cover. In th way all cell connections are made by mere putting on the cover.

This wholly eliminates the shaking loose cell connections, and it is very easy to r place a worn out cell or to make any d sired changes.

The Speedwell Motor Car Co., Dayto O., has appointed Mr. Walter Keenan

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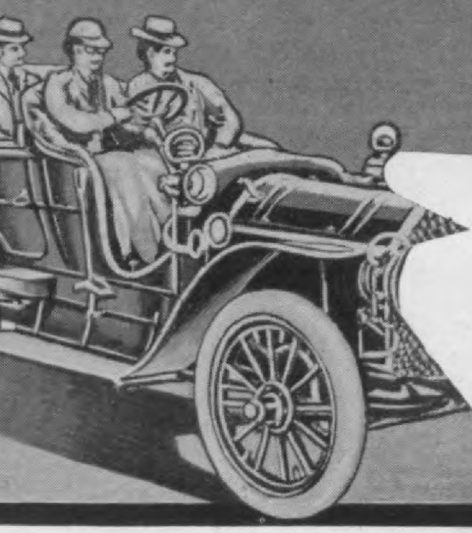

Helmet Oil

WILL SOLVE YOUR LUBRICATION TROUBLES

Few automobilists realize the importance of good oil.

They know in a general way that a car needs oil—and see that their car has "enough."

But good lubrication in an automobile isn't a matter of quantity—any more than it is in a watch.

After the man cleans your watch he oils it carefully with a special oil—that won't clog or gum or eat the metal—but will simply lubricate until the oil is evaporated.

Now you know that the watch will run for a long time after that—without attention—because the *oil is made for that purpose*—and we say to you "You can get the same results on your car if you'll go at it right—and here's how"—

Helmet oil is to an automobile what the finest watch oil is to a watch—Bearings packed with Helmet Oil need no attention except at long intervals—same as a watch—because—

The same applies. It is made with that end in view. It won't run out of the bearings because it won't melt under 175° F. It won't freeze. It doesn't contain an atom of pitch or gum or acid. It simply preserves a thin film of perfect oil between two frictional surfaces—until it just naturally evaporates.

That is the most perfect form of lubrication known.

That is what Helmet Oil is doing daily on the finest cars in the world.

That is why it requires just half—50 per cent. less—Helmet Oil to run your car than any other brand.

This is no accident. It is the result of a scientific combination of high grade, refined ingredients *in exact proportions*. Helmet Oil will lubricate every bearing of your car.

But don't take our word for this· Simply take advantage of the following liberal offer.

You'll never have the limit of satisfaction with your car until you do.

WE POSITIVELY GUARANTEE HELMET OIL

Send us your name and address and we will see that you get a sample cup of Helmet Oil. Try it 10 days. If it does not save you 50 per cent. over any soft oil you've ever tried—return it to our nearest agent—and no charge will be made for the oil used.

Our book "Auto Lubrication" sent free. Address

C. H. Besly & Co., 13 S. Clinton St., Chicago, Ill.

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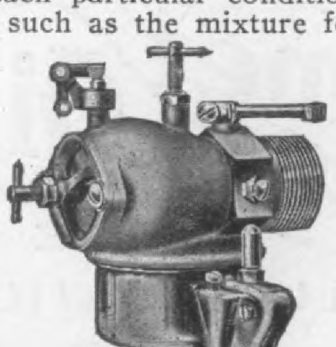
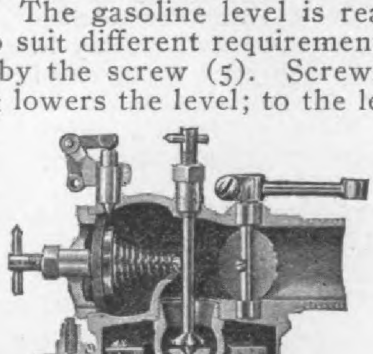
ted for automobile, marine and sta-
ary use on either the four or two-
e type of vapor engine. It contains a
ber of new and original features that
e it especially adapted to automobile
The mixing chambers are construct-
o that it produces just the right mix-
for each particular condition, speed,
etc., such as the mixture for crank-



Heitger Carburetor, exterior view.

o start motor, the low throttle speed,
full throttle, low speed, hard pull and
full throttle high speed. It is com-
neat and light and will readily go
ost any place on the machine. All
stments, draining, etc., are made from
op. The gasoline level is readily ad-
d to suit different requirements. This
ne by the screw (5). Screwing it to
ight lowers the level; to the left raises



ger Carburetor, sectional view. 1, Main Mix-
hamber; 2, Float Chamber; 3, Float (cork); 4,
Plates (2); 5, Float Adjusting Screw; 6, Float
7, Float Valve; 8, Float Valve Spring; 9,
Valve Guide; 10, Suction Tube (main air inlet);
ray Nozzle; 12, Gasoline Adjusting Stem; 13,
ne Adjusting Stem Lock Nut; 14, Gasoline Ad-
Stem Cone; 15, Air Valve Cage (auxilliary air
16, Air Valve (leather); 17, Air Valve Spring;
r Valve Adjusting Stem; 19, Air Valve Adjust-
em Lock Nut; 20, Starting Plunger Lever; 21,
g Plunger Lever Bracket, 22, Starting Plunger;
hrottle Disc; 24, Throttle Disc Screw; 25,
le Stem; 26, Throttle Lever; 27, Throttle Lever
Screw; 28, Gauze Strainer; 29, Drain Screw;
oat Valve Guide Cap (not shown); 31, Throttle
Screw (not shown); 32, Air Valve Cage Screws
t shown); 33, Gasoline Connection; 34, Gasoline
tion Nut.

The float always lays in a horizontal
pushed down by lever (20), so as to hold
air valve (16) closed in cranking, allowing
all air to pass thru suction tube (10), mak-
ing a rich mixture for starting withou
spilling gasoline. There is a fine gauz
strainer (28) around the base of the suc
tion tube (10) to prevent dirt entering
spray nozzle. Throttle can be set to open
or close by either a push or pull motion
and throttle lever can be operated from
either side or any point between. The
makers are ready to send these carbure-
tors to manufacturers or other responsible
parties on approval and trial, and can make
immediate deliveries on the ¾, 1 and 1½
inch, either horizontal or verticle connec-
tion and on the 1½ and 2 inch in about 30
days.

Trade Printed Matter

The "Pittsburg" Automatic Vise & Tool Co., Gen
eral Offices, Pittsburg, Pa., have just had publishe
and sent out to the trade, a very handsome and uniqu
book advertising the Pittsburg Two Way Vises, an
dealing particularly with their "High Speed" Benc
Vise. The cover design is a vivid mill scene wit
the Pittsburg vise prominent in the foreground, sur
rounded by a wreath of Victory.

Morgan & Wright, Detroit, Mich., very patrioticall
celebrated the Fourth of July by issuing, in the nam
of 99 3-10 of the users of M & W tires, a declaratio
of independence printed in red and blue on whit
paper and bordered in red, white and blue. A littl
American flag was placed across the corner of eac
copy. The "declaration" was, very naturally, in th
form of a boost for M & W tires.

The fourth of their series of route books has jus
been issued by the White Co., of Cleveland, Ohio, an
contains full particulars regarding the "air line"
route to the Jamestown Exposition.

The Logan Construction Co., Chillicothe, Ohio, hav
issued a neat folder to disseminate the story of th
run of a Logan "Blue-Streak" runabout from th
"Lake to River," that is, from Toledo to Portsmouth
The distance covered was 254 miles and, as the folde
tells the story, it was accomplished "twixt daw
and dark."

New York Motor Fabric Co., Room 415, No. 3
Union Square, N. Y., have issued their first catalog o
fabric specialties for the automobile trade, and it i
a very commendable publication, containing 12 good
sized pages and a very neat cover. Their line of lam
covers, tire cases, etc., is very favorably presente
and nicely illustrated.

Rough Rider seat springs are both artistically an
practically advertised in a fine-looking booklet calle
"Automobile Comfort," and issued by Ventilated Cush
ion & Spring Co., Fisher Bldg., Chicago.

The Locomobile Company of America, whose fac
tory is located at Bridgeport, Conn., have issued thr
their publicity department, which is in charge o
J. A. Kingman, an inspection book for 1907 Loco
mobile Touring Cars. It is one of the most complet
and useful pieces of printed matter ever issued by a
automobile manufacturer, as it takes up the variou
difficulties or problems which confront the automo
bile operator and deals with them individually, intelli
gently and concisely.

It is a book 4½x7 inches in size and contains abou
ninety pages of text and illustrations. It has a tabl
of contents with classifications, so that as a referenc
book it is very accessible.

These instruction books are sent to owners of Loco
mobiles in such form as will command attention an
demand preservation. They are enclosed in a leathe
wallet which has a pocket on the opposite side, whic
can be used for maps and other data useful to th
automobilist. If more manufacturers would conside
the practical side of the automobile and endeavor t
fully enlighten their patrons it would be of great bene
fit, for such instruction books as the one referred t
cannot help but appeal in all aspects to the exper
enced automobilist as well as the novice.

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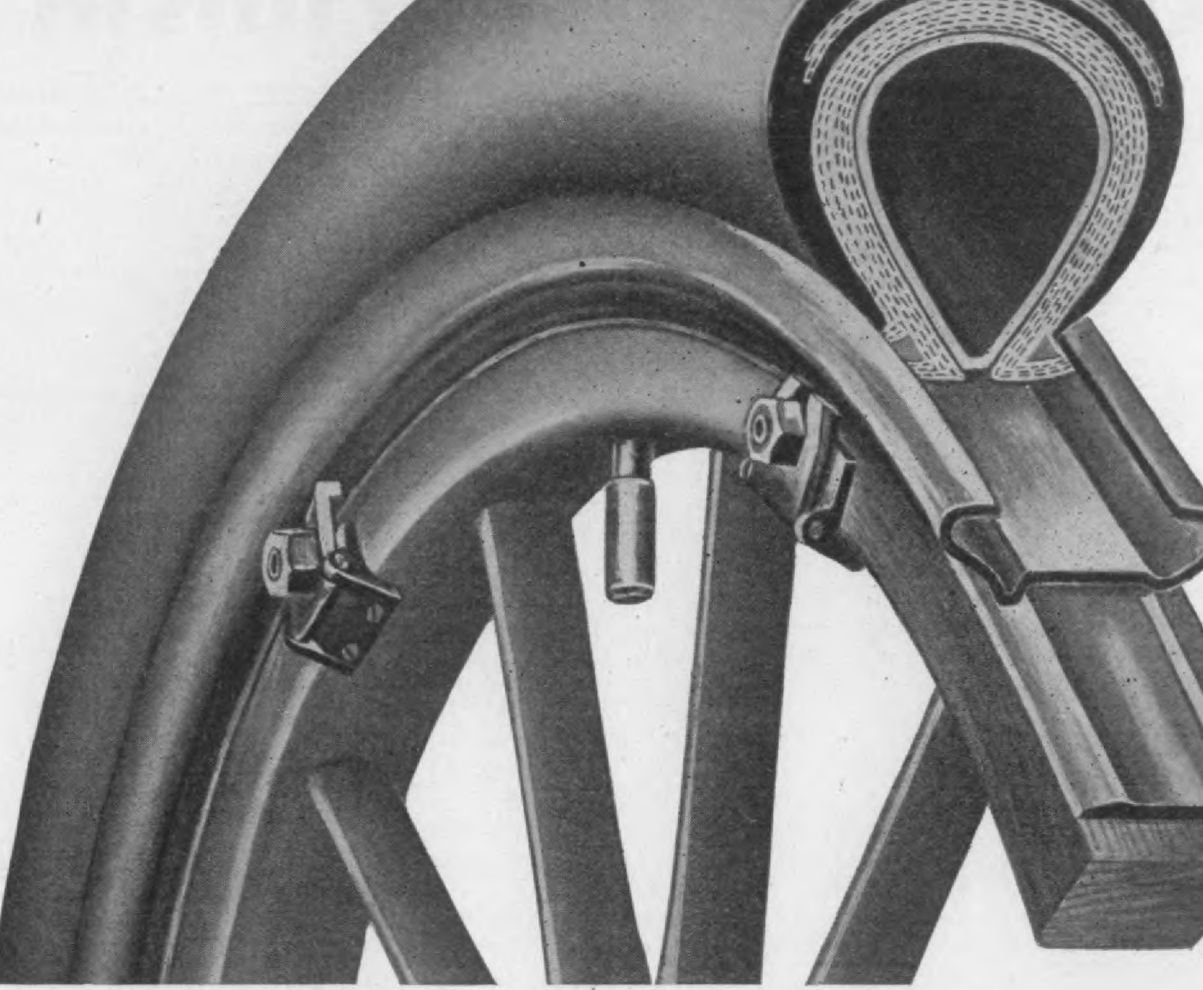

Save 27 Minutes

The usual time required to replace a punctured tire is 30 minutes. With the

CRESCENT Removable Rim

(Formerly Harburg)

a complete tire change is made in 3 minutes, by the watch.

The above sectional view shows the permanent beveled band, fitted to the wheel felloe, the adjustable rim holding any regular make of clincher tire, and the hinged clip, six of which are used to hold the rim in place.

Extra tires and rims are always carried—the tire being inflated at home before starting on a trip.

When a puncture is experienced, the damaged tire with its rim is removed and the extra rim and inflated tire is quickly bolted to the wheel, the entire operation consuming but three minutes.

Nothing could be more simple. Irritating delays are absolutely done away with. All parts are galvanized, nickeled or bronzed, thereby preventing any possibility of their rusting tight.

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Dealers' Department

Goods That are well Advertised - A Dealer's Ideas

The importance to the dealer of handling well-advertised goods is a factor that bright business men and automobile dealers and garage men have been quick to avail themselves of and have thereby enhanced their reputation and the value of their advertising inestimably. The corners of the road to success are rounded and the road is shorter and more smooth when this plan is adhered to.

The constant association of your name with goods of national or world-wide fame adds prestige to your standing as a dealer and likewise equips you to do better and more satisfactory advertising, while it brings immeasurably better results at less expense.

The small and comparatively unknown dealer who selects an unknown car or tire or other accessory of little or no reputation, even though of much more real merit, is, to say the least, handicapping himself very largely. He cannot give it more than a local reputation even though he puts much money and effort into its exploitation. And the weight of his well-meant assurances is largely dissipated thru the the public's lack of confidence in his recommendation.

It is comparatively easy to focus the attention of the public on an article or car of well-known manufacture and quality and one that the manufacturer himself has established the reputation of at an expense of thousands of dollars. The dealer has to establish his own reputation before he can attain to any considerable measure of success and as it is a very generally recognized principle that the best known goods are to be found in the most progressive stores, he should immediately avail himself of the first opportunity to annex such well-known and widely advertised goods as will enhance his standing and prestige.

Many dealers who have secured the advantages as outlined above have been far from successful principally from the fact that thro their inability to grasp the situation, or their improvident, slipshod or slothful methods of conducting their business, coupled with untidy or unkempt surroundings, they have been unable to obtain or retain all of the business that came to them. A glaring example of this class of dealer was our late friend the bicycle agent and repairman and as many of our present automobile dealers and garage men are graduates from the better class of these, let us hope that they have learned their lesson well and taken it to heart. Here was a splendid business that was boosted to the top notch of success through persistent advertising and then all but ruined through a ruinous and unbusiness-like competition. The manufacturers of first-class goods could not stay the hand of the jobbers of the "cheap and nasty" whose goods soon found their level and were handled by those of their own ilk.

The lessons taught by the bicycle are many and the fact that anyone in any old place could sell them, brings home to the dealer the importance of handling well-advertised articles and to both the maker and the dealer, the importance of advertising.

For the good of the business and all concerned let us hope that the manufacturer will take under advisement rather more than the mere ability to pay the price, when considering the placing of an agency: The location, environment, and calibre of the individual's character should be considered together with his facilities for the proper representation of a line of cars.

It needs no argument to convince the most skeptical that the automobile and commercial truck business is rapidly approaching a boom season and this not alone from the general excellence and utility of the vehicles, but from the fact that the manufacturers and all concerned are unitedly working along the same lines that at one time made the bicycle the most talked about and best advertised article of the day. Big money is spent on the racing game or touring contest and much more in giving these events publicity. This appeals to the popular idea of the masses and is good general advertising in which all classes of periodicals, gratuitously or otherwise, assist in spreading the gospel of the horseless vehicle. The effect on the public of the combined advertising of the maker, the user and the dealer, coupled with that derived from the great touring and racing events, is to unconsciously arouse an interest in automobiles and a little later comes a desire to know about the different kinds. Then the announcements of each company perform their special function and later on, those of the dealer also.

As regards the dealers who would be successful, the question of advertising has been positively and permanently settled for them in the affirmative; and it only remains for them to decide on how and when and what the advertising shall consist of. Shall it be the new and bright and logical kind with plenty of attractiveness for catching the eye, or shall it be the dull and commonplace announcements such as grandfather used?

The advent of the automobile has been productive of considerable prejudice which in

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EVER READY CAR MODEL VULCANIZER

THE ONLY

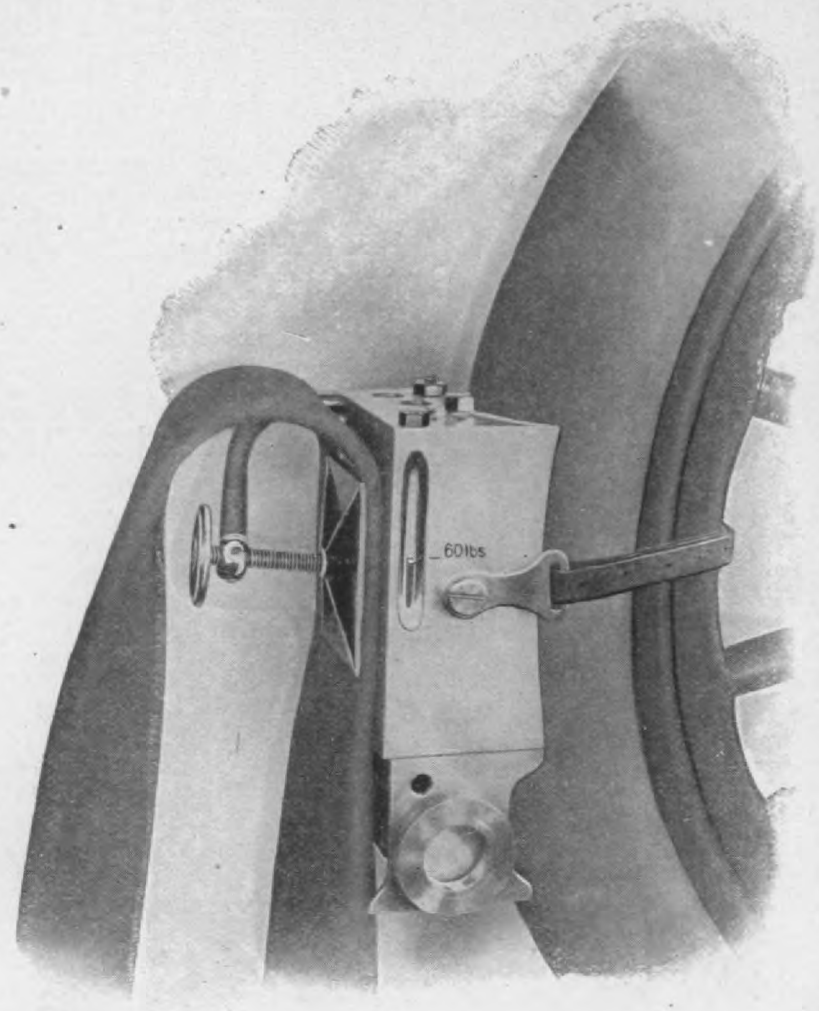
portable vulcanizer on the market which is guaranteed, by a responsible concern, to do perfect and permanent work.

The "EVER READY" vulcanizer does absolutely no patching, but actually builds up all damaged parts with new materials.

The repaired part is guaranteed to stand more than the original tire.

Any repair can be made right on the road in less than thirty minutes.

The car model, with case and tools, weighs less than five pounds.



CAR MODEL VULCANIZER IN OPERATION

Price Including Tools, Materials, Carrying Case and Book of Instructions $25.00

At our Broadway Building we have Equipped the Largest and Most Complete Tire Repair Plant in the World. Ask for Scale of Repair Prices.

SPECIAL PROPOSITION TO JOBBERS AND DEALERS

We also Manufacture "EVER READY" Tire Tools and Speedometers

ADDRESS DEPARTMENT 4

AUTO IMPROVEMENT COMPANY

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turn has created some adverse criticism; and while this criticism is unavoidable and in a measure regretable, it does, however, serve the purpose of general advertising even though it be of somewhat doubtful value. The widespread popularity of the automobile is, however, proving an irresistible power in breaking down prejudice and building up in its place a demand for the vehicles. No amount of "knocking" or adverse criticism can more than temporarily stay the progress of an article that has merit; and especially is this true of vehicles for the rapid transportation of persons or merchandise. This is progress that knows no restraining hand until the limit of possibilities along this line has been reached. The field is a large one that offers great possibilities to all who can measure up to the requirements.

The up-to-date advertising of to-day, as exemplified in the many exclusive automobile papers and the leading magazines, represents all that art can offer and money can buy at the present time and no more fitting object could be selected than the automobile on which to expend so much money or concentrated effort in high-class advertising. Handling well-advertised goods and catering to a good class of trade is usually a satisfactory and remunerative business in the long run and one that enhances the reputation of a house. Selling the "just as good" kind or the "cheap and nasty" will also prove efficacious in giving one a reputation, but it will be on a par with the goods and the conduct of the house. A MAINE DEALER.

[If you have ideas on this or kindred subjects in connection with the dealer's end of the business let us hear from you. The Cycle and Automobile Trade Journal is always pleased to further an interchange of helpful ideas.—Ed.].

Philadelphia Branch of the Mercedes Import Co.

The Mercedes Import Company, of 590 5th avenue, New York, has branches at Chicago, Pittsburg, Newport and Philadelphia. This last branch is at 153 North Broad street, in charge of Mr. H. B. Stillman, who has been connected with the selling of first-class cars for the last four years.

To begin with, the Mercedes agent takes high ground, asserting that the Mercedes is the best car, barring none; as it should be, since it is the highest-priced in all of its various models. The Mercedes now builds four different chassis models, of different powers and prices—35-H. P., $8400; 45-H. P., $10,150; 70-H. P., $14,000; all three of these having 4-cylinder motors and a 75-H. P., 6-cylinders, a nominal 1908 model, a few of which will be supplied this season at $15.000 each, for the chassis only, no bodies being included in the prices. The most ordinary equipment is a 7-passenger tonneau, cape top, body and lamps, costing about $1800 in addition to the price of the chassis. The prices of Mercedes bodies go up to $6000, when made to include pretty much every suggestion of convenience and luxury which can be included in carriage construction.

"The best in the world," thus becomes the keynote of the Mercedes selling talk. This is, of course, a very powerful argument. But this alone is not enough. However, a strong evidence of durability is given by citing examples of Mercedes cars which have been in almost uninterrupted use for 6, 8 or even 10 years, on American roads.

Little use is made of demonstrations on the road by Mr. Stillman, who does not always have even one car on view, tho it is the intention to have. Last year he had one car which he drove himself into the outlying residence districts in the early mornings and brought possible purchasers into town to business, either by appointment, or by studying the habits of his man and catching him between his residence and the railway station, a plan which had very good aggregate results.

Mr. Stillman thought he would do well to sell 10 cars the past year in Philadelphia, and it took two months to make his first sale, and another month to make the second one. After that the preliminary work began to show results, 50 cars being disposed of between April, 1906, and April, 1907, very nearly one-quarter of the total importation of Mercedes cars for the whole 12 months.

Mr. Stillman makes a great point of persistence and careful presentation to every possible purchaser, and says that the sales he is now making are without exception to men who have been under assiduous cultivation for from three to nine months.

Where a customer wants durability evidence Mr. Stillman shows his own 1902 Mercedes, 18-22 H. P., which has been driven hard for five years. This car has a heavy limousine body and has been driven without mercy from the first, with no repairs, it is claimed, of principal parts, save new babbitt bearings thruout, this car antedating the use of ball bearings in the Mercedes constructions.

The Boston Automobile Dealers' Association, at their last annual meeting, re-elected practically the old Board, as follows: President, J. H. MacAlman; vice-president, George H. Lowe; treasurer, Harry Fosdick; secretary, Chester I. Campbell; directors, J. S. Hathaway, A. F. Hinchcliffe, A. P. Underhill, S. K. Dingle, J. W. Maguire and Charles E. Ray.

An excellent example is set by the Union Electric Light & Power Company, of St. Louis, Mo., by which dealers generally could profit. This concern handles Studebaker and Rauch & Long electric cars, and to exploit the good points of these machines they issue a catalog quite as elaborate as many manufacturers' catalogs. This catalog possesses some unusual features, is well-illustrated and contains ample information regarding the cars and the facilities of the company for charging, repairing, etc.

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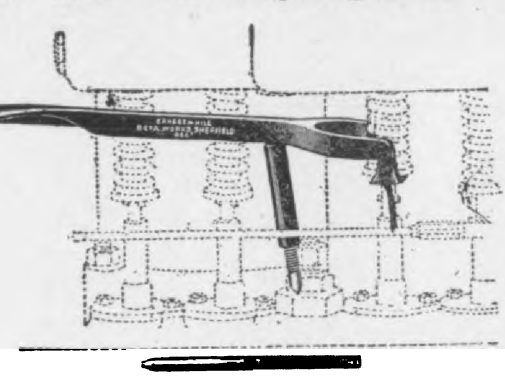
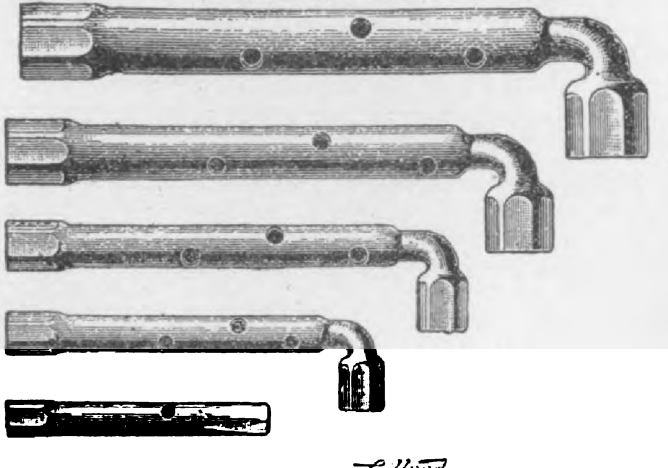
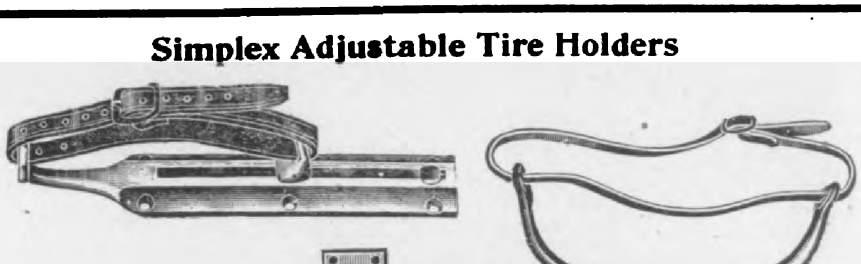


is Tool is designed to facilitate the Re-
al and Replacement of Valve Springs, and
ted with three fulcrum screws of various
ths, so as to suit all makes of engines.
valuable to repairmen desiring to grind
he valves on motors. Price, including
e screws, $1.50.



Set C—Consists of four pieces and lever handle. Will fit five standa d sizes of hexagon nuts. Price, $5 0 . Set D—onsists of five pieces and lever handle. Price, $6.00.

Simplex Adjustable Tire Holders



Consists of a set of three pieces—two side pieces for attaching to the body of the car, and one botto
cket to be attached to running board. Can be adjusted to hold from one to three tires. The leng
also be adjusted from three to twelve inches at reverse end of bracket. All parts are made of ext
vy, non-breakable steel with highly polished brass finish and equipped with strong straps for ho
tires. Price, complete set, $8.00.

uaranteed Accurate Time Pieces especially designed
use on Automobiles and Motor Boats.

Krausz Auto Record

A practicable and convenient Expense a
Record Book, invaluable to every auto own
Size 4½ x 6¾ in.

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The Githens Brothers' Company, Chicago. Oldsmobile and Stearns

HUGH DOLNAR.

The Githens Brothers' Company, 1328-30 Michigan avenue, Chicago, Ill., has the Stearns seven-passenger touring car, four cylinders, 60-H. P., price $4600.00, and the Stearns two-seated roadster, same chassis, at $4500.00, also the Oldsmobile, five-passenger touring car, four-cylinders, 40-H. P., price $2750.00, and the Oldsmobile three-passenger roadster at the same price.

Githens Brothers report sales up to expectation to May 1, then came a dull period, followed by better sales, tho not large, for the second week in June. Their 1907 trade, it is claimed, was nearly three times that of 1906.

The drop in sales May 1st, is believed by them to have been due to the cold weather, but, in spite of this, their 1907 May sales total was $13,000.00 in excess of the May, 1906, sales. They believe that even with a warm season from now on the 1907 sales total will fall far behind what it would have been with seasonable spring weather. Intending purchasers waited because of the cold, wet weather, and will not buy now because the outdoor time is so far gone.

This firm advertise once a week or more in the week-day papers and in the three principal Chicago dailies on Sundays. Two of the local evening papers are also used. The total advertising cost for 1906 was a shade less than 2 per cent. of sales total. A card is also carried steadily in two of the trade weeklies.

The Githens Brothers say that at least 90 per cent. of names to which sales are finally made come to them thru satisfied purchasers and friends. They had, at one time, no less than 55 sub-agents in three different States, Wisconsin, Illinois and Indiana. The last connection of this sort was terminated in the spring of 1907, because there was not enough to be divided. When they had 25 per cent. commissions they could give sub-agents 20 per cent., and make a living all round. When it came to 20 per cent. only, the commissions did not give enough. Again, the high-priced cars do not find a country market in large numbers. Their Milwaukee branch, established in December, 1903, was withdrawn January 1, 1907, and this company is now doing no business in the three States mentioned, outside of a radius of 150 miles from Chicago.

Names of possible buyers are kept in a card index file and communication is constant by personal interviews and by correspondence so long as a speedy sale seems probable. When a possible purchaser ceases to respond his name is placed on the "inactive" file, which is constantly studied, and is the subject of reminders from time to time, as seems expedient.

TOWN _____ STATE _____

NAME _____ DATE _____

SOURCE OF INQUIRY _____

REMARKS

NO. ONE _____

NO. TWO _____

NO. THREE _____

MAIL LIST _____

GENERAL ADV.

SALESMEN

ORDERS

Form 1.—Githens Brothers' Office File.

The index cards are forms 1 and 2, printed on one side only, first on the office file card, white, 4x6 inches, printed in black, as here shown.

As soon as a name is filed on the office form it is placed on a salesman's card, form 2, and given to the most suitable salesman, who carries the card in his pocket and makes the sale a personal matter.

The salesman's individual name card is 3x5 inches, white, and printed in black.

FORM LETTERS.

At one time correspondence with prospective purchasers was largely by means of several differing letter forms, the use of which has now been wholly abandoned because of the better effect produced by individual letters suited to personal peculiarities.

TREATMENT OF NAMES.

As a matter of course, no prospective purchaser is hurried or importuned, and still

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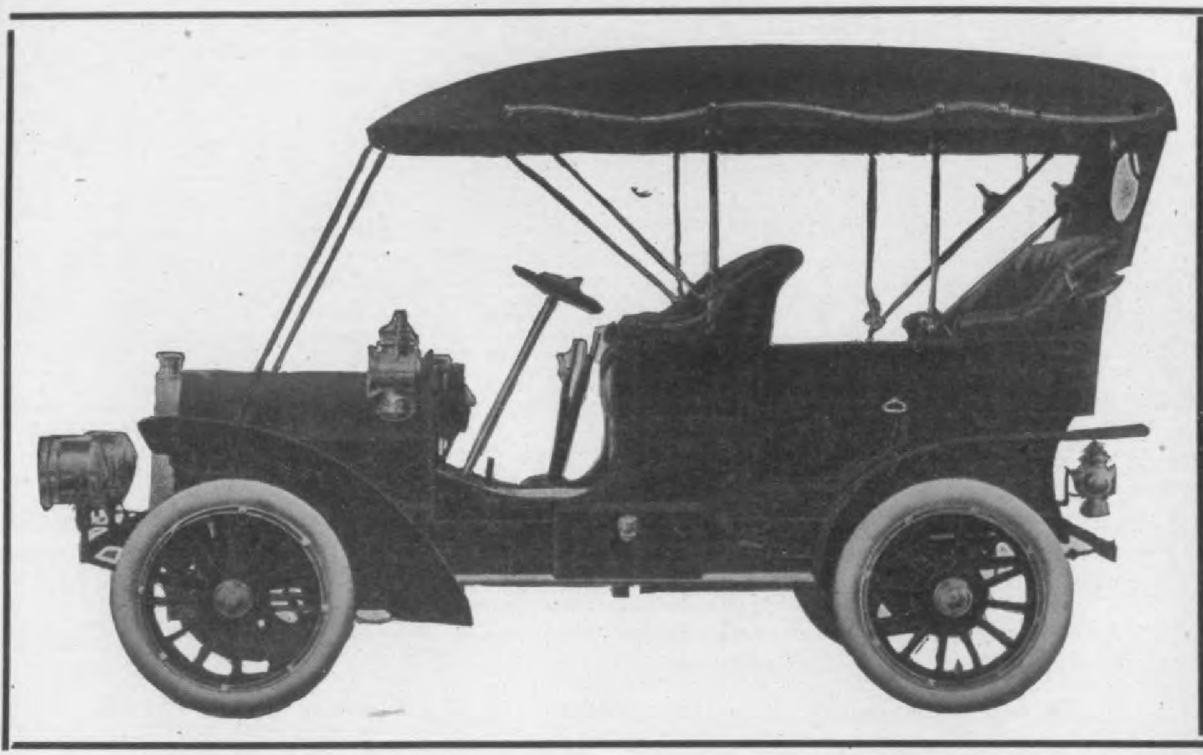
The Springfield Metal Body Co.



LARGEST MANUFACTURERS OF HIGH GRADE ALUMINUM TOURING, RUNABOUT, LIMOUSINE, AND LANDAULET BODIES IN THE WORLD.

We will be pleased to correspond with manufacturers as to their requirements.

We are now closing contracts for 1908 delivery.

Write for information and prices.

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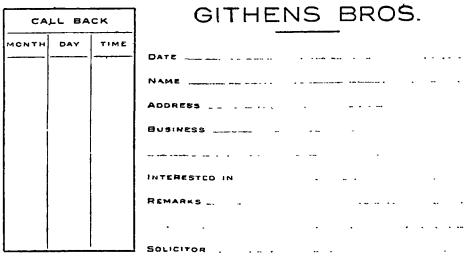
SPRINGFIELD METAL BODY COMPANY

less is a possible purchaser neglected. From the time a name is received and listed to the time the sale is completed, attention is as constant and solicitous as the nature of the case permits. Demonstrations from the Chicago sales rooms only are given, and long runs are made with the high-priced cars. No demonstrations are made away from home.


CALL BACK

MONTH	DAY	TIME

GITHENS BROS.

DATE

NAME

ADDRESS

BUSINESS

INTERESTED IN

REMARKS

SOLICITOR

Form 2.—Githens Brothers' salesman's individual prospective buyer's name card, filled out and given to a salesman who is personally charged with attention to this particular customer.

When a sale is made careful and extended instruction is given, where needed, to either the purchaser or his driver, and in some instances to both; cars sold at prices up to $2750.00 are most often driven by their purchasers, but hardly ever is this true in the case of higher priced cars.

After a car has been delivered letters are sent once in thirty days, or the buyer is called up by telephone for a report.

Any fault of the car as sold is made good free of charge. The guarantee is for sixty days only. But a small list of repair components is carried in stock, and promptness in securing parts is secured thru telephone communication with the factory.

Trading in a second-hand car invariably means a loss for the sales agent, and the practice is followed from necessity only.

AGENT'S BETTERMENT.

Githens Brothers' suggestions for improvement of selling agents' business follow: First, the business habits and abilities of the agents themselves should be greatly improved. The business of selling motor cars does offer large opportunities for agreeable personal employment and social pleasure, but sound business qualifications on the part of the selling agent are an indispensable requirement. All promises and engagements must be made good, and promptness, energy and close financial management are necessary to win permanent success.

Second, manufacturers should be more careful in the selection of agents.

Makers of a new car are inclined to obtain sales by the use of new agents, which often results in placing an incompetent or irresponsible agent in new territory, which is the source of decided injury to the trade at large, since what hurts or discredits one car is bad for all cars.

Sound business principles alone can win success in trade, and the automobile is no exception to this trite rule.

Third, and specially emphasized by Mr. Githens, comes the imperative demand of a complete system of sales agency management, to be as rigidly followed as the production routine of any well-systematized factory. He points out that the sales agency of the motor car must include the function of repairer, both with replacements furnished by the factory and with hand work of thoroly competent and reliable workmen under the eye and authority of a skilled constructor, who can be depended upon for a rigid personal inspection of every repair job carried out at the agency work shop, and is also competent to select men suitable for sending to outside jobs, and to see that these men are assisted in every possible way for the protection of the interests of the customer and the reputation of the agency. He also enlarged upon the importance of satisfactory and able repairs foremen and repairs workmen and an efficient agency repair shop system.

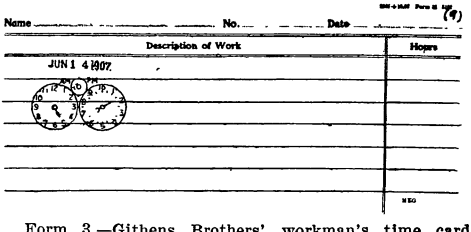
The Githens Brothers have had a large manufacturing experience, and have carried a complete agents' repair shop system to success.

This system, which is the most complete of any so far noted by the writer, is the outcome of some years of improvement of originally well-devised form blanks, some of which are here shown and briefly described, and are worthy of careful study.

AGENTS' FORMS.

Besides the possible purchasers' names, office index and salesmen's cards shown in Forms 1 and 2, this company uses nine other principal form blanks, the customer's order to Githens Bros., numbered in duplicate with its carbon copy which is the repair shop production order, both signed by the customer, the original becoming the company's bill to the customer.

The agency stores room is supplied by requisition forms which are filled by the


Name ..... No. ..... Date .....

Description of Work	Hours
JUN 1 4 1907.	

Form 3.—Githens Brothers' workman's time card, dated by time stamp. Thick manilla card; size 3½x 7 9-16 inches. Printed black.

storekeeper or by the repair shop superintendent and sent to the head of the department who acts as purchasing agent.

The stores room deliveries are recorded on another form, filled and signed by the stores keeper, and on still another form for the repair shop. Materials returned are credited on a special form, filled out and signed by the store keeper.

The workmen's time is charged on Form 3, time of work being indicated by a clock-controlled stamp. A repair shop envelope, printed in black, to take a complete record of each separate repair, is used and also serves to hold all related forms and papers,

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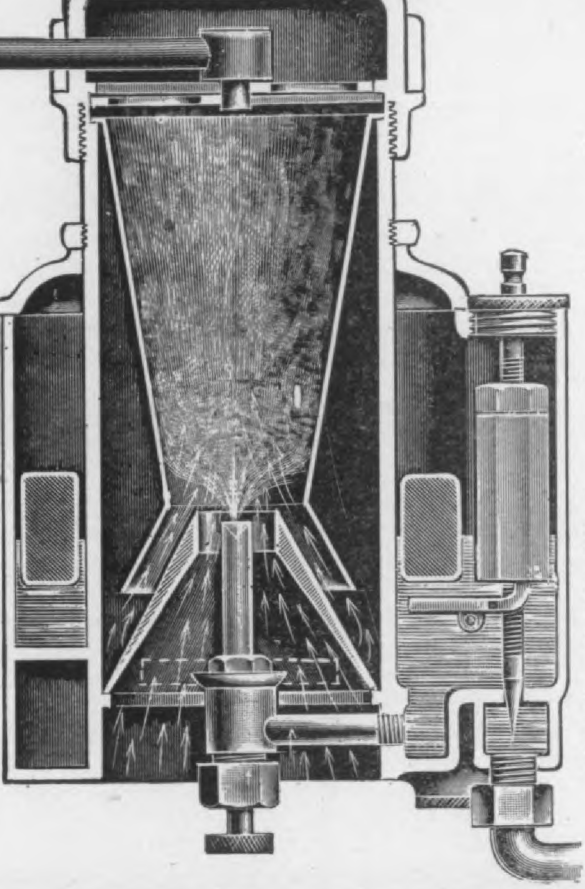

CARBURETOR

(PATENTED)

PRODUCES FROM AN INTERNAL COMBUSTION MOTOR

ITS MAXIMUM EFFICIENCY.

RESULTS:

GREATER FLEXIBILITY, POWER AND SPEED

WITH A

MINIMUM FUEL CONSUMPTION.

A study of sectional drawing will convince you that the principles embodied and method of forming a perfect mixture are absolutely correct, and that the results secured must necessitate superiority over that attained by others with their crude methods.

WE GUARANTEE the claims we make, and invite Automobile manufacturers to verify them with the sample instruments, which we will gladly furnish for this purpose.

Catalog on request.

The F. E. BOWERS COMPANY, Inc.

New Haven, Conn.

GILBERT AUTOMOBILE

HE ONLY ONES WORTH YOUR MONEY

FABRIC SUPPLIES

QUALITY . . . . SUPERIORITY

TIRE CASE

STORM HELMET

WE MAKE EVERYTHING IN RUBBER FABRIC

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and is sent to the shipping clerk with the completed repair, and is also sent by tne shipping clerk to the office after shipment or before as the routine may require. This form is extremely convenient and valuable as furnishing a complete progressive and historical record of each order in a self-contained and durable form.

Their monthly report, which is a complete statement of the month's business with the Olds or the Stearns cars, is kept on a special form and when filled gives a complete statement with separate details totals of the business for time covered, and is very convenient and well arranged.

R. W. Cook & Co., Chicago, Sales Agency for the "Royal Tourist"

HUGH DOLNAR.

R. W. Cook and Company, 1253-55 Michigan avenue, Chicago, handle the "Royal Tourist" touring car and roadster only. The 1907 Royal Tourist is a seven-passenger car, four cylinders, 5⅛x5½, 45-H. P., price $4000.00. The roadster has the same chassis, with seats for two passengers only, price $4000.00.

The Royal Tourist cars have been held strictly to prices named with no concessions. This company does not favor the trading of second-hand cars, but follows the practice to a limited extent.

Some advertising is done in the local daily papers, week-day and Sunday editions both, with no advertising in any other publications.

A large proportion of sales results from the performances of the Royal Tourist on the road, either by recommendations from satisfied purchasers, or from witnessing car performance.

A card index is kept of names of possible purchasers. No letter forms are used, each letter being suited to its recipient. The index card is a plain white blank, 3x5 inches, ruled red and blue, with no printing whatever. There is no settled routine for dealing with inquiries received by post or from callers.

After a car is sold close watch is kept of performance, inquiries are mailed once in 30 days to out-of-town purchasers and city sales are followed up by communications of drivers. Every fault reported receives immediate attention, commonly by workmen sent to the car. The Royal Tourist cars are sold with a guarantee for a year, and no repair charges are made in that time, save in case of accident or manifest fault of the driver.

For improvement in the condition of sales agents, Mr. Cook suggests refusing to trade in second-hand cars, and the closing of all manufacturer's branch houses entirely, everywhere, and selling thru agents only. The Royal Tourist has no branch houses.

Mr. Cook also says that 20 per cent. is not enough to pay for attractive quarters in a good locality, and pay for attentions purchasers should receive. His estimate of overhead expenses is at least 14 per cent. of the gross sales, leaving the agent 6 per cent. only.

Trading in of second-hand cars commonly results in a cash loss, and when there is an even money trade the agent loses the time needful to make the second-hand sale.

The Cornish-Friedberg Motor Car Co.

HUGH DOLNAR.

The Cornish-Friedberg Company, 1233 Michigan avenue, Chicago, are Chicago agents for the "Aerocar," 1907 models, which include a five-passenger touring car, water-cooled, 40-H. P., four-cylinder motor, price $2750.00; a four-passenger touring car driven by an air-cooled four-cylinder motor of 20-H. P., price $2000.00, and a three-seated roadster, same, 20-H. P., air-cooled motor, price $2000.00.

The Cornish-Friendberg Company has a factory at South Bend, Indiana, and began to make deliveries of its own "C—F" cars in March, 1907. The "C—F" line consists of a five-passenger touring car, driven by a water-cooled, four-cylinder motor, 40-H. P., and a three-seated roadster on the same touring car chassis, the price of either "C—F" model is $1750.00.

This company advertises in the local papers, both week day and Sunday editions, also in the suburban papers and in the trade journals. This company depends on local and suburban paper advertising for its agents' trade and looks to the trade journals for communication with possible sales agencies for its own "C—F" cars.

Names of possible purchasers are entered in an address book, not on index cards. If the inquirer resides in the city and does not call at the sales room in person, a man is sent at once to him, one outside salesman being employed. Out-of-town names receive an individual letter, no letter forms being used. If no reply is received the name is followed for two months or so before the matter is allowed to drop.

No time guarantee is given with cars sold, and no specified routine is followed after a sale is made, the assumption being that a purchaser's continued silence is evidence of satisfaction, and that no attention is needed until called for.

Great care is taken to fully instruct the purchaser, believing that this is the surest way to make a car satisfactory to the buyer, and that most troubles with cars come from ignorance.

Mr. Friedberg expressed the belief that agents could be very much benefited by exclusive territory alotments, and says that agents who sell the same car over the same territory are likely to cut prices.

The Cornish-Friedberg Company trade in old cars, altho declaring this practice to be bad, as forcing the agent to make two sales to obtain the profits from one.

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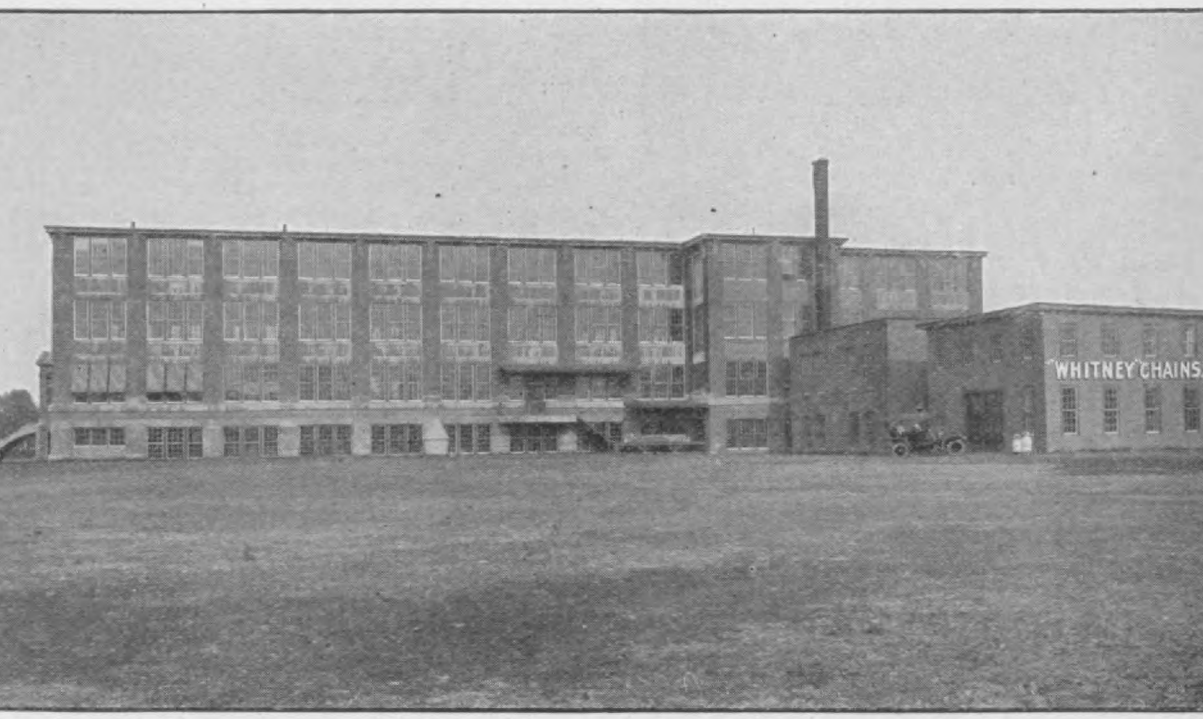
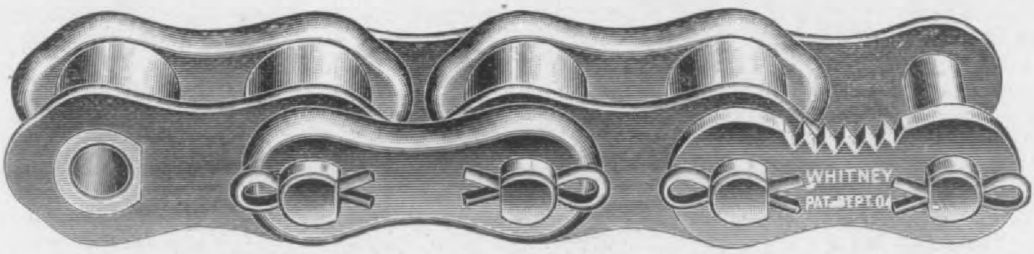
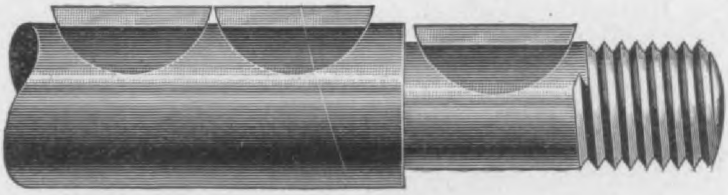
Factories in the world.



No Automobile Chain has averaged better than the "Whitney" and for the season of 1908 no chain manufacturer has made such extensive preparations and improvements as the Whitney Co.



Headquarters for Automobile Chains and Woodruff Patent Machine Keys.



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The Ralph Temple Automobile Company

HUGH DOLNAR.

The Ralph Temple Company, 311 Michigan avenue, Chicago, Ill., is the Chicago selling agent of the "National" cars, of Indianapolis, and of the "Jackson" cars, built at Jackson, Michigan. In addition the company has a direct interest in the "Temple Tourist" and in the "Temple Marvel," the two latter cars being made in Detroit.

These specified motor cars furnish the company with ten different models of American cars, ranging in price from the "National" at $5000.00, to the "Marvel" at $850.00. All of these cars have four-cycle, water-cooled motors, and all but one are bevel-gear driven.

The Temple Company claims to be the oldest motor car selling concern in Chicago, and expects to sell from five to eight cars per day from February 1st to July 1st of the year, and actually did receive orders for eleven cars on the dav of this writing, June 13th.

Mr. Temple expressed the opinion that had the weather been good this season it would have been impossible to fill orders, and he also said that he believed the very backward season and the long-continued cold and wet weather would largely reduce the total volume of sales for this season and would certainly lead to a material reduction of prices for the season of 1908.

The Temple Company obtains the names of possible purchasers from commendations of satisfied previous purchasers in some part, from advertising in Chicago dailies, but more than from anything else from the personal efforts of six outside men, and from assiduous early and late attentions to callers at the Michigan avenue salesrooms. A considerable part of sales comes from replies to stranger enquirers, who have been favorably impressed by the performance of cars sold by the company, and by the close attention paid by this company to keeping purchasers' cars on the road.

Names once obtained go on a card index list, and letters go into vertical files in envelopes. No regular correspondence forms are used, all letters to enquirers being individual, and suited to personal conditions. Where correspondents do not reply promptly letters are continued at intervals. The only circulars sent out are regular descriptions of new cars.

The correspondence card file blanks are printed on both sides and are green or yellow in color, size 3x5 inches.

No name once placed on the Temple card file is ever allowed to drop, even tho years pass without an order. Car descriptions and personal letters are continued at interva', as past experience shows that any name n.ay develop into a purchaser, no matter how slow the enquirer may be in reaching a favorable conclusion.

Mr. Temple gives the following list of rules for selling agents, and believed to be indispensable to continued success:

First, any promise made by any one connected with the Temple Company to a customer is kept, no matter how much the subordinate may have exceeded his authority in making the promise. The fault of the subordinate is never permitted to disappoint the purchaser.

Second, in case a car sold develops faults which are clearly traceable to the factory these faults are made good to the customer by the Temple Company itself, which has had the purchaser's money and is the only principal known to the purchaser in the matter of the sale. If the Temple Company can recoup itself at the expense of the manufacturer, well and good, but in no case is the customer allowed to suffer.

Third, on notification of a customer's trouble a competent expert is sent immediately to the car, no matter how far away, and, except in case of repairs due to accident, no charge is made to the buyer.

Correspondence is continued with the purchaser after sale, and constant offers are made of assistance.

Mr. Temple's suggestions as to the general improvement of the selling agent's condition include better work and more cordial support by the manufacturers, and on the other hand better business methods on the part of the agents themselves, many of whom are good drivers and demonstrators, but are wholly deficient in commercial training, and do not live up to promises made to purchasers.

Mr. Temple also criticised the conduct of agency employees, who seek opportunities for outside money-making, often to the extent of actual theft.

Sound commercial principles and honest dealing are urgently required in the automobile business, the same as in every other form of buying and selling, if permanent success is to be obtained.

Mr. W. Wayne Davis, who has for some time past been connected with the Keystone Motor Car Co., of Philadelphia, has joined the Peerless force and will assume full charge of the Peerless department of the Quaker City Automobile Company, of Philadelphia, Pa.

At the last annual meeting of the New York Automobile Trade Association the following officers were elected for the ensuing year: President, Mr. Percy Owen, of Percy Owen, Incorporated; First Vice-President, Mr. Frank Eveland, of A. G. Spalding & Bro.; Second Vice-President, Mr. E. C. Partridge, of Wyckoff, Church & Partridge; Treasurer, Mr. William P. Kennedy, of Smith & Mabley; Secretary and General Manager, Mr. E. V. Stratton.

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We are Manufacturers' Agents and Distributors, Manufacturers, Importers, Jobbers and Wholesalers of

Automobile Supplies, Materials Accessories, and Tools

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We Give Your Orders

Careful and Accurate Shipment

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Prompt and Courteous Attention

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Send for Catalogue "AA"

Established 1876 **CHICAGO, ILL.**

233-235-237 RANDOLPH ST.

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Commercial Motor Car Department

Experience of Commercial Motor Car Users

Wonderfully Successful in Shoe Delivery

The experience of the Chicago Quick Shoe Repairing Co., 120 James street, Syracuse, N. Y., shows that the automobile is the best means of delivering shoes. They use a Cadillac Model M delivery wagon, of 10 H. P., and state that it takes the place of four horses and wagons. The cost of operating the car they figure on a high average at about a dollar a day, excluding repairs. They carry an average weight of load of 200 pounds. The average daily mileage is from 15 to 20. The car cost them $950, and they figure it depreciates 10 to 15 per cent. per year. Cost of storage for car is $10 per month. They claim it better to store one's own car. Their car is driven by one of the firm.

They state that all machines should be made with vertical motors,considering the vertical motor more accessible and convenient for repairs or adjustments.

The automobile in this case not only insures quick delivery, but also is a great advertisement. They make no extra charge for collecting and delivering.

One Truck Replaces Four Wagons

Messrs. Kuntz & Johnson, Dayton, Ohio, are now using a Knox 24 H. P. gasoline truck for hauling purposes in place of four horses and wagons formerly employed.

With horses they hauled on an average of 1500 pounds per load, and made from four to five trips per day; one call per trip; covering two squares to three miles radius per day; their horses cost $175 each, and harness $15 per set.; average monthly cost of care and feed of each horse amounted to $16; shoeing $2.50; repairs to each vehicle $3.50; driver's wages each $40. They figure the horse to depreciate 1-3 and the wagon 15 per cent. in value in a year, respectively.

The truck has a carrying capacity of three tons, makes 30 miles on an average per day, in a two to five miles radius of territory. The truck cost $3000. Gasoline and lubricating oil are figured at $14 and $2.60 per month, respectively. Repairs and repair parts are figured at $10. The operator receives $60 per month. No helper is employed. Summing up the total cost of maintenance of the horse-drawn vehicle and motor car we find the horse vehicle expenses amount to a total of $248, as against $86.60 for the motor car, or a saving of $161.40 per month, or $1936.80 per year. They figure the motor to depreciate 1-3 in value in a year. They store their own car, which also helps to reduce expenses. No trouble has been experienced in securing a competent driver. Quick deliveries is the chief advantage of the motor car over the horse vehicle as suggested by their experience. They use 7-inch rubber tires on rear and 6-inch on front wheels, but claim they will not stand their use, and suggest that rubber tires should be done away with.

Wholesale Drug Houses Use Commercial Vehicles

The following is a brief account of the experiences of the Kauffman-Lattimer Drug Company, of Columbus, Ohio, with two 4-cylinder, air-cooled Frayer-Miller trucks.

The first was purchased in June, 1906, and had a capacity of two tons, and the second, of the same type, of 4 tons capacity, was put in service in March, 1907.

These trucks took the place of four wagons, one of which was a two-horse truck and the other three were single-horse trucks. The smaller wagons carried 2000 pounds, and the large one 5000 pounds, so the two gasoline trucks gave a carrying capacity of 5000 pounds more than the wagons. The trucks are run every day from 7 A. M. until 6 or 8 P. M., and are used for delivering to about 120 druggists and several manufacturers within a radius of 5 miles of the city.

The cars are kept at a public garage, for which a charge of $10 per month for each is made. The drivers are paid $17 per week and the helper $10, as against $10 to $12 per week for the horse drivers and $9 to $10 for their helpers. But with the motor trucks only two instead of four drivers are required.

The total expenses of the trucks, including drivers, from June 1, 1906, to January 1, 1907, were $657.64, and from January 1, 1907, to May 1, 1907, were $692.25. It will be noticed that the expenses were much lighter during the first period, and this is accounted for by the fact as stated by the company that during that period they had a very competent and careful driver, who

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RELIANCE MOTOR TRUCKS

For Freight and Passenger Service.

¶ In successful operation under all kinds of conditions and service in all parts of the country.

¶ Sold under a liberal guarantee by a company in position to back it up.

¶ Manufactured complete in our own large plant which is devoted exclusively to the production of high grade commercial vehicles.

¶ Not an evolution from a pleasure vehicle, but designed strictly along truck lines with a surplus of strength in all parts.

¶ One man and a **Reliance Truck** will do the work of three men and three horse-drawn trucks, with an operating cost about equal to one horse-drawn truck. (We give you data and names of users to prove it.)

Write for catalog, and state kind of service in which you use trucks.
Some good territory open for responsible agents.

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RELIANCE MOTOR CAR CO.

tended strictly to business and consequently the machine ran well and there were practically no repairs necessary. Another man was put on later, and as he drove carelessly and did not give the mechanism proper attention, there was continual trouble and much repairing and expense necessitated. The first man was then put on the large truck with the result that there was almost no trouble or expense with this machine. The company states it is now breaking in a good man for the old truck, and that soon it will equip a garage of its own.

In regard to depreciation, nothing definite could be obtained, the statement being made that this is the vital point and depends largely upon the care the machines receive and that their experience has not been long enough as yet to judge accurately.

The advantages of the motor trucks to this company are shown by the following statement: "We are to-day able to deliver 8000 pounds five miles from the store, together with two or three other stops to or from this point in one and a half hours, which formerly would take us a half day with a two-horse wagon. The two trucks, with reliable drivers, are very satisfactory."

Electric Truck Used by Brewer

According to the experience of the Gund Brewing Company, of La Crosse, Wis., the chief advantage in the use of electric trucks for delivering lies in the increased speed at which they can be run, thus effecting considerable saving in time.

This firm displaced a single and double-horse truck by an electric of about 1 ton capacity. Two trips per day are made, aggregating from 10 to 15 miles. The machine is not kept in an outside garage.

COMPARATIVE COST OF OPERATION.

The electric truck cost $2000, as against three horses at $225 each—$675; two wagons at about $675 each, making about the same initial cost for each equipment. The operating expenses average about as follows:

ELECTRIC TRUCK.		HORSE TRUCKS.	
Charging, per month	$10.00	Horse-feed and care	$9.00
Repairs, per month	11.00	Wagon Repairs	3.50
One driver	58.25	Shoeing of Horses	12.00
One helper	46.25	Two drivers	116.50
		One helper	43.75
Tot. per mo.	$125 50	Tot. per mo.	$184.75

The wages above are figured on the basis of 25 working days per month. The depreciation of both wagons and trucks are placed at about 10 per cent. The cost of harness and the renewal of batteries are not given, and would, of course, change these accounts considerably. The chief point for improvement is believed to be in connection with the storage battery, and the objection is made that it is sometimes impossible to negotiate roads which could be covered by the horse trucks.

Commercial Cars Used by the Boston Elevated Railway Company

The Boston Elevated Railway Company at the present time are using five gasoline cars, four of which are air-cooled Marions and the fifth is a Buick. Three of these machines took the place of eight horses formerly used with four business buggies. The cars are used by the department superintendents and foremen and are cared for on the premises of the company by one competent mechanic, who is paid a salary of $56 per month. With the motor cars an average daily distance of about 50 miles is covered as against 25 miles per day as a good average with the horses. The monthly cost of gasoline is $26.25 and lubricating oil comes to $2.63. The entire expense for the six winter months including repairs caused by accidents are: Labor, $62.05; materials, $41.01; shop charges, $15.22; total, $118.28. And if to this is added the cost of fuel and oil for six months, namely, $173.28, the total cost of operating the cars for six months is $291.56. In regard to depreciation the company states that it estimates it at 50 per cent. the first year and 20 per cent. on the depreciated value each year thereafter.

Truck Much More Speedy Than Horses

A Knox Model D-3 air cooled gasoline car is being used by a New England firm for hauling machinery. It is a 16 B. H. P. car and costs $2500.

They make an average of 14 short trips, covering 14 miles per day, in a radius of 1½ miles. Gasoline expense is figured at $12 per month and lubricating oil at $4.48. Repairs are figured at $87.58. They store their own car. The monthly wages of operator are $45, helper $35. They calculate that the car depreciates about 25 per cent. in value in a year.

They previously used one horse and wagon all the time and one horse and dump cart part of the time. The weight of load carried was slightly less than with the auto and the mileage was only about 10½ daily. Horses cost them $200 each; horse, wagon and harness $500; care and feed of each horse $11.20 per month; repairs to vehicle, $3. They state that the useful life of a horse extends over six years and value at end of period is $30. The useful life of a wagon is 8 years, terminal value $50. They have had no trouble in securing a competent driver. The most needed improvement to motor cars as suggested by their experience is reliability. They claim speed to be the only advantage of the motor car over the horse-drawn vehicle.

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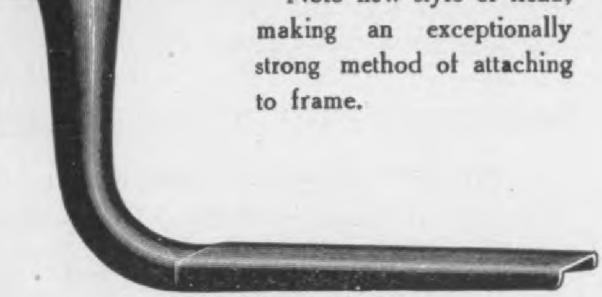

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making an exceptionally strong method of attaching to frame.

STAMPED STEP HANGERS

Neat—Light—Strong

Made in several lengths and drops

The CROSBY COMPANY

BUFFALO, N. Y.

L. CHAS. KENEN

French Automobile Designer

We furnish designs, with complete working drawings, specifications for materials best treatment of steel, etc., for motor cars, trucks, omnibuses, delivery wagons, auto boats and railway motors.

Our experience, gained by many years of work in the best French shops, assures rapid and successful results, without experiments whatever.

Correspondence Solicited.

1 MADISON AVE. **NEW YORK, N. Y**

A light and powerful

DELIVERY CAR

Correctly designed and carefully built

Load capacity, 1000 lbs.
Price F. O. B. Lockport, $1000.00

COVERT

The Commercial Motorcar Co.

INCORPORATED 1905.

Times Building, New Yorl

Correspondence invited with Busin
Houses contemplating changes or ad

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Only Cost Two-Thirds as Much as Horses

W. R. Kuhn & Co., East End, Pittsburg, Pa., have been using three electrics, manufactured by the Pittsburg Motor Vehicle Co., and one gasoline car, made by the Waltham Mfg. Co., for delivery purposes, and have found the motor car to entirely meet the requirements of their business.

The cars carry an average load of 700 lbs. and cost $1700 each. They make about six trips daily; twenty calls per day; covering about four miles radius of territory. They only received their gasoline cars a short time ago and therefore cannot give cost of maintenance, etc. The electric cars they charge with their own current and store themselves. They require no helper, only an operator to each car, who receives $10 per week. The cars have been in service for three years, and they claim they are running as well to-day as when new. The average monthly cost of repair work and repair parts is figured at $8.00.

Each car has taken the place of two horses and one wagon. The wagons have a carrying capacity of 12 to 14 hundred lbs. each. The load carried, trips made, etc., are the same as with the motor car. The wagons cost $475 each, horses $175 to $200 each; harness $35 per set. The average monthly cost of care and feed of each horse was $18.00, shoeing $3, repairs to vehicle $6, drivers' wages $10. They calculate the wagon to depreciate 20 per cent. in value in a year.

Mr. Kuhn in enumerating his experience states that the greatest trouble they have is in getting parts when wanted. They have been unfortunate enough to break an axle on two of their cars at different times and would have to wait three months for new parts from factory.

Mr. Kuhn considers the electric wagon, weighing 2200 pounds and carrying 700 to 1000 pounds, to be the best business proposition for a retail business, as the maintenance on a small wagon is so much less and it meets the requirements better than a large truck. Their tire renewals on three wagons in three years have only been about $150. They always carry an extra set of batteries, and have only removed two sets in three years.

In regard to maintenance Mr. Kuhn says: "I believe when seven to ten or more motor cars are required and they are charged at owner's barn with a careful man to look after them, they can be operated at half the cost of same number of horses and wagons, for it must be remembered that an electric wagon can run all day, where a horse must be relieved; in my business we use two horses in each single wagon; generally when we attempt to run them all day they soon go down. My experience with motor wagons for the past three years to me has been quite favorable and satisfactory. Some improvements have been made since on the same make of wagon we are using and the now should be even better."

A Farmer's Experience with an Automobile

Mr. Frank Brendle, of Salina, Kan., is using an 8-H. P. 1906 model Reo gasoline car for all kinds of purposes, hauling produce from the farms, salting stock, buying and selling cattle, etc. With his car he carries an average load of 400 pounds, and covers about 30 miles per day. The car cost $675.

Mr. Brendle has never had a breakdown, only a little ignition trouble once in a while. He has not kept account of fuel expenses, the only other outlay was for recharging batteries, one charge a year at the cost of $1.20. He stores his car in his barn, claiming it best, as no others can then meddle with it. The most needed improvement on motor cars, as suggested by his experience, is that of being careful. He runs the car on an average speed of 10 miles an hour when the roads are in fair condition. To fully meet his requirements he could use a little more power, especially when the roads are muddy or heavy. He claims the car to be as good today as when he bought it. Mr. Brendle also states that the average motor car is made too complicated and light for the rough usage in the hands of wild, reckless and inexperienced drivers.

Ships Fruit and Vegetables with Gasoline Truck

In the produce business Mr. Walter Waldin, of Miami, Fla., finds the motor car answers all the requirements of the business to his utmost satisfaction. He is using a one-ton gasoline truck, built by the Rapid Motor Vehicle Co., of Pontiac, Mich. Average daily mileage made with this truck is 28; two trips per day; 10 calls per trip; covering a radius of 7 miles. The car cost $1600. Monthly cost of gasoline and lubricating oil is figured at $15 and $3, respectively. Repairs are figured at $1 per month. He stores his own car. Wages are $9 per week for operator and helper. He figures the car depreciates $200 in value in a year.

Mr. Waldin states that his car has replaced four horses and two wagons, and that with the motor car he can make twice the number of trips and calls as with horses. As a suggestion he says that work could be saved if there were some substitute used for brass that needed no polishing. He also claims the motor car to save considerable time and that the horse vehicle has no advantage at all over the motor car. Mr. Waldin uses his machine when rushed as a power to pull an additional car carrying about 1500 pounds. In concluding his experience he states that his only trouble is that he cannot get a car strong enough which at the same time must be light, to stand 10 or 15 miles per hour.

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Waltham Runabout

FRICTION-DRIVE

$350

A car of small cost and great accomplishment.

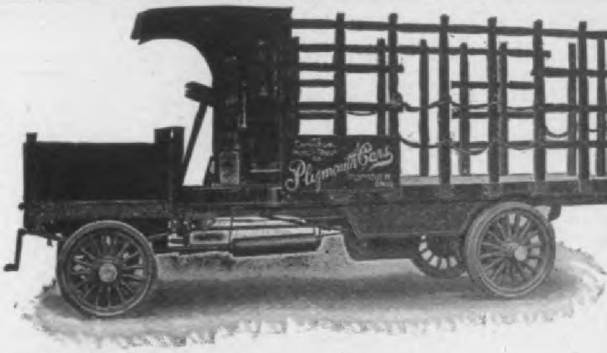
MODEL B. R. 4 H. P. $350.

WRITE FOR FULL PARTICULARS
(and enclose this ad.)

WALTHAM MFG. CO., Waltham, Mass., U. S. A

PLYMOUTH CARS

Stake Trucks—Flat Trucks
Sight Seeing Cars
Side Board Trucks—Busses



OUR Famous-Duplex Friction Transmission is the explanation for the wonderful pulling efficiency, simplicity of construction and ease of operation—*Send for Catalog.*

The Commercial Motor Truck Co.

PLYMOUTH, OHIO.

COMMERCE TRUCKS

TRADE MARK

Built for **Commercial** Purposes

4-CYLINDER 4-CYCLE

POWERFUL — ECONOMICAL — RELIABLE

2½ to 5 Tons Capacity

BODIES TRUCKS SIGHT-SEEING BUSSES MOVING VANS

---

3 TON 5 TO

"Manhattan"

Commercial Trucks and Sight Seeing Car

Buy the Best and save money and annoyance.

MACK BROS. MOTOR CAR CO, - Allentown, Penn

"RAPID"

"THE CAR THAT RUNS"

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The Soules 1907 Delivery Cars

HUGH DOLNAR.

The Soules Motor Car Company, W. F. V. Neumann, General Sales Agent, 736-40 Woodward avenue, Detroit, Michigan, U. S. A., is offering for the season of 1907 one delivery car, 1500 lbs., paying load, with the standard body, but is fitted with a variety of different bodies suited to service demands.

The first Soules cars were sold to purchasers in 1906. The motor of this first car was two horizontal opposed cylinders, set far forward under the hood, clutch-case and gear-case applied to the motor crankbox so as to form a rigid propulsion and transmission unit, all located in front of the driver's seat, where it is readily accessible by lifting the hood and the loose floor boards. The 1906 car cylinders were 4½x5 ins., nominal 15 H. P. In this first model the line shaft of the sliding gear speed change was splined; the drive was thru a universal shaft to bevel gears in the divided rear axle housing. The rear wheels were forced on the plain cylindrical axles and retained by key and pin.

For 1907 the Soules delivery cars have a larger motor, two cylinders opposed, 5½ x5 ins., nominal 22 H. P., the line shaft is squared instead of splined, and the rear wheels are forced on tapered axles, keyed and hex nut retained.

The same form of assembled motor unit is retained with the same far forward placing and the same ready accessibility.

As the power has been raised from 12 to 22 H. P., the 1907 Soules delivery car can do very much more work than the 1906 model, and can make good time thru deep sand with the full load. The construction of the change gear is much improved by squaring the line shaft, and the 1907 improvements greatly increase the working value of the car tho the price remains the same, $1800.00.

The pair of 5½x5-in. cylinders have more combined piston area than any other delivery car of the same rating, which makes the service quicker and better in every way.

The assembled motive unit has shown itself to be durable, and the location makes access and inspection very convenient.

The motor is nominal 22 H. P., and can easily show that on the road. The nominal paying load is 1500 lbs., but the power and tires are ample for 2000 lbs., and 2500 lbs. has often been carried on these cars.

The weight is about 2200 lbs. Price, $1800.00, with standard covered body, three oil lamps and full tool equipment, all ready for actual service.

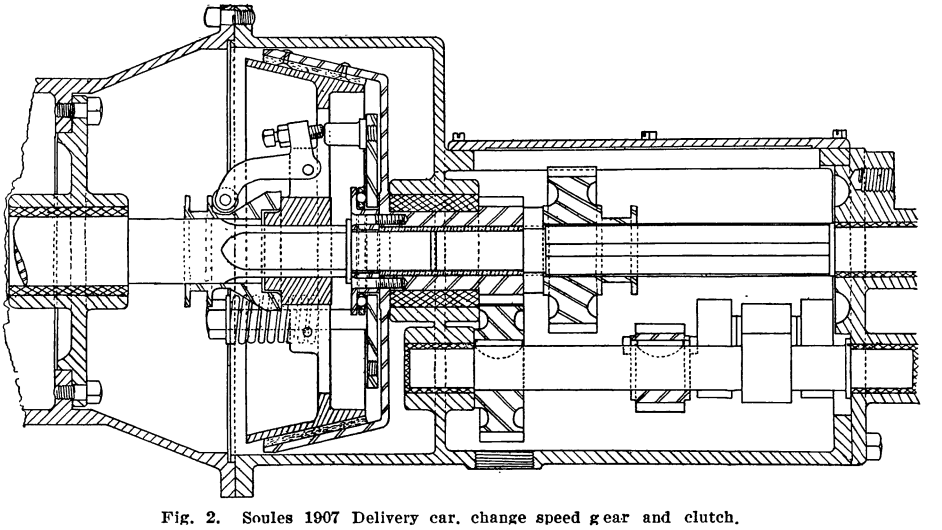

Fig. 2. Soules 1907 Delivery car, change speed gear and clutch.

Commercial Vehicle Notes

A motor hose cart costing $2200 was placed in service in North Yakima, Wash., on June 1.

The Fire Department of Long Beach, Cal., have constructed their own self-propelled fire fighting apparatus. They removed the tonneau of a Rambler touring car and substituted a chemical apparatus on the rear deck.

Lee and Younghand are operating a electric omnibus service between Almont, Mich., and Romeo a distance of nine miles.

A motor hose wagon will be purchased for use in Winchester, Vt.

A motor stage is in operation between Picture Rocks and Montgomery, Pa., a distance of 20 miles.

Motor buses will replace the horse-drawn vehicles on the stage line of Nathaniel Church, operating between Tiverton and Seaconnet Point, Mass.

Motor cars were placed in service May 11 between Amarillo and Tucumcari, Texas, a distance of 115 miles is covered in seven or eight hours.

J. B. Van Sciver Company, of Camden, N. J., have purchased three Reliance trucks.

As a result of the enforcement of the "Jim Crow" law in San Antonio, Texas, the Texas Transportation Company has started a line of passenger motor cars patronized by negroes.

The city of Akron, Ohio, has ordered a Reo patrol wagon.

Motor cars now connect Kissimee, Orlando and Sanford, Florida.

The Merchants' Motor Delivery Company, Ft. Wayne, Ind., is the outcome of a move on the part of a number of merchants who absorbed the business of the Merchants' Parcel Delivery Company.

Postmaster of Pittsburg has been granted authority to procure the service of automobile for mail collection and delivery.

With a capital of $100,000 the Auto Transportation Company of Buffalo was recently incorporated to operate motor buses between the city line and Sheton Square along Delaware avenue and between the chief places in Erie, Niagara and Genesee counties.

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SUCCESSORS TO TURNER & FISH CO.

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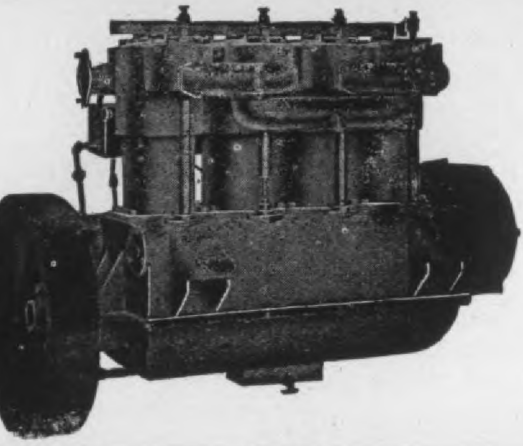

Automobile and Truck

MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

HERSCHELL-SPILLMAN CO.
W. Tonawanda, N. Y.

A Word to the Autoist

FOR BEST RESULTS USE

Palmbla Carburetor

THE NORTH CHICAGO MACHINE CO.
NORTH CHICAGO, ILL.
WRITE FOR PARTICULARS.

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The SOULES LIGHT DELIVERY CAR, 22 H. P., two 5½ x 5 orizontal opposed cylinders, sliding gear transmission, bevel ear drive. THE CAR THAT HAS BEEN TRIED AND FOUND OT WANTING. Agents wanted. Correspondence solicited.

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ONLY PRACTICAL TIRE FOR THE COMMERCIAL VEHICLE.
Wears like iron—Rides like rubber.
Correspondence solicited from manufacture and users of commercial vehicles to whom v can guarantee greater tire satisfaction tha they have had heretofore.

ARTHUR H. MIDDLETON, 2821 N. Broad St., Phila.,

TON 5 TON
AMERICAN MOTOR

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Motorcyclists Make Fast Time

'he first local motorcycle race of the sea- was run off June 22, at the Collinswood k in Hills Grove, and proved a success. e events were all well contested and close shes proved the feature of the day.

ake DeRosier, of Springfield, claims to e established new marks for mile and mile events for the half mile, flat track. the five mile event his time was 6.44 1-5, second mile of this event being covered 1.09 flat. Results follow:

e-mile novice, single cylinder machines, owners to —Klaus Olsson, first; Frank Larsson, second. e—1.13 4-5.

o-mile amateur, limited to Rhode Island riders, ers to ride—J. B. McLaughlin, first; A. Heilborn, nd; B. L. Barnes, third. Time—3.21.

ve-mile amateur, free-for-all, finals (six starters)— r Hedstrom, Springfield, Mass., first; J. L. Picker- second; Peter Cox, New Haven, third. Time— 1-5.

hibition mile—Jake DeRosier. Time—1.22 4-5.

limited pursuit race, Providence Motorcycle Club Newport Motorcycle Club—Won by latter; distance miles. Time—2.57 3-5.

ve-mile exhibition—W. H. Wray, Brooklyn, Mass. e—7.16.

n-mile handicap—Frank Domina, first; Klauss on, second; B. L. Barnes, third; J. B. McLaughlin, th; Peter Cox, New Haven, fifth. Time—17.20 2-5.

o-mile race, open—O. Hedstrom, Springfield, first; k Domina, second; Peter Cox, New Haven, third. e—3.01 1-5.

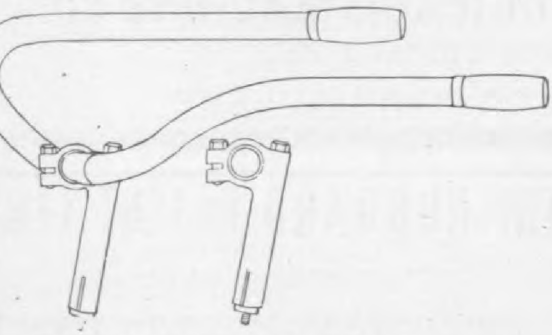
ve-mile exhibition—Jake DeRosier, of Springfield. e—6.44 1-5.

nsolation race—D. V. Riley, first; Frank Wilkin- second. Time—1.44 3-5.

limited pursuit race between winners of the day— k Domina, first. Distance 1¼ miles. Time— 1-5.

w "Ideal" Motor Cycle Handlebar

'he motor cycle handlebar here illus- ed is the latest product of the Ideal ting Co., 3 Appleton street, Boston, ss., who are well known as specialists he handlebar and stem business. This



New "Ideal" Motor Cycle Handle Bar.

"Ideal" motor cycle bar was demand- by the trade, and the Ideal Company but filling a clearly exprest need in nging it out.

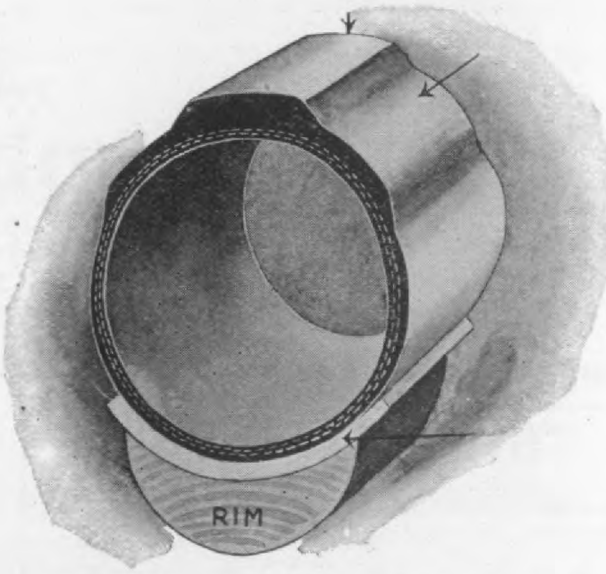
walls are ¼ inch thick with seven-si teenth pinch bolt which will hold any o dinary strain put on the same. The dov stem is three inches long and is made inch, 13-16 inch and ⅞ inch in diamet This stem will take any bar with 1-in collar, but will be made in quantities take 1⅛-inch and 1¼-inch collar on o der. They also make any shape mot bar tops in quantities.

This cut represents a regular stock m tor bar top. It has 3-inch rise, is 24 inch wide with grips, 12 inches long, and made out of 14-gage tubing.

Armstrong's Improved Palmer Cycle Tire

A. F. Armstrong Co., 673-677 Huds street, New York City, has brought out improved form of the Palmer Cycle tire a are listing it at $10 per pair. It is made the Goodrich factory but sold by the Ar strong Co.

The prominent feature of the tire, excep ing the all-'round excellence of materi used and methods employed in its manufa ture, is the formation of the tread, which well illustrated in the accompanying cut.



The "Armstrong's" Improved Palmer Tire for Cycles.

It is a light racing tire and the narro substantial tread gives it great speed qua ties, while broad tread foundation, or su

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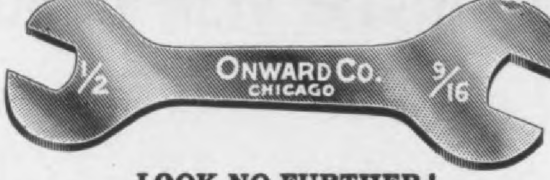

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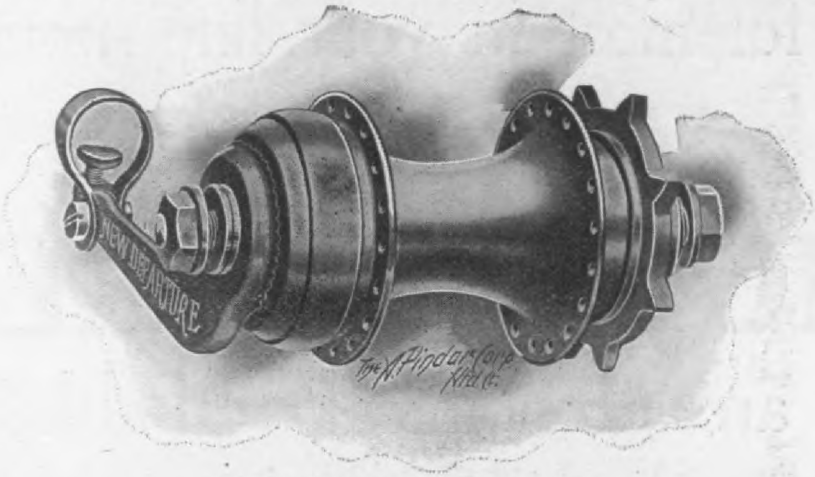

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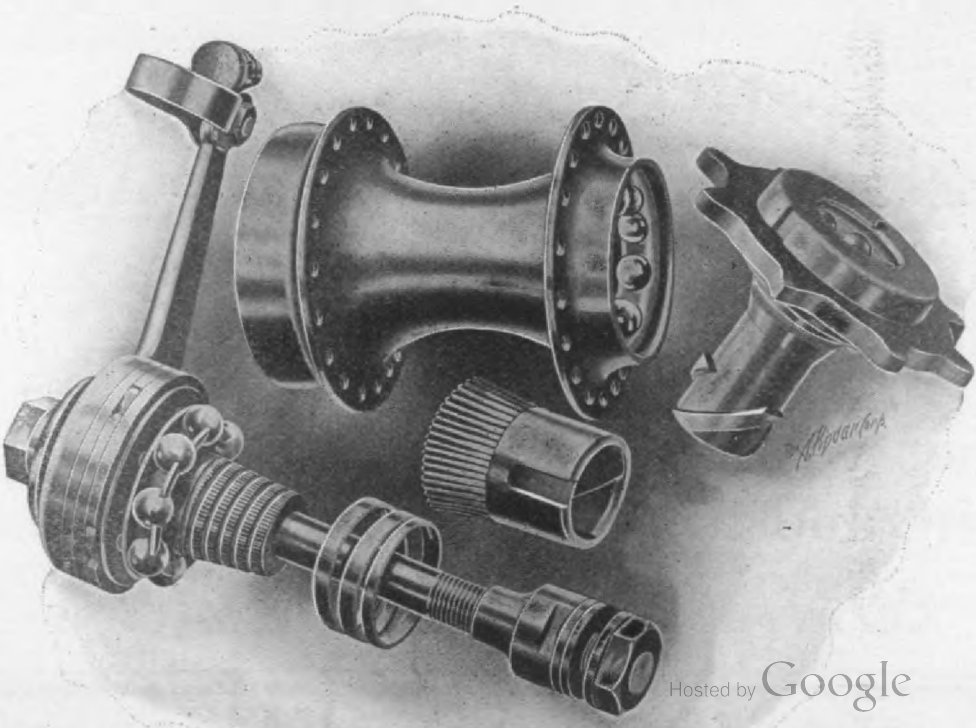

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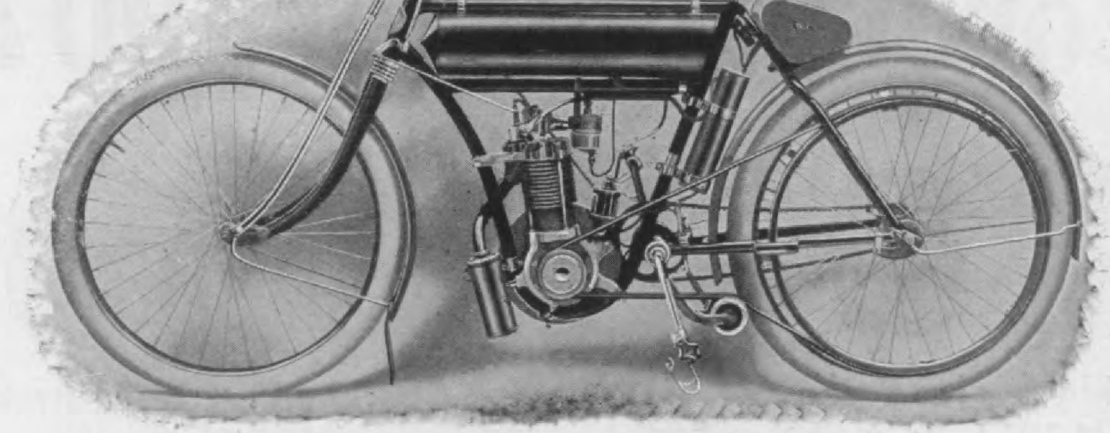

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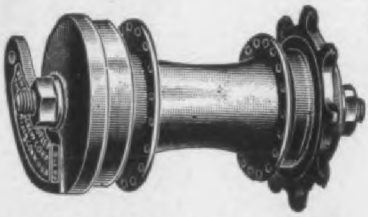

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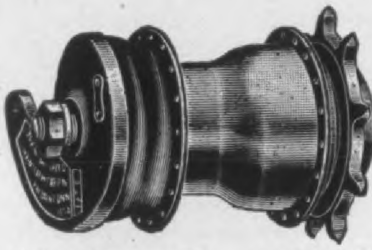

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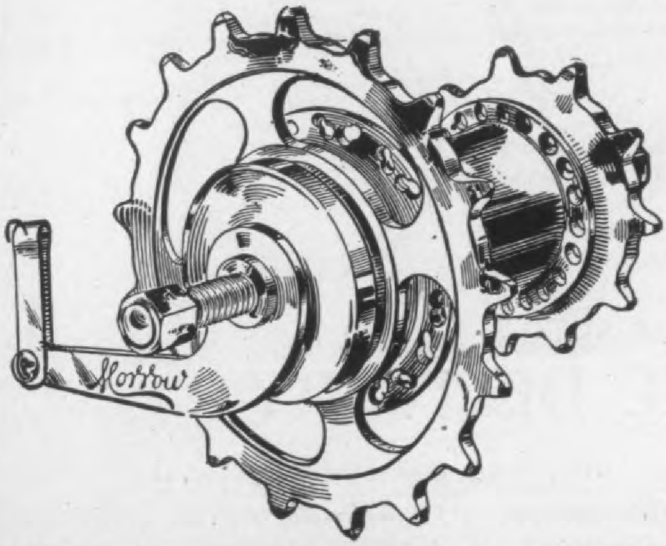

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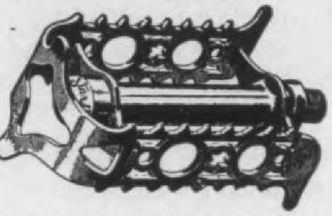

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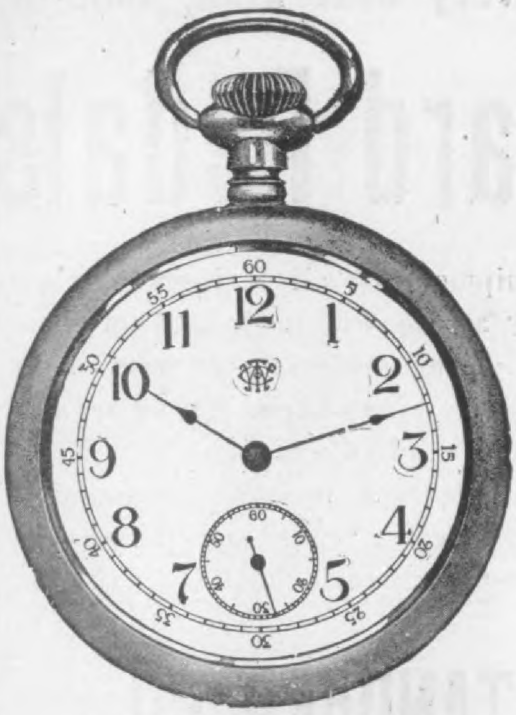

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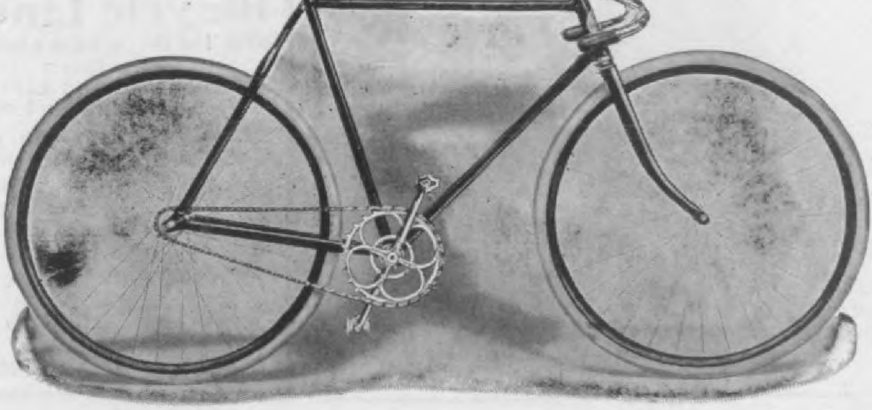

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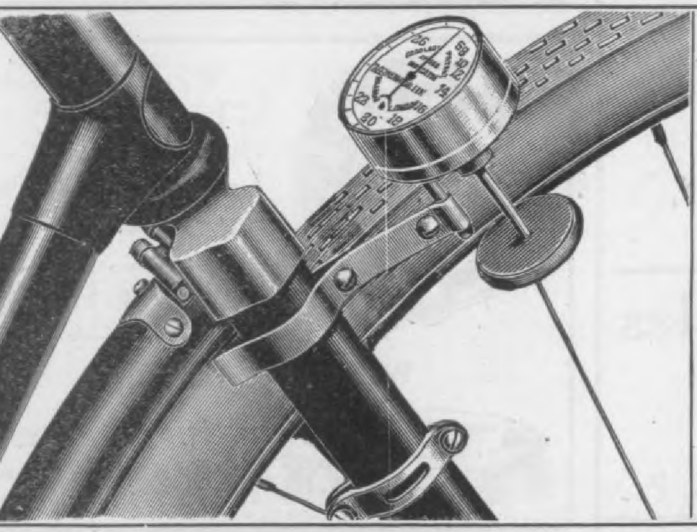

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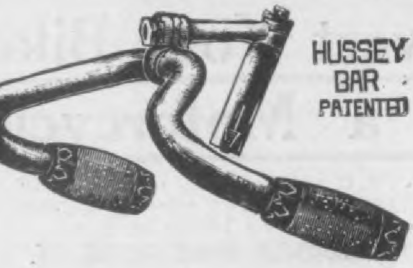

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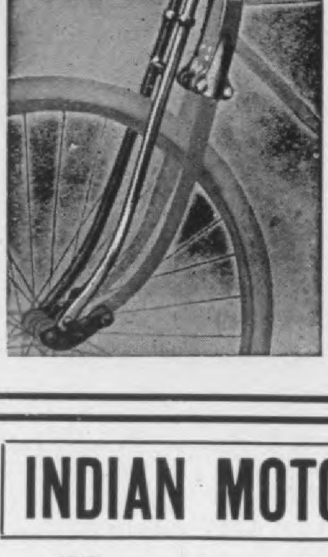

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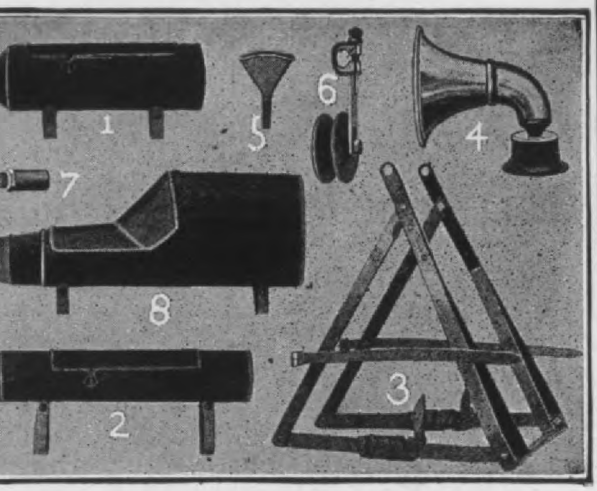

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5 .P. **Two-cylinder**

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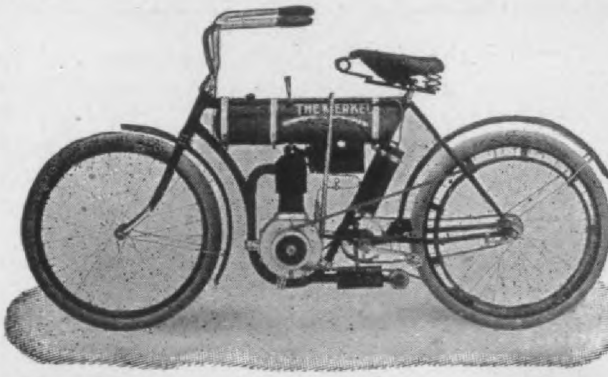
Write for list No. 125 of seventy machines



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POWER-SPEED-WEAR-PRICE!

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Motor Boat Department

Marine Coming Events

August 8-11—Toledo, Ohio, Yacht Club's Carnival on Lake Erie.
August 13, 14, 15—Gold Challenge Cup Race, Chippewa Bay.
August 15—Toledo Yacht Club, Long Distance Race on Lake Erie.
August 15—Motor Boat Contest, Automobile Club of Austria.
August 16—Annual Meet, Lake Butte des Morts Yacht Club, Oshkosh, Wis.
August 17—Annual Regatta, Oshkosh, Wis., Yacht Club.
August 20—Motor Boat Club of America, start of Jamestown Cruise.
August 22—American Power Boat Association, start of Jamestown Cruise.
August 23—Week for Motor Boats of Ostend, Automobile Club of Flanders.
August 28-31—Illinois Valley Y. C., Annual Regatta, Peoria.
September 1—Contest of Motor Boats, Automobile Club of Sweden.
September 2—Races at Baldwinsville, N. Y.
September 2-6—Motor Boat Races, Jamestown Exposition.
September 23-28—Motor Boat Club of America, Regatta Week.
October 5—Motor Boat Club of America, Members' Race.
December 7-14—Annual Motor Boat Show, Grand Central Palace, N. Y. National Association of Engine and Boat Manufacturers.
January 14-18—Hartford Automobile Dealers' Show, Foot Guard Hall.
January 27-February 1—Boston Motor Boat Show, Mechanics' Hall. New England Engine and Boat Manufacturers' Association. Chester E. Campbell, Mgr.
February 20 to March 7—Fourteenth Annual Sportsman's Show at Madison Square Garden, New York. J. A. Dressel, Manager.

"Reywat" Wins at Peoria

Out of the forty motor boats entered in the Webb Endurance Race of the Illinois Valley Yacht Club of Peoria, Ill., June 8, thirty-nine finished. The outcome is remarkable in many ways, showing the reliability and durability of the motorboats constructed to-day.

The race was held on the Illinois river over a 33.7 miles course.

The Reywat owned by H. L. and George A. Lawyer, of Peoria, Ill., won with elapsed time of 4.11.20, and S. and P. Stettman, and Potter (Chill), was second; time, 4.15.

Motor Boat Club of America

Spendthrift, after installing her proper batteries, won the motor boat race of the Motor Boat Club of America, on the Hudson River, June 29. The unfavorable conditions of wind and wave, rather than rain, deterred a number of owners from competing in the meet. Even with the delinquents the sport was first-class, and the club had the satisfaction of getting three splendid boats to start in the cruising race. The cruising boats come under class K, 40 feet and over, and each was a roomy, business-like craft, capable of making a long voyage if necessary. The three boats in class K were:

Alabama—Seventy feet over all, fitted with a 60-horse power American-British motor.

Mao II—Hull by Henry R. Gessner, 70 feet over all, 57 water-line, six cylinder, 60-horse power Lamb motor.

Kittu—Thirty-five feet over all, fitted with 25-horse power standard motor.

The competitors in racing boats not over 33 feet and not less than 26.25 feet in length class were:

Spendrift, owned by William Bjur, Jamaica Bay Yacht Club; boat is 30 feet over all, 29 feet water-line, fitted with a four-cylinder Rockaway motor.

May Be, owned by John W. Allison, of Elkins Park, Pa.; boat is fitted with a 40-horse power Leighton motor and is 35 feet on water-line.

The course used was identical in each class, once around representing 10¼ knots. The original plan was to have all the boats breeze around the course three times, a total distance of 30¾ sea miles. The cruisers were stopt at the end of the second round, however, and as the May Be ran out of gasoline she had to quit at the end of 20½ miles, and the Spendrift was the only racer to complete the demanded distance.

The racers were sent away at 3.20, and the cruising class was dispatched ten minutes later.

Summaries—Racers—May Be, did not finish; Spendrift, time 1.55.8. Cruisers—Alabama, time 1.41.30; Mao II, 1.43.33; Kittu, 2.01.03

Wolverine 2 and 4-Cycle Gasoline and Alcohol Motors

HUGH DOLNAR.

The Wolverine Motor Works, Grand Rapids, Michigan, U. S. A., make both 4-cycle and 2-cycle gas engines, using either two or three cylinders with either cycle, and producing motors of from 6 to 100-H. P., which are highly approved by users.

They recently received an order from Cuba for a launch motor, two vertical cylinders, 6½x7 inches, 4-cycle, to burn alcohol as fuel. This motor was shipt in April last, after a trial in the boat with gasoline, wood alcohol and grain alcohol as fuels, the cost of the alcohol being much the greater in the United States, but less in Cuba, where molasses is so cheap as to be burned as fuel under steam boilers, and can be made to produce alcohol at low rates.

The ignitor used by the Wolverine is make and break, wet battery and magneto, all ordinary elements, the magneto being by Remy and the batteries, six in number, by Gladstone and Ladande.

No change was made from the regular Wolverine 4-cycle construction, which is shown as a 3-cylinder 4-cycle motor in Fig. 1. The exhaust pipe, E, is surrounded for

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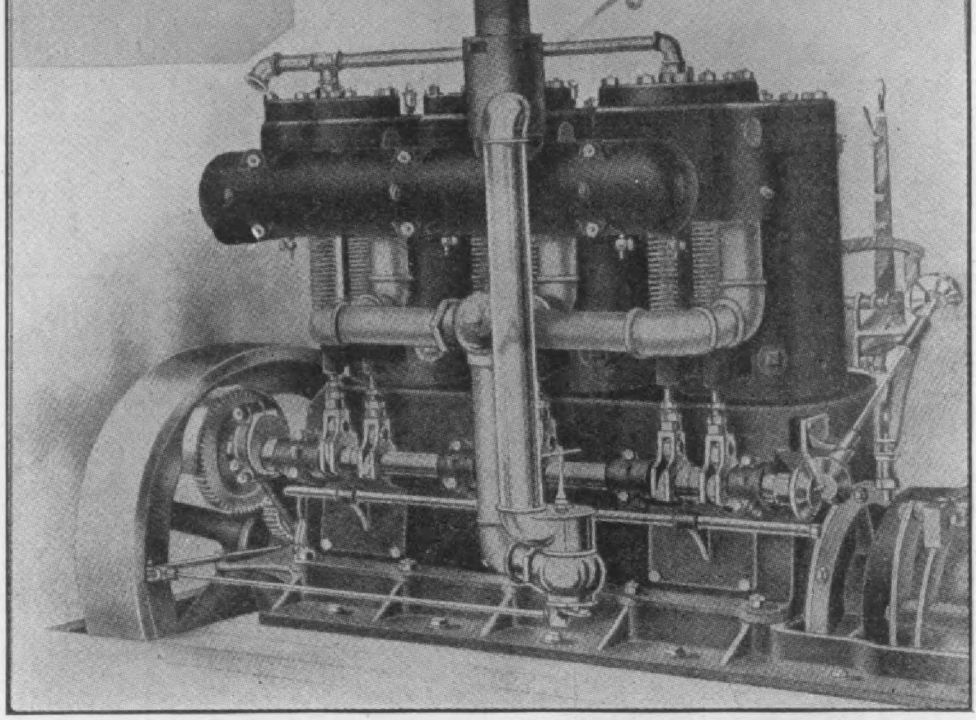

Figure 1. The Wolverine 3-cylinder 4-cycle marine motor. The same cylinders and fuel supp used to make up the 2-cylinder alcohol burning motor sent to fill a Cuban order. No photogra taken of this alcohol burning motor, and no assembly drawing of it was ever made. E, exhaus J, Air-jacket around the exhaust, open to the atmosphere, thru which air is drawn downward air-pipe, A. A, carbureter air intake pipe, from the air-jacket J to the carbureter.

a certain distance by a jacket perforated to admit cold air, and piped downward to a mixing valve known as the "Wolverine Generator." This is of usual form, without float, and is partly shown in section in Fig. 2. The valve is held up against the piston suction by a light spring. The fluid fuel is admitted at F, and regulated by a needle valve at R. Air heated in the jacket, J, so that the pipe is uncomfortable to the hand, is drawn in by suction, presses the generator valve down and goes onward to the cylinder, carrying with it whatever fuel has been admitted to the valve chamber thru the regulating valve, while the air valve is held down by piston suction.

The whole fuel supply is of the simplest description, the fuel descending by gravity from the fuel tank and being stopt by the air-valve and its spring until the air valve is forced downward by piston suction.

Trial runs of about 50 miles total were made with gasoline and two kinds of alcohol, the motor being thought about 10 per cent. stronger with alcohol than with gasoline, because it turned the same screw faster, same boat and same motor.

The igniter shown assembled, and dissembled, in Fig. 3, is of usual form, platinum contacts. No photographs were taken of

valve in the cylinder head, and in one port only, the exhaust port, oper closed by the movement of the pist

The Wolverine crank-case intake also an automatic poppet.

This construction makes the cra

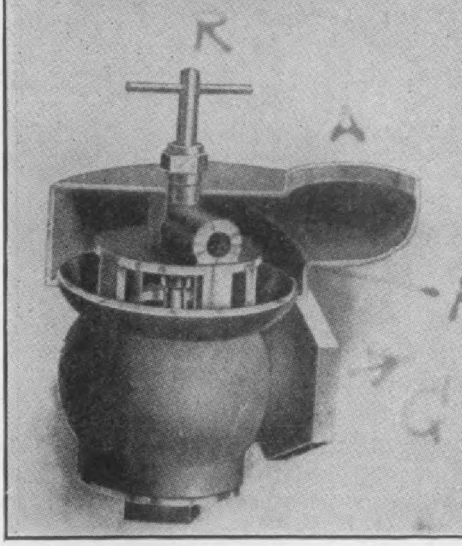

Figure 2. Wolverine "generator" or carbu heated by the exhaust is drawn into the at A; gasoline enters by gravity at F, and tity of gasoline allowed to escape and be by the air passing from A downward, and to

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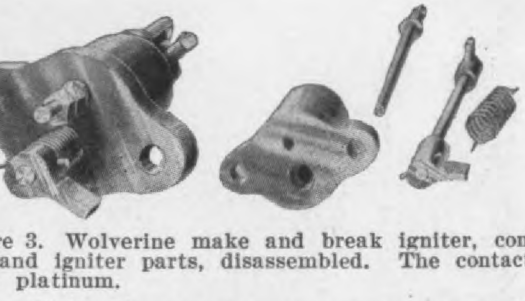
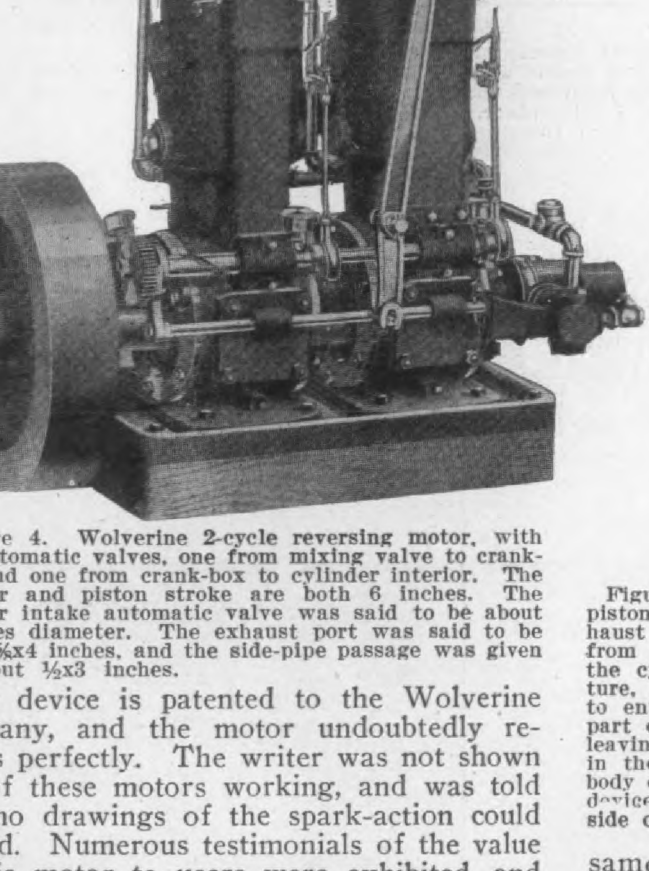
s.



re 3. Wolverine make and break igniter, com-
and igniter parts, disassembled. The contacts
platinum.

e Wolverine motors use two automatic
s, and are regarded as wholly satisfac-
by the builders and by the users.
s motor is reversing, as the ignition is
ake and break, eccentric operated, and
s time changed by the movement of the
sing lever. This reversing make and



e 4. Wolverine 2-cycle reversing motor, with
tomatic valves, one from mixing valve to crank-
d one from crank-box to cylinder interior. The
r and piston stroke are both 6 inches. The
r intake automatic valve was said to be about
s diameter. The exhaust port was said to be
x4 inches, and the side-pipe passage was given
ut ½x3 inches.

device is patented to the Wolverine
any, and the motor undoubtedly re-
perfectly. The writer was not shown
f these motors working, and was told
o drawings of the spark-action could
d. Numerous testimonials of the value
s motor to users were exhibited, and
orkmanship and the design appeared to
od.

HE 2-CYCLE AUTOMATIC INTAKES.

e suction stroke on the crank-box can-
raw in quite so much mixture thru the
atic valve as the same piston displace-
would cause to enter the crank-box

motor shown in Fig. 5 from giving the cyl-
inder so large a bulk of mixture as might
be caused to enter a cylinder having the

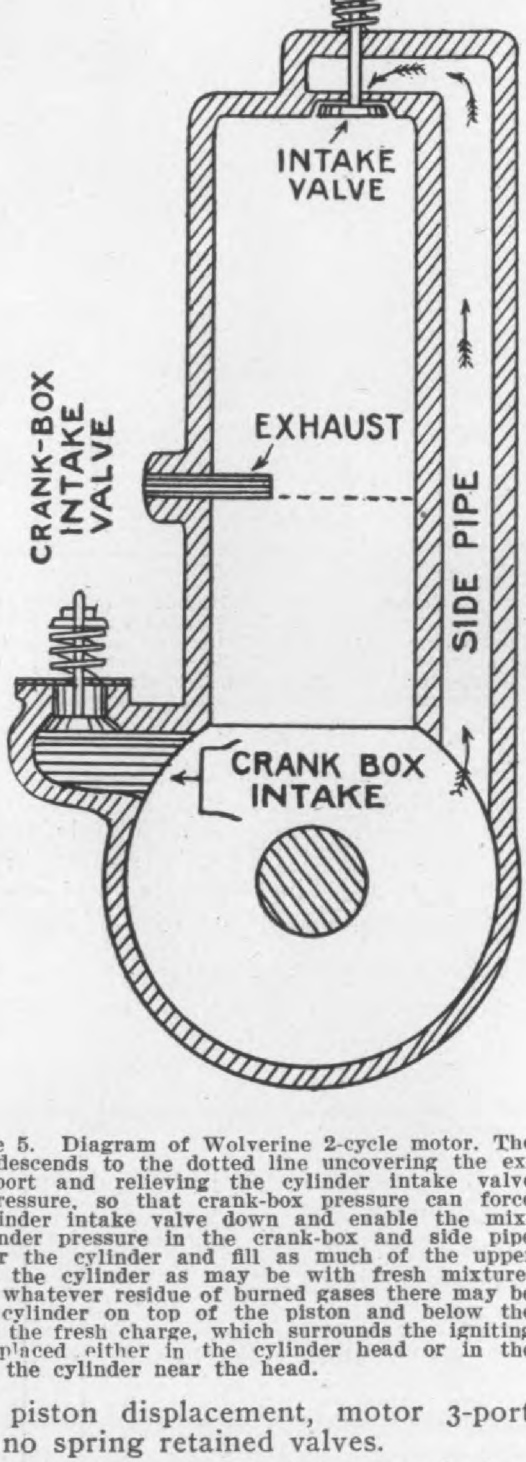


Figure 5. Diagram of Wolverine 2-cycle motor. The piston descends to the dotted line uncovering the exhaust port and relieving the cylinder intake valve from pressure, so that crank-box pressure can force the cylinder intake valve down and enable the mixture, under pressure in the crank-box and side pipe to enter the cylinder and fill as much of the upper part of the cylinder as may be with fresh mixture, leaving whatever residue of burned gases there may be in the cylinder on top of the piston and below the body of the fresh charge, which surrounds the igniting device placed either in the cylinder head or in the side of the cylinder near the head.

same piston displacement, motor 3-port
type, no spring retained valves.

But it is claimed that the charge is bet-
ter located when introduced thru a valve in
the cylinder head, so that the Wolverine
motors give as much power for equal pis-
ton displacement as the 3-port, no valve, 2-
cycle motor, or even more, and this claim

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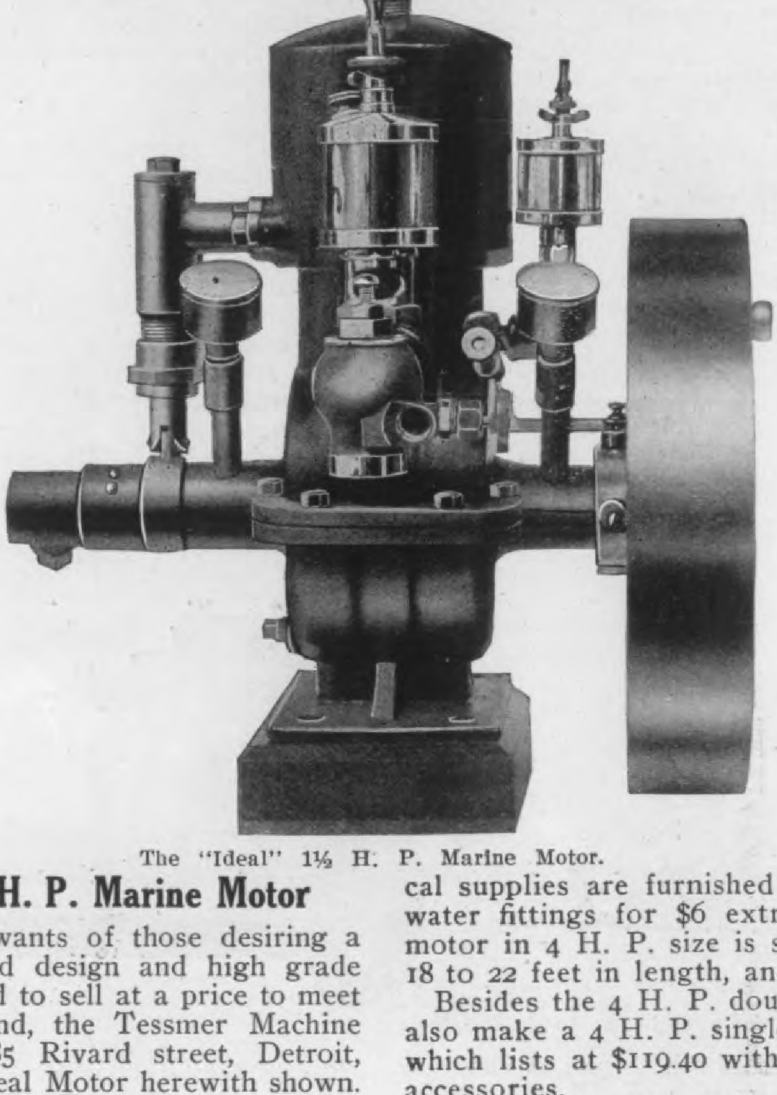


The "Ideal" 1½ H. P. Marine Motor.

"Ideal" 1½ H. P. Marine Motor

To supply the wants of those desiring a motor of advanced design and high grade of construction and to sell at a price to meet the popular demand, the Tessmer Machine and Tool Co., 285 Rivard street, Detroit, Mich., offer the Ideal Motor herewith shown.

The cylinder is 3-inch bore and stroke. Ignition is by jump spark, timed by a reversible commutator. The crank shafts are hammer forged from a steel billet. The connecting rod is made of phosphor bronze, fitted with adjustable bearings. Two oil cups are provided for each cylinder, one of which lubricates the piston and piston pin and the other the crank pin and all internal moving parts. The speed of the motor is from 50 to 800 r. p. m. It weighs about 75 pounds complete.

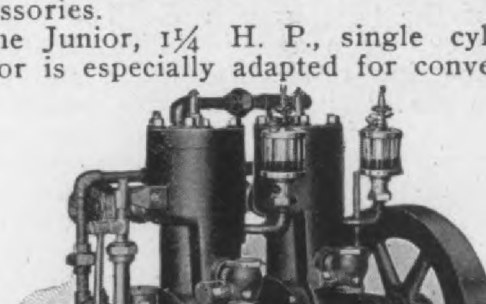
"Junior" Marine Motors

The Chas. Crouch Motor Co., 474-482 Carroll avenue, Chicago, Ill., are manufacturing "Junior" 2-cycle marine motors in 1¼, 2, 2½, 4 and 8 horse power sizes. The accompanying cut shows their 2½ H. P., double cylinder type. This type is suitable for a boat 16 to 18 feet in length. The cylinders are 2¾-inch bore by 2½-inch stroke. The diameter of fly wheel is 12 inches. The

cal supplies are furnished for $21 and water fittings for $6 extra. This ty motor in 4 H. P. size is suitable for 18 to 22 feet in length, and lists at $1

Besides the 4 H. P. double cylinder, also make a 4 H. P. single cylinder m which lists at $119.40 with complete r accessories.

The Junior, 1¼ H. P., single cyl motor is especially adapted for conve



The "Junior" Double Cylinder 2½ H. P. Ma Motor.

rowboats or any boats of 12 to 16 f length, into small power launches. T ameter of the fly wheel is 8 inches. weight of the motor complete is abo pounds. With complete outfit it lis $42.60. Salt water fittings are furnish $4 extra.

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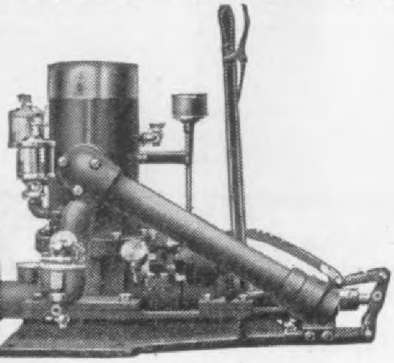
r splendid new building which is
modern and contains ample space
extensive manufacture of their 2-
marine engine which has proven
fully successful. The new plant is
with the latest machine tools and
machinery of the most improved
vill be installed very shortly as or-
ave been placed ahead in order to
lelays. The new factory has a splen-
cation, being situated in the north
the city and has the very best rail-
nipping facilities. In this plant the
& Baldridge Machine Co. will con-
he manufacture of their motors on
larger scale than heretofore.
illustration herewith represents the
. 5 to 6 H. P. single cyclinder, two-
marine motor which is also built
vo-cylinder size. The cylinders are



& M. 6-H. P., Single Cylinder, 4¾x4, 2-cycle Motor.

hes bore and 4-inch stroke, and are
of the best gray iron. The crank
s cut from a solid billet of steel;
nnecting rod is of bronze and the
gs are all interchangeable bushings
pecial anti-friction metal. The mo-
fitted with a bronze rotary pump,
riven timer, water jacketed exhaust,
er carburetor, jump spark ignition
mounted on an improved base
greatly facilitates installation. It
ided with self-aligning thrust bear-
d universal coupling, allowing the
to run perfectly free from any
whatever. The motor is of the
port type, designed for a normal
of 650 revolutions. The single cyl-
engine is equipt with plain or re-
propeller or with Gies reverse
nd the two-cylinder engine is equipt
ies reverse gear.

lo" Slow Speed Marine Motors

Buffalo Gasoline Motor Co., 1280-

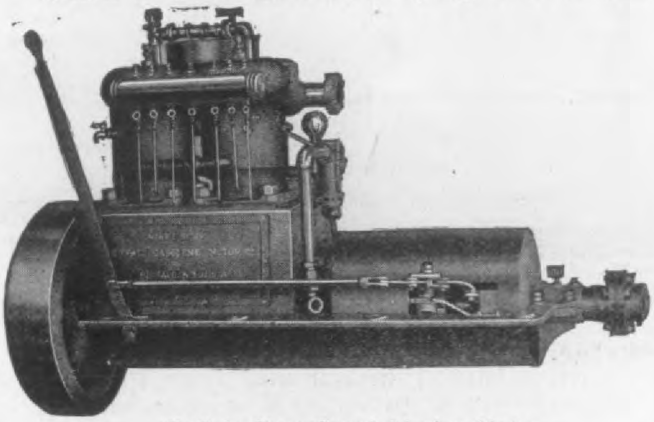
after being machined up, is ground to size. The rings are made of hard, springy metal and are ground.

The connecting rods are steel drop forgings and are very strong. The crank pin ends, or journals, are made of a special bronze metal that they have tried out and proven on their regular launch engine. The piston end is bushed with bronze and has an adjustment so that any wear may be taken up.

The crank shaft is made of high grade carbon steel and of such size as to withstand hard usage.

The cams are of the best steel and are keyed on their shaft so that if one is removed it can be replaced without interfering with the timing.

Special attention is called to the base, which is a closed one, keeping the oil from



Buffalo Slow Speed Marine Motor.

getting into the boat. It is also provided with exceptionally wide bearings for the crank shaft. When a reverse gear is desired, a different base is put on. This base is the same as the former with regard to bearings, etc., but has an extension on which the reverse gear is mounted, and it also forms a thrust for the motor. In this way, the crank shaft, reverse gear and thrust bearings are sure to be in perfect alignment and the thrust is taken from the crank shaft.

The cams are all made of high-grade steel and are keyed to the cam shaft with Woodruff keys. The cam shaft is a ground steel shaft and can be taken from the machine without removing either the time gear or the valve cams.

The Wood End Life Saving Station, of Provincetown, Mass., has been equipt with a 25-horse-power motor lifeboat, measuring 34 feet in length.

The Duluth Boat Club, of Duluth, Minn., will have a new clubhouse on the St.

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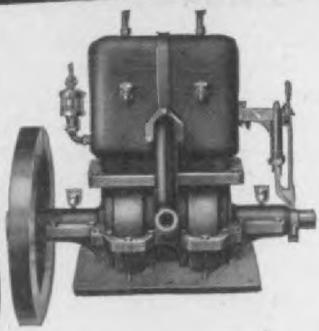
PEERLESS

Marine Engin



This is by far the best engine Mr. S. R. Du B
produced. His other designs were leaders; he has n
proved on **every feature** of them so that the Peerl
leader of leaders. In a word, the Peerless is the
marine engine made, not only at **its** price but at any

Our Peerless Swell Spe

12 to 24 h. p., two 4¾ x 5 cylinders, cast in dual units with one Pum
Overflow and one Exhaust Pipe for both; double contact eccentric comm
our special Autonomous or any standard float feed carburetor; compressi
of special design insures perfect lubrication; vibration eliminated.

Use the Peerless Engine for 30 days and if it does not live up to ou
claim send it back at our expense and we promptly return your money.

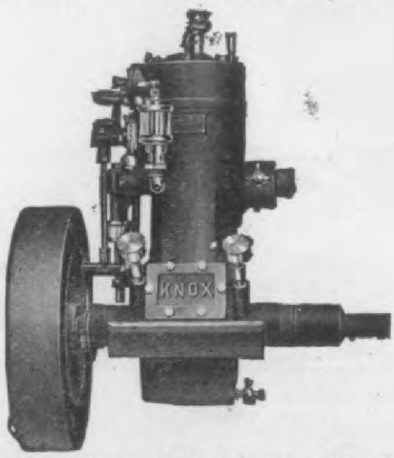
Write to-day for catalog quoting all sizes.

The Peerless Marine Engine Co.

326 Jefferson Ave. Detroi

Speed without Vibratio

1907
Knox Motors
Marine and Stationary.



Marine, Three Port, 2½ to 13 H. P.
Marine, Four Cycle, 20 and 40 H. P.
Stationary, Four Cycle, upright, 4, 6 & 9 H P

Strong, Simple, Reliable, Economical.

1907 Catalogue ready.

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GAS ENGINE LUBRICANT
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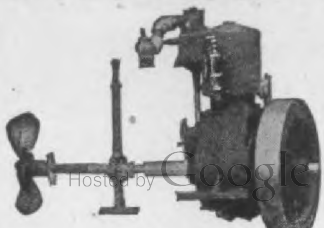
when you buy a Houle en



We buil
sizes, 2 to
P., 2 and 4
State your
and we will
you price.
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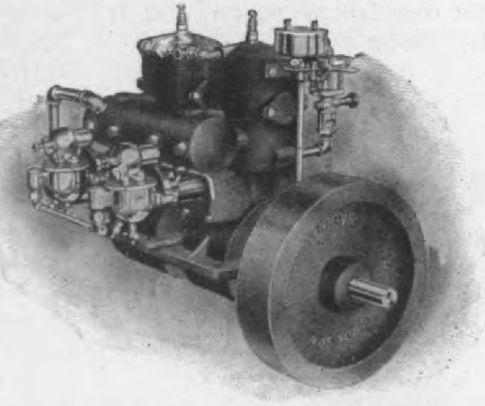
, is here shown, then a cylinder, 2 marine motor.

e cylinders are 4-inch bore by 4½-inch e, cylinder and cylinder head cast in-l. The crank shaft is made from piece hammered steel. The bearings



The "Bruno-Knapp" 2-Cylinder Motor.

of ample proportions, and the best of ng metal is used. Their regular stock els of this size motor are one and cylinders. They also build three and cylinder motors to order. They are ging out a two and a three-cylinder 5x6-motor of similar design, with the ex-

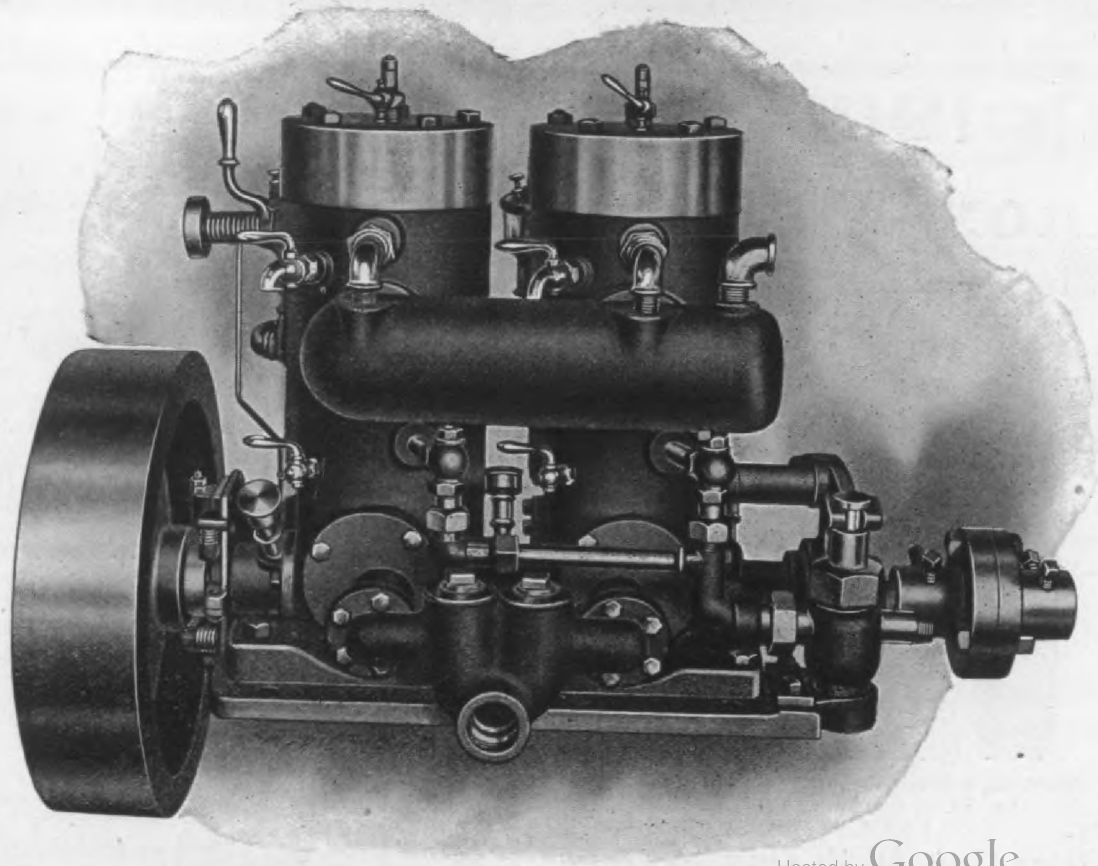
Bliss Brothers' Line of Marine Hardware

Bliss Bros. Co., 170-176 Commercia street, Boston, Mass., are large jobbers o launch trimmings and hardware, and carry also a large stock of marine goods gener-ally. They issue an attractive catalog, a perusal of which shows that their stock in-cludes all the popular and well-tried spe-cialties on the market. As they carry a large and complete stock, they are able to make prompt shipments.

The 1907 "Pequot" 2-Cylinder Marine Motor

We herewith show the 1907 type of ma-rine motor manufactured by the New Lon-don Motor Co., New London, Conn. The general description and specifications are the same as for the one described in our Jan-uary, 1906 issue, page 400.

Some slight changes have been made however, in the new type, the most notable improvement being to provide a gasoline manifold which contains a check valve for each cylinder, which draw their supply from a common jacket. This prevents flooding the



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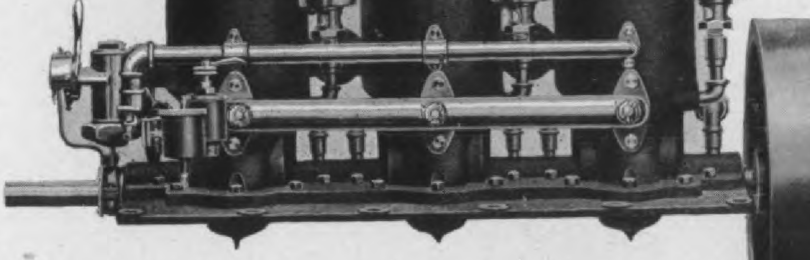
The 1907 "Pequot" 2-cylinder 2-cycle marine

Marine Motors

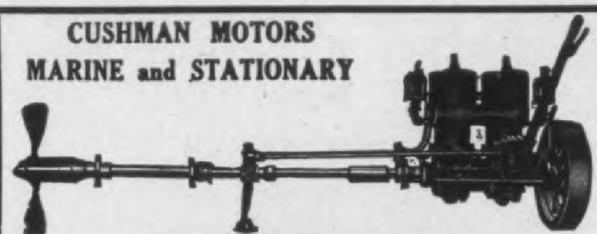
Our two and three cylinder engines are guaranteed to run at high speed without missing an explosion and to develop more than rated Horse Power. Write for descriptive catalog. Ten sizes.

DuBRIE MOTOR CO.,
432 Guoin St., Detroit, Mich.



Our original arrangement of generator valve is the only known method of running a three cylinder engine at high speed without missing. **18 to 27 H. P.**

CUSHMAN MOTORS
MARINE and STATIONARY



8 to 10 H. P. Weight 185 lbs.
Designed for service. Material best obtainable, workmanship unsurpassed. Cylinder, Piston Rings and Crank Shaft ground. Bearings hardened. Write for catalogue.

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Eastern Branch, J. N. LIMEBURNER, 84 Chambers St., N. Y. City.
W. W. STEPHENS, Agent, 6 Reade St., Greater N. Y. City.
Western Branches: DENVER GAS ENGINE & APPLIANCE CO., Denver, Col.
SEATTLE HARDWARE CO., Seattle, Wash.

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you can get,—better let us tell y
what we can do for you.

We have a long list of satisfied users.

STURGEON BAY BOAT MFG. CO
Sturgeon Bay, Wisconsin

Perfection

MARINE MOTOR

2½ HP COMPLETE $55 —The engine you want—a proven success—not an experiment. Thousands in use. Quiet, smooth operating, correctly designed—delivers power in excess of rating.

Reversible, Speedy, No Cranking
two-cycle, no valves nor cams. Cylinder and piston ground to a mirror finish. Piston rings pinned in position. Extra fine finish.

Price includes full boat equipment ready for installing. WE GUARANTEE absolute satisfaction or replace without cost to you. Write at once for catalogue of all sizes.

THE CAILLE PERFECTION MOTOR CO.
1303 Second Avenue, Detroit, Mich.

JOE'S REVERSING GEA
and
ONE WA
Clutch

Send
MARI
SPECIAL

SNOW & PETRELLI MFG. CO., New Haven,

IF you want a high grade boat outfit, write for illustrated catalogue. Our motor boat outfits

---

PUTNAM MOTORS & CARBURETTOR
Start and Run on either Kerosene or Gasoline Without Change.
PUTNAM MOTOR MFG. CO.,
57 Lebanon St., Springfield, Mass.

YANKEE SILENT MUFFLER For Automobiles and Marine En

Thou
"Ya
Muff
used
ring

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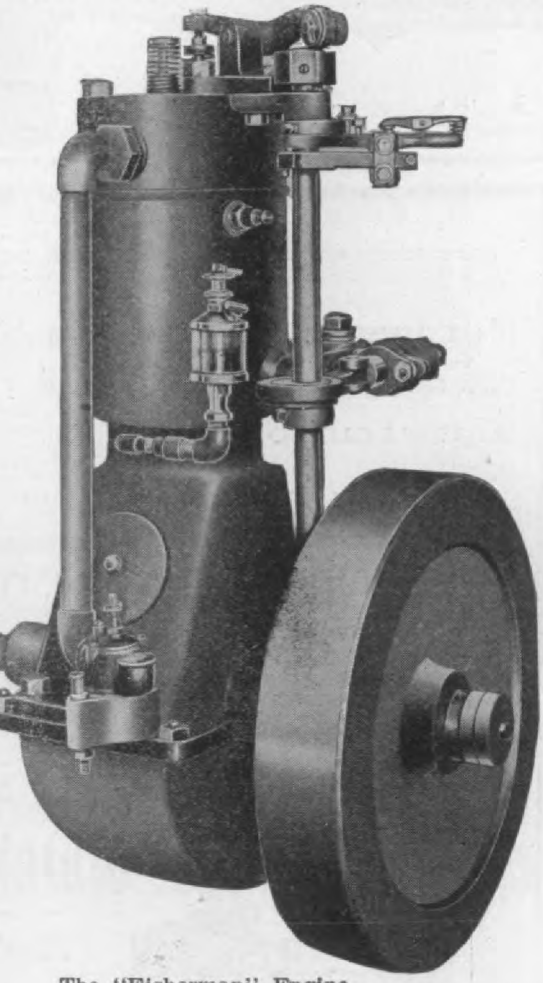
en, crabbers, oystermen and others llow the sea for a livelihood. This is large and heavily built, can be dis- d and reassembled with an ordinary wrench and each piece of the engine bered so that any part broken can be



The "Fisherman" Engine.

l by number. Every part of the en- designed to be instantly accessible. valves are very large in diameter and t lift. The engine develops 6 H. P. paratively low speed, is guaranteed ar, sold under contract to refund the after 10 days' trial, and retails at th complete outfit.

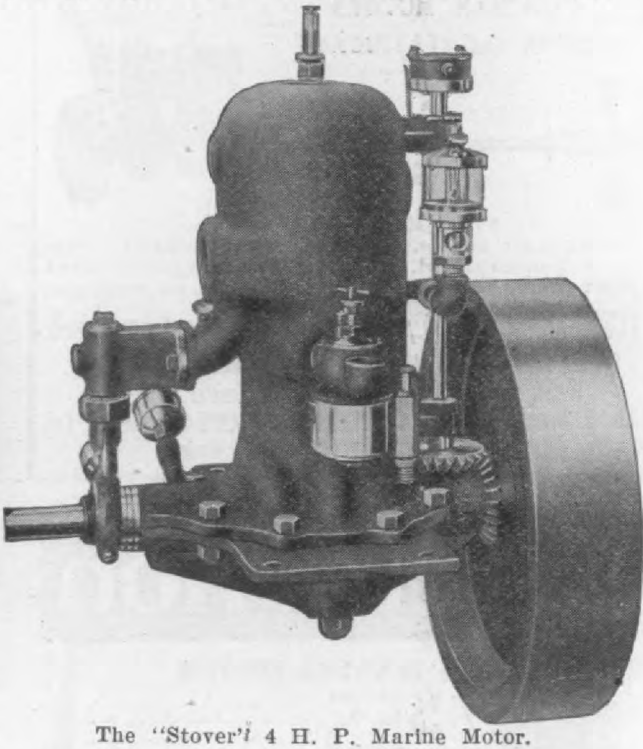
he "Stover" Marine Motor

r marine motors are the product of over Motor Car Co., Freeport, Ill., ld them in 4- and 6-horse power sin- nder and 8- and 12-horse power dou- nder sizes. All are of the two-cycle, rt type.

one illustrated is their 4 H. P. model. linder is 4¼ in. bore by 3½ in. Its height is 18½ inches over all. ght complete is 125 pounds. The

ufacturers call special attention to the method of lubrication. By their system the oil is delivered fresh before it comes in contact with oil in crank case direct to the crank pin bearing. This insures a positive and continuous flow of oil which is fed from oiler into cylinder thru groove in piston pin and then it drips down into a cup cast on the side of connecting rod and from there thru a cored out passage in rod direct to the bearing. This engine is furnished with four different outfits.

Outfit No. 1 includes engine, bronze water pump, sight feed lubricator, reversible com-



The "Stover" 4 H. P. Marine Motor.

mutator, carburetor, priming cup, compression relief and water drain cocks, spark plug, crank, two wrenches, one gallon cylinder oil and one package lubricating grease.

Outfit No. 2 is the same as No. 1 with the addition of the necessary electrical accessories, viz.: one spark coil, five feet primary wire, five feet secondary cable, both with terminal connections, five battery connections, six dry cells, switch, extra spark plug.

Outfit No. 3 includes all the items enumerated in Outfit No. 2 with the addition of a solid propeller equipment, viz.: a cast iron two-blade 14-in. diameter propeller complete with shaft, bronze stuffing boxes and coupling.

Outfit No. 4 includes everything specified in outfits Nos. 1 and 2 and in addition a propeller outfit complete for salt water, viz.: a bronze two-blade 14-in. propeller with bronze shaft and bronze stuffing boxes and coupling. Reversible propeller equipment

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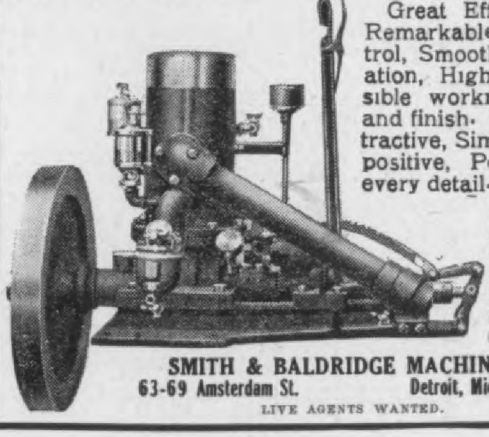


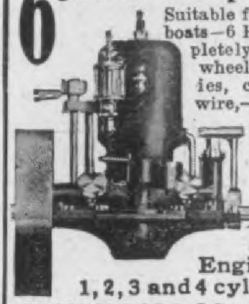
Great Efficiency, Remarkable Control, Smooth Operation, Highest possible workmanship and finish. Very attractive, Simple and positive, Perfect in every detail.

Write for price and description of our 6 H. P. Motor ready for delivery

SMITH & BALDRIDGE MACHINE CO.
63-69 Amsterdam St. Detroit, Mich., U. S. A.

LIVE AGENTS WANTED.

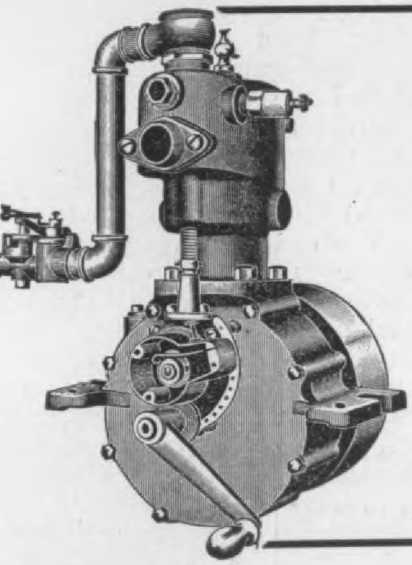
6-H. P. Complete Outfit $97



Suitable for 18 to 25 foot boats—6 H. P. Engine completely equipped shaft, wheel, stuffing box, batteries, coil, switch, muffler, wire,—everything but tank and pipi

Write for prices and scription of our 2½ H Motor, the lowest pr Boat Motor ever so power considered. Cat showing all our Ma Engines from 2½ to 40 H. P 1, 2, 3 and 4 cylinders sent free.

GRAY MOTOR CO., 28 Leib St., Detroit, M



The Most Power and Reliability ever given for the money

The "LITTLE GEM" Marine Moto

Price $100, including carburetor, spark coil and teries. Bore 2 ⅞", stroke, 3¾", 2½ H. P.

It is the lightest and strongest motor on the market, weigh but 72 lbs. We stand back of every engine we sell.

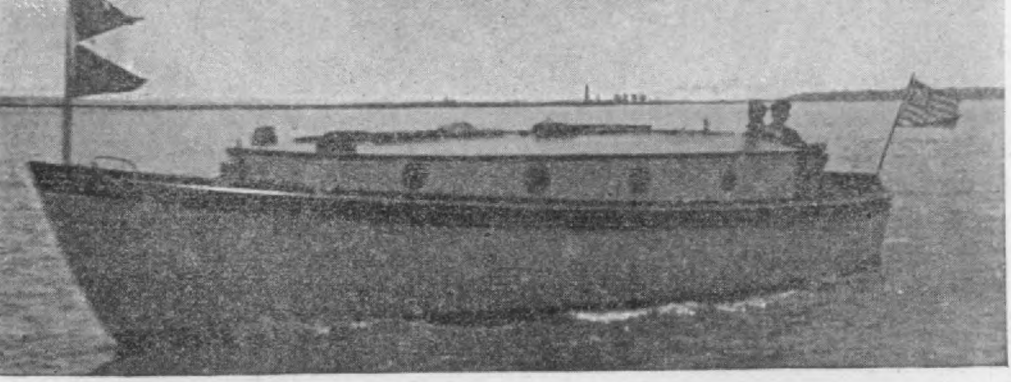
It is impossible to get anywhere near this value elsewhere double the price. Send for further particulars. A word to wise is sufficient.

MANUFACTURED BY

THE HARRIMAN MOTOR WORKS,
South Glastonbury, Conn., U. S. A.

FOR SALE

Thoroughly up-to-date Trunk Cabin Cruiser. Nock's latest design of the best material, copper and brass trimmings, so can be used in salt water 36 ft. long, 8 ft. beam, draws 32 inches. Ca 6 ft. head room and is finished in quarter sawed paneled red oak. Decks mahogany. Equipp every possibl venience for c eating, and aboard fo cruises. El lights inclu searchlight B past winter a in commissio ration Day two days, so a ly new. sacrificed on of protracted of the owner Write for par to



J. W. S., 1134 Third Avenue, Detroit, Mich.

There are years of experience behind "Watkins" Engi and years of service ahead.

"WATKINS" ENGINES

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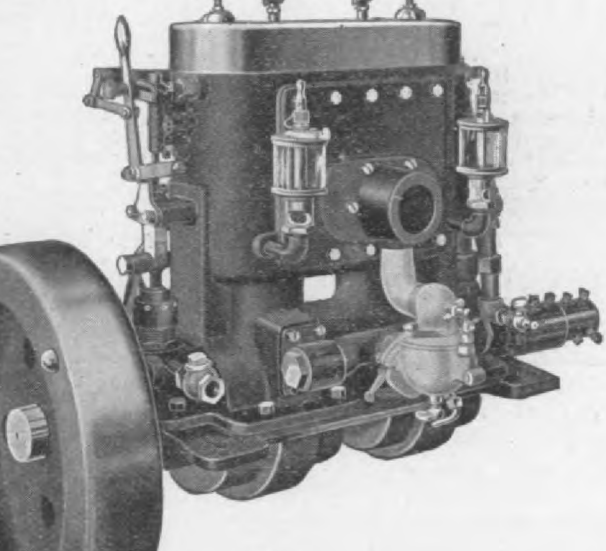
ars' experience in marine motor manu-
cturing have been establisht as machinists
ce 1864, during which time they have
en known as producers of only the high-
grade work.

Stanley motors are of the 2-cycle type
d are made in three models, a 2½ H. P.
gle cylinder motor, and 5½ and 9 H. P.
uble cylinder motors. They are ignited
the make and break system. The cylin-
rs in the 2-cylinder motors are cast in-
grally.

Water-cooling is employed and the water
circulated by a plunger pump. A separate
ge pump is also provided. The crank
aft is a steel forging and the connecting
ds are of hard bronze, extra long bear-
gs are provided for the wrist pin and
ank pin. The rods are clampt to the wrist
n. A ball thrust bearing is provided.



Stanley 2- cylinder, 2-cycle Marine Motor, made in
o sizes, developing 5½ and 9 H. P., respectively.
here is also a Stanley single cylinder model develop-
g 2½ H. P.

The piston lubrication is accomplisht by
eans of a groove turned in the piston near
s lower end, a vertical groove being milled
connect with it leading from the lubrica-
r. The crank pin is oiled from a cup on
e right hand side of the motor, a pipe
ading direct from it to the middle bear-
g, whence it reaches the crank pin.

All Stanley motors are finisht in blue
amel. The outfit furnisht consists of
obin bronze propeller shaft, bronze pro-
eller, muffler, bronze stern bearing with
uffing box and lag screws, battery, bronze
ter connections, spark coil, seamless cop-

all, by 17¾ inches high over all, and ha
11½-inch base. It weighs 175 lbs., includ
flywheel. The 5½ H. P. motor has
same size cylinders, is 32¼ inches long a
weighs 290 lbs. The 9 H. P. motor
5⅛x4½-inch cylinders, is 39¼ inches lo
by 33 inches high and weighs 475 lbs.
base is 14 inches wide.

"Raino" Automobile Coats

The Raino Co., 735-737 S. Halsted str
Chicago, are introducing to the automol
trade a waterproof garment that is lig
pliable and clean. They claim it will
stick or gum, neither will it crack or bre
and can be packed in trunks with the fin
clothing. It has been used by our ar
officers in the Philippines for three yea
also in Cuba and the Panama Zone. It
especially designed for hard service, and
commended to motor boatsmen, automo
ists and for all other outdoor occupatio
The color is an olive drab, similar to
army khaki. The coats are made in vari
lengths from the 31 jacket to the medi
and long coat coming down to the he
also in pommel or horseback coat. The
tomobile coat buttons diagonally across
chest to right side with double storm
and continues thence to bottom, thus mak
an apron effect across the lap so that
cannot run between the legs. It is also p
vided with two outside pockets with sto
flaps. It lists at $7.50 for either lady
gentleman.

"Peerless" Rust Proofed Water Jackets

For several years Mr. Du Brie, of
Peerless Marine Engine Co., of Detr
Mich., has been experimenting on differ
chemicals and trying to produce results
would not allow the interior of marine
gine water jacket to rust when using
water. It is well known that salt water
damaging when standing still. The che
cal is syphoned and pumped to the cy
der. One hundred pounds pressure is u
on the main pressure tank for forcing
chemical to the water jacket.

The jacket is warmed with a gaso
torch, making the condition of the jacket
receptable for the chemical. The comp
states that it chemicalizes all of its engi
for marine work. It can be done in a
minutes and no extra charge is made.
tempts have been made after the cylinc
have been chemicalized to rust them by p
ing salmoniac in the jacket and allowin
to remain six weeks. It is claimed th

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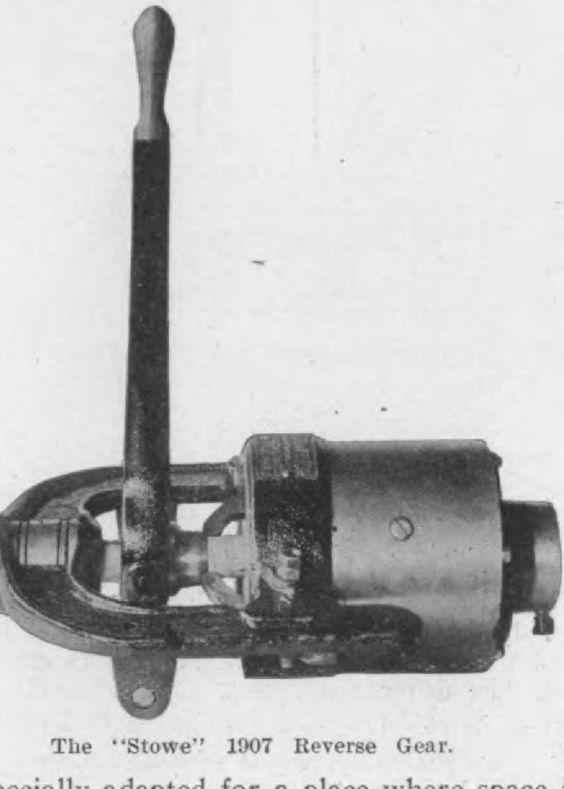
w model of their reverse gear, illustrated rewith, which is fine both in appearance d design and possesses several improvents.

The gears, which are used only on reverse vement, run in oil and are made from bar el with cut teeth, which makes them practally noiseless in operation. The end gears e made with large sleeves made integral th gear and bored and key seated to reve engine and tail shafts. The clutch is



The "Stowe" 1907 Reverse Gear.

pecially adapted for a place where space is nited, as it requires no couplings to make nnections.

Another entirely new feature is their dou- thrust bearing in the clutch bracket, ich takes the thrust both on forward and verse movement and removes all strain om both clutch and engine crank. The um is turned, polished and is oil tight. ey are manufactured in sizes from 4 H. P.

The Stowe Reverse Clutch, is put t in three sizes. No. 1, for engines up to H. P., lists at $35; No. 2, for engines up 30 H. P., lists at $55, and No. 3, for enes up to 50 H. P., at $75. The dimenns of the three respective sizes are 6¾ ches diameter by 12 inches long, 10x16 ines and 12x20 inches.

Apple" Ignition System in Marine Use

The well-known "Apple" ignition system, charging a storage battery, the storage tery in turn furnishing current for lights a ignition, and the whole system centering a controlling and indicating switchboa This is all the apparatus required with exception of the coils and plugs.

One of the best features of a system this kind, and one which is especially valble in marine work, is that the storage b tery is fully charged at all times. Sho anything go wrong, this may be depend upon to always get the boat back to port

The Apple ignition system above descril makes ample allowance for the use of t or three lights, and furnishes when desi a special filament high efficiency white lig which in its intensity and brilliancy either searchlights or general illumination unsurpast.

No-Mil-Du

This is a new product recently placed the market by the No-Mil-Du Co., 32 South Senate avenue, Indianapolis, Ind., object of which is to prevent canvas b coverings, tents as used by the automol ists while touring, and all canvas coveri etc., from becoming coated with mild

No-mil-du is a combination of seve chemicals, each chemical having a certain ject to perform. It is also claimed to r der the canvas proof against water and to quite an extent. It will not discolor canvas and will not wash out.

No-mil-du is put up in one-pound pa ages, listing at 50 cents; 5-pound packag $1.50, and 100-pound lots at $25.00. The pound package makes 10 gallons soluti enough for treating 100 square yards of c ton duck.

SKIDOO!
MARINE ENGINE
The 2-Cycle-Engine-Sensation of the Year. Entirely n improved design introducing many exclusive features on Gasoline, Distillate, Kerosene or A

2 ACTUAL H. P. Bare Engine $2
COMPLETE ENGINE with Fresh Water Boat Fittings, $39.90

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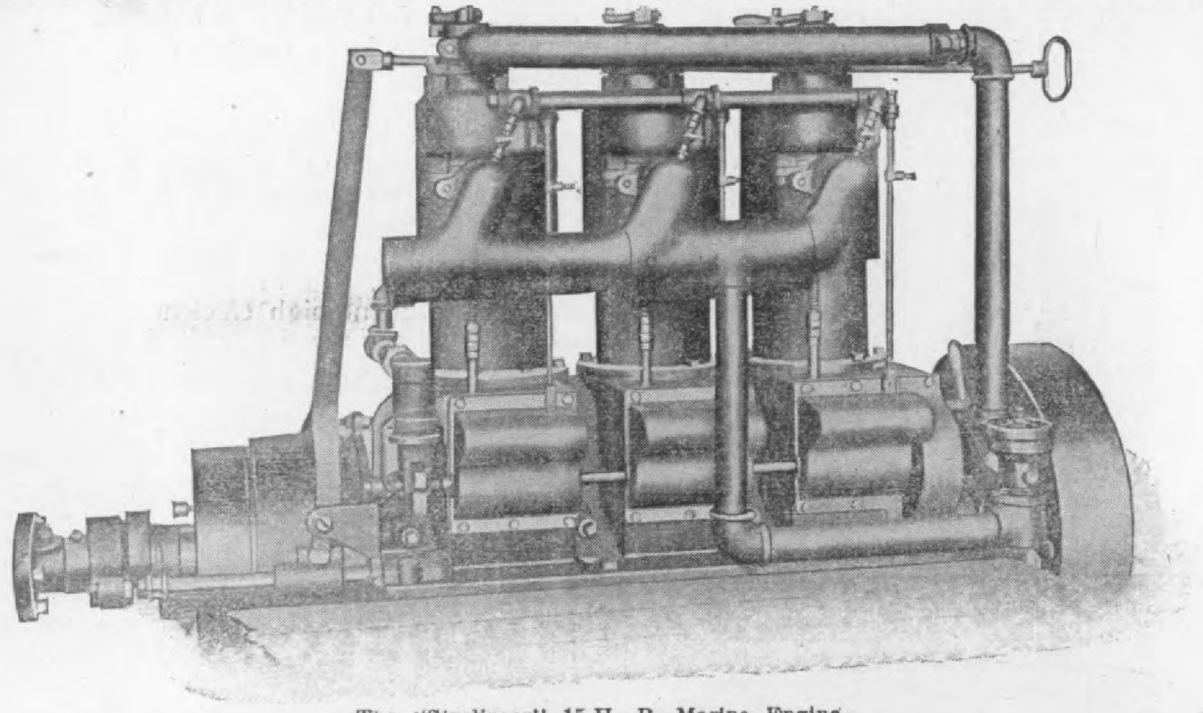
ese motors are of the 4-cycle type and cylinders are cast integral, with the d and body in one piece. All the cyl- er and cylinder heads are thoroly water keted with the exception of the 3-H. P.

carried.

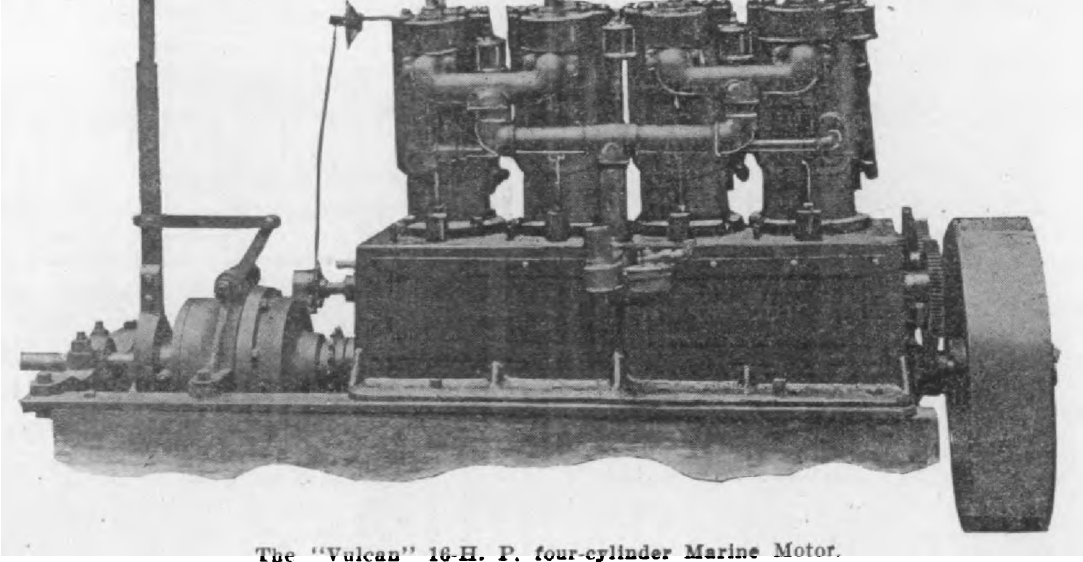
The price of this engine with full equ ment is $1310. The equipment of the 15- P. motor consists of a solid three-bla manganese bronze propeller with steel sp



The "Strelinger" 15-H. P. Marine Engine.

gle cylinder size, in which the cylinder ad is not water-jacketed, owing to its all size. Steel drop forgings are used ruout from the crank shaft to the smallest rt of the igniter mechanism. In the bear- gs "Genuine" Babbitt Metal is used. In der to obtain perfect automatic lubrica- n of the gears and cams, also to obtain

geared reversing mechanism; 8 feet st shaft, five cells type "V" Edison Lalan batteries, spark coil, switch and wire, A ple dynamo with governor, wrenches, oil and tools, two gallons C. A. S. gas eng oil. The other sizes, 3, 5, 10 and 20-H. list at $296, $460, $945 and $1695 respecti ly.



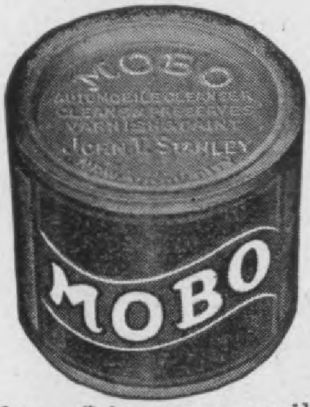
The "Vulcan" 16-H. P. four-cylinder Marine Motor.

ietness in running, they are all inclosed dust proof cases. The cylinders and

"Vulcan" Marine Engines

We show herewith the 16-H. P. 4-cylin

For Cleaning Auto Bodies



It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO

Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

Belcher & Loomis Hardware Co.
89 Weybassett Street
Providence, R. I.

and at all good automobile supply stores in all leading cities.

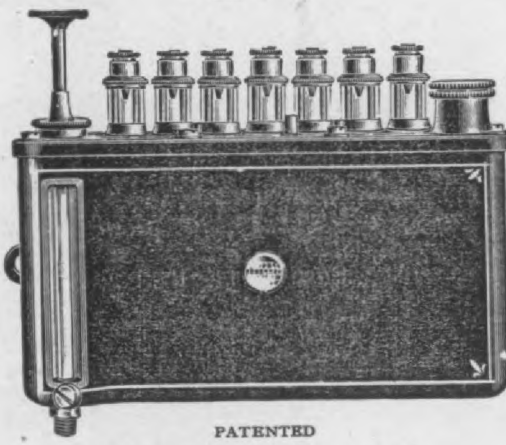
Send for our Mobo booklet —"*How to Clean Well Varnish*

THE PEDERSEN Mechanical Lubricator

Has earned the name of being

"The Best Oiler on the Market"

Type X



PATENTED
Mechanical Lubricator

BECAUSE—

There are no Check Valves or Springs to get out of order.

It can not gum up. Works in cold or hot weather with same adjustment.

Has constant Sight Feed.

And many other valuable feature

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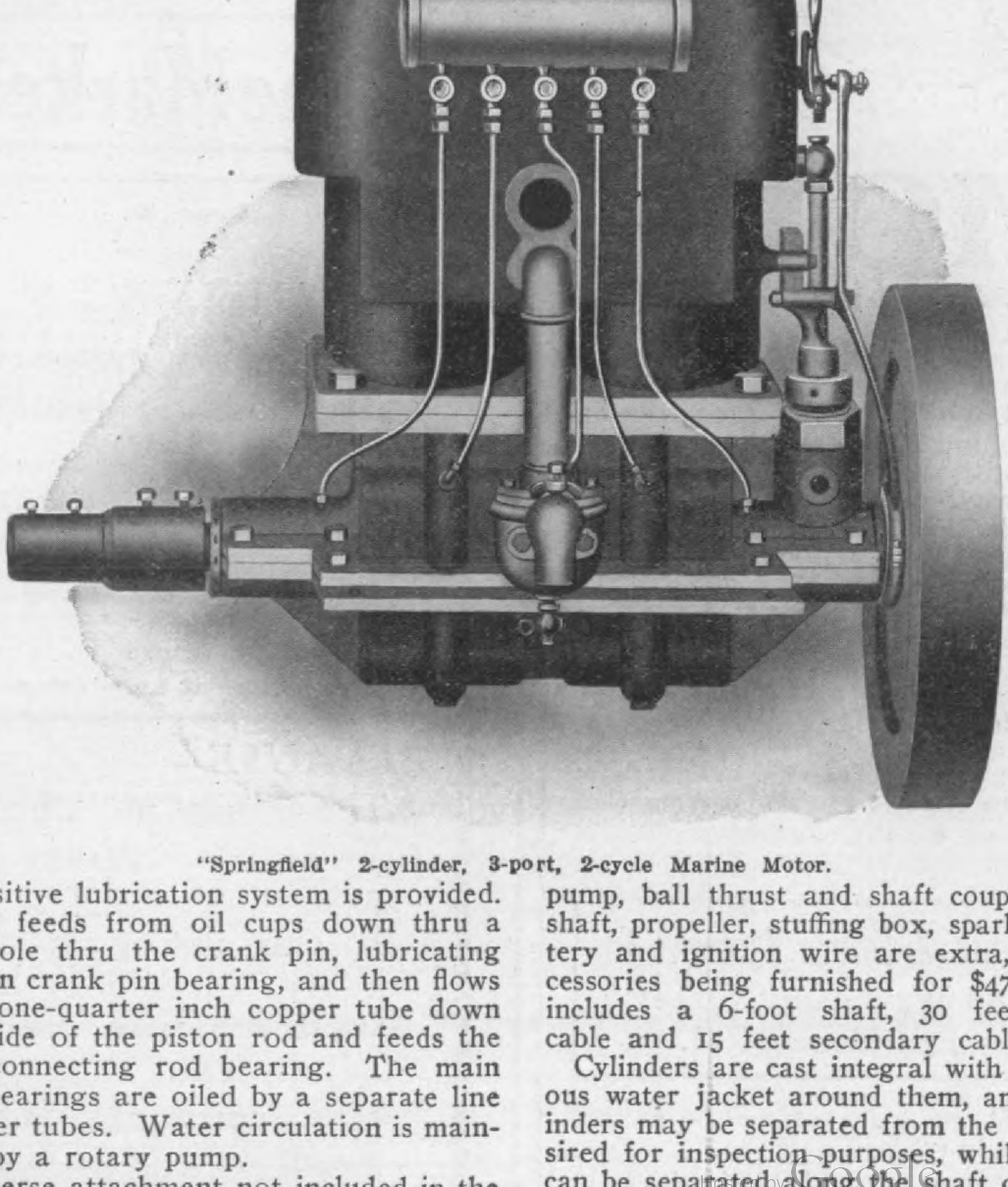
ovided with a special flange of their own sign, which projects into the inside of e cylinder, to prevent the packing from owing out. The crankshaft is a forging bar steel, accurately turned and fitted. e shaft bearings are of extra large dinsions and are lined with best grade of obit. The pistons are light and long, d are fitted with three piston rings. Igion is by the jump spark system. A at feed carburetor is used. The inlet ves are mechanically operated. The rk and gasoline supply can be controlled nultaneously or separately as desired.

"Springfield" 2-Cycle Motor

Springfield Motor Manufacturing C Springfield, Mass., are making a specialty a 2-cylinder, 2-cycle marine motor of the port type. The speed range is from 100 1000 r. p. m. and the motor develops horse power at 400 r. p. m., 10-H. P. at and 12-H. P. at 600. The bore and stro are each 4½ inches. The motor weighs pounds and lists at $225, including float-fe carburetor, sight feed multiple oiler, circ breaker, spark plugs, muffler, starting cra



"Springfield" 2-cylinder, 3-port, 2-cycle Marine Motor.

A positive lubrication system is provided. e oil feeds from oil cups down thru a all hole thru the crank pin, lubricating main crank pin bearing, and then flows u a one-quarter inch copper tube down ng side of the piston rod and feeds the er connecting rod bearing. The main nk bearings are oiled by a separate line copper tubes. Water circulation is mained by a rotary pump.

A reverse attachment not included in the price of the motors, is furnished extra pump, ball thrust and shaft coupling T shaft, propeller, stuffing box, spark coi, ba tery and ignition wire are extra, these cessories being furnished for $47.80, whi includes a 6-foot shaft, 30 feet prima cable and 15 feet secondary cable.

Cylinders are cast integral with a contin ous water jacket around them, and the cy inders may be separated from the base if d sired for inspection purposes, while the ba can be separated along the shaft centre li Stuffing boxes are applied to the main bea

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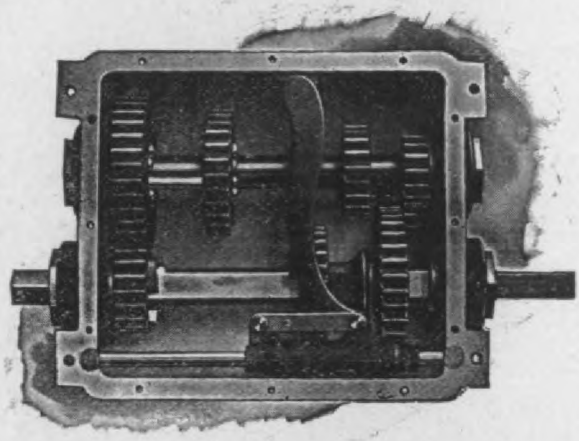
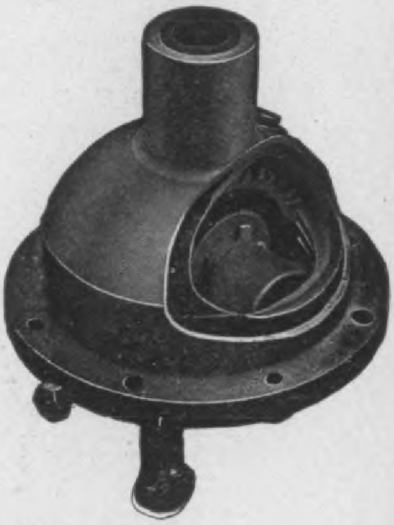
Differentials for chain and shaft drive
Back lock steering Sliding gear transmissions



Catalogue
and
Blue
Prints



K. FRANKLIN PETERSON, 166 Lake St., Chicago
THOMAS J. WETZEL, 29 West 42nd St., New York City } Direct Factory Salesmen

CHAS. E. MILLER, 97 Reade St., New York,
318-320 N. Broad St., Philadelphia,
202-4 Columbus, Ave., Boston,
406 Erie St., Cleveland, Ohio } Sales Agent, Carrying Stock.

POST & LESTER CO., Hartford, Conn., Eastern Sales Agents

BROWN-LIPE GEAR COMPANY, 206 S. Geddes St., Syracuse, N. Y.

We Manufacture The
NEATEST
LICENSE PLACARD

A Strong Light Frame
Covered With
PATENT LEATHER

WIND SHIELDS
USED BETWEEN STEP BOARD AND BODY
MADE TO YOUR PATTERN

Write For Description
And Price

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all purposes, in each case designing a for the particular work that will be cted of it. While he carries no stock els in the ordinary sense of the word, a number of his designs are as suit- for one person as another if he desires at for the same class of work. One of most popular designs is of a speedy

Quick-step" Designed and Built by A. H. Cuthbert.

y launch, 32 feet long by 6 feet beam, capable of speeds up to 24 miles per

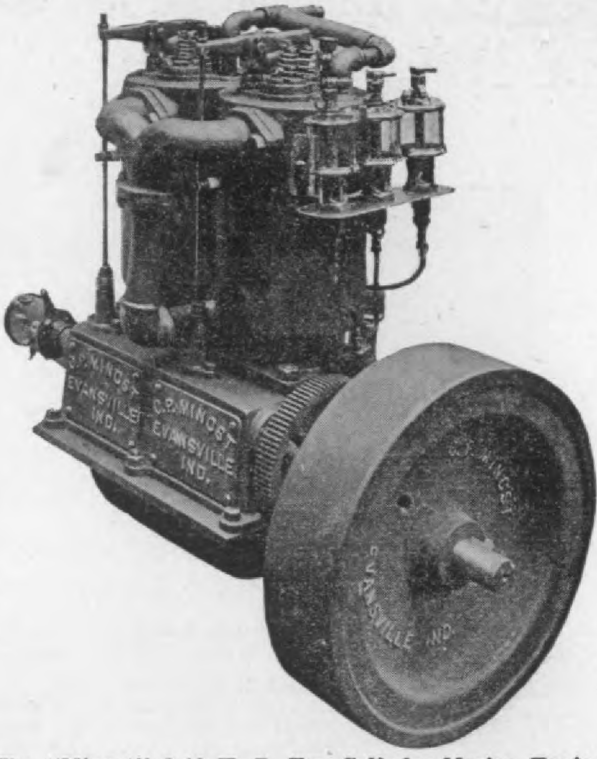
e "Quickstep," here illustrated, is a cabin boat designed by Mr. Cuthbert, has won laurels in its class. She has foot beam and is 30 feet long, finished out in oak, natural finish. There are berths and a full cruising outfit is in- ed. The cock pit is water tight and self- ying. Power is furnished by a 14-H. -cycle, Holliday motor.

"Mingst" 4-Cycle Marine Engine

e "Mingst" marine engine is of the 4- horizontal type, and is designed for wear, accessibility and to run at a speed om 150 to 1000 revolutions per minute. the product of C. P. Mingst, 1230 Riv- e avenue, Evansville, Ind.

e valves, which are 1¾ in. in diameter, laced in the heads directly over the com- on chamber and piston. The valve, valve and spring are all self contained in a which is easily removed by simply un- ing a jam nut in head of cylinder. The der head and water jacket are cast in iece. The cylinder is cast of hard dense iron, insuring good wearing qualities. bearings are all large; the two crank bearings being 1⅝ in. in diameter by long. The wrist pin is 1⅝ by 2¼ long. hollow steel piston pin has a bearing of by 2¼ in. The motor has steel con- g rod and drop forged steel shaft, hard-

on crank shaft.

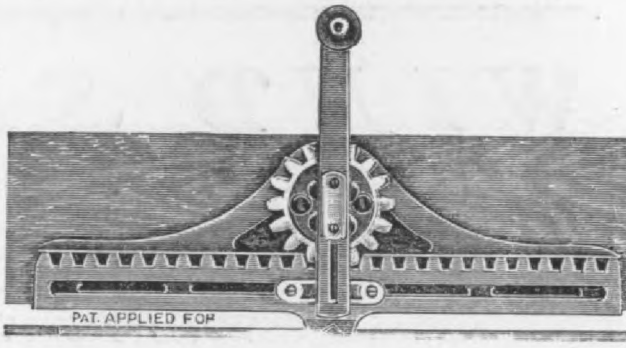


The "Mingst" 8-10 H. P. Two-Cylinder Marine Engine Price $325.

The manufacturers make these engines i one, two, three and four-cylinder sizes, de veloping four to five horse power in eac cylinder.

The J. A. G. Side Steering Device For Motor Boats

The accompanying cut illustrates the J. A G, side steering device for motor boats, re cently brought out by J. A. Garrett, Au burn, N. Y. Special attention has been pai to the designing of this device, as to strength space it occupies, convenience and the eas of operation. It can be located convenient ly for the engineer so that he has perfec



The J. A. G. Side Steering Device for Motor Boat

control of the launch without leaving hi

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 3. PHILADELPHIA AND NEW YORK SEPT. 1, 1907

August Edition, 20,058

19,214	Copies mailed.
4,502	Copies delivered to News Company.
951	Copies to Philadelphia and foreign, etc., under stamps.
100	Copies held in reserve.
24,767	
4,709	Back numbers sent out.
20,058	Total copies August edition.
	Of these
12,579	Were paid subscriptions.
4,502	Delivered to News Co.
17,081	
2,635	Returned by News Co., to August 20, 1907.
14,446	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the August issue was 20,058.

Of these, 25,219 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 21 ounces, representing 19,214 copies, and 4709 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Pope Co. Slightly Embarassed

Pope Mfg. Co., of Hartford, Conn., and its various subsidiary companies, having been temporarily embarrassed by the inability to raise ready cash to meet loans that were falling due, has been placed in the hands of a receiver. The company, according to the receiver's counsel, is entirely solvent, having assets of $10,750,000 and liabilities of only $2,900,000.

R. H. Johnson has forwarded his resignation as treasurer of the New York Motor Club to President S. B. Stevens, Jr.

Coming Events

Aug 1, Sept. 30.—Amsterdam, Holland, International Exhibition of Motors and Machines, Palace of Industry.

September 1.—Italy, Brescia Circuit, Florio Cup, A. C., of Italy.

September 2—Overland Park Track Meet, Denver, Col.

September 2—Harrisburg, Pa., Race Meet of Motor Club of Harrisburg (probably Middletown track. Sept. 2, Chicago, Harlem rack, Race Meet under the auspices of the Chicago Automobile Club. Sept. 2, Bridgeport, Conn., Labor Day Hill Climb, Sport Hill, Bridgeport Automobile Club.

September 4.—Padova Bovolenta, Automobile Club of Venice.

September 5.—Cedar Lake Economy Run, Chicago Motor Club and Chicago Auto Trade Association.

September 7.—Minneapolis, Minn., State Fair Race Meet of the Minnesota State Automobile Association.

September 7.—Hartford, Conn., Hill Climb, under the auspices of the Automobile Club of Hartford.

September 9—Commercial Vehicle Trials of English Royal A. C.

September 14.—95-mile road race, Albany Automobile Club of Albany, N. Y.

September 14.—Jamestown (Va.) Exposition, Aeroplane Contest for "Scientific American" prize.

September 14.—Reliability Tour, under the direction of the St. Louis Automobile Club.

September 14-15.—Mont Ventoux Hill Climb.

September 15.—Semmering Hill Climb.

September 20.—Milwaukee, Wis., State Fair Grounds track, Race Meet, Milwaukee Automobile Club and Milwaukee Dealers' Association.

September 28-October 7.—International Automobile Show, Copenhagen, Denmark.

October 1-15.—Contest of Electric Vehicles, Automobile Club of France.

October 6.—Cup of L'Auto Maisons-Laffitte.

October 13.—Kilometer Contest at Dourdan, under auspices of L'Auto.

October 20.—Gallion Hill Climb.

October 21.—St. Louis (Mo.), International Aerial Race for the Gordon-Bennett prize.

October 24-31.—Eighth Annual Automobile Show; A. C. A., Grand Central Palace, New York.

October 31-November 7.—A. L. A. M. Show, Madison Squaqre Garden, N. Y.

November 1-15.—France, Voiturette Contest near Paris.

November 11-23.—Olympia Motor Show, London.

November 12-December 1.—Paris Show, Grand Palais and Place Des Invalides, A. C. of F.

November 30-December 7.—Chicago National Automobile Show, S. A. Miles, Mgr., No. 7 E. 42d st., New York city.

December 14-21.—Local Show, St. Louis, Mo., Auto Manufacturers' and Dealers' Association.

December 28-January 4.—Importers' Salon, Madison Square Garden, New York City. C. R. Mabley, Sec. and Mgr.

May 16, 1908.—Sicily Targa Florio, Automobile Club of Italy.

July 14, 1908.—Paris to London, Aerial Race.

The Rochester Automobile Club is having signboards erected in the neighborhood of that city. The signs are of uniform size and shape, being made of enameled iron. They give the name of the road, the direction to the nearest town and the number of miles.

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Mechanical and Automobile Engineers Meet at Buffalo

Mechanical Branch of the Association of Automobile Manufacturers held its session in Buffalo on Monday and Tuesday, July 29, 30, in conjunction with the Society of Automobile Engineers.

Steels and their quality were discussed at Monday morning's session at the Buffalo A. C. rooms. On Tuesday afternoon and evening the subject of magnetos was taken up. A paper, by Otto Heins, of the Bosch Co., showed the necessity of a closer relation between the car maker and magneto manufacturers. During the meeting at Buffalo there were luncheons and inspections of the Pierce and Thomas plants and a run to Niagara Falls.

Plan Suggested for Co-Operative Control of Automobile Events

The Trades and Contests Committee of the Importers' Automobile Salon, was appointed in June, 1907, for the purpose of studying the basis upon which the most sportsman-like automobile events are held, and to submit recommendations for a method of improving and if possible placing such contests in this country upon a scientific basis.

The following is the substance of the recommendations, a copy of which was sent to the A. M. C. M. A., the A. C. A. and the A. L. A. M.

1st. That events exclusively for either American or foreign cars be discouraged. 2d. That those in charge of all contests be automobile or mechanical engineers of recognized repute and also representatives of the associations interested in the industry, such as the A. L. A. M., A. M. C. M. A., I. A. S. and the A. C. A. 3d. That such associations appoint committees to confer together and revise existing methods of conducting automobile contests. 4th. That the true horse-power classification, as given by the formula adopted by the Automobile Club of Great Britain and Ireland, be used until some international standard is adopted.

The following classification is urged:

Class A, beginning with 60 H. P. and over. Class B, beginning with 50 H. P. to but not including 60 H. P. Class C, from 40 to but not including 50 H. P. Class D, from 30 H. P. to but not including 40. Class E, from 20 H. P. to but not including 30. Class F, from 10 H. P. to but not including 20. Class G, under 10 H. P.

CLASS 1, PISTON AREA UNDER 35 INCHES. 1st. Autocar, percentage 10.065. 2d. Autocar, percentage 13.505. 3d. Holsman, percentage 14.65.

CLASS 2, PISTON AREA 35 TO 50 INCHES. 1st. Buick, 8.11. 2d. Maxwell, 11.011. 3d. Reliable Dayton, 15.68.

CLASS 3, PISTON AREA 65 TO 90 INCHES. 1st. Moon, 8.513. 2d. Buick, 9.183. 3d. Haynes, 9.23. 4th. Autocar, 9.30. 5th. Corbin, 9.69. 6th. Mitchell, 10.254. 7th. Oldsmobile, 12.49. 8th. Pierce Racine, 13.076. 9th. Rambler, 16.173.

CLASS 5, PISTON AREA OVER 90 INCHES. 1st. Pierce Arrow, 8.07. 2d. Berliet, 8.68. 3d. Stearns, 8.796. 4th. Berliet, 10.62. 5th. Apperson, 11.134. 6th. Stearns, 11.50. 7th. Packard, 12.036. 8th. Haynes, 12.04. 9th. Stearns, 12.234. 10th. Rambler, 12.42. 11th. Apperson, 13.837.

These ratings are based upon the accompanying table, prepared by Mr. Worby Beaumont.

The usual formula for calculating horse power was used in calculating this table, viz.:

PLAN.

33,000X2

When P equals mean effective pressure of 90 lbs. per square inch.

L equals stroke of engine in feet.

A equals area of piston.

N equals revolutions per minute.

Horse Power Table—Cylinder Dimensions in Inches and Fractions.

Bore. in.	0	¼	½	¾	1	¼	½	¾	2
2	0.54	0.60	0.67	0.74	0.81	0.88	0.94	1.01	1.08
	0.72	0.80	0.89	0.98	1.08	1.17	1.25	1.35	1.44
2¼	0.76	0.84	0.92	1.01	1.09	1.18	1.26	1.35	1.43
	1.01	1.12	1.22	1.34	1.45	1.57	1.68	1.81	1.90
2½	1.04	1.15	1.25	1.35	1.46	1.56	1.67	1.77	1.88
	1.39	1.53	1.67	1.81	1.95	2.09	2.23	2.37	2.51
2¾	1.39	1.51	1.64	1.77	1.89	2.02	2.14	2.27	2.40
	1.85	2.02	2.19	2.36	2.53	2.70	2.87	3.04	3.20
3	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	3.00
	2.40	2.60	2.80	3.00	3.21	3.40	3.61	3.81	4.00
3¼	2.30	2.47	2.65	2.82	3.00	3.18	3.36	3.53	3.70
	3.06	3.28	3.52	3.76	3.99	4.22	4.45	4.70	4.92
3½	2.86	3.06	3.27	3.48	3.68	3.88	4.09	4.30	4.50
	3.81	4.09	4.36	4.63	4.90	5.18	5.45	5.72	6.00
3¾	3.53	3.76	4.00	4.35	4.47	4.71	4.95	5.18	5.41
	4.71	5.02	5.34	5.65	5.97	6.28	6.60	6.91	7.23
4	4.27	4.65	4.81	5.08	5.35	5.61	5.89	6.15	6.41
	5.71	6.06	6.42	6.78	7.13	7.50	7.85	8.20	8.55
4¼	5.13	5.44	5.74	6.04	6.34	6.64	6.95	7.25	7.55
	6.84	7.24	7.64	8.05	8.45	8.85	9.25	9.66	10.06
4½	6.19	6.53	6.87	7.22	7.56	7.90	8.25	8.59	8.93
	8.25	8.68	9.16	9.62	10.08	10.54	10.96	11.41	11.89
4¾	7.18	7.55	7.94	8.31	8.70	9.07	9.45	9.82	....
	9.57	10.07	10.57	11.09	11.58	12.08	12.59	13.09	....
5	8.38	8.80	9.22	9.65	10.05	10.46	10.90	....	....
	11.16	11.72	12.28	12.84	13.40	13.95	14.50	....	....
5¼	9.70	10.16	10.62	11.09	11.54	12.00	....	....	....
	12.02	13.54	14.15	14.76	15.40	16.00	....	....	....
5½	11.12	11.65	12.15	12.66	13.15	....	....	....	....
	14.84	15.51	16.20	16.86	17.54	....	....	....	....
5¾	12.71	13.27	13.82	14.38	....	....	....	....	....
	16.06	17.70	18.42	19.19	....	....	....	....	....
6	14.45	15.05	15.65	....	....	....	....	....	....
	19.25	20.05	20.85	....	....	....	....	....	....

To use table: Take the bore of your motor from marginal or left-hand column, follow directly across to the column whose heading in fraction of inches added to the bore gives stroke. The figure at the intersection of this column and your bore column gives the horse power of one cylinder of that size at 750 revolutions, and the figure immediately below gives the horse power at 1000 revolutions, which is generally accepted for computing present day high-powered motors.

The table represents the calculated indicated power given by one cylinder. For multi-cylinder engines the power shown must be multiplied by the number of cylinders.

Day Returns to Licensed Fold

George H. Day is again back in the ranks of the A. L. A. M., actively participating in its direction. Mr. Day some time ago resigned from active duties on account of ill health, but following the resignation of Milton J. Budlong as president of the Electric Vehicle Company, he was appointed July 30 to fill the vacancy thus created in the Executive Committee of the Association of Licensed Automobile Manufacturers.

As an evidence of the ever-growing popularity of the automobile, Mr. Alfred Reeves, of the American Motor Car Manufacturing Association, says that the demand for space at the Grand Central Palace, New York, surpasses even the demands of last year.

Already in almost every instance manufacturers who exhibited last year are clamoring for larger space this year, and the coming show in October is destined to be the largest ever held in this country.

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Twenty-Four-Hour Race Rules

The Racing Board of the A. A. A. has promulgated rules for the conduct of 24-hour automobile races. These rules were compiled in order that records might be properly established and to avoid arguments over scoring methods and other grounds for dispute:

The rules are as follows:

1.—Twenty-four-hour contests shall be open to stock cars only, and shall be divided into two classes: (A) Endurance, (B) Relay.

1-A.—In class A each entrant shall nominate but one car and not more than two drivers.

In class B each entrant shall nominate not more than two cars of the same make, horse power and model, and not more than three drivers.

2-A.—(Section 20 American Automobile Association Racing Rules). The designation "Stock Car" shall mean a vehicle completely described in the manufacturers' catalogue for the current or any preceding year, and one which is on sale and ready for delivery to buyers, or has been on sale and sold to buyers.

B.—Stript stock cars under this classification shall be cars conforming to the preceding section with all or any portion of the following equipment or parts removed or replaced:

Body, signal devices, lamps (except between sunset and sunrise), running boards or steps, fenders or mud guards, mufflers (exhaust must not be directed towards the ground), recording and light generating devices, tools, spare parts, repair kits, tires and tire holders, tops, wind shields or bonents.

Note.—In class B a stript car may have as its relieving car, one fully or partially equipt car of the same make, horse power and model. This does not mean that two stript cars with equipt cars as substitutes can be used, but that two cars, one or both stript, or one or both equipt may be used.

C.—Fuel or lubricating containers may be replaced by those of equal or greater capacity, located as desired.

D.—No substitution of cars shall be allowed in the event of accident or other reason, and the factory number of the motor and the manufacturer's serial number of the car shall be declared before the start.

3.—In class B cars of each entrant shall carry in the usual places the same entry number, preceded by the letters A and B respectively.

All competing cars shall carry suitable head and two tail lights between sunset and sunrise.

5.—Drivers may alternate and in case of accident to a driver or drivers, application must be made to the referee who may, in his discretion, give permission in writing to substitute another driver or drivers.

6.—In class B the two cars on any team may be interchanged at will, it being understood that when one car relieves another the retiring car must come to a full stop beside the relief car before the latter is started.

7.—In any event in which more than five cars are actually running on the track, all supplies must be taken on and repairs, replacements and adjustments made in the paddock, which shall be in charge of a paddock judge, appointed by the referee.

8.—Each race official shall have an assistant to act as a relief.

9.—It is recommended that a mechanical means of recording the score be used and that the score be posted at the end of each fifteen minutes in full view of the race officials and press.

Exports Soar Skyward

Government statistics show that there is a continued increase in the exports, June being $732,054, an increase of $192,786 over June, 1906, and $76,604 over May, 1907.

Exported to—	June 1906.	June 1907.
United Kingdom	$194,709	$310,632
France	56,495	67,892
Germany	20,107	36,487
Italy	20,612	11,675
Other Europe	40,959	61,124
British North America	92,429	154,923
Mexico	80,934	49,989
West Indies and Bermuda	4,089	8,385
South America	18,899	19,641
British East Indies	2,947	682
British Australasia	5,353	4,974
Other Asia and Oceania	603	5,489
Africa	125	61
Other countries	1,007	100
Total automobiles and parts of	$539,268	$732,054

Gasoline Machines Allowed on Piers

Thru the efforts of the American Motor Car Manufacturers' Association and the New York Automobile Trade Association the following steamship companies have signified their willingness to allow gasoline motor trucks on their piers, and a number of other companies have the matter under consideration. The Enterprise Steamship Company, the Brunswick Steamship Company, the Maine Steamship Company, the New York and Porto Rico Steamship Company, the United Fruit Company and the Ward Line.

Double Check System to be Used at Shows

At the eighth annual Automobile Show in Grand Central Palace, October 24-31, several new features will be introduced regarding tickets and badges, chief among which will be a double check system for exhibitors. Each exhibitor will receive a non-transferable admission badge and ticket for his own use and for each employe necessary for the proper conduct of his exhibit. The badge is not good for admission in itself, except when used in connection with the admission ticket. Upon leaving the building a ticket will be given to be used for admission on returning.

Our Special Show Numbers

On account of the early dates of the shows this year much costly delay will be avoided.

The first show will be held October 24-31 at the Grand Central Palace, New York, under the auspices of the Automobile Club of America and the American Motor Car Manufacturers' Association. Our October number will therefore be the first show number. The November issue will be the second show number and will contain a forecast and space distribution of the Association of Licensed Automobile Manufacturers' show in Madison Square Garden, October 31-November 7. The December number will be the Chicago show number, which show will be held November 30-December 7. In addition to these the January number will be the Great Eighth Annual Buyers' Guide Special. The February issue will be the Boston Show Number and the March edition the Eighth Annual Complete Vehicle Review.

Counsel for the Massachusetts State Automobile Association are preparing to test the constitutionality of the law which went into effect August 1 compelling owners of machines to pay a fee of $5 for each car instead of $2, which has for some years been required. Members of the Worcester Automobile Club are instigators of the test case, but they are being joined by members in other cities.

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THE READING STANDARD

is the highest standard. It's like blood; it tells.

TWO INSTANCES

(1)---HERMAN H. HINTZE

riding a two-year old Reading Standard Bicycle easily won the

Century-Mileage Contest of 1907

of the Century Road Club of America.

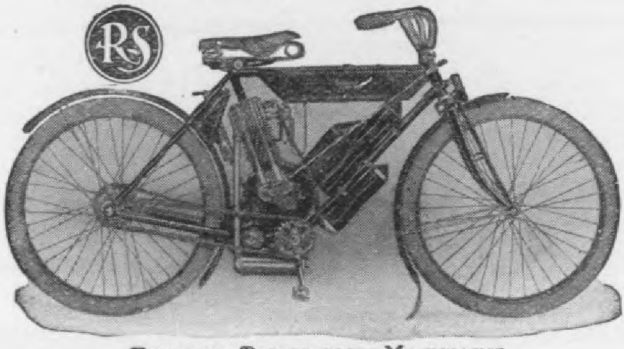
139 Centuries—20,292 Miles

(2)---R. S. MOTOR CYCLES

"America's Best"

Winner of the 20-Mile Road Race at F. A. M. Meet, Providence, R. I. Competing against one, two and four cylinder machines. The most important "open to all" event of the Meet. The "R-S" machine was a regular stock model, same as you get for your money.

First Up Pike's Peak



First Up Mount Wilson

BUILT AND TESTED IN THE MOUNTAINS.

If machines of this sort appeal to you, we'll be pleased to forward catalogs and other particulars.

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CYCLE AND
AUTOMOBILE
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Change of advertising copy must reach this office not later than the 10th of each month. New advertise ments will be accepted as late as the 20th.

Philadelphia, September 1st, 1907

Cycle and Automobile Trade Journal Moves into New Plant

We are pleased to announce to the trade and our readers in general that we have removed from 1213 Filbert street, Philadelphia and are now installed in our new plant at Forty-ninth and Market streets, Philadelphia. The Trade Advertising and Publishing Company and the Chilton Printing Company, both under the same management, have now been consolidated and will be known as the Chilton Printing Company; James Artman, President; Geo. H. Buzby, Vice-President, and C. A. Musselman, Secretary and Treasurer.

With our now enlarged facilities and with the Editorial and Printing Departments under one roof, we hope, if possible, to make the Cycle and Automobile Trade Journal even more useful as a trade publication than in the past, and will take pleasure at any time in receiving and showing our friends thru our new quarters.

The Glidden Tour—An Impossible Combination

Unfortunately the promoters of the Glidden Tour do not yet seem to realize that they are laboring in vain to combine two incompatible events, a pleasure tour and as severe a test of automobiles as can well be imagined. Who will say that the recent tour was a pleasure event? It was as nerve-racking, weight-reducing and trying an ordeal as none but the most hardy could endure. To begin with, there are altogether too many entrants to constitute a pleasure tour even if the time schedule was not so strenuous as to cause even conservative drivers to take appalling chances. The persistency with which the idea of a pleasure tour is clung to, in spite of the fact that the event is in reality a strenuous contest, is ludicrous in the extreme. This persistency simply introduces rulings and prohibits others which would make the contest a true index of individual car superiority, for no one will deny that long hard tours over such roads as are to be found in this country do, as nothing else can, bring out the weak points of the cars. Made strictly a contest, divorced from the pleasure tour idea and conducted under rigid contest rules, much valuable information could be obtained and made public, which is manifestly impossible under the present conditions. Each car should have an official observer, tire troubles should not under any circumstances be counted against the score of a car, or if counted should be kept separately. But above all an accurate record should be made of each and every trouble encountered and at the end the cars should each be thoroly overhauled and critically examined by a representative body of automobile engineers who would then pass upon the condition of each part and by suitable penalization complete the score of each car. All records should be public property if the benefits possible from such a contest are to be derived.

Under such a ruling there would be no chance of heralding a car far and wide, as a perfect score machine, when in reality at the close of the tour it is fit only for the scrap heap while some sweet running piece of automobile mechanism as was ever made, thru tire and minor troubles has a blackened record which might lead one to believe it almost unfit for touring service.

There is no objection to a pleasure tour as such, but there is a decided objection to mixing up such an event with a contest and thus spoiling the pleasure to be derived from one and the knowledge and benefit to the industry which might be derived from the other.

In certain quarters we read that the tour is useless and shows nothing, proves nothing. With this we certainly do not agree as we believe much information was obtained, even under the present arrangement, but are firmly convinced that much more useful information to the manufacturer and the public, can be obtained if the tour is made entirely competitive. Everything is not yet known concerning automobile construction, and such a road event can be made extremely valuable, particularly as it deals with stock models on average American

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roads. We heartily indorse the promotion of all such stock car contests, but let them be under the supervision of engineers, entirely distinct from pleasure events and by all means allow all the results to be made public.

Questionable Advertising Methods

Some automobile manufacturers and dealers are shortsighted enough to employ advertising which, altho not absolutely false, at least gives an entirely erroneous impression to the reading public. Such practices are to be condemned and sooner or later the deception is found out and undoubtedly works injury to the dealer or firm employing these methods.

The type of petty deceit referred to was shown in several advertisements which appeared in the daily papers following some of the recent endurance contests in which the order of the finish under the rules of the competition, meant absolutely nothing in regard to the merits or demerits of the cars. Yet the advertisements in question blazened the fact that such a car finished *first,* thus giving the readers a false impression as to the results of the contest.

In many instances the winners of certain events are specially built cars entirely different from the same make of car as known to the purchasing public; yet the fact that these cars are specials and perhaps no more like stock models than a Vanderbilt racer is like a buckboard, is carefully concealed in the brazen advertisements which intentionally or otherwise make it appear that the winning car was of the regular type. In one particular instance a maker mounted a regular 4-cylinder motor on two sills and used light wire wheels. There was practically nothing used but the motor that ever entered into the regular stock model construction. This freak won a hill climb and it was immediately advertised far and wide that that particualr make of car won. No mention whatever was made of the true state of the case, and the deluded purchaser was made to believe that that particular make of car was a great hill-climber. In some cases cars are specially tried out on a certain hill upon which there is to be a contest and the gear ratios changed until one is found to suit that particular hill. It makes no difference whether the rules of the contest admit of such a practice or not, in regard to the questionableness of advertising such a car as the winner when nothing whatever is said about the questionable methods used to obtain the result.

In still another instance a dealer spread by means of glowing advertisements the fact that his make of car was awarded a gold medal at a certain exhibition, giving the impression that this was for excellence of design when in reality the award was given for a booth decoration or something equally irrelevant to perfection in motor car construction.

Such deceptive practices in advertising may delude a few, but sooner or later when the truth is known, cause a very depreciatory view to be taken of all future claims made by that individual or firm and may even start a public decline of confidence in that make of car, and we cannot too strongly point out the fallacy of such questionable advertising methods.

Fallacies in Testing Shock Eliminators

Since the introduction of the various types of shock absorbers there have been several methods employed by different manufacturers and others to make scientific tests which would show graphically the advantages claimed for their various devices when applied to an automobile. In every instance that has come under the notice of the writer, the method employed consisted in obtaining a curve, the abscissa of which was time, and the ordinates the motion above or below a medial line, of the body relative to the axle.

But does a curve with shorter ordinates when the device is applied, than the curve obtained without the use of the shock absorber, prove conclusively that the car is made easier riding by the shock-eliminating device used? The writer is of the opinion that it has very little bearing on the subject. In the first place easy riding cars are not necessarily shown by lack of relative motion between the body and the axles, for if this were the case, a car in which the body rested rigidly upon the axles, without any spring being interposed, would give a perfect curve which would be of course a horizontal line. Furthermore, it is very possible for a car to be easy riding in which there is a large relative motion between the body and the axles, provided, however, this motion covers considerable space of time, or in other words, whose vibration is a slow one, altho its amplitude may be large. Curves made in the usual way, in which the portions of the curve representing a change of motion from upward to downward, or vice versa, are not sharp, but very gradually rounded, would indicate to a certain extent, easy riding cars, as such a curve would show that the body was not suddenly thrown upward or deprest, but that such motions covered a considerable period of time, and could be compared more accurately to the rising and falling of a boat, than to the jolting of a wagon body. From these facts it will be seen that the amount of vertical motion between the body and the axle, may mean very little in regard to easy riding qualities, but that the time of vibration means everything, when smoothness of action and lack of jolting is the question under consideration.

There seems to be but one true indication of the riding qualities of a car, and that is

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the varying pressure of the weight of an individual or occupant of the car upon the seat cushions. If a curve of such pressure variations upon the seat could be obtained, this would indicate conclusively whether or not the occupants would be thrown violently into the air at one moment, and suddenly met by the rising car at the next. The point in the curve which indicated that there was no pressure on the seat would show that either the person had been thrown upward from the seat or the car had dropt from under them. If this were followed by a sudden rise in pressure, it would indicate the landing heavily of the person upon the seat, or in other words, a curve of the variation of pressure of the weight of a person or of a load equivalent in weight, would be an accurate indication of the riding qualities.

Altho difficulties might be met in devising a pressure-recording instrument which could be placed upon the seat, and either a dead weight equivalent to that of an average person placed upon it or could actually be sat upon by an occupant of the car, such difficulties could easily be overcome. With such an instrument records could be made in competitive tests of the different shock-eliminating devices on the market and with such a curve as a basis of comparison the relative merits of different instruments could be determined. Scientific tests of the minor details of automobiles will in time be made, but at present, the American makers are too interested apparently in the main features of the mechanism to take the necessary time and expense to demonstrate such minor features. Nevertheless, such scientific competitions would be very enlightening to the purchasing public, and would also form the basis of very advantageous advertising. We look forward to the time when every part of the American automobile will be submitted to competitive tests under the supervision of competent engineers.

Electric Transmission

Elsewhere in this issue of the Journal the first plain and fairly complete story of electrical transmission is given to our readers.

The electrical transmission is the work of Justus B. Entz, a very able electrician who is thoroly familiar with the storage battery, having been the Chief Electrical Engineer of a very large storage battery factory. It is highly significant that Mr. Entz, who has had an extended experience in directing some very large ambitious and costly applications of the storage battery to vehicles of various classes, including street railway cars and commercial work, should now be giving his attention to motor car driving by a gas-engine with electrical transmission between the engine and the driving wheels, thus abandoning the use of the storage battery and at the same time doing away with all forms of toothed gearing for speed changes. This arrangement also supplies electrical brakes, which effectually control the movements of the car.

The Mercedes is placing the same combination in 1908 cars, a gas-engine with electrical transmission.

The great advantage of electrical transmission is its simplicity, and its possibility of giving varied effects without the use of separate machine parts.

The Entz transmission gives 5 forward and two backward speeds, also an ordinary brake effect and a "sprag" or hold-back effect in both directions, making it impossible for a car to coast down hill either forward or backward at a speed exceeding about two miles an hour, all without any gears of brakes or ratchets and pawls whatever, simply by moving a small controller handle which requires only the slightest muscular exertion on the part of the driver. Mechanical brakes are, of course, provided so as to give the driver control if the electrical system fails.

It is well known that really satisfactory brakes are few, and 1908 practice is divided between metal to metal and fibrous facing. Electrical brakes do not require contact of surfaces, and hence cannot give rise to mechanical wear.

The story of electrical transmission to which attention is called is not only the first ever printed showing the possibilities of this form of car control, but is told in such plain language that readers having very little knowledge of electricity can understand what can be gained.

The Entz system involves a broad new invention, and not only produces many highly desirable effects not shown in the Mercedes system, but is vastly more economical of engine power, so that American gas-engine driven cars employing electrical transmission need fear nothing from comparison with the Mercedes.

The work of an American, Stewart Perry, 1842-46, anticipated that of Lenoir and Daimler by many years, and it now seems to the writer that Perry's 2-cycle gas-engines and the Entz Electrical Transmission will make the final motor a wholly American production.

Growing Demand For American Runabouts

It seems surprising that neither France nor England has appreciated the value of meeting the demand for medium-priced machines. They have devoted their energies almost exclusively to manufacturing the most expensive type of cars, and for this reason it is not surprising that England has turned to America to meet this want. There is a great field abroad for runabouts, and English makers are beginning to wake up to this fact and are preparing to supply this demand. While few, if any, of the expensive American cars are exported, statistics show that there is a general increase in the number of American runabouts exported.

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ne statement received from the secre-
s office of the American Automobile As-
tion.

is decision was reached by Wm. K.
lerbilt, Jr,. and chairman of the com-
on Mr. Jefferson De Mont Thompson,
being in correspondence with the act-
hairman by cable.

e deferring of the race this year was
ed wise in view of the many delays and
the following specific reasons:

e unfavorable attitude of the Governor
ne State of New York with regard to
proposed use of the militia to guard the
se; the failure of the New Jersey State
te to convene in special session owing
ead-lock; the great distance which the
gners would be obliged to travel in the
t of accepting the very cordial invita-
of the Governor of California, and the
of assurance from Missouri, due to the
nce of Governor Folk from the State,
the guard of that State could be used.

White Wins Hower Trophy for Runabouts

order to decide the owner of the Hower
ny, it was necessary that the two cars
for the trophy should travel 2080 miles.
White car, driven by H. K. Sheridan,
the Stoddard-Dayton, by G. S. Smith,
ed on Monday, July 29, on the sup-
entary contest to continue from day to
until one was penalized. The contest
run under the rules governing the Glid-
tour with the important additional re-
ement, that an observer be carried on
car. The contest lasted three days, the
day the cars ran to Albany; 155 miles,
car was the only car to arrive on schedul
time.

The cause for the delay of the Stoddard
Dayton car is well explained. On Wednes
day, when the contestants left Syracuse, th
Stoddard car was suffering from a broke
spring, which had been repaired as well a
possible without penalization. Fifteen mile
out from Syracuse the spring snapped an
was patched up without new materials an
the car hobbled along to regain lost time
At Batavia the car met a fireman's parad
and, it is claimed, lost its way in trying t
avoid it.

Long Distance Race Being Planned for Ormond

How about the 1908 Ormond Beach races
This is the question now being frequentl
asked because the Vanderbilt race canno
be run. The shows will be thru early an
American makers have racing cars finishe
and also an anxiety to try them out. Th
promoters of Ormond are thinking deepl
and planning, and the A. A. A. Racin
Board is more than anxious to aid them t
make the event of next year the greates
ever known on Ormond Beach. It seem
quite probable that a long distance rac
will be put on to replace the Vanderbil
contest and that loops will be constructe
on the beach and land so that the cars ma
run continuously for any distance require
With this done it is probable Europea
makers will send their fastest cars to thi
country. The proposed long distance strip
ped touring car race may also be conteste
there. It is said now that the long race
will be put on first with time limits insid

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red or be forced to run in a class by themselves. At any rate there is every chance that Ormond will be a greater meet than ever in 1908.

Brighton Beach 24-Hour Race

A new one-car record was made in the much-heralded 24-hour race on Brighton Beach Track, under the new A. A. A. rules, August 9 and 10, by Montague Roberts driving Harry S. Haupt's 60-H. P. Thomas Flyer. He did 997 miles in the 24 hours.

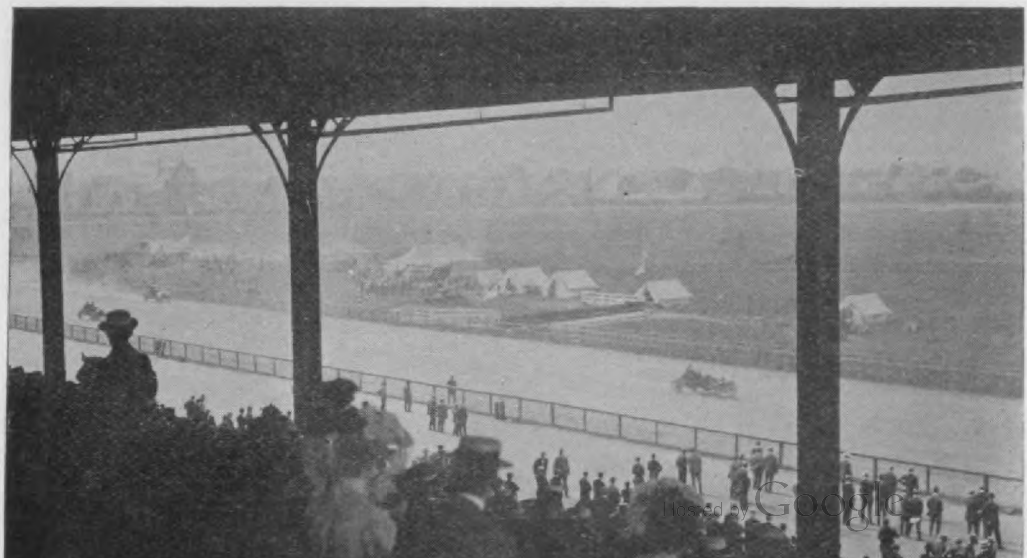
The winning Thomas being viewed by the crowd at the 24-hour races at Brighton Beach, L. I. This car made a new one-car record of 997 miles.

He was stopt no less than four times to light his tail lamps, and at one time it looked as tho the question of lights would decide the race. A 40-H. P. Lozier car was second, with 972 miles to its credit, and a 40-H. P. Jackson third, having covered 966 miles. Altho 15 cars had started in the race, only six were participating when the time limit was reached. A 35-H. P. Mitchell was still going and had 774 to its

racq, with a score of 774 miles, and a haye, with 720 miles, were undergoin justments when time was called. The F Miller held the lead continuously up t sixth hour, when it skidded thru fence, damaging the car so badly that i withdrawn. The table following give scores of the 15 starters and the numb hours they ran:

	Driver.	Hrs.
60 H. P. Thomas.....	Roberts	24
40 H. P. Lozier.....	Smelzer-Lynch	24
40 H. P. Jackson.....	Burman-Cobe	24
35 H. P. Mitchell.....	Zirbes-Hudson	24
45 H. P. Delahaye....	Mongini	24
50 H. P. Darracq.....	Nuneman-McCalla	24
35 H. P. Oldsmobile...	Sturwood-Anderson	18
50 H. P. Welch.....	Trewin-Greenwood	18
50 H. P. Matheson....	Ryall	17
50 H. P. De Dietrich..	Fuller	9
.. H. P. Frayer-Miller	Lawwell-Knepper.	6
35 H. P. Oldsmobile...	Michener-Mufford.	..
28 H. P. Pilain.....	Strang	9
40 H. P. Lozier.....	Howard-Thomason	13
35 H. P. Stoddard-D..	L. and J. Light...	17

Preceding the 24-hour race several and middle-distance races were run. W Christie, in the front drive racer whi built for the French Grand Prix, furn the fastest burst of speed on the Bri Beach track by doing the mile in 5 seconds, thereby wiping out Barney field's time of 1.00 2-5, which had stoo two years. It was the first occasio American public had had of witn Christie's new machine at work. The cipal event was the 100-mile Brighton middle distance Derby. There were starters. Vaughn, driving a Stearns, the lead up to the 45th mile, when a b gasoline connection caused a stop fo pairs. After returning to the trac again got the lead, the second man, i meantime, having also retired for re and he held his place till the 82d mile,



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The Thomas and Jackson on the turn, followed by the Delahaye and Oldsmobile. The Jackson Thomas closely contested for leading position, which was held by the Jackson until the 23d r, when an accident put the car out. The Thomas had continual tire trouble and was de- ed several times by the referee to light its tail lamps as per the new A. A. A. rules; but lly won, making 997 miles in the 24 hours.

oken chain again put him out of the est for a time. Elliott, on a Packard, back of Vaughn in the 19th mile, but his place in the 59th on account of trou- and when he returned was four miles nd Vaughn, with a Lozier, and Stude- r also ahead of him. At 90 miles he ed the Studebaker, but failed to catch o the Lozier, which finished in 2.06.21. tt's time was 2 hours 12 minutes.

e Atlantic City, N. J. Automobile Carnival

e Automobile Carnival, August 5 to during which there were three days of g on Ventnor Beach, a floral parade an automobile show, provided enter- nent for thousands of the mid-summer sure seekers at Atlantic City.

nly one record was broken and that was he big six Stevens-Duryea in the third t, a championship race for touring cars the Atlantic City Bureau of Information valued at $500. The six-cylinder car fully equipt and carried five adult pas- ers. The mile was covered in 1.06 3-5, h is 2 1-5 seconds better than the Eng- Daimler record of last year. Guy ghn and Church's Stearns were debarr- s they were classed by the judges as abouts, rather than touring cars. The re of the day, however, was the class regularly equipt gasoline runabouts. Of 14 entries only 6 started. The B. L. M. kept out as it was stript. Leland's six-cylinder Stearns won easily in 52 nds, with the Thomas "forty," driven McIlvred second, and Guy Vaughn in Stearns third.

e first race was won by T. W. Berger Oldsmobile and was the first of a

THE SECOND DAY.

The second day's races were the best o the meet, all being hotly contested wit several grandstand finishes. The event were run off promptly and some fast mile made, altho no records were broken. Th record for the day was made in the thir race, a free-for-all, which brought togethe such well-known cars as the 120 H. P Thomas Vanderbilt racer, the B. L. M. ca built for the Vanderbilt race, the Matheso Vanderbilt car, the six-cylinder Stearns an the Stevens-Duryea Big Six. Two heat were run and the winner of each and th fastest second car were chosen t compete in the final. The finish brought th Thomas, Stearns and Stevens Duryea to gether and the Thomas won in 40 2-5, s far the fastest time of the meet, the Stearn was 1 2-5 seconds behind. Christie's tim of 34 seconds still stands as a record, bu was not made in competition.

A PECULIAR ACCIDENT.

The only other event in which the mil was made under a minute was the speci race for stock touring cars against tim The six-cylinder Stearns of Leeland was th only starter and after covering the cours in 44 flat, just after passing the line th fly-wheel of the speeding car burst sendin part of the floor boards and the dash hig into the air and badly damaging the moto No one was injured but the car could no compete in the next day's races. There wer eight events in all and the slow time in sev eral is accounted for by the fact that the were handicap races and necessarily wer run from a standing start.

THE THIRD DAY.

Unfortunately the racing on the third da was not so good as the two previous day The cars were slow and the course in muc worse condition than before. Improvise races were run to fill in the gaps wher there were no starters. However the spe

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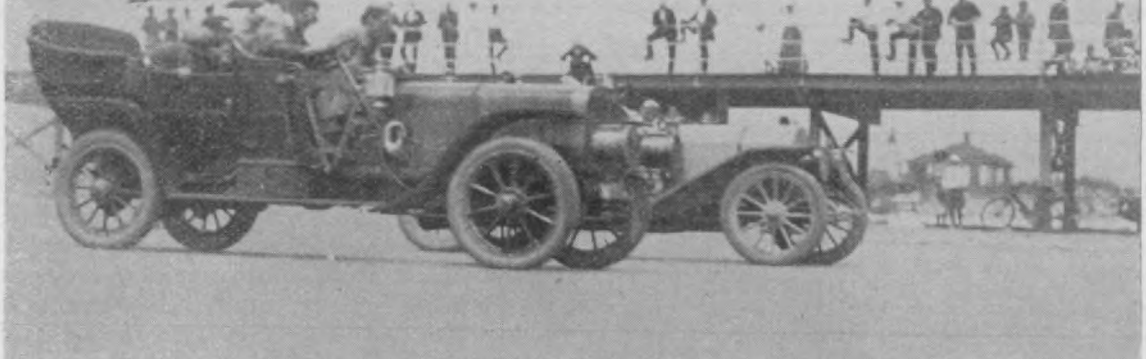

The Stevens-Duryea Big Six which did the mile in 1.06 3-5 at Ventnor Beach, which is 2 seconds faster than the previous record for stock touring cars. The car was fully equipt carried five adult passengers.

FLORAL PARADE.

The floral parade turned out to be simply line-up of cars, as only three of the 36 ars in line were decorated. A Studebaker ar entered by Miss A. T. Nichols and ocupied by four ladies and a driver presented he best appearance.

THE AUTOMOBILE SHOW.

The three days' Automobile Show in the lancing hall on Young's New Million Dollar Pier, a show room with a clear floor space 50 by 250 feet, was well attended and prounced a decided success. The pier was eautifully decorated and there was a good epresentations of the well known cars altho f course the exhibits were not as representative as the mid-winter shows.

Reading Race Meet

The postponed race meet of the Reading Automobile Racing Association was held uly 26 on the half-mile track at the fair rounds. No fast time was made, as a light ain made the track too dangerous for fast riving. Pullman cars won four of the ight automobile races carded, and R-S motorcycles carried off the prizes in the two vents for motorcycles. Summaries:

Half-mile obstacle—Won by J. E. Sellers, Maxell. Time, 0.45.

Two miles for gasoline stock cars—Won by hester B. Smith, Jackson. Time, 3.01½.

Three miles for stript stock cars—First heat on by Robert Morton, Pullman. Time 4.42. Second heat won by J. A. Kline, Pullman. Time, 4.40.

Stock touring car gymkhana—Won by Robert Morton, Pullman.

Three miles for gasoline stock runabouts—First eat won by J. A. Kline, Pullman. Time, 4.37. econd heat won by Robert Morton, Pullman. ime, 4.41.

Three miles for gasoline stock touring cars—Won by William Haggerty, Acme. Time, 4.47.

Two-mile match—Won by Robert Morton, Pullman; second, W. E. Smith, Ford. Time, 3.26.

Milwaukee Hill Climb

Milwaukee Automobile Trade Association best performance of the day. Seven o eight events were on a price classific basis and one was a free-for-all for a tr donated by the Milwaukee Sentinel.

The first event for small cars was by a Ford runabout in 46 2-5 seconds, it bettered this time by one second in next small-car event. In Class 3, cars ing at $2000 and under, a 22-H. P. B won in 41 2-5 seconds. A 35-40-H Rambler won in Class 4, cars listing $3000 and under; time 35 2-5 seconds, w was the best time for four-passenger t ing cars. The same car and driver wen in 33 2-5 seconds in another event. A f cylinder Jackson went up in 30 4-5 in free-for-all and a Wayne did it in 32 1

Creditable Performance

The recent performance made by the more car driven in the Glidden tour by Becker is very noteworthy, and goe demonstrate the correctness of the two-c principle. The car entered by Mr. Be was a 35-horse power two-cycle Elm and previous to leaving Cleveland all p of the car were sealed, so that no rep or adjustments could be made without br ing a seal. He reached New York Cit the finish of the 1600-mile contest wit seals still intact. After the car finished contest it was turned over to the New Y agents, who ran it around New York, ering about 500 miles. The car was run to Philadelphia, where it was used Gawthrop and Wister, local agents for Elmore car, for demonstration purpo covering about 400 miles. The car shipt back to the factory with all seals intact, having traveled, it is claimed, i about 2500 miles without adjustment.

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Supreme Court, sitting in New York which places all cases of alleged ing under the local ordinance, which les for a fine of not more than $10, to have aroused a great deal of in- Some of the anti-automobile papers have been crying loudly for jail sen- and large fines, seem much perturbed the reasonable penalties which are to licted on drivers who forget they have peeds on their cars. It appears prob- that the Board of Aldermen will pass regulations to conform with Justice 's decision. Anticipating this fact, De C. Morrell, the acting chairman of the Committee of the New York Auto- e Club, has written a letter requesting representatives of the club and of the try generally in New York city be given pportunity to appear before the Board. New York A. C. is anxious to see a city ordinance enacted which shall be basis of reckless driving rather than f which a definite rate of driving shall e keynote. It is held that if this is reckless drivers will be the sufferers hands of the police, while drivers who sing due care will not be held to un- nable and foolishly slow speeds.

A. A. Legislative Board Reports

a recent meeting of the A. A. A. Ex- e Committee, Charles Thaddeus Terry a report for the Legislative Board. e Legislative Board has kept in touch the legislative situations in the various s, to whose legislatures statutes relat- o automobiles were presented at their sessions. While the general trend of ation, as gathered from the data col- , seems to be in the direction of rea- leness and a somewhat larger degree irness than heretofore, and to show what of abatement of the unreasoning several States as to indicate an imperative demand for one of two things, to wit: either (1) the speedy enactment of a Federal law covering the field as far as may be; or (2) the enactment thruout the States of a uniform automobile State law framed upon the model of the best of the present State laws, with improvements thereon if possible.

The Board is prosecuting its work along both of these lines and seeking the earnest co-operation of the individual members of the Board to those ends. It will be remembered that the Board prepared and introduced in Congress at its last session a bill providing for the Federal registration of automobiles, and that it is the intention of the Board to press that bill to passage if possible at the coming session of Congress.

The Board asks that a copy of the draft of the uniform State motor vehicle law in its final and approved form be sent to each member of the Board with the request that such member, in case the legislative situation in his State is such as to make it feasible, have the bill introduced into the Legislature of his State, and use his energetic efforts to secure its passage and signature by the Governor of his State.

Morris Park 24-Hour Race

An important announcement has just been made regarding the track racing situation in New York. There has been formed, for exploiting track racing, the Morris Park Motordrome Club, with headquarters in the Times Building. Recognizing the fact that both the public and the trade are much interested in 24-hour races, and because of the failure of the promoting company to secure the Brighton Beach track for another 24-hour race, the Morris Park Motordrome Club has announced a race of this kind to be held on the Morris Park track, together with interesting programs of short races, on September 6 and 7.

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Considerations of Motor Car Elements

HUGH DOLNAR.

(The name of the writer of these considerations is well known to our readers as a describer of new cars, and his extended experience as a machine designer and constructor gives value to his deductions and suggestions. Should any of our readers dissent from the conclusions reached in these articles, the columns of the Journal are open to all, in the full belief that free discussion and interchange of opinion is the shortest road to perfection.—Editor.)

High-Class Material in Car Construction

Viewed from the standpoint of "reliability" only, what grade of material should be or must be used in the construction of the best motor car? Is it needful to use chrome-nickle steel and aluminum to the extent now adopted in first-class cars? Should car bodies be made of wood, of steel, of sheet aluminum or of aluminum castings? As to upholstering, the surface of the cushions, curtains, pockets and so on is subject to constant wear from use and cleaning, and there is no question but the best and highest priced material is best, both with regard to elegance and durability, but considerable saving may be made in body trimming by the use of really good and durable material which is what might be termed "best second-class," to finish a body with an appearance of luxury and give a fairly long life at much below first-class total material and labor costs. The sheet steel body is cheapest of all, provided a permanent model can be adopted, since the first cost of material is low, and by intelligent design and expert press and die tool making, the labor cost of such bodies can be materially reduced.

SHEET ALUMINUM BODIES.

Sheet aluminum bodies are much more costly than sheet steel bodies, but can be readily produced by hand in different styles by expert workmen with very few special tools, and thus are often used for special bodies. They are light and fairly strong, and they offer little resistance to blows, being easily dented, but fortunately can easily be put into shape again. This class of body is not as commonly used as formerly.

Cast aluminum bodies are costly, are difficult foundry productions, but are extremely good and durable when of correct design.

WOOD BODIES.

Wooden bodies are made at all prices, and of all degrees of goodness and badness, from the flimsy excuses that begin to show cracks in the salesroom to the highest examples of the coach builders' art, which must be made of selected woods by expert workmen, after being carefully designed. They are very costly and extremely durable.

SHEET STEEL BODIES.

For the cheapest and the moderate priced car bodies, which will soonest appear in final or standard forms permitting the fullest use of machinery in production, sheet steel seems certain to have large employment. For the highest class of work in tonneau and limousine bodies, cast aluminum would be cheapest and best if designs could be repeated, but if the design must be varied to suit individual purchasers, wood is the only available material. A first-class wooden limousine body can be furnisht to the customer for about $2,000.00, the body "in the white," as it leaves the woodworker's hands, costing about $600.00.

Considering the chassis only, can a thoroly good and satisfactory car be made of ordinary steels, with grey-iron instead of aluminum castings, a steel casting or bronze casting front axle in place of a no-weld drop-forging, and a grey-iron crank-box and gear-box, or is it absolutely indispensable that chrome nickle steel and aluminum and high-grade bronze castings should be used at all points?

Chrome nickle steel oil-tempered is very strong, and offers the greatest resistance to wear. It is also very costly in the rough, is very hard to work and is extremely destructive to both dies and cutting tools alike.

Machine steel is a very cheap and abundant material, soft, not very strong, and offering little resistance to distortion by shock. But machine steel is easily worked and can be cheaply stiffened by expert case-hardening and by skillful designing can be used in many places with very good results.

As to aluminum, there is a famine in the land. The one company which is the principal or only supplier of aluminum to the motor-car trade, is now adding a $5,000,000.00 extension to its Niagara Falls plant, which will help, but for 1907 the aluminum supply will govern the production volume of more than one builder of high-grade cars.

Motors on Springs

All car motors are heavy; a 4-cylinder motor weighing anywhere from about 425 lbs. upward, according to the size. If the motor-base lugs reach across and hang on the top edges of the chassis frame sides then sudden movements of the car on rough roads can place severe stresses on the side frames.

To obviate this difficulty and relieve the frame, some makers are introducing springs between the engine and frame.

Where a sub-frame is used for carrying the motor the sub-frame itself is commonly of angle steel, not very heavy, and acts as a very stiff spring in transferring the motor-weight shock to the cross-girts and chassis frame, so that with the sub-frame there is some elasticity in the motor support without introducing springs directly under the motor-base lugs.

The Menges car-motor has 3 long lugs on each side of the aluminum motor base, nearly filling the width between the chassis side-frames. The side-frames themselves have fixt to their inside 3 brackets each,

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located to suit the motor-base lugs. The two middle base-lugs sit on coiled springs which rest on the middle frame-brackets, while the four end-lugs have coiled springs above as well as below, the lower springs supported, of course, on the side-frame brackets. The bolts which pass t!.ru the frame-brackets and base-lugs have globe-washers under their nuts.

This carries the entire motor on its own springs and so wholly avoids the possibility of any hammer and anvil effect between the mass of the motor, about 600 lbs. weight, and the side-frames.

Altho the vertical movement of the motor on these supporting springs is very small at the ends and hardly more than a mere rocking on the middle lugs, a cushion is a very different thing from a rigid anvil, and almost wholly negatives the destructive effect of a blow, even tho the cushion is but slightly deprest.

Where heavy weights are to be carried on a moving structure of the lightest construction compatible with reasonable expectation of safety, every possible shock alleviation by spring cushioning is of very great value, and the spring-location of most efficiency is between the heavy mass itself and the first of the light supporting members of the chassis frame, as this directly weakens the effect of the blow of the mass unit.

If these assumptions are correct, then the carrying of the motor on local springs permitting limited motion in all directions is sound engineering practice, likely to show to very great advantage in the rough-road work of heavy cars.

The motor supporting springs should have as much flexibility as is compatible with a sufficiently stable motor-support when placed under normal compression, and in well considered forms, as shown in the Menges car it seems that carrying the motor spring supported should make for long life of the chassis frame and the front springs, elements which are among the first to fail when cars are driven rapidly over rough roads.

SPEEDOMETER DRIVING.

Why or how any one ever took up the plan of driving the speedometer from the front wheel hub passes all comprehension. The front wheel is now invariably used for steering, and there is no way to avoid either a universal joint or flexible shaft, if the speedometer drive is taken from a front wheel. The result is a flexible shaft in a flexible brass casing, leading from the speedometer on the front-board to a front-axle bracket with a spur gear and pinion running in the dirt inside the front wheel. All this looks very bright and nice in Madison Square Garden, but is not at all delightful when the flexible shaft goes adrift and winds up on the front wheel hubs with the end tangled up with the axle bracket and nearly puts the car into the ditch.

The writer does not know of one single speedometer flexible shaft that went thru the Glidden Tour in good shape—no matter who the maker was, the speedometer was not in business on any car noticed at Jersey City. Some of the flexible shafts went out of business the very first day, between Cleveland and Toledo, and more the next day, when the cars were all hub-deep in the mud out of Toledo.

The writer saw a design for a speedometer driver, made since the end of the Tour, in which the power was taken from the line shaft and carried forward with plain shafting and gearing, no flexible shaft, to the speedometer on the front board. Some of the French cars drive the speedometer from the line shaft. All chain drives to the rear wheels can have the speedometer driven from the counter-shaft, and all bevel gear drives, where there is but one ratio of gearing to the rear axles, can drive the speedometer from the line-shaft at the rear of the gear-box, without trouble. Where the speed change gear is in the rear axle gear housing, so that there is no fixt ratio between the line-shaft speed and the rear axle speed, the drive for the speedometer could not well be taken from the line shaft.

One thing is sure, however, and that is that no arrangement yet offered in which the speedometer is driven from a front wheel thru a flexible shaft, will stay in place thru hard touring. The last Glidden Tour made that perfectly plain and certain.

There is no real objection to taking the speedometer drive from one of the rear axles, tho there is plenty of opportunity for lucid thought and correct reasoning in designing an ideal speedometer drive, especially as it must contain a speed change that will permit variations of ¼ inches in wheel diameters.

For the plain bevel gear and side chain drive, which are yet almost the only forms used, there is no trouble at all about driving the speedometer from the line-shaft or the counter-shaft, and so enclosing the whole speedometer drive, and making something that can be relied upon.

A speedometer could probably be sold for less than the price now demanded if it was not for the trouble made by the drive, the gear and pinion on the front wheel and the flexible shaft.

The speedometer is a necessity, and it is of great importance that it should be reliably driven, and there is an opportunity to show a lot of good judgment in selecting the initial pont of driving and arranging the wheel diameter changes and compensations, between the initial point and the speedometer on the front-board.

The rear axle is the only initial point that fills all conditions, and perhaps is the best place to begin.

Marvel Automobile Co., Detroit, Mich., has filed a petition in bankruptcy. The three largest creditors are Milton Mfg. Co., $532.86; Long Mfg. Co., $1333.25, and the Class Journal Co., $591.65.

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Trade Changes

Auto Goods Company, of Boston, Mass., has removed from room 410, 60 State street, to 95 Milton street.

American Motor Car Company, Indianapolis, Ind., has filed notice of increase in capital stock from $25,000 to $100,000.

Appeal Mfg. and Jobbing Co., Los Angeles, Cal., has removed from 940 South Main street to 631 South Los Angeles street.

Blue Ribbon Horse and Carriage Company, of Bridgeport, Conn., has been succeeded by the Blue Ribbon Auto and Carriage Co.

Coleman, J. C., of Detroit, Mich., manufacturer of steering wheels for automobiles and motorboats, has removed his factory from 234-238 Jefferson avenue to 58-60 First street.

Electric Storage Battery Company, of Philadelphia, has removed its San Francisco sales offices from the temporary location at 11 Hawthorne street to the Crocker Building, that city, where they will be permanently located.

Hercules Auto Specialty Mfg. Co. informs us that the Chicago end of the business, with offices at 115 Dearborn street, has been incorporated for $100,000, full paid, with fololwing officers: J. Arthur Scott, president; G. N. Scott, vice president; D. W. Russell, secretary and treasurer.

Hartford Auto Parts Company, of Hartford, Conn., has increased its capital stock from $1 to $35,000.

Lear, Oscar, Automobile Co., Columbus, O., has increased its capital stock from $200,000 to $250,000, and changed its main place of business to Springfield, O.

Monarch Motor Car Company has removed from Franklin Park and Chicago, Ill., to Chicago Heights, Ill.

Marion Motor Car Co., of Indianapolis, Ind., has increased its capital from $25,000 to [illegible]

Morgan & Wright's Atlanta, Ga., branch has changed its location from 49 South Forsyth street to 92 North Prior street.

Matheson Motor Car Company, of New York, on September 3, will be succeeded by Palmer & Singer Mfg. Co.

Rubber Paint Company, of Chicago, Ill., has been succeeded by Adams & Elting Company, of that city.

Royal Motor Car Company, Cleveland, stockholders on August 3 voted to increase the capital stock from $500,000 to $1,000,000.

Standard Detachable Rim Co., manufacturer of the Ruff detachable rims, has removed its headquarters from 42 Broadway to 1876 Broadway, New York.

Sartus Ball Bearing Company, of New York city, has changed its address from 155 Spring street to 99 Chambers street.

Shoemaker Automobile Company, Freeport, Ill., has increased its capital from $100,000 to $[illegible]

Triumph Motor Car Company, Cragin station, Chicago, Ill., factory, machinery and equipment purchased by Bendix Company, of Chicago.

Turner Brass Works has removed from 65 Michigan avenue, Chicago, Ill., to Sycamore, Ill.

Victor Auto Tire Repair Company, of Passaic, N. J., makers of the Victor inner tubes, has changed its style to Victor Auto Tire and Repair Co.

Ventilated Cushion and Spring Co. has removed its main offices from 2014 Fisher Building, Chicago, to Jackson, Mich.

Fires, Judgements and Failures

Aerocar Company, Detroit, Mich., three creditors filed petitions in bankruptcy, liabilities amount to $250,000.

Bullard Automatic Wrench Co., of Providence, R. I., attached for $25,000.

Davis, Albert A., proprietor of a San Bernardino (Cal.) garage, filed petition in bankruptcy. Liabilities, $6162; assets, $4592.

Duer Auto Company, 24 Richmond street, Providence, R. I., damaged by fire, caused by explosion of gasoline.

Garrett, Timothy, garage, 70 Penfield street, Roslindale, Mass., damaged by fire.

Grout Automobile Company, Orange, Mass., trouble has been temporarily patched up, and the factory will soon be in operation.

Hirsh, F. P., Tower Hill, Ill., garage and repair shop, totally destroyed by fire August 6; insured.

Knox Automobile Company, of Springfield, Mass., outlines plan for reorganization. This plan is to issue preferred stock at 8 per cent. to cover the present liabilities of the concern, amounting to about $560,000, and then turn the company's present capital of $363,000 into common stock; they would thus have $923,000 capital.

Lockwood & Co. (Frank P.), Merrimac, Mass., fire damaged body factory. Loss estimated, $5000.

McTachern, of West Roxbury, Mass., garage damaged by fire, July 20, to the extent of $3000.

Meyercord Company, Inc. (The), of Chicago, decalcomania manufacturers, fire visited their plant, entirely destroying one building. Plans have been completed for the rebuilding on larger scale.

Mack Bros., 532-540 Atlantic avenue, Brooklyn, N. Y., garage totally destroyed by fire. Loss estimated at $110,000.

Pitt, Walter H., and Berthold Lienhardt, individually and as members of the firm of Pitt & Lienhardt, were duly adjudicated bankrupts on June 25.

Pennsylvania Electric Vehicle Company, Philadelphia, Pa., a petition for the appointment of a receiver has been filed.

Safford, W. F., Manufacturing Co., manufacturers of motor boats, Westerly, R. I., have been declared bankrupt.

Shreveport Automobile Company, of Shreveport, La., destroyed by fire July 29.

St. Louis Motor Car Company, of Peoria, Ill., bankrupt, $95,000 of the $120,000 indebtedness of the St. Louis company has been purchased at 25 cents on the dollar on all bills outstanding and payable to the company. If the remainder is acquired the bankruptcy proceedings will be discontinued.

University Garage, on Olive street, New Haven, Conn., damaged by fire.

Western Motor Car Company, Sacramento, Cal., fire of unknown origin entailed a loss of about $1300.

Willis, E. J. Co., 8 Park place and No. 231 West Fifty-fourth street, New York, has made a settlement with creditors at 30 cents on the dollar, payable 15 cents cash and 15 cents in two notes at four and seven months, secured by a deed of trust of the capital stock of the company.

Legislation

MICHIGAN.

Leudington.—Council recently established a speed limit of six miles an hour.

The new law which went into effect June 28 is different from that which preceded it. One of the chief changes is that motorists must pay an annual license fee of $1 instead of $2 for a perpetual license. Also license numbers must be displayed on both front and rear of cars.

The secretary will issue each year a directory of all licensed automobile owners, to be furnished gratis to city or town officials and licensed motorists. The law also provides for the punishment of persons taking a machine without the owner's permission.

INDIANA.

Indianapolis.—City Council has passed an ordinance prohibiting the use of blinding searchlights on motor cars within the city limits, with the exception of the police emergency car, which is allowed to retain its powerful light.

Automobile Club of America Begins To Redeem Bonds

August the first, three months after the opening of the new club house and garage of the Automobile Club of America, $20,000 of the second mortgage bonds were redeemed and cancelled.

Much satisfaction is exprest among the members at this evidence of the club's stability and progressiveness, and the governors are now planning to have at an early date in the fall a meeting of the club members for the purpose of burning the cancelled bonds.

Further blocks of the bonds will be redeemed at short intervals.

The membership of the club is increasing very rapidly and before the close of the year promises to reach the 2000 mark.

Word comes from London that the expected change has been made in the regulations governing the Tourist Trophy contest and the Royal Automobile Club has definitely decided to abandon the contest on the Isle of Man. Instead of this the Tourist Trophy will be contested for in a 1000-mile road test, finishing up with speed and scientific trials on the motor racing track at Brooklands.

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Columbia Electric Transmission for Gasoline Cars

HUGH DOLNAR.

NOTE:—The Columbia Gasoline-Electric Car, built by the Electric Vehicle Co., Hartford, Conn., was briefly described page 125, March 1907, and we now present to our readers a detailed description of the electric transmission itself.

The object of this electric transmission is to transfer the power of the motor car gas engine to the car driving-wheels so as to turn them at varying speeds forward or backward, and also to provide an electrical brake which can be used at any speed of the car when moving in either direction and, finally, to supply a coasting resistance, which will prevent the car from running either forward or backward down any incline not too steep to permit wheel-adhesion control of the movements of the car.

SPEED CHANGES.

As is well known, the whole round of mechanical speed-changing devices, including toothed gearing in the sliding gear and the planetary assemblages and friction drives in the form of belts, friction-disks and friction-wheels, has been tried and is now in use in motor cars. The planetary gear changes are effected by friction selection, as are some forms of always-engaged toothed speed-changes. In other forms of toothed-gear speed-changes solid-jaw clutches are used, which cannot be engaged with each other save in certain positions. The friction disk and friction wheel can always be disengaged and engaged, but every change causes some loss of time, during which the motor drive is mechanically interrupted, this being true of all the forms used, thus greatly decreasing the hill-climbing power. It is wholly within the bounds of truthful statement to say that no form of mechanical speed change and control is satisfactory, every arrangement of this kind so far shown having serious faults of its own which cause loss of power, waste of time and constant up-keep costs.

The electric transmission, it is claimed, avoids all these generic faults of both the toothed gear and the friction motor-car speed-changes and control effects because (a), electrical speed-changes can be made instantly, regardless of the relative positions of the mechanical parts (b), because electrical speed-changes in both velocity and direction can be made with no losses due to either friction, inertia, or momentum, and (c), in case of retarding or brake effects, well known to be most destructive to all forms of mechanical brakes when used on long hills, the electric resistance is ideal, since it involves no mechanical contacts and hence does not include the possibility of either excessive heating or abrasion, and so inflicts no injury of any kind on any part of the mechanism of the car.

The two advantages of electric transmission of commanding importance are, the possibility of instant application and the entire avoidance of losses by the friction of gear-teeth or of frictional engagement.

ADVANTAGES OF INSTANT APPLICATION.

It is well known that a good driver can increase his speed by repeated journeys over a given course, because as he learns the road he knows in advance exactly what his car can do on every rise and descent and in every stretch of mud, sand or rough surface, and can have his gear in its most suitable change before arriving at the point where this change must be used to make the car do its best.

On a strange road the driver, even tho very skillful, must always be surprised by unexpected conditions. It is a very common event for a driver to attempt a hill-climb at a too high rate, and then to fail in making the required gear-shift and so take much more than the least possible time of his car in ascending this particular hill.

Again, a car often begins to run down a steep hill in spite of all a driver can do, or in case the brakes do hold the car safely down the hill, they are found to be destroyed by heat and cutting when the descent is completed.

But if a driver can certainly make any speed-change instantly at any time, regardless of relative positions of his speed-changing elements, he is most effectually guarded against surprises of any and every description, since he can suit his car to any kind of road conditions as soon as these conditions are perceived, without causing the drive to let go of the car for a single moment. This possibility of instant speed-change, with no loss of time and no stoppage of driving effect, enables the driver to give his car the nearest approach to a uniform speed that his motor power permits. With all mechanical-control changes there must be stoppage of action, but the electric transmission never lets go of the car.

YIELDING ENGAGEMENT.

The electric transmission is not rigid, altho it is perfectly reliable; it has a fixt and constant slip, which cannot be exceeded, so that there is never any failure to drive, such as is caused by the undesired slip of a mechanical clutch.

This constant slip prevents any engagement shock, and permits the heavy field, fixt to the engine crank-shaft, to be driven at maximum speed at the time of making changes in rate, without injury to the mechanism. In hill climbing the car can be permitted to coast to the foot of the incline while the engine is running free and reaching its highest speed, giving the flywheel field its greatest momentum, and then for ascending the incline, this full maximum engine effect can be at once applied to the car-drive with no shock or injury, the yield-

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ing engagement avoiding all danger of breakage.

POWER LOSSES BY TOOTHED AND FRICTION GEARS.

These are well known to be enormous in all toothed gear and friction motor-car speed-changes, so that the draw-bar pull of the best motor cars, that is to say the power actually expended by the driving-wheel tires on the road surface to push the car forward, is never more than a small fraction of the horse power developed by the combustion of the fuel in the motor cylinders.

Motor friction may be regarded as the same with all transmissions, since any motor may be used to drive either a toothed gear, a friction gear or an electric transmission gear, hence whatever friction losses can be avoided by installing the electric transmission must be regarded as pure gain, with no draw-back save that of journal friction caused by the added weight due to the electrical installation. This added weight is only a very few hundred pounds at the most, and as it is all carried on ball-bearings and is all in perfect standing and running balance, with no side thrusts whatever, the frictional power losses and consequently the mechanical up-keep charges must be extremely small with the electric transmission.

ELECTRICAL TRANSMISSION METHODS.

Prior to the inventions of Mr. Justus B. Entz in electrical transmission, the only known method of electrically transferring the power of a prime mover, as a water-wheel, a steam-engine or a gas-engine, was to make the motor turn either the field or the armature of an electric generator and apply the electrical current thus generated to the turning of electrical motors which were made to produce the desired useful effect. Where the electrical current generated by the work of the prime mover is to be used directly, as for lighting or for electrical furnace work, this method is very largely used to transmit the power of water wheels to considerable distances, as well as for the local distribution of electrical current to obtain power by driving motors. This same method has also been applied to some extent in motor-cars to avoid the use of storage batteries.

ESSENTIAL ELEMENTS.

To electrically transmit the power of a gas engine to a toothed pinion and so make it turn the driving wheels of a motor car, an electrical "field" can be fitted in place of the ordinary fly-wheel rim and made to surround an "armature" which the field does not touch, but which field, when revolved, will cut the lines of "magnetic force" between the field and the armature and so generate an electrical current. This generation of electrical current takes place at a low speed of the field if the armature is held from turning, or with a small difference in the relative velocities when the armature movement is resisted so that the armature does not turn so rapidly as the field revolves, and the first step taken by Mr. Entz was to apply such a field in place of the engine fly-wheel and make this field surround a generator armature, the shaft of which was connected to the driving pinion of a motor-car rear-axle. This constitutes an electrical transmission in its simplest form and might be made to take the place of the ordinary motor-car clutch to transfer the power of the gas engine to the pinion shaft, but would give a direct, high-gear drive only, with no low-gear or other speed-changes save such as were due to engine speed and no brake effect except to retard the car in coasting backward, leaving the car free to coast forward and with no electrical brake when the car was moving forward, either by gravity, by momentum or by the power of the motor, so that this simplest form of electrical transmission would be of no practical value. Besides the functional deficiencies specified, the excess speed of the field turned by the engine above that of the armature, which is necessary to cause the generator armature to revolve, generates a certain quantity of electrical current which must represent a power loss with this simplest form of electrical transmission, because the transmission as described cannot use the by-product current generated in useful turning effect on the pinion shaft.

Hence the next step was to apply an electric motor armature to the generator armature shaft, between the generator armature in front and the driving pinion in the rear, and this motor armature, provided of course with its necessary coacting stationary field, enabled the current generated by the relative travel differences of the generator field and the generator armature to be used to help in turning the pinion shaft.

This electrical motor applied to the driving-pinion shaft is given two separate windings, which can be placed in series or in parallel, so that the same quantity of current can be made to turn this motor with more velocity and less torque, or with less torque and more velocity, and a small "exciting" battery is supplied to excite the generator field and make it more quickly effective.

Lastly, to obtain a low-speed reverse drive, the pinion shaft was cut in two between the motor armature and the generator armature, and a solid-jaw clutch was placed so as to clutch the two parts of the pinion shaft together and make them turn as one when the forward clutch member was forced to the rear as far as possible, or to wholly separate the parts of the pinion shaft, when the forward clutch member was moved as far forward as possible, and at the same time to so interlock this forward clutch member with the chassis frame as to hold the generator armature from turning. This low-speed reverse is not economical of motor power, but as the reverse is very little used low first cost and convenience are the prime considerations.

This cutting the shaft carrying the pinion

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and the motor armature and the generator armature in two, and placing the clutch members as specified, so that at the will of the driver the two parts of the shaft can be connected, or can be separated and hold the generator armature still while the motor armature and its shaft carrying the driving pinion are left free to be turned by the action of electric current supplied to the motor fields, gives the electric transmission all the powers required for the perfect handling and control of the car.

THE CONTROLLER.

To surely and quickly produce any of the desired motor-car driving or controlling effects by the use of a gas engine and the electrical transmission, a controller, arranged to be hand-actuated by the driver, is provided. This controller consists of a small horizontal shaft, carried in suitable bearings located on the inclined upper surface of the fuel-tank, under the driver's seat. The controller has fixt to its shaft a 9-tooth retaining ratchet and a spur pinion. This controller pinion is engaged by a hand-moved spur-gear sector of sufficient radius to give the controller pinion one turn with about 120 degrees of movement of the spur-gear sector, the hand lever part of which rises up through the driver's seat at the right hand so the controller sector can be conveniently worked by the driver's right hand.

Besides this controller there is one mechanical brake pedal which operates when pushed forward, first to electrically disconnect the engine from the driving-shaft and then apply the external, rear-hub-drum, mechanical brakes. Besides this mechanical, exterior brake effect applied by the right pedal, a left pedal when pushed forward, applies the rear-hub-drum, internal, expanding brake-shoes only, producing no other effect.

dition to all of these brake effects, the rearward "sprag" effect is always automatically operative.

The two reverse speeds are obtained by un-clutching the two sections of the pinion and armature shaft, and locking the generator armature so that the whole power of the gas engine is applied to the generation of electric current to supply the electric motor which drives the pinion shaft in the reverse movements.

WEIGHT REDUCTION AND POWER SAVING EFFECTED.

Altho this form of transmission was briefly described in the March, 1907, issue of the Journal, page 125, as many do not yet fully understand its operation, the following detailed explanation with diagrams is given.

The diagrams here reproduced are not intended to represent actual constructions, but the principles only.

The numerals given in connection with these diagrams are chosen for convenience and plainness of illustration and ready comparison, and the same basic values are used in the three diagrams; while the numerals are not exactly those of practice the conclusions exhibited are indisputable.

What was known before the invention of Entz is shown in Figure 1, and represents the principle only as now used for the reverse. The diagram shows the flywheel generator-field as fixt to the engine crank-shaft and surrounding the generator armature, A, which is prevented from turning by the resistance arm. When the engine turns the crank-shaft the whole power is expended in the generation of electrical current, which is conveyed by the conductors to the motor, this motor shaft having fixt to its right end a bevel pinion engaging a bevel gear, the turning of this pinion

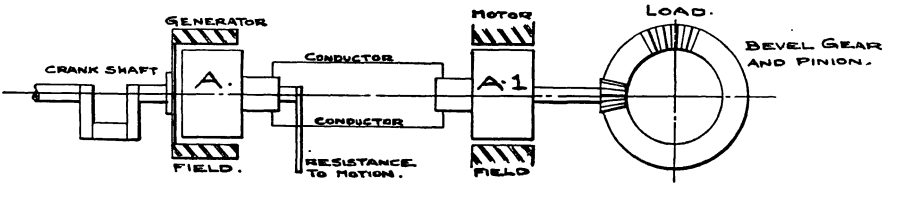

Fig. 1. Generator and motor each 80 per cent. efficiency. Engine 500 R.P.M., 100 torque. Mortor 500 R.P.M., 64 torque. Efficiency 64 per cent.

There is also a third extremely powerful brake effect, produced by placing the controller handle in the braking position, reversing the currents in the electric motor field, so that this motor becomes a dynamo, and gives a sufficiently powerful retardation to bring the car at once to a very low speed. A modification of this effect permits any degree of electrical forward brake effect to be applied to the pinion shaft, so as to regulate the coasting speed of the car to any desired rate without the use of the mechanical brakes, thus controlling the movement of the car while coasting down long hills, forward, without mechanical friction and without injurious electrical action. In ad-

and gear being the load to be overcome by the motor.

The weights required to transmit a certain gas engine power by the mechanical and electrical linkage shown in Figure 1, and the losses and efficiencies resulting from this form of electrical transmission are all well known.

The values chosen are arbitrary selections, but are approximations to results obtained in practice. Assuming the engine to make 500 revolutions with 100 constant torque and the motor and generator to each show 80 per cent. efficiency, 10 per cent. of loss by friction and 10 per cent. loss by electrical resistance, the motor will show

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64 torque with 500 revolutions, which is equivalent to 64 per cent. efficiency and 36 per cent. transmission loss.

As in the case of all far-reaching improvements, the basic modification made by Mr. Entz to reduce the machinery weights and power losses of electrical transmission is extremely simple, so very simple that it can be clearly shown in a single diagram, as Figure 2.

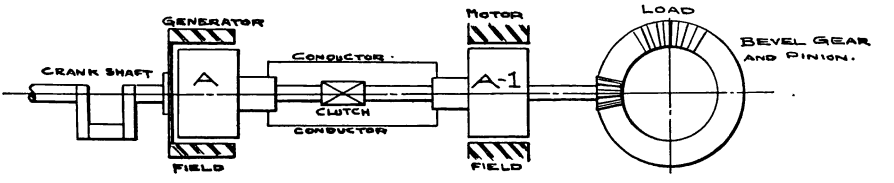

Fig. 2. Reduced speed. Engine 1000 R.P.M., 100 torque. Motor 500 R.P.M., 164 torque, efficiency 82 per cent. Exactly the same electric output from generator to motor, same speed differences, but 2½ times the output for the same weight and same machine as in Fig. 1.

Fig. 2 has precisely the same parts as Fig. 1, but the form of generator armature resistance is changed from that of an arm to resist the generator-armature rotation, to the prolongation of the generator shaft and the mounting of the motor-armature on this shaft-prolongation, with the bevel pinion, representing the work, at the right, as before. The conductors from the generator-armature to the motor armature are retained and the new effects gained are two (a), the driving of the bevel pinion principally by the torque of the generator armature on its shaft and (b), the driving of the electrical motor by the current generated by the excess of the generator-field revolutions over the generator-armature revolutions.

power that is efficient in overcoming the work resistance, whereas in Fig. 2 the electric motor is called upon to transform only a small part of the energy developed by the gas engine from electrical current to mechanical movement.

Not only is the mechanism made much lighter and cheaper by the changes shown in Fig. 2, but the efficiency is enormously increased, so that assuming 1000 engine revolutions with 100 torque and giving the electric motor and the bevel pinion 500 revolutions as before, the total torque of the armature and pinion shaft must be 164, composed of the 100 torque assumed and the 64 torque due to the driving effect of the electric motor which is driven by exactly the same electrical output as in Fig. 1, where the generator field had 500 revolutions more than its stationary armature, same speed difference as in Fig. 2. This places the efficiency at 82 per cent. for Fig. 2 as against 64 per cent. for Fig. 1, while Fig. 2 can transmit 164 torque as against only 64 torque in Fig. 1.

Various effects, subsequently specified, are produced by different applications of electric current to the electric motor, placed

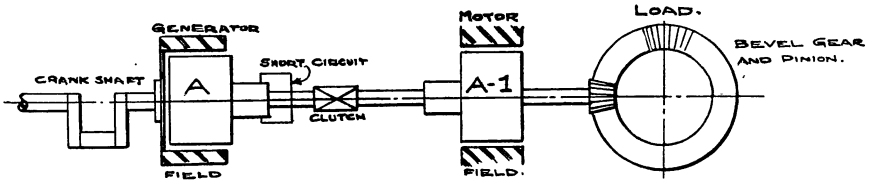

Fig. 3. The clutch generator short circuited on itself. High speed direct drive. Engine 1000 R.P.M., 100 torque, shaft 950 R.P.M., 100 torque, efficiency 95 per cent. No current thru motor. No external electrical work. Output three times that of Fig. 1.

This gives the bevel pinion representing the load the full combined torque of the engine and the electric motor, which is over 2½ times the power transmitted in Fig. 1, and this increased effect is gained without any loss to offset the gain in power transmitted, but the engine must be run at twice the former speed, thus generating more power, so as to give the crank-shaft 500 turns more than the generator armature, the same as it has in Fig. 1, where the armature is held stationary.

Thus in Fig. 2 by far the larger part of the power is transmitted mechanically thru the armature shaft itself, while the electric motor has only a small part of the total work to do, and can therefore be very much smaller, lighter and less costly than if it had all the work to do as it has in Fig. 1, where the electric motor transmits all the

as shown in Fig. 2.

Fig. 3 is the same as Fig. 2, save that the generator armature is not wired to the motor armature, but is short circuited upon itself. Supposing the engine to make 1000 revolutions, 100 torque, then the generator armature will make 950 revolutions, because of the 10 per cent. electrical resistance of the generator. This gives 95 per cent. efficiency, since there is no torque loss, consequently the bevel pinion will be given 950 revolutions, 100 torque, with no current thru the motor, no external electrical work, and with a power transmission capacity 3 times as great as that of Fig. 1.

Hence it appears that if Fig. 1, representing the state of the art prior to Entz, has an efficiency of 64 per cent., Fig. 2, representing the Entz first modification, has 82 per cent. efficiency while the second modifi-

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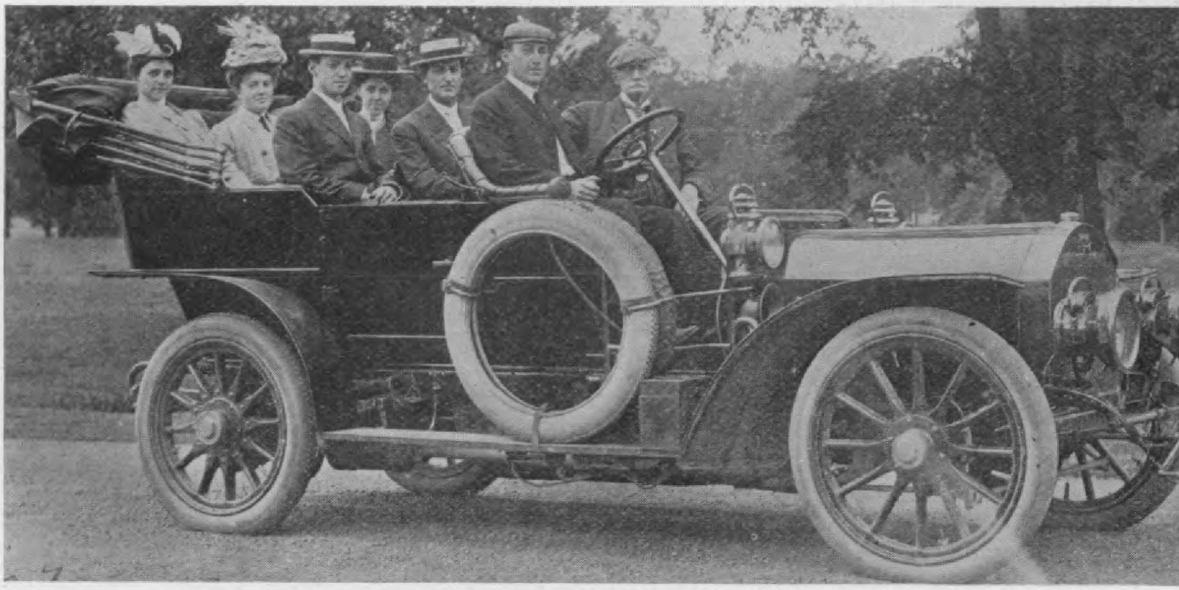
rect drive with 95 per cent. efficiency.

In the diagrams one motor only is shown, but in practice it would be necessary to use more than one motor in the system shown in Fig. 1 in order to obtain the necessary number of speed changes. In the Entz system the motor armature has two windings. Five forward speeds are obtained in all of which the full engine torque is transmitted directly to the driving shaft, the same as shown in figures 2 and 3 which exhibit two of the five forward speed variations, other variations being obtained by placing the motor armature windings in series or parallel, and by shunting the fields of the generator and motor. As the controller passes to each higher speed position the torque which the motor adds to the driving shaft is reduced, and also the counter electro-motive force or electrical back pressure developed in the motor is reduced, thus requiring less speed difference, or slip, between the generator field and armature to overcome it, until in the fifth position there is no counter electric motive force to be overcome, and the only speed difference between the generator field and armature is that required to overcome the electric resistance of the generator circuit. This slip or loss of speed only reduces the maximum speed of the driving

If it is wished to slow up while cending a hill to take a bad wate it is only necessary to slacken the spe the engine by a partial closing of the t tle. This slows down the field to a below that of the engine, all generati current and clutching action ceases an car drifts, or coasts, over the obstru Upon opening the throttle the engine s up without any load being imposed up until it reaches a speed greater than of the driving shaft, at which point ge tion of current and the clutching actio gins, but with a quick opening of the t tle the engine may speed up to one o hundred revolutions faster than the dr shaft before it is fully loaded, thus gi augmenting the momentum of the gene field which is equal to that of a 350-lb wheel, which, when applied by elastic cl ing effect, pulls the car up to full again at a surprisingly rapid rate, more rapidly than is possible in a car any form of mechanical transmission.

The fact that all clutching action c when the driving shaft is turning faster the engine, produces the same effect as of a coaster brake on a bicycle, and on grades the engine is allowed to run s under control of its governor while th coasts with absolute freedom and sile



Columbia Electric Vehicle Company's 1908, 7-passenger Electric Transmission Touring car, c trol side. Note absence of brake and gear shift levers.

The specifications are: Wheel-base 124 ins., gage 55 ins., Electric Transmission, 5 forw speeds and two reverse speeds. Electric brakes for all speeds forward and backward, also elec down-hill hold-back in both directions, which does not slide the wheels, but holds the car t speed of one or two miles per hour. Powerful exterior and interior rear-hub brakes are provi pedal actuated, for use if the electrical control should be absent.

The motor is 4, vertical, 4-cycle, water-cooled 5½x5½-inch cylinders. The body is a side trance tonneau, doors swinging to rear, for 7 passengers, two on revolving chairs in front of tonneau seat. The tonneau is extremely wide, giving ample room. Weight about 3900 lbs., ta filled. Price $6500, including 5 lamps, batteries, horn, ammeter, mats and tools. Cape top ex

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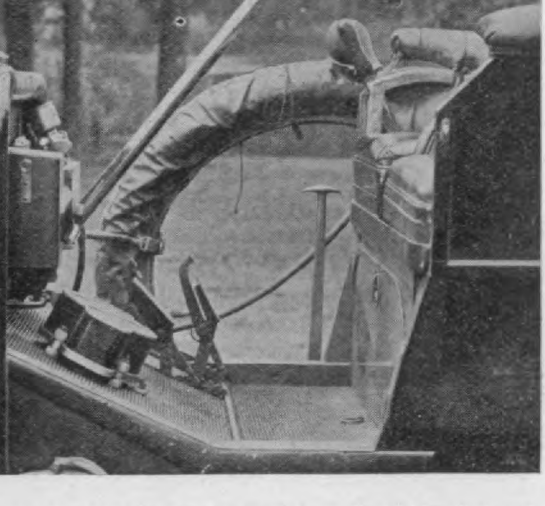
possibility of injury to the apparatus.

CONTROL.

he spark and throttle levers are on top he steering wheel. The left large pedal ies the external, ordinary, rear-hub-n brakes, and the right large pedal ap-s the internal expanding shoes to the e drum. These are mechanical brakes ordinary action. The small horizontal al is the accelerator and opens the throt-when deprest. The throttle is normally er governor control. A small, vertical-uided, hand-worked slide which stands ow position when the clutch is engaged, in high position when the clutch is dis-aged and the generator armature is held ionary, all as in the diagram Fig. 1, is ted outside the car body, at the driver's



ntrol levers and pedals of 1908 Columbia tric Transmission Touring Car. Description in

t hand. All electrical changes are made placing the controller handle in 9 differ-positions, retained by a 9-tooth ratchet, to the controller shaft, which is engaged a spring-actuated roller-pawl. The con-ler handle in the extreme forward posi-gives high speed, diagram Fig. 3. Next tion to rear gives a reduced forward ed, with the motor armature windings in llel, and a weakened motor field. Sec-position to rear gives third speed, mo-windings still in parallel. The third tion gives third, yet lower forward rate, ling in parallel, motor armature wind-in series. The fourth position gives speed forward, winding in series, gen-or field weakened by a shunt. The sixth roller handle position is the neutral, no

tion to accompany the driver of a Columb car fitted with the Entz form of Electr Transmission in the 1907 Glidden Tour wa accepted, the writer joining the car a Cleveland and continuing from Clevelan to Toledo, South Bend, Chicago, Sout Bend, Indianapolis, Columbus, Canto Pittsburgh and to within about 25 miles Bedford Springs, where long hills entaile low-speed work and failure to open ventila ing doors caused some of the soft-solderin of the motor armature retaining bands give way, causing a short circuit, which pu the car out of the tour. The distance co ered was something over a thousand mile and was made with absolutely no mishap delay at all due to the electric transmissio

On the run of July 10, Cleveland to To ledo, 121 miles, there was only one plac rule in force, disqualifying any car passin the leader, or chairman's car, except in cas the leader was disabled. The running rul forbade racing and obliged a leading ca to give room for passing when requeste Under these rules the cars which had spee and hill-climbing power took precedence they pleased, and as the dust was very ba indeed the cars which could do so we ahead and picked individual positions fo themselves, clear of the dust clouds.

It very soon became evident that the Co lumbia Electric could take any position th was desired, and that, greatly to the ob server's astonishment, it could pass an thing overtaken when climbing a hill.

The lighter cars which could keep out our way on the level were passed easi when going up hill, and it came to be ou regular practice when we wanted to pass make the attempt on an incline, the steepe the better for us. The driver's method wa to run the car down hill coasting, with th governor holding the throttle at low fu supply and the generator over running i field, so the coast was made with almost resistance; when the car began to climb th next hill the accelerator pedal was depres thus giving the motor high speed, and soon as the generator field, which takes th place of the engine fly-wheel, overran i armature the car would invariably accelerat no matter how steep the rise was. It wa only on long hills and over bad roads th low gear was used, and the Cleveland-To ledo run was made on high gear almost quite exclusively, the road performance b ing ideal.

Toledo to South Bend course, 166 miles, was covered after a heavy ra in the night and this day's work include miles together of deep mud, where all th

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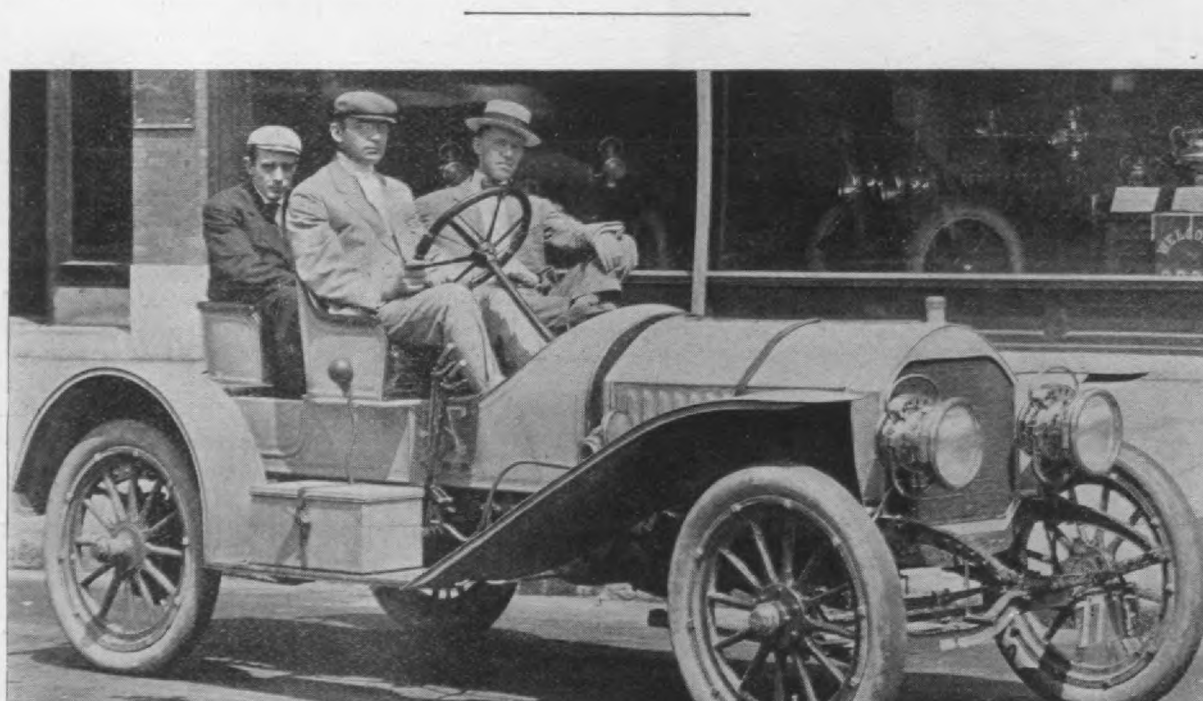
hich should not have taken more than a uarter of an hour at most, but which, thru arious mishaps, including the dropping of bolt down past the cam-shaft into the ank-box, forcing the pulling down of the l-basin, and then a long delay in timing e commutator, occupied about five hours. Then we were finally right we flew over the miles to Chicago at a fast clip, but were eavily penalized for our delay, which had othing whatever to do with the electric ansmission.

Pittsburgh to Bedford Springs, 97.2 miles, as over long hills with stony roads and ater breakers. The car was stopt on a ood stretch of road and refused to start gain.

A roadside inspection led to the belief at the insulation between the collector ng had failed, and the car was withdrawn om the Tour. It was afterward discov-ed, at the factory, that nothing having any ectrical function was injured in the slight-t degree; all commutators and brushes ere in absolutely perfect condition and all indings were in place. What did happen as this: The motor armature windings are around the turns of wire and soft sold One end of one of these bands lifted allowed one end of the binding wire coi escape and this, unwound, was long eno to reach over to the armature commut and establish a short circuit. If the sol ing had been thoro at first, this acci would not have happened, or if the vent ing doors of the motor casing had b opened it is not likely that the band would have opened. The accident wa the most trivial nature, but it resulte the withdrawal of a car which was ot wise in perfectly good condition, and i impression among the Tourists that withdrawal was due to some electrical hap, when the whole electrical part of transmission was in perfect condition, commutators smooth, and none of graphite brushes even worn down t bearing.

The time of our finish stop was the showing of any electrical difficulty, and curred when the car was within 25 mile Bedford Springs and had covered ove thousand miles of the Glidden Tour in most successful manner so far as the e trical transmission was concerned.



The new 35 H. P. "Mile-a-minute" Autocar roadster, made by the Autocar Co., Ardm Pa. It is something decidedly new, not in mecha nical features alone, but in the finished eff which is a pronounced color of cirulean blue an d crimson. This striking combination of c is most attractive, and in strong contrast to the usual quiet effects as seen in the Autocar D tor's car.

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The Royal Motor Car Company, of Clev

E. H. Broadwell, formerly head of

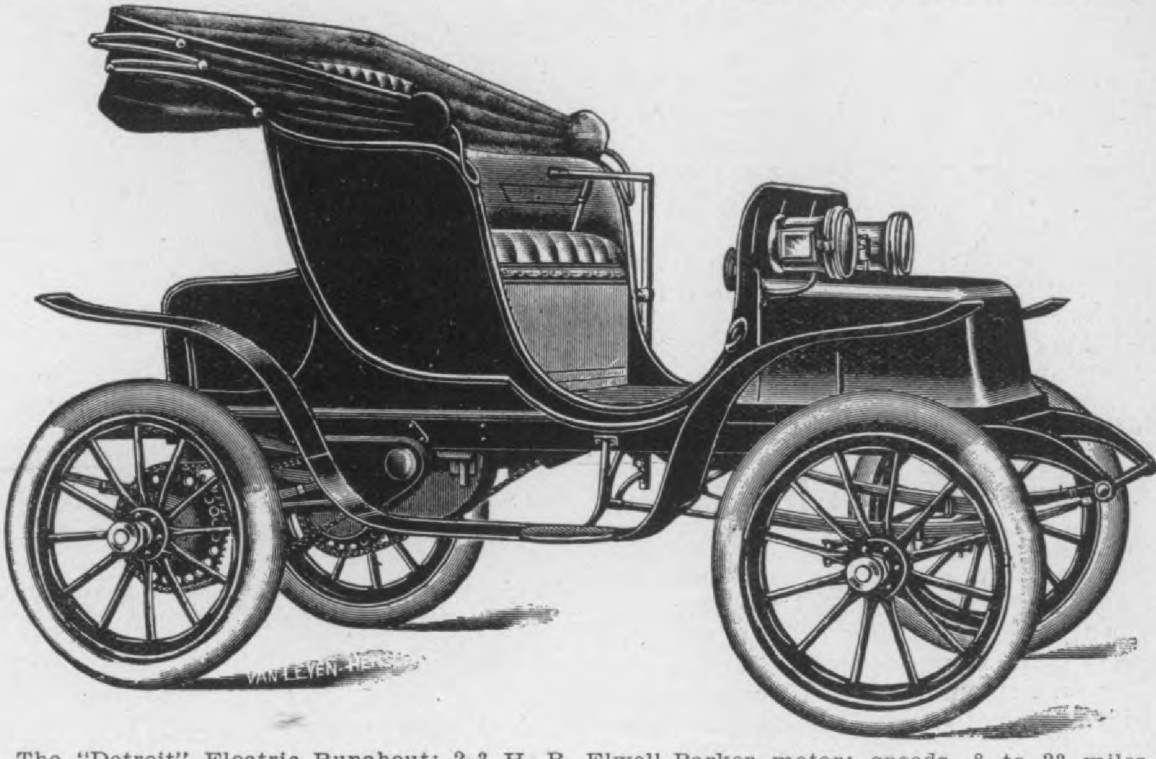
ech put on the market by Anderson Car
iage Mfg. Co., of Detroit, Mich., makers
f the well-known "High School" line of
orse-drawn vehicles; their capacity for pro-
ucing these horse-drawn vehicles being 15,-
00 per annum.

The chassis frame has 3-inch channel steel
ide members full length and angle steel
ross members. The front body hangers are
he full depth of the channel at the joint and
aper gracefully to the spring eye, where
hey are tied together with bolt and dis-
ance pieces of steel tube. Rear body hang-
rs, together with all other parts entering
nto frame proper, are substantially riveted;
ll rivets being put in hot.

Wheel base is very liberal for this typ
vehicle, being 74 in., and the tread is 4 ft
in. Wheels in standard equipment
wood, artillery type, 12 spoke; hub flan
5½ in.; rims universal to take 32x3½
pneumatic tires.

Where road conditions will permit of
use, solid tires will be furnished if
sired, and in this case wheels are incre
in diameter to take 34x3 in. tire, and
maximum speed of vehicle cut back t
miles per hour.

The motor is the latest design of El
Parker, of the multipolar type, normally
ed at from 2 to 3 H. P. Its overload
pacity is about 200 per cent. and is sa



The "Detroit" Electric Runabout; 2-3 H. P. Elwell-Parker motor; speeds, 8 to 23 miles
hour forward, 8 to 13 backward; 24-cell battery in two sections; battery mileage, 75 to
channel and angle steel frame; wheel base 74 in.; gage 50½ in.; wheels, 32x3½; pneumatic tire

Rear springs are 1½x40 in. full elliptic
croll. Front springs are 1¾x40 in. half el-
iptic, perched 1½ in. forward of centre.
ront ends connect to body hangers in wa-
erproof sockets. Rear ends are shackled
o frame with 3½ in. shackles.

Both front and rear axles are of extra
eavy Shelby seamless steel tube, clipped
o spring in such manner that there is no
hifting of springs on their saddles. Both
xles are arched, allowing the proper set to
ll four wheels. Steering knuckles are of
he Elliott type, their yokes being substan-
ially brazed in the axles.

All connections in the steering mechanism,
rom steering mast to knuckles, are ball
nd socket joints, adjustable in the joint and
djustable in the connecting rods. All mov-

not burn out or develop any commu
trouble under any conditions likely to a

The armature shaft revolves in the
known Hess-Bright annular ball-bea
and requires no adjustment or attentio
cept an occasional repacking with greas

Power is transmitted from motor to c
ter shaft thru a silent running Renold c
running in oil, and inclosed in an oil-
case. The counter shaft on which is p
the differential gear, also runs in H
Bright annular bearings, three being
one at each outer end and one near
centre of the shaft.

A sub frame of aluminum supports
motor, counter shaft and controller. Sh
it become necessary, however, each co
nent part of this unit may be taken

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ontroller is of the very latest design. operations are performed with one lever it is never necessary for the operator emove his hands from the controller or the steering lever, to obtain any of speeds, either in forward or backward tion, or in sounding the alarm.

e controller gives forward speeds of 8 to 23 miles per hour, and on reverse speeds of from 8 to 13 miles per hour. e operation of the controller lever is ard for both ahead and reverse speeds. lling controller lever backward, whether ehicle be running backward or forward, vs the current off and applies an emer- y brake, which consists of a drum and arrangement on the motor shaft.

combination with the controller, a lock h is provided which eliminates the car- of the usual running key, which in eliminates the risk of having the vehicle n or wrecked, and also serves as an gency switch.

is lock switch is operated by the foot two push buttons in the toe board of ehicle.

o brakes are used, one acting on the hubs and operated by a pedal and et arrangement. This is the regular

changed when worn out.

The other or emergency brake is the on on the motor shaft in connection with th controller lever. Either of these brakes ma be used separately or together. Each ar effective if used singly; or in cases of emergency, both may be applied without injur ious effects. Steering is of side lever type Drive is by two chains.

The battery consists of 24 cells, divide into two sections of 12 cells each, one sec tion being placed in the front and one in th rear of the vehicle, both under detachabl hoods. The battery space is generous, allow ing the use of various-sized cells. Th mileage on one charge is rated at from 75 t 125 miles, according to size of battery, typ of tires, etc. Drip pans beneath the bat tery prevent acid from reaching any par of the car or the wiring.

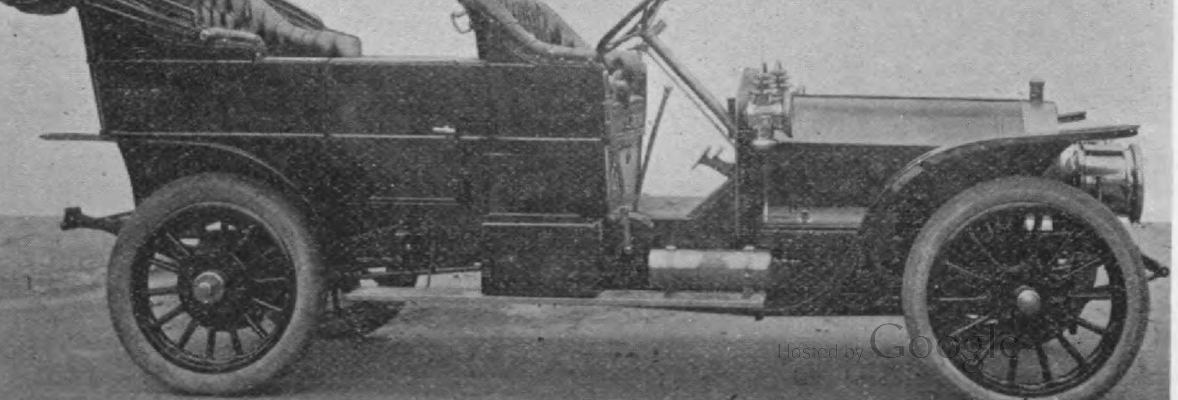
The equipment includes a Veeder 10,000 mile odomoter, a Whitney combination volt ammeter, two side lamps and one tail lamp

The chassis is so designed that it take any of three types of body and the body lift free of the chassis without disturbing an part of the machinery or wiring. A meta case around the foot brake mechanism pre vents cold air entering around the brak pedal in the winter.

Cleveland Cars to be Built in New Factory

nouncement is made that the Cleveland r Car Company has sold its plant in Whitney Power Block, Cleveland, O., e Garford Company, the transfer to place on September 1st. The announce- of the new location of the Cleveland any will be made on or about Septem- st. It is also stated that from this time on the Cleveland cars will be of dis tinct and individual type and that two car for 1908 will be placed on the market, a 40-45 H. P. touring car and a roadster with a very similar chassis but with 108 instea of 120 inch wheel base.

E. E. McMaster has associated himsel with the Continental Caoutchouc Compan of America as Western sales manager.



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Eighth Annual Automobile Show

of the
Automobile Club
of America

Participated in by the American Motor Car Manufacturers' Association and the Motor and Accessory Manufacturers, Inc.

NEW YORK CITY

October 24th to 31st, 1907

Grand Central Palace

Lexington Ave. & 43rd St.

OPEN TO ALL AMERICAN AND FOREIGN MANUFACTURERS

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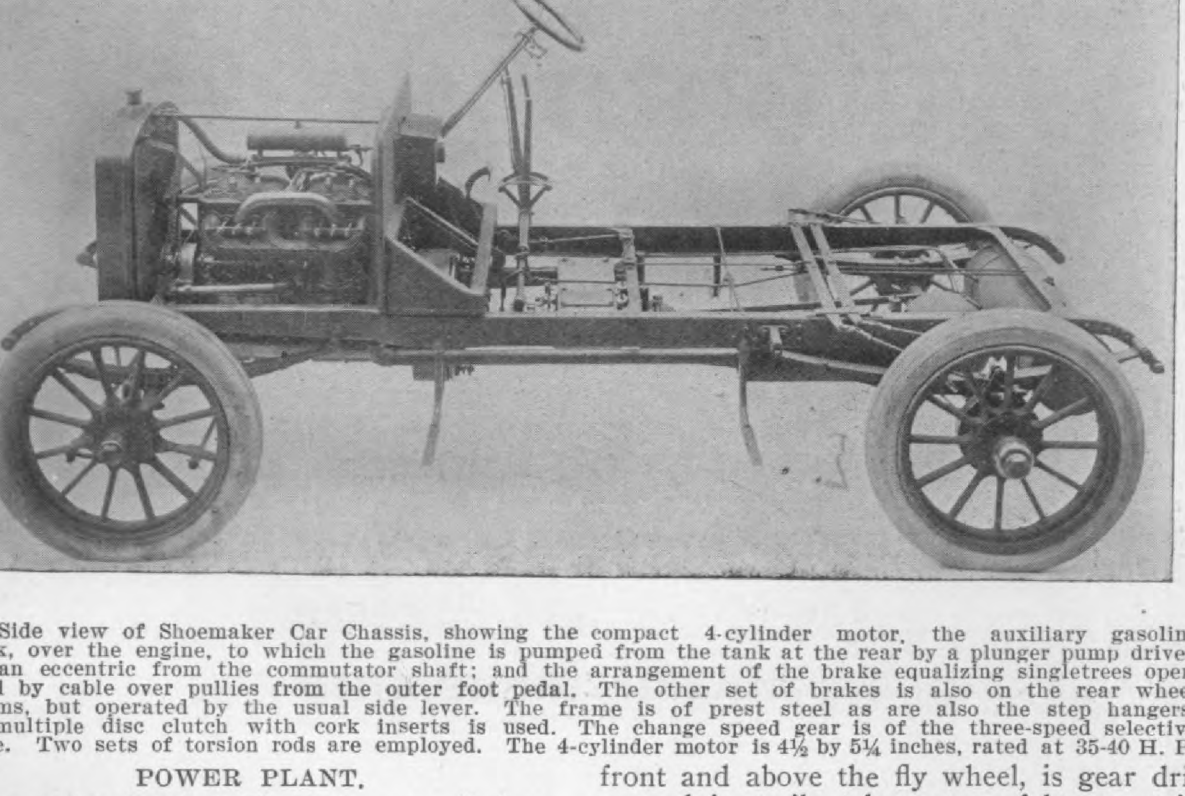
vn as "Model C," manufactured by the emaker Automobile Company, of Free- Ill.

frame by a positive plunger pump driven b an eccentric from the commutator shaf The commutator is located immediately i



Side view of Shoemaker Car Chassis, showing the compact 4-cylinder motor, the auxiliary gasoline k, over the engine, to which the gasoline is pumped from the tank at the rear by a plunger pump driven an eccentric from the commutator shaft; and the arrangement of the brake equalizing singletrees oper- l by cable over pullies from the outer foot pedal. The other set of brakes is also on the rear wheel ns, but operated by the usual side lever. The frame is of prest steel as are also the step hangers. multiple disc clutch with cork inserts is used. The change speed gear is of the three-speed selective e. Two sets of torsion rods are employed. The 4-cylinder motor is 4½ by 5¼ inches, rated at 35-40 H. P.

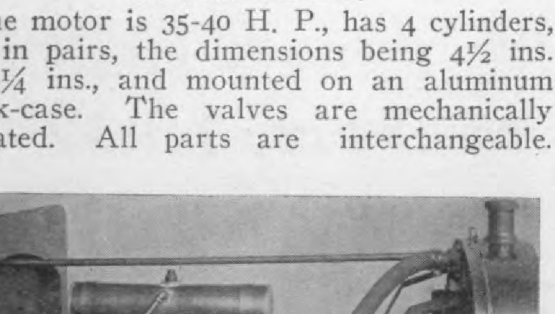
POWER PLANT.

e motor is 35-40 H. P., has 4 cylinders, in pairs, the dimensions being 4½ ins. ¼ ins., and mounted on an aluminum k-case. The valves are mechanically ated. All parts are interchangeable.

front and above the fly wheel, is gear driv en and is easily taken care of by removin a panel on the left side of the dash slope

THE TRANSMISSION.

Is of the sliding gear, selective type, giv ing three speeds forward and one reverse direct on high speed. The gears are 1 in



t side of Shoemaker Motor, showing the car- r located at the top of the cylinders and fed by y from the auxiliary tank over the engine. This gement insures a feed of gasoline to the car- r on any hill and places the carburetor out of of mud or water. The large hand holes giving access into the crank case are also shown. Note echanical oiler driven by an arm and eccentric.

Left side of Shoemaker Motor, showing the arrange ment of the inlet and exhaust manifolds and the method of retention, also the yokes for holding th push rod guides in position. All gears are encased the fan being the only non-positively driven part.

carburetor is of the automatic compen-

face and 6 pitch, and case hardened. Th

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The 1908 MITCHELL

at all agencies

September 1, 1907

The 1908 Mitchell, the finest touring car in the world for $2000 as well as the runabout and the NEW Mitchell Roadster shown at all agencies September 1, 1907. See them. Say to any Mitchell agent—"Show Me." He'll show you in a Mitchell for 5 miles or 50 whichever you say. Convince yourself that for power, control, silence, speed and sweet running there is nothing can equal the 1908 Mitchell at the price.

The 1907 Mitchell a Winner

At Hamline Track, St. Paul, Ed Zerbies in the 24 hour race, after wrecking two cars on the fence at the turns because of the dust—having no other car, borrowed a 20 h.p. Mitchell Runabout from a doctor in the crowd and drove it for nearly four hundred miles until another Mitchell 35 h. p. could be secured. In the face of this awful handicap Zerbies finished only 28 miles behind the winner who drove a 40 h. p. car, selling for over twice as much as the Mitchell, and in addition broke all previous world's records for 24 hours—183 miles.

The 1908 Mitchell chassis is a refinement of the 1907 with all the latter's good points and the same standard construction. You can't afford to overlook the 1908 Mitchell.

MITCHELL MOTOR CAR CO.

188 Mitchell St. RACINE, WIS.

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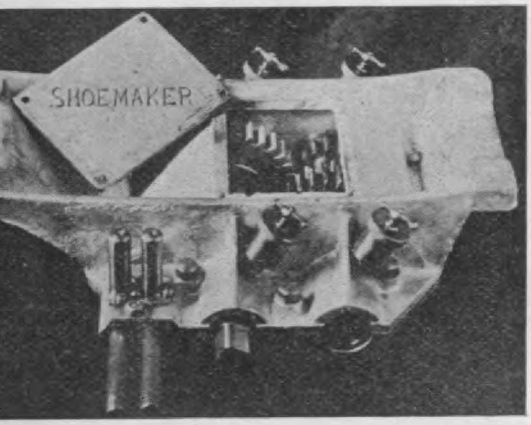
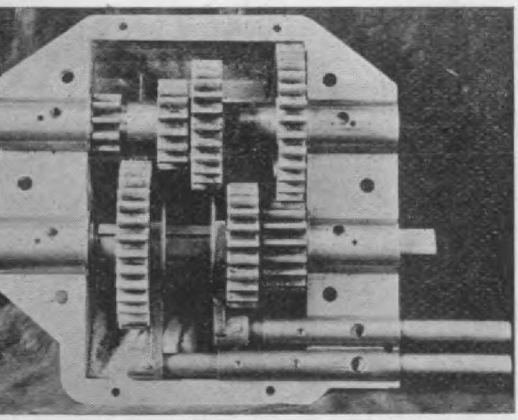
clutch consists of an aluminum disc ork inserts; when the clutch is seated



or of the Shoemaker Change Speed Gear Case, the rigid pan like construction, the two-gear rods and the four main bearing grease cups.

eld between two cast iron discs, sup- by four lugs screwed into the fly to which the springs are fastened hold it to its seat. The springs be- cated around the outside edge of the allow the pressure to be applied at rgest diameter possible, which causes r to start in an exceedingly easy r, eliminating any jerky movement. lisc that rotates with the transmis- haft only weighs 5½ pounds, conse-



r of the Shoemaker Change Speed Gear, show- compact arrangement and unusually short The gears are 1 inch face and 6 pitch. There e forward speeds and one reverse selectively . The weight is but 58 lbs.

raking the gears is reduced to a ım. The final drive is by propeller from the transmission to the rear connected with universal joints so nder load all lines are in the same

ion levers extending from the cross the frame to the rear axle eliminate nces due to any inequality of coun-

BRAKES.

The braking system consists of two external and two internal camel's hair faced brakes on the rear wheels; one set being operated by a foot pedal, the other by the hand lever. An equalizing rod is used on both brakes which causes them to be applied on each wheel with the same tension. These levers are held in place by long springs connected to the rear cross member of the frame.

FINISH.

The standard color is black with gold striping, back corners paneled in deep, rich maroon, while the molding effect on the body is done in dark brewster green, making a beautiful combination. The upholstering is all in black, done in either dull or bright finish of the best quality of goat's skin, in either pebble grain or French finish.

Motoring is Healthful

The hospital records of London contain interesting observations recently made on the influence of motoring on the general nutrition of both healthy and anaemic subjects.

The individuals experimented on were taken daily on a motor run of from 100 to 200 kilometres at an average pace of 40 kilometres an hour for eight or ten days. During this period it was found that the number of red corpuscles increased in large proportion, as well as their hæmoglobin content.

A further beneficial effect was the influence on sleep. With normal subjects sleep was more prolonged, and in the case of neurasthenics, who were suffering from insomnia, the power of sleep was completely restored.—New York Sun.

Personal experience has shown the writer all the above specified advantages as resulting from motor car riding. Very often a ride of 20 or 30 miles at the end of a busy day has brought refreshing rest and a sense of increased vigor, but this only in case of an open car or a car with a cape top and open all round. The writer has believed and yet believes, that the surprisingly speedy rest and recuperation derived from motor car travel is due to the agreeable movement and the rush thru fresh air.

The American Consul at Breslau, Germany, states that there ought to be an opening for American motor boats in Breslau, if properly introduced, as there is a large class

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YOU CAN STEER A STRAIGHT COURSE
ON
WEED CHAIN
TIRE GRIPS
NON SKIDDING

Weed Chain Tire Grip Co.

28 Moore St., N. Y. City, N. Y.

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A Flawless Record
FROM START TO FINISH

Elmore Valveless 2-Cycle

For all practical purposes the grandest performance of this or any previous Glidden Tour."

hat was and is the consensus of opinion concerning the wonderful achievement of the valveless two-cycle Elmore in coming through the Glidden Tour with bonnet locked and sealed.

t the outset good friends of the Elmore shook their heads doubtfully and said: "You're running a risk."

/e knew we were not.

very Elmore owner knew we were not.

/e've been preaching and proving for years that all the Elmore engine needs is a good fat spark—that the continuous impulse principle eliminates every weakness that would make such a test a dangerous risk for the four cylinder type.

/e knew that unless it was wrecked by accident it would not be necessary for a human hand to touch the Elmore engine.

/e proved that in the last Glidden Tour—but we wanted to make the proof so conclusive that the whole world would know it.

So, in the presence of a committee in Cleveland we locked and sealed the bonnet and relinquished the key. If we won—it meant that the most brilliant performance of any and every other car was outdone and outshone.

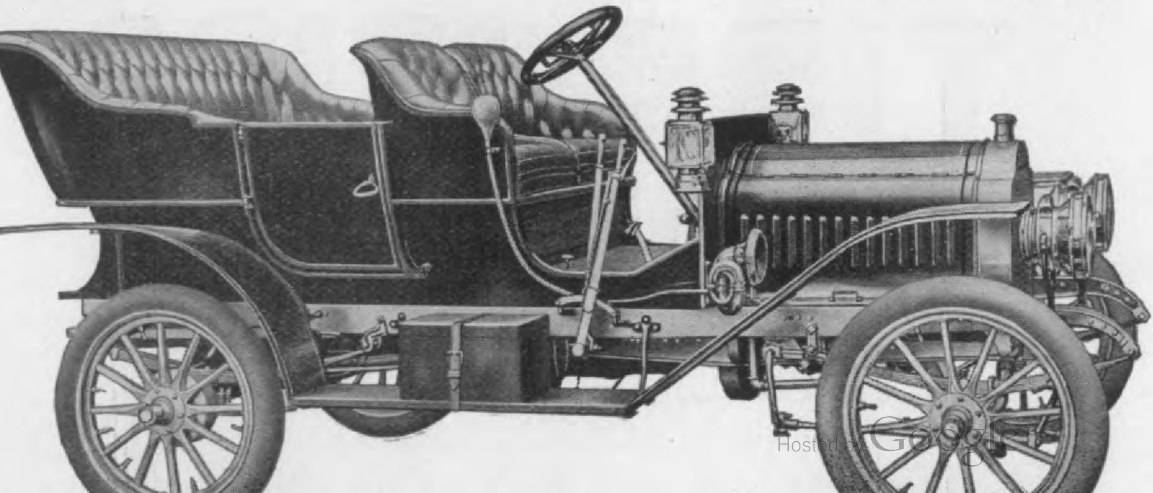
They could coax and tinker, renew, repair and replace—we had voluntarily put the Elmore engine to the most terrific test to which any car in this country has ever been subjected.

We won—just as we have won time and time again in the hands of hundreds of owners who have put the valveless two-cycle engine into direct contest with the best four-cycle cars made.

Just as quickly as it can be done we're going to put the story of this wonderlul tour into print.

In the meanwhile, you will want to know all about "the car that has no valves"—the car that is making automobile history—the car that cannot keep up with the demand while many four-cycle cars are languishing.

Write for the booklet, Our Daily Mail.



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MECHANICAL AND TECHNICAL Department

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our dedartment editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special in formation on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

METHODS OF DETERMINING HORSE POWER.

Pomona, Cal.

The relative power of engines is in proportion to their piston displacement, is it not? Instead of the elastic and wholly unreliable "horse power" measurement, would it be a fair rating to adopt an arbitrary unit of power, say 10 cu. ins., and let the piston displacement divided by this unit represent the power of an engine. For example: Cadillac, 1 cyl., 5x5 inches piston displacement 98.15 cu. ins. divided by 10 equals 9.8 units of power (catalog power 10). Thomas "Flyer," 4-cyl., 5½x5½-in., piston displacement 522.67 cu. ins., divided by 10 equals 52¼ units of power (catalogue 60 H. P.). Fiat, 6 cyl. 5x6 1-32 inches, piston displacement 710.35 cu. ins. divided by 10 equals 71 power units (catalogue 50 H. P.). By the A. L. A. M. formula D squared multiplied by N divided by 2.5 equals H. P.

1-cyl. Cadillac, 10 H. P. (catalog 10), piston displacement rating 9.8.

4-cyl. "Flyer," 48 H. P. (catalog 60), piston displacement rating 52¼.

6-cyl. "Fiat," 60 H. P. (catalog 50), piston displacement rating 71.

4-cyl. Northern, 40 H. P. (catalog 50), piston displacement rating 37.3.—WHEELER.

The power of an engine should be properly exprest by its piston displacement in any given unit of time. Since, however, piston friction is the limiting factor in the matter of engine speed, it is customary to assume that an engine is capable of 1000 ft. per min. piston speed. In my formulas I have assumed 750 ft. per minute as the maximum piston speed and it makes no difference whether the stroke is short or long, for the area of the piston multiplied by the piston speed will give the displacement per minute; so my horse power formula is D squared divided by 3 equals H. P.

The formula recently adopted by the Automobile Club of Great Britain and Ireland and the A. L. A. M. is based on 1000 feet piston speed per minute, and is N multiplied by D squared divided by 2.5 equals H. P. From this you will see that the principal difference is in the assumed maximum practical piston speed.

The method you suggest is a good one and has been used. The A. C. of France used a constant of 12 cu. ins. per horse power. This was several years ago when horse powers were not rated so high as at present, probably because they figured on a lower piston speed. The objection to your method is the laziness of the average man's mind. He can easily square the diameter but to figure the length of stroke and the number of strokes per minute, so as to get at the piston displacement per minute is a task of such increased difficulty that he will not take the trouble. It is therefor better to assume a maximum piston speed which permits neglecting the length of the stroke, and with a proper constant the area of the piston need not be figured, for the areas of circle are proportionate to the squares of their diameters. This therefor makes a result substantially as accurate with much less mental effort. Your error lies in assuming that a piston displacement per stroke is the determining factor, but if you reflect you will see that it is the displacement per minute or unit of time that counts. You will also recognise that a short stroke motor can make more revolutions per minute without exceeding a given piston speed than can a long stroke motor. In regard to the discrepancies noted by figuring and the makers ratings, no notice of this need be taken, as most manufacturers' ratings are purely arbitrary and bear very little relation to the averge actual horse power developed by their engines.—C. E. D.

HOW MUCH DOES A GAS ENGINE CHARGE EXPAND AFTER IGNITION?

Where can I get data as to how much a charge of gasoline vapor, mixt properly with air, will expand after igniting, at pressures ranging from atmospheric to, say, 100 lbs.? I suppose someone has determined this by experiments?

I do not know where such a table can be found. By examining an indicator card you will see that the maximum expansion pressure is about four times the compression pressure, and this is probably near enough for practical purposes. Gases vary in volume in proportion as their pressure or temperature varies from the absolute, so that compressing a perfect gas at constant temperature to twice its pressure will cause it to occupy half of the original volume; and heating a given volume to twice its original temperature, measured from the absolute zero, will double its pressure. The charge in a gas engine is not a perfect gas, but the variation from the theory is so small as to be neglible. Pressures for these purposes are figured from 14.7 lbs. below atmospheric (gage) pressure; and temperatures are figured from the absolute zero, which is 273 degrees centigrade or 491.2 degrees Fahrenheit below the freezing point of water. Roughly, you can compute the absolute zero as 500 degrees below atmospheric temperature. While the combustion temperature is probably 2000 degrees above, which corresponds with the indicator card. As a matter of fact the explosion temperature is probably higher than this, but there is some unexplainable heat lost, which prevents a theoretical expansion and pressure being reached.—C. E. D.

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A NEW CARBURETOR ARRANGEMENT.

Hampton, Iowa.

I noticed in one of your recent issues an article relative to the difference in the power of a car in morning and evening of a hot day. I also have marked this and have been trying to develop this condition during the heat of the day. My experiments have developed a carburetor made with a series of pipes in the gas tank so arranged as to create a constant action of the gasoline, which causes a spray and the lowering of the temperture of the mixture, thus giving greater expansion to the mixture. The air is drawn thru the gasoline in the tank by suction of the engine. The mixture caused by this action is too rich, so I have constructed a sliding valve near the engine, whereby I throttle the air. I also have a flutter valve near the engine. so in case the intake valves fail pressure is prevented from entering the tank at my sliding valve, provides a release. Have tried this device on a two and four-cylinder engine. While I drive a single cylinder car. In each case I find a marked difference in the increase in power, and find I can control the mixture at will to any consistency desired with the throttle, and I can take all the advantages desired in country driving to save gasoline and cool my engine. Because, in coasting a hill, I open the throttle, which admits pure air into the cylinder and stops the flow of gas entirely. I have also placed a governor on the pipe leading to the engine, whereby air is automatically taken into the mixture. This valve is in operation only when starting the engine, so as to have it run at a given speed until the operator manipulates the throttle. Thus I have done away with all adjustments, for everything is fastened stationary. There is absolutely no chance of being bothered with dirt or water in any reasonable quantity, as the smallest pipe employed is three-quarters of an inch in diameter. My car never fails to start with the first charge of gas, and weather conditions seem to make no change, as I have operated in severe cold. I have a connection to the intake to provide warm air for winter use. I find that the greater the demand by the engine the better the mixture, as the spray is finer and inexhaustible in its supply. I never have been able to get this to miss fire as others I have had seemed to do. When running fast, if I shut them off and then started up suddenly, they would fail to take hold for several explosions for some cause unknown to me. It looks good to me, but as I am merely a novice along these lines, would like very much to have you comment and advise as to whether to push same or not.—G. M. RODNER.

Your description of the carburetor sounds well. The perfect carburetor has not yet been put on the market. The surface or bubbling carburetor gave a gas as your device seems to do. It was very economical but delicate. It required constant adjustment for various speeds, and was not so satisfactory as the spray device now generally used. Possibly your device combines the advantages of them both. Show it to several of your friends and let them sign a written description of it, so that you will have proof of what you have invented. This will protect you and permit you to show it to others without much danger of having it stolen from you. Then get in touch with people having carburetor troubles and supply your device. They will gladly pay a good price for a good article. It is my opinion that the carburetor is the most neglected part of the auto to-day. When you have made and put into use several of your devices, you will then know whether they are good enough to warrant patenting and manufacturing for the market. It is useless to spend money on patents until you know that the article is right and the market waiting for it.—C. E. D.

GASOLINE IN THE CRANK CASE.

San Francisco, Cal., June 21, 1907.
419 Foerster street.

I have a 4-cycle, 4-cylinder gas engine which acts very peculiarly; three cylinders consume the fuel perfectly, while cylinder No. 3, which is second in time of firing, explodes, yet the fuel goes thru in liquid form. The ignition is make and break. The fuel goes thru the cylinder into the crank case, so that in 15 miles' running it cuts the oil in the pit so that it is perfectly useless.

All valves are mechanically worked and are all set alike. Inlet valves open and close on centers, exhaust valves lead by about 15 seconds and close on centers. Inclosed I send you a correct sketch of the inlet pipes.—W. F. P. SCHNEIDER.

It seems incredible that you should have the trouble you mentioned. First, your carburetor should deliver a gas, not liquid. Ordinarily this is in the form of a spray which may get past the inlet valve in small quantity. It can hardly get farther for contact with the hot walls of the cylinders will vaporize such fine particles and prevents their remaining on the walls. It would seem that the gasoline must get into the pit in some other manner. If the rear cylinder was giving the trouble, I would assume that your engine was considerably inclined and that unvaporized fuel would carry to the lower end of the pipe, but since this is not the cylinder giving trouble, it is quite evident that this explanation will not serve. The carburetor is located near the faulty cylinder, and I think it likely that gasoline may be blown thru a leak in the carburetor and against the outside of the engine, and thus reach the interior, cutting the oil as you say. Look at the joint between the ports of the crank case just below the carburetor, and also see if the carburetor floods or drips much. Careful search should locate the trouble and we will be pleased to hear what it was when you have found it.—C. E. D.

MUFFLER INCREASED SOUND OF EXHAUST.

Brooklyn, N. Y., June 26, 1907.

Will you kindly tell me thru the columns of your magazine why my 45 H. P. car, with a muffler on, makes a noise as tho the cutout was half open, and without a muffler makes no noise at all, no matter at what speed the motor is running? Has the setting of the valves anything to do with it or not?—H. E. P.

The condition you recite is an unusual one, but it illustrates beautifully my contention that the muffler effect is a matter that can only be found by trial. If the pipe and passages are such as to break up the sound vibrations pretty fully, it is possible that the muffler may increase the sound just as the bell of a horn does the sound of a reed. I do not see that it is possible to make the matter clearer to you. It is well known that a fiddle would make little noise without its sounding board. The object of the muffler is to break up the puff of the motor, and in your case it evidently does the other thing. Try changing the length or shape of the muffler or the pipes to it. I have found that a few dents knocked into the muffler with a hammer will sometimes improve its muffling quality. Irregularity is a valuable feature in a muffler, for it causes interference of the sound vibrations.—C. E. D.

Hazleton, Pa., July 9, 1907.

I have a 4x4, air-cooled, 4-cycle, single cylinder runabout. Am remodeling same. Would it be advisable to bore a ½-in. hole in cylinders wall just over top of piston, when down, for an auxiliary exhaust, strapping a pipe connection outside, to the muffler? One mechanic here seems to think that it will interfere with the perfect lubrication of the cylinder over the hole. If this is so, how do 2-cycle engines manage? Such a hole ought to be small enough to cause little inconvenience of that sort, yet furnish some relief to the regular exhaust valve and back pressure in the cylinder. According to current Horseless Age (July 3), it is a good thing.—EDW. E. HOWE.

The auxiliary exhaust can be made as you suggest. Several small holes are probably better than one large one. The piston rings will spread the oil so you will not have much trouble. Unquestionably the auxiliary does save the exhaust valve from a large amount of heat. I doubt if the running of the motor will be improved unless the present exhaust valve is too small, but it may prevent overheating if the motor has a tendency that way.--C. E. D

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RATIO OF ENGINE TO REAR WHEEL SPEED.

July 25, 1907.

Kindly advise me thru the next issue of the "Cycle and Automobile Trade Journal" what size side sprockets are right to use in a car weighing 2300 lbs. and an engine 4½ by 5 in., the rear sprockets have 36 teeth in them? The bevel gears in the transmission are of equal size, therefore on the high speed the jack shaft goes as fast as the engine. Also what should be the ratio of the speed of an engine of that size, to the speed of the 34-in. rear wheels?

C. H. LEPHARDT.

The gear ratio should depend on your roads. You do not say how many cylinders you have. Ordinarily the engine on high gear should make 3 or 3½ turns to one of the rear wheels. If in a bad roads country or small engine more than this. This would require front sprockets to have 10 to 12 teeth. C. E. D.

KNOCKING UNDER FULL LOAD.

Grand Forks, N. D., July 15, 1907.

In the June issue of the "Cycle and Automobile Trade Journal," under the title "Overheating of Air-cooled Motors," you state "they are a little more likely to knock at full load." I would like to know your theory as to cause of this? That is: Why should an air-cooled motor be more likely to knock than a water-cooled motor? An answer thru the columns of the "Cycle and Auto Trade Journal" will be appreciated. J. L. ROBERTSON.

Knocking or pounding is very generally a symptom of overheat or lack of oil. The water-cooled motor is practically always too cool in order that it may safely be kept from overheating. It, therefore, seldom smokes its oil away and knocks because its cylinder walls are dry so long as oil is feeding properly and usually it is given less oil than an air-cooled because of this fact. Being cool it is not so likely to carbonize the oil as is a hotter engine, altho this is rather a matter of excess of oil and fuel than of heat, for if there is no excess the heat cannot carbonize. Particles of carbon do no harm until they get hot, which they do quicker in a hot engine. So the air-cooler is a little more likely to give trouble from these causes. But there are air-coolers which keep even cooler than a watered engine, and so it is a matter of design. Sufficient surface and air will keep the engine cool in either case. The water is most regular and most troublesome. The air is most economical and simple. Take your choice. C. E. D.

COULD NOT KEEP FLYWHEEL TIGHT.

Louisville, Ohio.

Through "The Cycle and Auto Trade Journal," would like to ask your advice. I have an automobile engine, single cylinder, bore 5 ins., stroke 6 ins., compression space 30 cu. ins.

My first flywheel would work loose and I kept setting up the key until the hub split. I put on a new flywheel with the same result. I then shrunk on a heavy steel band over the hub and drove the key in as tight as I could get it. This held for some time, but at last the hub twisted off from the wheel.

It was very hard to turn the engine over against the compression, and when running slow it was very jerky. I have concluded that I have too much compression and would ask you how many cubic inches compression space a motor of this size should have.—CHAS. K. HOOD.

If your motor does not ignite prematurely I would not assume that the compression space is too small. A high compression motor is capable of high speed and the makers probably knew what they were about. Your piston displacement is about 120 cu. ins., so the compression space is 1-5 of the total cylinder contents. This is smaller than I like, ¼ is quite common and 1-3 often used with success. It may not be convenient for you to shorten the connecting rod or lengthen the cylinders by a ring under the head. I would therefor prefer to attack the flywheel hub problem. Either the hub was too small in the first place or the key did not fit properly. Keep in mind that the key should be tight sideways. Many people imagine that the key should be tight top and bottom, and this is what splits many hubs. It also throws the flywheel out of true. Because of the difficulty of holding a flywheel to a gas engine shaft of the usual size, it is common and the best practice to form a flange solid with a shaft, to which flange the flywheel is bolted.—C. E. D.

2 Cycle Engines

HUGH DOLNAR

Last winter I intended to build a 2-cycle engine with a disc crank case inlet and piston and inlet to cylinder, the same as the Dorville Libby described in the July "Cycle and Auto Trade Journal," tho I had never seen one or heard of an arrangement similar to the piston of the Dorville Libby engine. I did not build, because I was afraid that the incoming charge would not keep this style of piston cool as an air-cooled engine which was what I proposed to build, tho since I have thought it would. Do you think a machine with piston of this style can be run successfully air-cooled? Is this style of piston patented? Cannot one make any patented article for their own use? WM. T. SMITH.

The Dorvill Libby, "Atlas" engine would probably air-cool as well as any other 2-cycle engine using crank-box pressure cylinder supply. The piston head is better cooled than with the deflector on top of the piston. The 2-cycle motor water-cools more easily than the 4-cycle, so that the radiator which perfectly cooled two, 2-cycle, 3½x3½-in. cylinders had to be considerably enlarged before it would cool four, 4-cycle cylinders, 3½x3½ ins. in the same car, both engines doing the same work and driving the car the same speed on the same roads. The writer believes that the 2-cycle motor with an open crank-box and separate supply cylinder, can be well and easily air-cooled.

The Frayer-Miller Company is having much success with air-cooled commercial cars, and new air-cooled car-motors just now completed, and which will soon be described in the "Journal." The writer is very confident that the final car-motor will be 2-cycle, air-cooled, with a charging-cylinder supply.

The piston and port construction shown in the Dorville Libby motor is said to be a German invention, patented some years since, date not now at hand. See Heerman's 2-cycle motor, Journal, July, page 166, for similar piston.

No; you cannot make a patented article without infringing the rights of the patentee, tho you would not be likely to be molested for an experimental construction. H. D.

Chicago, July 15, 1907.

1. In a 2-cycle engine is there any objection either in theory or practice to the use of a compression cylinder, except added weight and cost?

2 Is there any objection to introducing the charge into the power cylinder at from 30 to 75 lbs. pressure, gradually decling to zero or atmosphere at the close of the port?

3. Will the heat produced by the compression cause the charge to enter the power cylinder in an expanded or attenuated form or will the rapid expansion from the compression reduce the gas to its former or nearly former volume?

4. If the connection between the compression and power cylinders is not unduly long or large and a check valve is located in it near the compression cylinder is there any necessity for having the compression cylinder any larger than the power cylinder? That is, will not the first stroke or two fill the connection, and since it is trapped between the power cylinder and the check valve

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when not moving, make it unnecessary to provide for filling it each stroke?

5. If a compression cylinder is used, is it either necessary or desirable to provide any special means of cooling it?

6. What gage wire and what mesh has been found best in a 2-cycle intake to prevent backfiring; that is, which gives satisfactory results with least obstruction?

Answers:

1. No. The separate supply cylinder is common European practice. The crank-box pressure is no lighter and no cheaper than the supply cylinder may be.

2. No; but there is nothing gained by high charge pressure. Whatever work is done in charge compression before the charge is in the working cylinder beyond that sufficient to cause a rapid and complete intake is lost, and worse than lost as the heat must be dissipated.

3. The ideal conditions would place the charge in the cylinder to fill it to the exhaust port, in case of no valves, at the lowest possible pressure, with no notable charge compression at any time. These conditions can be obtained in practice, the temperature of the charge in the cylinder being little above that of the exterior atmosphere.

4. The compression piston displacement need not exceed the working cylinder volume above the exhaust port top line. Charge transfer passages can be made so short as to be negligable. No check valve is needed, as the working piston closes both the intake and the exhaust port at the beginning of the compression in the cylinder. You have the idea of a slightly comprest charge in a charge reservoir, which is practicable, tho probably not the best thing possible.

5. Compression raises the temperature of air rapidly, but a bulk of air, carburized or not carburized, can be transferred to the inside of a 2-cycle cylinder without appreciably compressing the charge, because there is only a very small pressure in the working cylinder to resist charge entrance. Under some conditions there may be less than atmospheric pressure in the cylinder at the time of intake port opening. If the charge is much comprest heat will be imparted to the compressor walls; this heat might or might not be absorbed by the expanding charge or by the next incoming charge.

6. Ask Perry Okey. Okey Motor Car Co., Columbus, Ohio, about wire gauze, precise information not at hand. H. D.

Memphis, Tenn.

I wish to build a two-cycle engine which I intend to make valveless. Would like to make an air compressor or a compressor to take the gas from the carburetor to supply and purge the gasoline cylinder. If the gasoline cylinder is a four-inch bore and four-inch stroke, what would be the size of cylinder for the compressor to furnish the engine with ten lbs. of pressure, or would less pressure do, or would it be better to use a receiver? Or, would it be better to inject the gasoline after the exhaust is closed independent of the air, and about what would be the size of the pump to inject the gasoline which I suppose would have to be regulated by a throttle?

V. BEELING.

If you intend to begin experimenting with the 2-cycle motor you should inform yourself as to the construction of all small 2-cycle motors now made, which almost invariably use crank-box pressure, tho crank-box pressure has nothing whatever to do with the 2-stroke cycle. There is no need of more than a very slight charge pressure if you use a separate supply cylinder, as the intake port is open long enuf to take the charge before it has much compression given to it. The capacity of your compressor or charging cylinder can not exceed your charge space in the cylinder added to the port space between the supply cylinder and the motor cylinder.

You can make your intake port any length you chose, but you must make your exhaust port at least ¼-inch longer than the intake port. The length of port is its up and down dimension in a vertical cylinder. If your port is long enuf to stand open for 90 degrees of crank travel and you work the supply cylinder piston with a crank on the motor crank-shaft, then you will have about 15 pounds pressure on the charge when the intake port opens, but this pressure will fall to nearly nothing as soon as the intake port does open, and will be very small for the remainder of the supply piston stroke.

There are various linkages which can be used to work the supply piston, some of which can be made to supply the cylinder with only a very little charge pressure at any time.

You ask to be supplied with drawings for building a 2-cycle motor. What do you hope for, a new motor better than anything now made? Even if you could obtain such drawings they would be very costly, as they would cover a very valuable new invention, and your motor would be very costly before you were done building it.

The fuel can be injected into a charge of pure air after or before compression. This has been done repeatedly and with complete success, and avoids the carburetor, and this method of fuel supply permits the use of heavy fuels, like kerosene or raw petroleum. Gasolene mixes with air so readily that it has come into common use for car motors, but it is not likely to be retained, as it is extremely dangerous and very costly. Probably raw petroleum will be largely used in motor cars. Some of the mechanical oilers, like the Lavigne, could be made to supply any liquid fuel, governor control, with entire satisfaction. Pump fuel supply is broadly old, covered by an expired English patent.

Perhaps these hints may be of value to you, but you should make a careful and exhaustive study of the 2-cycle motor before you begin to spend money trying to bring out something new.

H. D.

Kendall, N. Y., June 29, 1907.

I should like to have your opinion upon a two-cycle motor of the following dimensions.

Bore 4 inches. Stroke 3⅝. Compression 90 pounds. Intake port 5.28x⅝. Exhaust 5.28x⅝. Intake and exhaust ports separated by one-inch bridges. Intake has 3 bridges 3-16 inches wide. Exhaust has one 9-16-inch bridge cast hollow for air cooling. Cylinders offset ⅝-inch. Cylinder wall ⅜-inch thick. Connecting rod 5⅝ inches long. Shaft bearings 1⅜x3. Crank wrist 1⅜x1½. Bypass through piston and cylinder walls between upper and lower sets of rings. Inlet to crank case by Mr. Malcolm's disk and port. Cooling by pins on cylinder. Air blast from blower to be sent in at top of applied jacket and discharged at bottom just above ports. Also pins cast on under side of piston head. Deflector very similar to Mr. Malcolm's. Aluminum bobs on crank shaft to make case compression about 6 pounds. What power should this motor show at 1300 revolutions? At this speed the motor has a piston speed of 785 feeet which is about the limit for satisfactory lubrication. About what power at 800 revolutions? Which is the more satisfactory method, to cast cooling pins integral with the cylinder or to apply by the Knox method? In the first method better radiation would be obtained, but wouldn't it make an extremely expensive cylinder casting? Can air cooling be used at this compression? 90 pounds is higher by 20 pounds than any air cooled motor that I am familiar with, but I chose this compression because the motor will be run on throttled charge more than half the time, and from recent investigations it appears that high compression under these conditions is desirable while on full charge 70 pounds is high enough. It was the opinion of Mr. Malcolm that compression up to 100 pounds could be used with air cooling. In my design the piston head slopes from the top of the deflector to the bottom of the exhaust port giving ample chance for cooling since the cool gas in the crank case has to sweep across the cooling pins on its under surface. What diameter inlet and exhaust pipes should be used? I am aware that 5⅝ inches connecting rod is considered short for this size of cylinder, but I have adopted it because I believe that the advantage gained by having the ports open longer more than compensates for the angularity. Will you give me some idea what it will cost to build this motor? It will be necessary for me to hire all the machine

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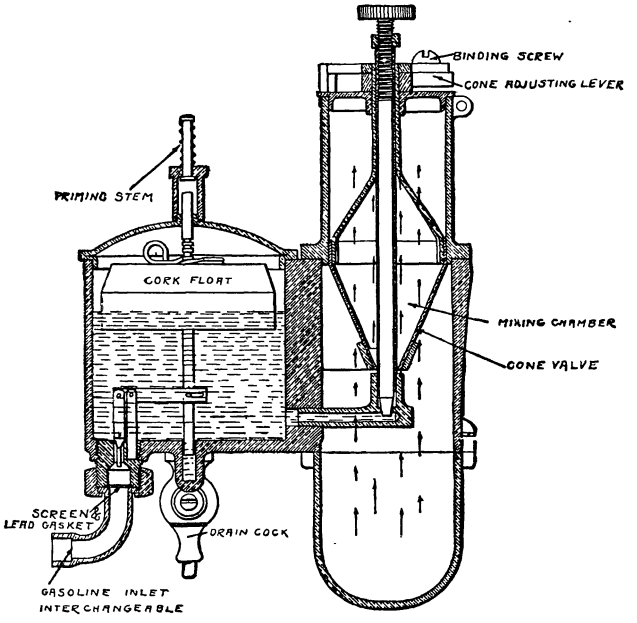
THE BUFFALO CARBURETOR



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work done. Please give approximate cost in dollars. What should be the cost for one motor? What should be the cost in lots of 10? Of 100?

G. D. FORBES.

The ports in two different planes, as shown in the description of the "Atlas" motor car, July Journal, appear to be extremely good, and the arrangement of the exhaust ports in a plane above the plane of the piston and cylinder intake ports seems very good. No special fault can be found with the specifications here given. The rods might well be longer as there is plenty of time to exhaust and take in a fresh charge while the ports are open, no matter what the rod-length is.

With 90 lbs. compression about 270 lbs. initial pressure is to be expected, but as the 2-cycle motor cannot fill the cylinder with the charge you will not have 90 lbs. working compression. No trustworthy estimate of H. P. can be made in advance, by the writer, at least.

You will probably do well if you obtain 100 lbs. average pressure and as the working stroke is 3 ins., you can readily estimate your work on the piston at revolutions specified, remembering that your motor is single acting.

It is cheaper and better to cast your cylinders with integral cooling projections. The cased-in 2-cycle cylinder, cooled by forcing air through the casing, as practiced by Frayer-Milller, was patented in 1844, and nobody holds any broad patent on air or water cooling. Frayer-Miller use 85 lbs. compression and have no trouble. Of course. whatever reduces the charge volume reduces compression if the compression chamber cubic content is always the same, and as most car-motor work is done with the throttle very little opened, it is very clear that the compression must be small. In one case of a very large bore engine something less than 15 lbs. compression, actual, gave the car about 40 miles per hour on a good road. This same car could be run at a slow walking pace, about 2½ miles per hour, on high gear, by close throttling, making it appear probable that the compression was not above atmospheric pressure. This particular motor showed 60 pounds compression by gage, when the cylinder was filled with pure air. The advantages of high compression are (a) to increase the full-charge, and thus give the maximum, power of the motor, and (b) to increase the compression of throttled charges and so obtain as much partial-charge economy as may be.

No reliable estimate of costs can be given The satisfactory way is to go to a good shop without knowing the shop and workmen, for either one motor or for current manufacture. and contract for production of parts to drawings and specifications furnished. You do not give the number of cylinders, but that is not important.

The writer believes. fully. in the 3-cylinder, 2-cycle, air-cooled motor for motor-car driving.

H. D.

A QUESTION OF TWO-CYCLE ENGINE DESIGN.

St. Louis, Mo.

I write to ask you some questions regarding a four-cylinder, two-cycle engine which I am designing. Each cylinder has a seven-inch bore, a six-inch stroke and a two-inch compression space at the head of the cylinder. The engine is for automobile work. and I am building it as light as possible. How thick should the cylinder walls be? How thick should the cylinder head be? What fraction of the area of the piston (which is about 38½ square inches) should the area of the intake port be to get the most power out of the motor? How far above the piston when it is at the bottom of the stroke, should the bottom of the intake port be? What part of the area of the piston should the area of the exhaust port be to get the most power out of the motor? I intend to compress the gas first, in the crank case. How many pounds or ounces to the square inch should this compression be? How large a crank-shaft should I use if I made it out of the best nickel steel? What horse-power would this motor give at 600 R.P.M.? I mean, how much H. P. would all four cylinders give? I would like to be able to run the motor 900 to 1000 R.P.M. under a load. Can this be done? If the parts were the right size, how much faster, if any, would the motor run under a load? How far above the bottom of the piston stroke should the bottom of the exhaust port be?—F. VAN BLARCOM.

I assume that your motor is for a passenger car. As you intend to use the two-stroke cycle you do not need four cylinders. Three cylinders will give you a smooth action. 7x6 inches is altogether too large for even three cylinders. 6x5½ is as large as you have any use for, even for a very large car. Three 5 or 5½x5 ins. will give you all the power you can use. The cylinder walls should be 5-16 to ⅜ thick. Head thickness depends on the construction, whether integral water jacket or applied head, and so on, and the form of applied head. A head ⅜ thick, suitably ribbed, will do for 5 or 5½ bore cylinders. Your cylinder head must resist at least 300 lbs. to the square inch.

Give all the port area you can. Port dimensions have nothing to do with anything but the motor speed. The more port area you have the faster your motor can run. Place the ports in two planes as in the "Atlas" motor, Journal, July, Page 81, or "Heerman," Page 166. The greater the port dimension is lengthwise of the cylinder, the more time you have for charge intake. The exhaust port should be open at least ¼ inch, and ⅜ is better, while as much as ½-inch would do no harm before the intake port opens. Do not consider port area at all, with reference to piston area. Port area and piston area have no functional relations in the two-cycle motor. Say you open your exhaust port, with a 5-inch stroke, when the piston has made 3¾ ins. of the working stroke, and open the intake port when the piston has made 4⅛ ins. of the 5-inch working stroke. Pay no attention to pounds of crank-box pressure, simply make the clearance as small as you can. Apply filling pieces to your crank-arms and save all the clearance you can. Do not use a nickel steel shaft. A good 40-point carbon steel forging is good enough. Make your shaft not less than 2¼ dia., wrists the same, and 2½ dia. is better.

With three cylinders, 5½x5 ins., you should show 50 or 55 H. P. at the very least at 1000 R.P.M. Your motor should be strong at 1500 R.P.M. The more load the slower the motor will run, of course.

The bottom of the exhaust need not be anything above the piston at low point. or it may be. say, as much as ½-in. above. The exhaust port ought to be big enough. A compression chamber for a 5-in. cylinder, 5 ins. stroke, may be 5⅛ diameterx⅞ high. If you apply your piston heads you can vary the compression chamber to suit yourself, by trial. Before you go on with your design you will do well to study the Okey 3-cylinder 2-cycle motor—H. D.

QUICK WORKING STROKE AND SLOW RETURN.

J. J. McC. has been giving thought to the 2-cycle motor, and having concluded that the working stroke should be as fast as possible made application for a patent on the linkage shown in the illustration, J. J. McC., 2-cycle motor.

The effect of this well-known linkage is to make a driving crank move the free end of a slotted lever turning on a pivot at one end move much more rapidly during one part of the movement of the uniform velocity crank, than during the other part of the crank revolution.

A, A, A, cylinder and crank-box, integral. B, piston. C, connecting-rod. D, crank-wrist circle of travel. E, crank-wrist. F, F, slotted lever, pivoted at G, to the crank-box. H, piston-pin. I, connecting-rod joint to the slotted lever, F. F.

The arc MN, struck from the center of G thru the center of the crank-shaft, divides the circle, D, unequally, by cutting D at X and V, thus making the up-stroke of the piston in the crank-time represented by the larger angular advance, YDX, and the down-stroke, working, in the crank-time represented by smaller angular advance, XEY. This linkage makes the piston

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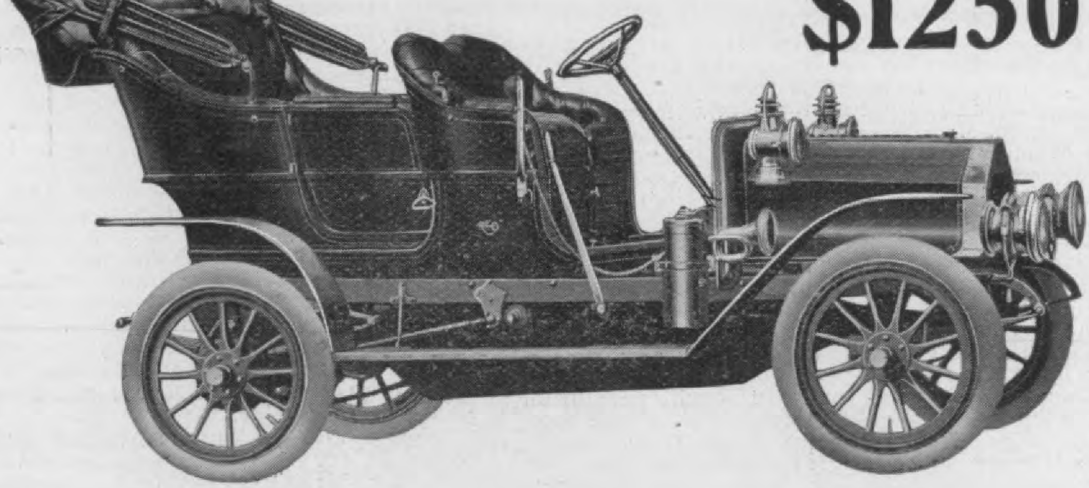

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slow in the compression stroke and fast in the working stroke, which is of some theoretical advantage.

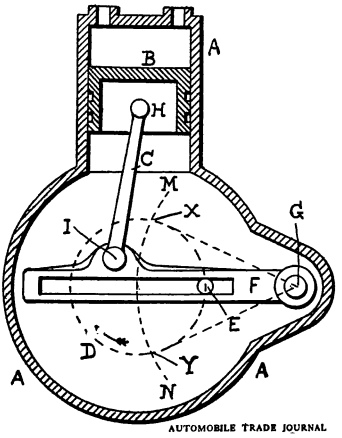
This linkage is commonly seen in slotting and shaping machines.

But the designer desired to obtain a quick working stroke with a slower return and compression stroke for the 2-cycle motor piston, hence the uniform velocity crank is made to turn in the direction shown by the arrow in the figure, which gives a quick down stroke of the piston with very great increase of piston velocity at mid-stroke. This action also increases the time of piston port-passing, so that the exhaust and intake times are somewhat augmented.

This linkage is thus seen to increase the speed and shorten the time of the working stroke and to increase the port opening time; these conditions are favorable to the action of a 2-cycle motor when considered merely as a heat engine.

When considered as a mechanical linkage in motion, this distortion of time and speed is very bad. The piston and connecting rod must be stopt and started twice in each revolution of the crank. A crank does not give the very best acceleration and retardation time, but it gives a very close approximation to the best time, much closer than any other equally simple linkage, and for this reason has never been displaced for the purpose of changing reciprocating to rotatory motion.

Again, the slotted lever and sliding box is



AUTOMOBILE TRADE JOURNAL

difficult to make, and very difficult to maintain, and the introduction of the slotted lever largely increases the number of parts in the 2-cycle motor, as well as the weight, the cost and the space occupied. If crank-box pressure is used to supply the cylinder charge the crank-box clearance should be as small as may be and here again the lever is bad, since it requires a larger crank case.

Once more, almost the same differences in the times of the two piston strokes can be had by offsetting the cylinders, without adding to the number and cost of the motor parts.

Viewed as a working machine only, it is vastly better to make the two piston strokes in the same time, and to use a long connecting rod so as to distort the crank-time acceleration and retardation of the piston as little as may be.

No difference how right or how wrong, the simple and smoothly working machine will always be preferred to the complicated machine which has violent changes of part-velocity, and hence is harsh in action and difficult and costly in maintenance.

These considerations make it easy to see why both Otto and J. J. McC. saw advantages in this slotted lever 2-cycle motor action and why the Otto patent never came into general use.

This slotted lever motor is shown here and considered at some length because the idea has been advanced often, and is probably even now thought valuable by many persons to whom it is new.

J. J. McC.'s story is here given in his own words. The reasoning is right, but the machine itself is wrong, and so far wrong that it is of no use at all when compared with the ordinary form of trunk-piston, 2-cycle motor.

J. J. McC. writes as follows:

"Hugh Dolnar:

"Several months ago I applied for a patent on a device, a crude sketch of which I enclose, which I believe will be of value to any manufacturer who takes it up. I had an examination made of the Patent Office files for 25 years back and found nothing of the kind in sight, and I believed I had something new.

"Judge of my surprise when my application was rejected on an old patent to Otto, dated December, 1873, about 33 years ago.

"Now, what puzzles me is this: Here is a device that will improve any engine it is fitted to. It has been public property for years. Competition among manufacturers should cause the adoption of anything and everything that will help their product. Nevertheless, I am unable to find any engine on the market to-day using this simple device.

"Now comes the query: Are the manufacturers really fit for their business, or was I wrong—and was Mr. Otto wrong in thinking this device an improvement on the ordinary style of crank motion for gas engines? Being unable, after badgering my brains for months, to discover any flaw in my argument that this is a valuable feature, particularly to the two-cycle engine, I have decided to ask you and if you can see your way to answer me in the columns of the 'Journal' I think a good many people will be interested in what you say.

"My main idea was to reduce the working temperature of the engine. I claim that the quicker expansion of the gases, due to the accelerated working stroke not only reduces the temperature, but does it in the only profitable way by using the saved heat to push the piston instead of heating up the surrounding atmosphere.

"There are incidental advantages, however, that are not to be despised, viz.: the increased time allowed at one end of the stroke for the admittance of the new charge and the escape of the old one, and at the other end to permit of greater advance of the spark without back pressure and consequently more complete combustion at the beginning of the stroke, and the reduction of the side-wear on the piston and cylinder, due to the small angle of the connecting rod.

As I have already stated this shortens the stay of the heated gases in the cylinder, and the cooling period is correspondingly prolonged. Will not this result in a lower working temperature? Then we have a more rapid rate of travel for the piston at the beginning of the stroke, due to the fact that the stroke does not commence until after the crank-pin has passed the 'dead point' by about 30 degrees. Will not this tend to relieve the strain on the engine at the moment of explosion, and reduce the chances of cracking the cylinder?

"I could ask 20 other questions about this device, but this letter is already much too long, and I will simply go back to my original query in effect: 'Why is this idea allowed to sleep in the Patent Gazette instead of being put to use?

"Respectfully,

"J. J. McC."

First of all, J. J. McC. should have gone back much more than 25 years to cover the gas engine. The first American patents on gas engines, 2-cycle, were granted in 1844 and 1846, and covered air-cooling, water-cooling and the use of hot-tube ignition, and wholly anticipated both Lenoir and Daimler. These patents are never spoken of, tho they are important.

Secondly, charge-firing is slow, and there is no violent shock by explosion due to charge ignition. In the third place ignition demands as much time as possible, and altho this linkage if of value, it is not of enuf value to make up for its bad features.

In conclusion, altho this linkage is not good, many persons think it is so, it is here noticed at some length. H. D.

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HAYNES

Always Has a Perfect Score.

THE GLIDDEN TOUR that left many cars by the wayside, proved the perfection of the Haynes, which finished with a **perfect score.**

THE CHICAGO SEALED-BONNET NON-MOTOR STOP RUN. All four Haynes cars finished with **perfect scores,** tying for first place with cars of twice their cost.

THE NEW YORK SEALED-BONNET CONTEST. A Haynes won a **perfect score** and is still running with seals intact.

THE NEW YORK MOTOR CLUB ENDURANCE RUN to Albany was a decisive Haynes victory, and the record of the Haynes stock model in the VANDERBILT CUP RACE is still unsurpassed in automobile history.

Private Haynes owners are constantly making **perfect scores.**

The man who brought back his car to us after he had run 5000 miles without an adjustment or mishap thought that the behavior of his car was extraordinary and deserved investigation. We assured him that his case was not exceptional—the exceptional case is that of the Haynes which gets into the repairman's hands.

There are reasons, and good ones, for such reliability—they lie in the design of the car—free from complications—and practically trouble-proof. Crank the engine—throw in the clutch—and go;—there will be no tinkering or fuss—no delay on the road.

The Haynes is made that way; it is "the car that always has a **perfect score.**"

For Catalogue Address Desk G-18

HAYNES AUTOMOBILE CO.

Members A. L. A. M.

Oldest Automobile Manufacturers in America,

KOKOMO, IND.

NEW YORK—1715 Broadway. CHICAGO—1420 Michigan Avenue.

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The Menges Motor Car Company, Grand pids, Mich., U. S. A., will offer for the ason of 1908 two models of chassis, one cylinder with a tonneau body to seat 8 ssengers, all facing front, and the other, aller one, 6-cylinders, fitted with either 5-passenger tonneau body, or with a 3-ssenger roadster body.

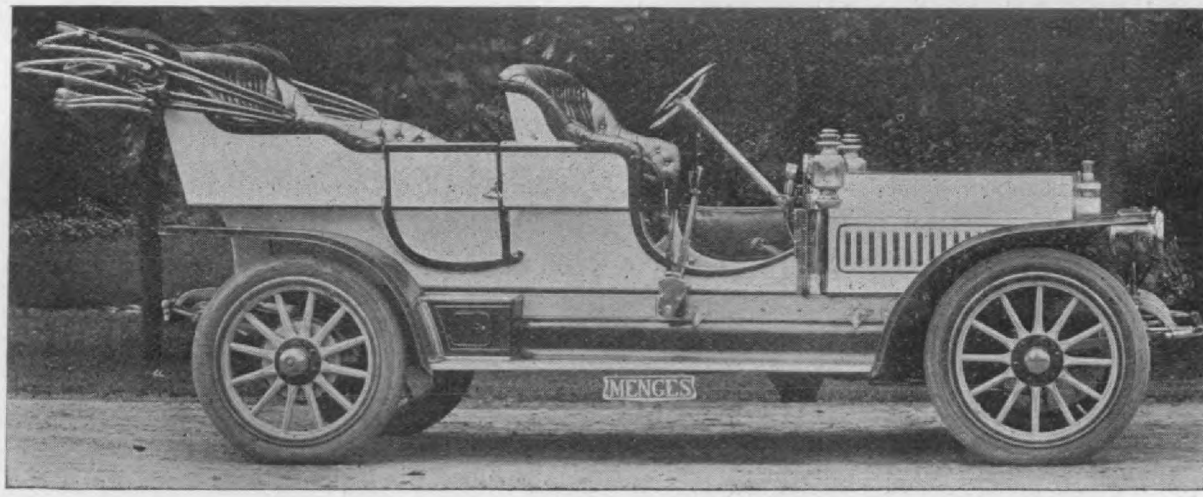
The Menges Company, $300,000.00 capital ck, is at the date of this writing, July 1907, just completing its organization.

The two Menges 1908 models embody iking novelties at almost every point, and e among the most original examples of 08 motor car designing.

Only the 4-cylinder, 8-passenger, touring r is now on the road; the new 6-cylinder r, seating 5 passengers, is nearly com-eted, but is not here described in its de-ls, which will bear a general resemblance the corresponding elements of the 4-cyl-ler, 8-passenger car, here shown and de-ribed for the first time.

that no change gears are provided save the reverse and the low speed.

Menges has made reversing gas-engi but prefers the toothed-gear reverse quick handling. The cars have abund piston area for all work on hard road s faces, but no matter what cylinder diame is used, a low gear is required for d mud and sand. The pistons are 6⅛ i diameter by 5½ ins. stroke, with alumin motor-base and oil pan, base lugs reach across to chassis frame brackets and carr on short coiled springs, interposed betw the motor-base lugs and the chassis fra bracket members. The weight of the tire motor is about 600 lbs., and this spr support of the motor on the chassis fra has been very carefully worked out, so to carry the motor with the least probabi of undesirable shock on the prest st chassis frame sides which are of the us 3-16 thickness. The motor valve stems vertical, valves in cages in the cylin



Menges 1908. 4 Cylinder, 8-Passenger Car. Caption in text of story.

The 1908, 4-cylinder, 8-pass... Menges r. Wheel-base 122 ins., gag: 54 or ins., tires 36x4½ ins. front and 36x5 . rear. All wheels on Timken rollers. otor, four, 6⅛x5½ ins. cylinders, water-oled, 4-cycle, variable compression, sup-sed to show about 100 H. P. at 1800 R. M. Menges clutch, with low-speed and verse gears always engaged, solid-jaw tch speed selection, interposed between clutch and the bevel gear to the divided r axle. Weight about 2800 lbs., price 000.00, including mats, horn, tools, 5 mps, speedometer, clock, cape top, side rtains and glass front, all ready for ex-ded touring.

NOTABLE FEATURES.

heads, and the cylinders are individual u with integral water-jackets and heads. T pistons are packed with eccentric snap-ri The cam-shaft is enclosed and packed heavy grease; the intake cams have u form valve opening rises and spiral val closing descents, the cam-shaft being fit to slide lengthwise, so as to give varia valve-closing times and consequent varia compression and variable motive eff This has been attempted before, but has been shown commercially, so far as writer is aware.

Ignition is by either hammer spark jump spark, with current from either m neto or storage battery. The commuta

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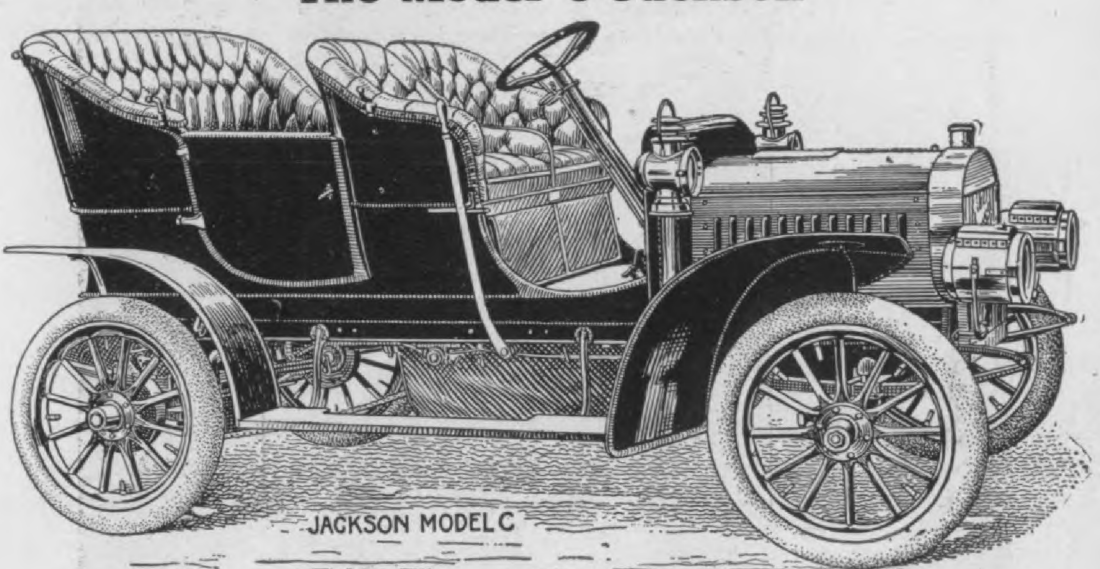
An Exciting Race and a Close Finish.

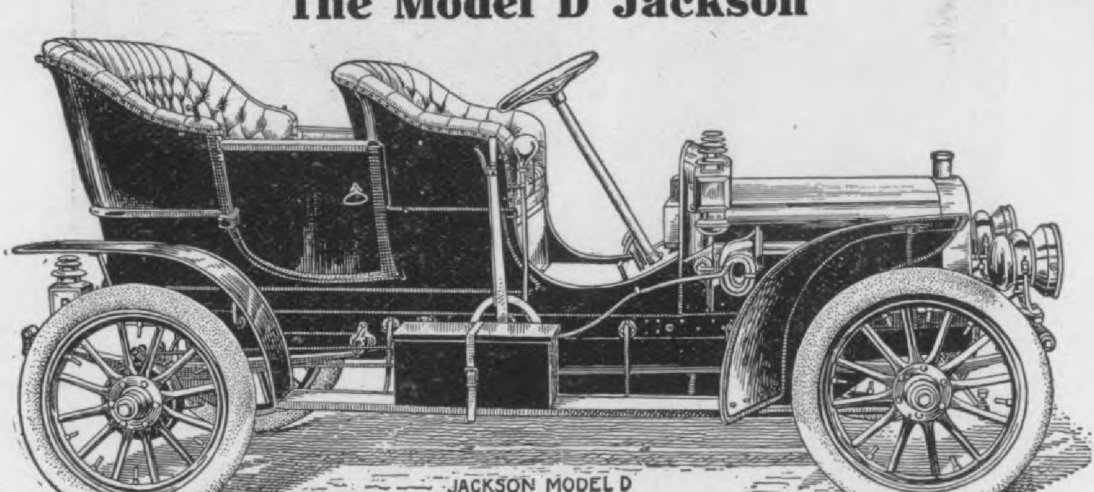
It is a remarkable co-incidence that after many months of hot competition, with honors alternating, on the first day of August, 1907, exactly the same number of Model C and Model D Jackson Cars respectively, had been sold and delivered, and the race was still on, with the unfilled orders slightly favoring the Model D. We are pleased to present pictures of the contestants.

The Model C Jackson



Price $1250. Two cylinders, horizontally opposed, under the body. Chain drive, with a strong and noiseless chain. Horsepower, 24. Wheels, 30x3½. Five passenger body with detachable tonneau. Complete equipment.

The Model D Jackson



Price $1500. Two cylinders, horizontally opposed, under the hood, giving much of the effect, in looks of a four-cylinder car. Horse Power, 24. Bevel-gear drive. Wheels, 32x3½. Ample seating capacity for five persons. Complete equipment of horn, lamps, etc.

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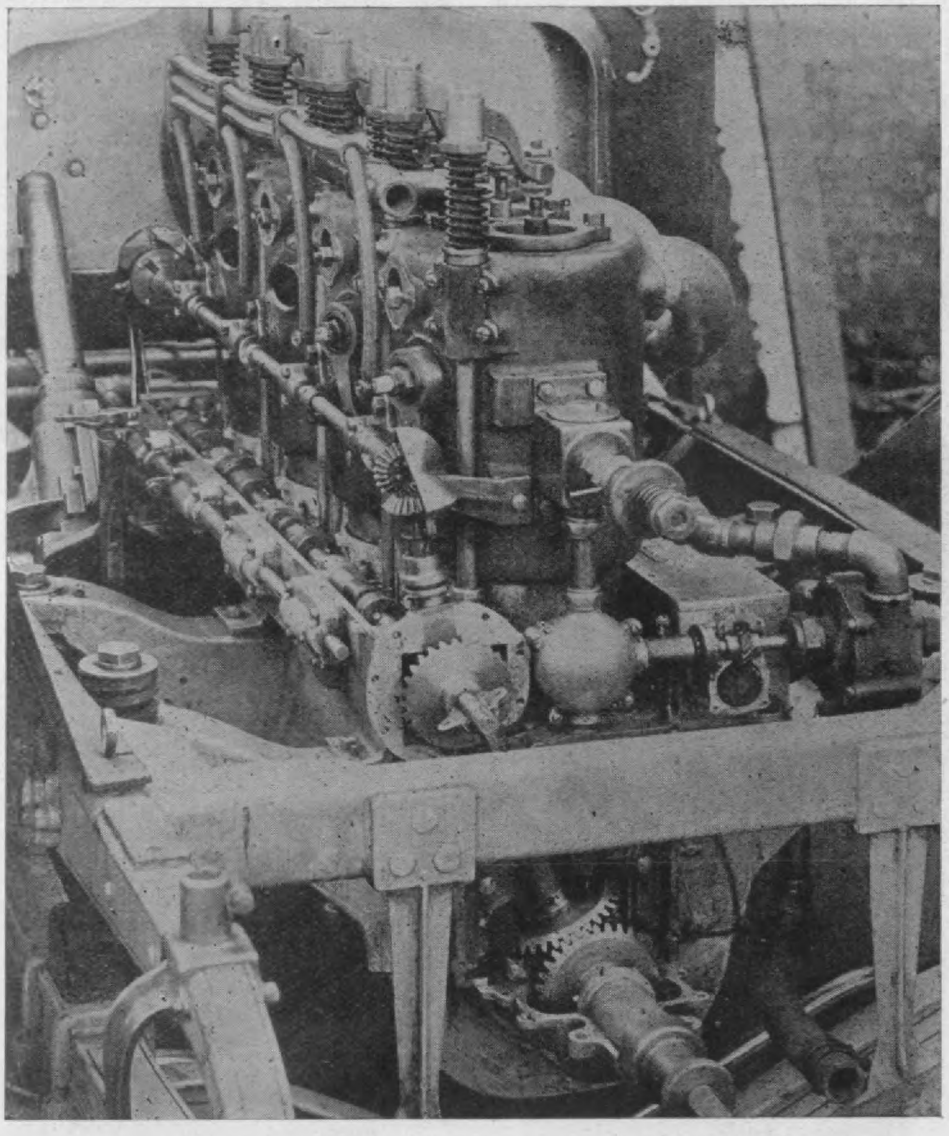
ark-start is effected by moving the ham-
er-spark-time regulating hand-lever. The
mp-spark self-start is effected by simply
osing the electrical circuit, without other
ndling.

Both the hammer-spark action and the
mp-spark plug are in a single grey iron
lindrical piece, which is held in a bored

The fuel-delivery stand-pipe needle-val
are so adjusted that the least delivery
allow the motor to turn up about 150 R.
M., the medium delivery stand-pipe gi
fuel enough to turn the crank-shaft ab
800 R. P. M., while the third stand-p
needle valve is adjusted to give the mo



Menges 1908 Car, front oblique view of the motor in the car, cam-shaft side, most of the covers
moved, showing the bevel driving gears which actuate the cam-shaft, commutator shaft, fan, water-pu
nd the two oil pumps.

linder seat by a breach block-thread and
ver arrangement which enables instan-
neous removal and replacement of the
mbined hammer-spark and jump-spark
ng without the use of a wrench or any
ner tool.

The carburetor is Menges design with
ree stand-pipes, each with its own needle
lve; each stand-pipe has its needle-valve
justed to give a different fuel delivery,
d is fitted with its own stop valve to shut

all the fuel it can use at maximum sp
A very large valve, very lightly loaded
adjustable spring-pressure is placed in
uptake from the carburetor to the cylin
intake pipes; this valve is placed to equa
the carburetor suction in some degree
so prevent detrimental fluctuations in
buretor action, and also to serve as a
valve and ensure the transfer of charge f
one cylinder to another during the cha
volume determination, in which part of

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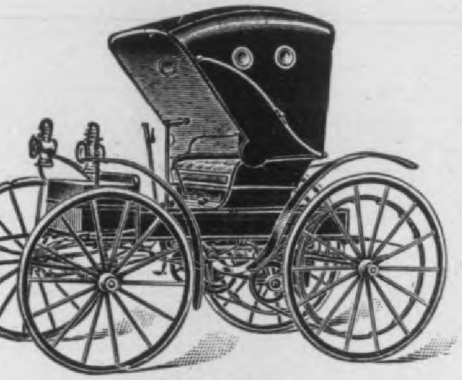
MODEL No. 3



MODEL No. 9

MODEL No. 10

MODEL No. 11

ANOTHER PERFECT SCORE

In the Chicago Reliability Ru

June 28, 1907

It takes time to perfect an automobile ju the same as it does any other piece of machine The **HOLSMAN** has now been on the market

5 YEARS

and has established a reputation for stability a reliability. Do not be induced to help some n inventor work out his experiments on you buying a machine that has not been on t market more than a year. If you are a user y will regret it, and if you are an agent you w regret it still more.

olsman Automobile Compan

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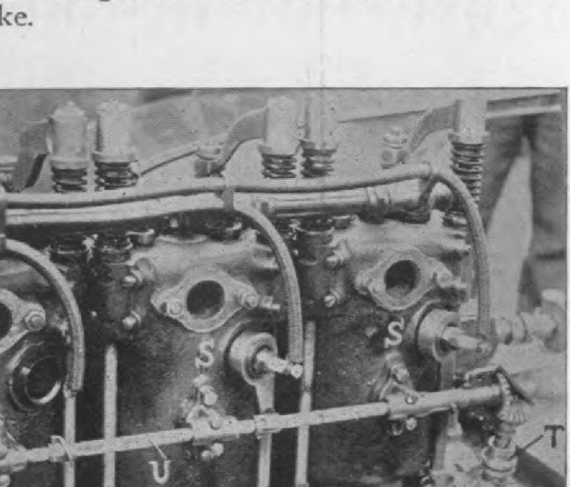
er.

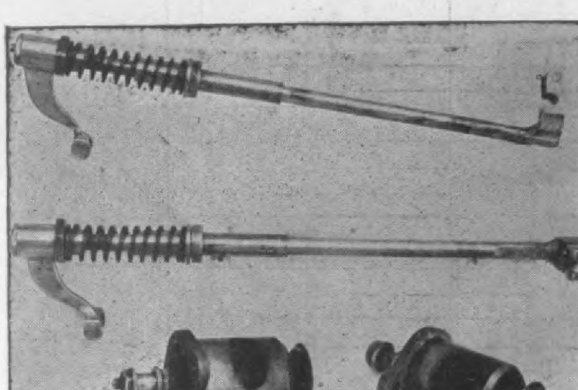
he carburetor air-supply is thru a pipe dia. from the crank-box, which in turn upplied thru three, ¾ dia. screened, ver- tubes, 6 ins. high, screwed into the top the motor-base between the cylinders. s gives the carburetor intake air a more ly uniform temperature than has before gained so far as the writer is aware. n when the motor has been standing a long time, the crank-box air is not , and when the motor is running the k-box air temperature is nearly con- t. This motor, it is claimed, has never shown a dirty spark-plug, and Menges eves the perfect combustion is due to the able fuel delivery by the three-stand- arrangement and the crank-box air- ke.



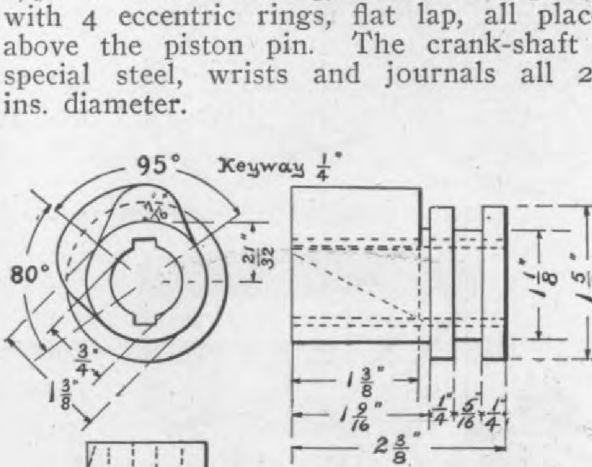
nges 1908 Car. Partial right side of motor. S. spark plug sleeve seats having integral hand- s. The sleeve seat female threads and the male e threads are mutilated or breach block style, s to slip in place and be fixt by 1-6 of a revolu- of the hand lever. The wiring connection is a g clip, so that the plug electrodes can be re- d and replaced in less than 3 seconds. The nutator shaft is marked V, and the spirally ed sleeve which changes the spark-time is marked One of the hammer spark active helicol-cams on commutator shaft is shown at U, near its left in this illustration.

he valve action differs at all points from thing before noted by the writer. The e rods are pulled downward, not lifted ard, and have no need of beams over- d and none of the weight of the valve s rests on the cams, which act against pression of springs at the top ends of valve rods these springs thus being in omparatively cool place, where they can- be overheated. The rod-lifting springs e a screw-regulated lifting pressure and

under ordinary valve temperature. T valves are in grey iron cages, symetrical



Menges 1908 Car Motor, valve actuating rods a valve cages. The rods are integral with brackets right angles at their lower ends which reach in un the cam-shaft. These brackets are forked to ca the cam-rollers which are placed under the cams, that the cams work against the left of the rod-spri only, and not against the weight of the rods. T valve fork arms are revoluble and the forks have d ends which fit the valve stem grooved sleeves a work the valves both ways. The cages are of gr iron, and the intake and exhaust valves are of differe diameters, altho the cages are of the same diamet located in the integral cylinder heads. T intake valve ports are 1¾ dia., the exhaus port diameter is 2¼ ins. The pistons a 6⅛ ins. diameter and 5½ ins. stroke, pack with 4 eccentric rings, flat lap, all plac above the piston pin. The crank-shaft special steel, wrists and journals all 2 ins. diameter.



Menges 1908 Car. Intake cams, uniform openi incline, spiral closing incline. This shows the ca as first made, to slide on the endwise stationary ca shaft. This construction will be changed; all ca will be fixt to the cam-shaft, which will have an e wise movement to vary the charge and, of course, t compression, giving a more simple and reliable c struction. The longer the intake valves are held o the smaller the cylinder charge becomes.

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BAILEY'S "Won't Slip" Tread TIRES

THREE TIMES Victorious

1905-1906-1907 GLIDDEN TOURS

They carried the cars making **perfect scores** to **VICTORY** by their **PERFECT TRACTION.** They prove to the world that they are **BEST.**

What better endorsement could they have? What better proof could you ask for? Then **INSIST** on having **BAILEY "WON'T SLIP" TREAD TIRES.** They are to the **AUTOMOBILE** what a **RUDDER** is to the **SHIP**

The **world wide** popularity of the Bailey "Won't Slip" Tire has been made entirely on its merits. The "mouth to mouth" advertising by those who **ride** them and who have found in them a tire which proves its **reliability, durability** and **superiority** over **any** and all anti-skid tire tread constructions has made it impossible for **8** of the largest tire manufacturers in the United States to supply the demand for Automobiles, motor cycles and bicycle tires with Bailey Tread. There is no **metal** in the Bailey Tread to **heat** the tire, **pull** loose from the rubber or tear the **road bed.** The **rubber studs** of the Bailey Tread are the **true** principal that give **perfect traction** and prevent **skidding**. They are to the Automobile what the **rudder** is to the **ship.**

N. B.—The extra cost of the Bailey Tires on the List more than smooth of same make, is 2½ and 3 in., $1.50 each; 3½ in., $2.00 each; 4 in., $2.50 4½ in., $3.00 each; 5 in., $3.75 each.

N. B.—Now ready: Bailey's "Won't Slip" Tread Bands for covering all makes and sizes of smooth, new or partly worn tires at nominal cost by Bailey Tire Manufacturers. Write us for descriptive booklet.

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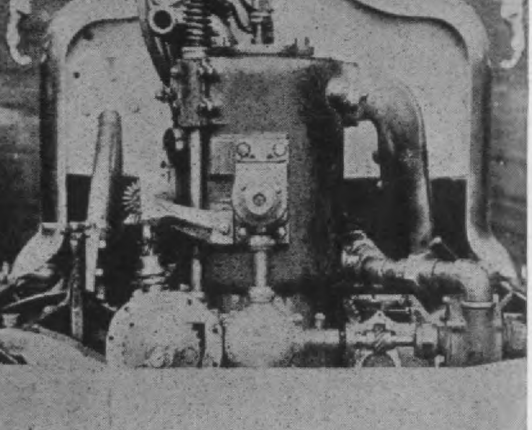
-pump is piped to the top of each
-shaft journal and the oil-basin is



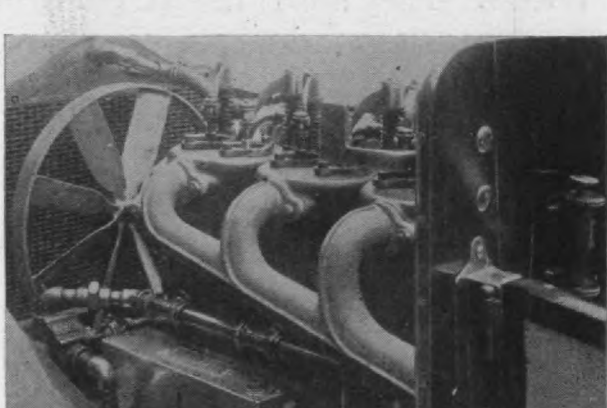
ges 1908 Car. Front elevation of motor, radiator
ost of the covers removed, to show the bevel
drive from the crank-shaft to the cam-shaft,
ommutator, the fan and the oil-pumps. At the
an be seen the engine supporting springs. All
gearing is small, and all is very readily ac-
e. No belts are used for any purpose. This
ation shows the construction by which these
ylinders, 6¼ borex5½ ins. stroke are made to
only 600 lbs., with everything cased in, and
hing gear-driven. The bevel gear drive from
ank shaft to the cam-shaft and the fan and
shafts is of such small gear diameters as to
ithout noise. Spiral or bevel gears are used as
ient.

d inside to form four separate, shal-
oil-pools, the depth being stand-pipe
ated, the pipes being in the two end-
, the overflow leading to the drainage
ell below which is constantly cleared by
wo-pinion oil-lifting pump, which feeds
il-tank. The connecting-rod caps have
oles and oil-scoops which dip into the
w oil-pools at each revolution of the
-shaft. The oil-tank screen catches
e fine dirt and so keeps the oil clean
is circulated. The oil-tank pump is
usly supplied by two intakes, one at
ottom, which is an open pipe reaching
y to the bottom of the oil tank, while
ther opens to the air in the oil-tank
o the oil-tank intake side at about the
le of the pinion space of the tank 2-
n oil pump, the delivery from which is
to the crank-shaft journals. Without
iddle intake, the tank oil-pump could

clutch member. The four expanding screw
are rack and pinion actuated to engagemen
by a coiled spring and for disengagement b
a pedal actuated rock-shaft, in the usua
manner.

MENGES' SELF-STARTING.

The self-starting device on this car con-
sists of an ordinary electric motor geare
down to 18 to 1 by 8 d. p. spur gearing t
a large gear 1¾ ins. face, formed of a stee
ring of gear teeth fixt to a grey iron wel
and hub, and mounted on the line-shaf
close to the clutch. A one-way clutch o
four steel rollers, ¾ dia., in eccentric seat
is used in the gear hub. Current to driv
the electric motor is taken from the storag
battery, and the start is very simple, chea
and certain. The motor crank-shaft is fitte
with the ordinary starting ratchet in fron
and a starting crank is provided for con
venience in the factory, but on the road th
starting crank seat is covered with a screw
cap and no use whatever is made of th
hand-start. The electric self-start is ex
tremely convenient, as it can be used t
drive the car on the factory floor or eve
for short distances at slow pace on th
street, since the motor consumes very lit
tle current. The starting motor weighs 1
lbs., and this first one, made to specifica
tions cost only $30.00. The motor arma
ture shaft normal speed is high, but th
motor has a built-in, planetary speed-reduc
tion of 2¼ to 1, making, with the 18 to
speed-gear reduction over 40 to 1 reductio
from the armature shaft to the motor crank



Menges 1908 Car, left side of motor in complete ca
showing the oil box, oil piping, water pump and ex
haust pipe. Note the easy curves of the exhaust mani
fold. The hand-operated plunger oil pump on th
inside of the front board is piped to force oil into th
hollow piston pins as the cranks pass the lowe
centers. The water pump is centrifugal. The oilin
system is hybrid, over-flow and return for crank
journals, scoop for crank wrists, oil-mist for th
pistons, and hand pump at discretion, oiling for th
piston pins.

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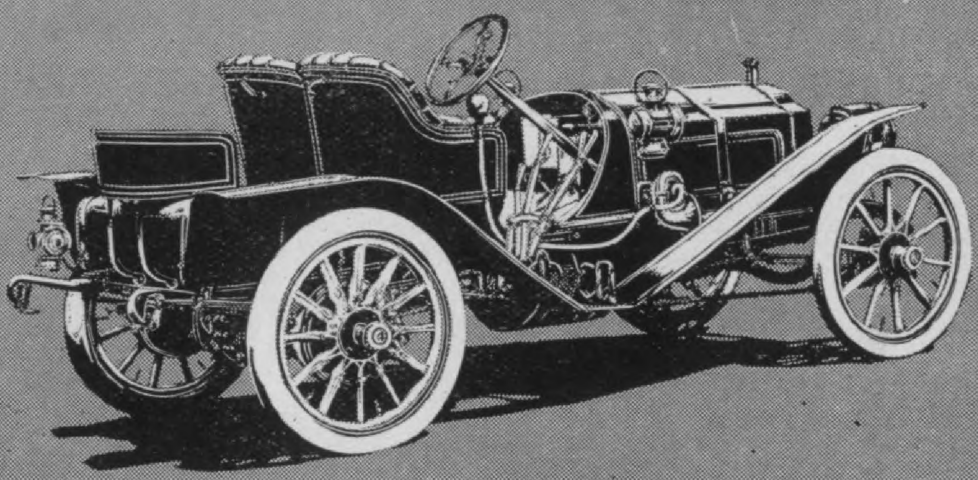
Packard

"THIRTY"
1908



PACKARD MOTOR CAR COMPANY
DETROIT, MICHIGAN

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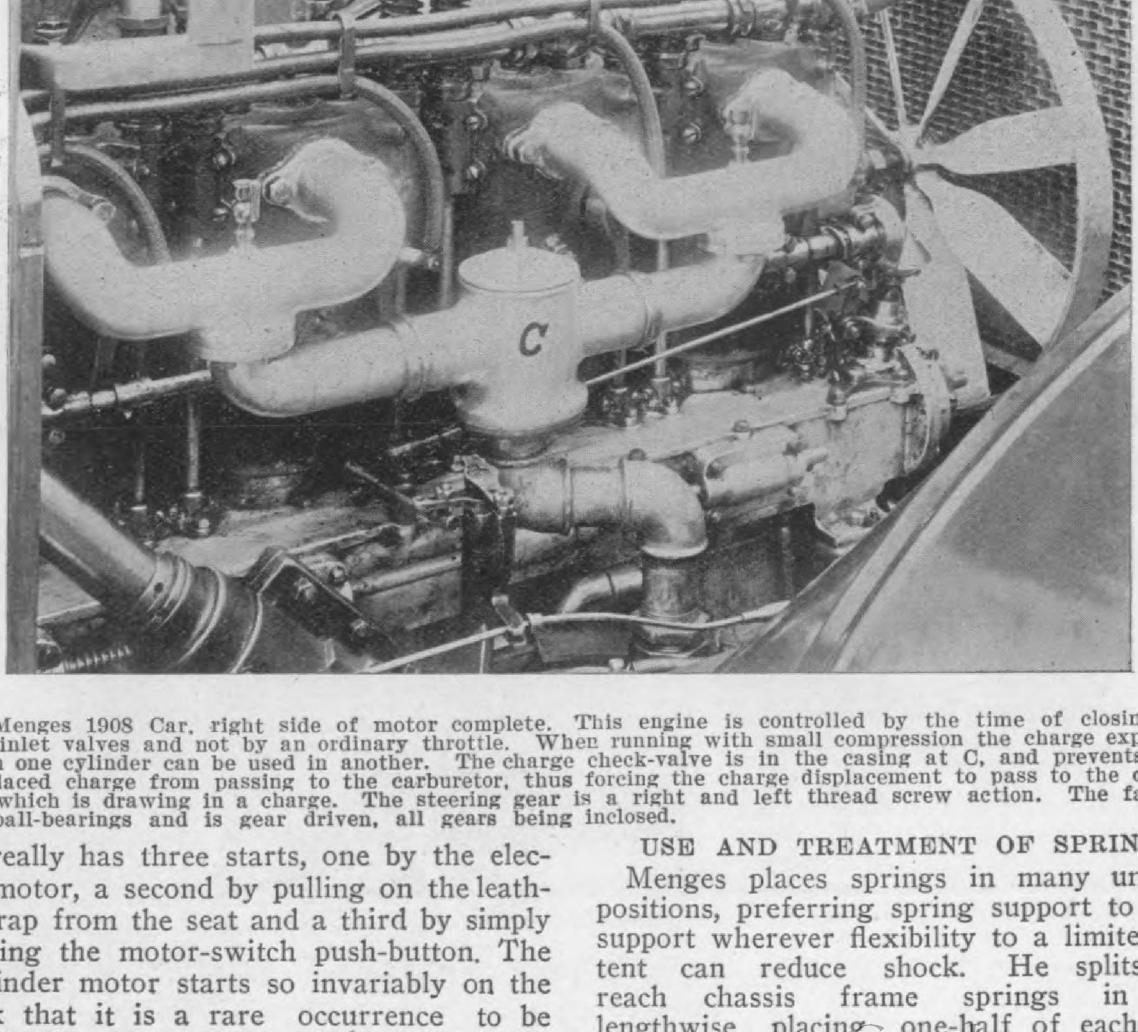
lected to the starting pinion by a one-
roller and eccentric-seat friction-clutch,
the strap-drum is also provided with a
return-winding spring, so that by pull-
the strap-ring upward the starting pin-
will be turned and so give a hand-start-
action for the motor; the reduction is
1. A push-button switch in the front
of the driver's seat, near the right-hand
gives storage battery current to the
ting motor. If the motor fails to start
antly it can be helped with a pull on the
l strap, the one-way clutch permitting
motor shaft to over-run the drum, and
n the strap-ring is released the drum
ng automatically winds the strap close on
drum and holds the strap ring in place
l against the floor. Thus the Menges

changed. The front wheels and floating rea
axles are on Timken roller bearings.

The gear changes are made by shiftin
two double-ended, solid-jaw clutches whic
are worked by latched hand levers thru roc
shafts working blocks having coiled spring
on each side, so that the hand lever may b
at once placed at the desired control-notc
whether the clutches are in position for en
gagement or not, and as soon as the clutc
jaws move to engaging position the sprin
forces them into place, so that any contr
engagement can be made at any time, wit
out delay and without clashing of the clutc
jaws. Since all the gears are always ful
engaged, there is no possibility of damagin
the gear-teeth by mishandling.



Menges 1908 Car, right side of motor complete. This engine is controlled by the time of closing o
e inlet valves and not by an ordinary throttle. When running with small compression the charge expelle
m one cylinder can be used in another. The charge check-valve is in the casing at C, and prevents th
placed charge from passing to the carburetor, thus forcing the charge displacement to pass to the cylin
which is drawing in a charge. The steering gear is a right and left thread screw action. The fan i
ball-bearings and is gear driven, all gears being inclosed.

really has three starts, one by the elec-
motor, a second by pulling on the leath-
trap from the seat and a third by simply
ssing the motor-switch push-button. The
linder motor starts so invariably on the
k that it is a rare occurrence to be
ed to resort to the electric self-start,
ch can be driven as a dynamo and made

USE AND TREATMENT OF SPRINGS.

Menges places springs in many unusu
positions, preferring spring support to rig
support wherever flexibility to a limited e
tent can reduce shock. He splits l
reach chassis frame springs in tw
lengthwise placing one-half of each sp
spring on each side of the symetrical re
spring hangers, so that he places four na

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The Tire of The Future

HARTFORD MIDGLEY TREAD TIRE

Clincher or Dunlop

ABSOLUTELY NON-SKID

Showing section of Midgley Universal Rims

"This invention is certainly a step in the right direction for it eliminates one of the greatest dangers in driving—the side slip or skidding."

—Philadelphia North American, June, 16th.

See the Cat's Claws?

No tire in the history of the automobile has made such a pronounced and instantaneous success. The Press, Owners who Drive, Chauffeurs, Professional Racing Men—all Motordom is enthusiastic in praise of this, the greatest tire invention of the age.

This tire in a few brief months has to its credit a list of speed, hill climbing and endurance victories never achieved by any other tire.

It isn't safe to drive a car that skids. Get Hartford Midgely Tread Tires at once and accept no substitute.

Millimetre Sizes for Foreign Cars

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NEW YORK, 88 Chambers St. and 1769 Broadway; CHICAGO, 83 Michigan Ave.; BOSTON, 494 Atlantic Ave. and 1020 Boylston St.; CLEVELAND, 1831 Euclid Avenue; DETROIT, 256 Jefferson Avenue; DENVER, 1564 Broadway; PHILADELPHIA, 138 N. 10th St.; BUFFALO, 725 Main Street; ATLANTA, GA., 55 Auburn Avenue; LOS ANGELES, 1505 South Main Street; SAN FRANCISCO, 423-433 Golden Gate Avenue.

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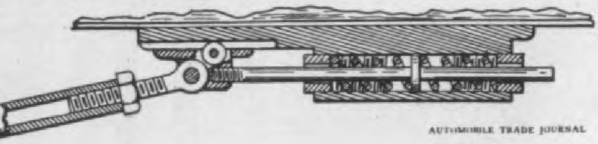
ng-blocks and on each side of the strut-
s by which the radius rods are linked
he chassis frame sides. The split, or
bled rear spring gives a symetrical con-
ction instead of the common overhung
-spring attachment.



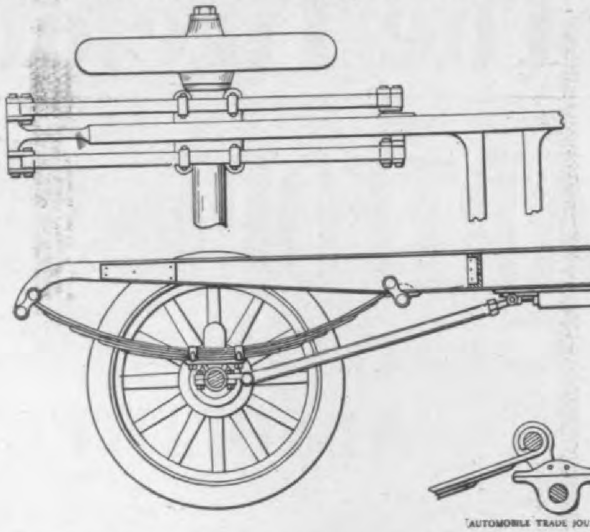
nges 1908 Car, radius rod construction. The rod
inted to a slide, rigidly connected to a double-
g spring plunger, so as to enable the radius rod
h to vary slightly to suit the body movements,
ns, and hand pump oiling at discretion, for the
length.

BEVEL MOTOR-GEARS.

ontrary to the usual spur gear practice,
nges places one bevel gear in front on
crank-shaft and radiates his intermedi-
shafts from this gear to drive his cam-
ft, pumps for both water and oil, com-
ator, hammer-spark shaft and magneto.

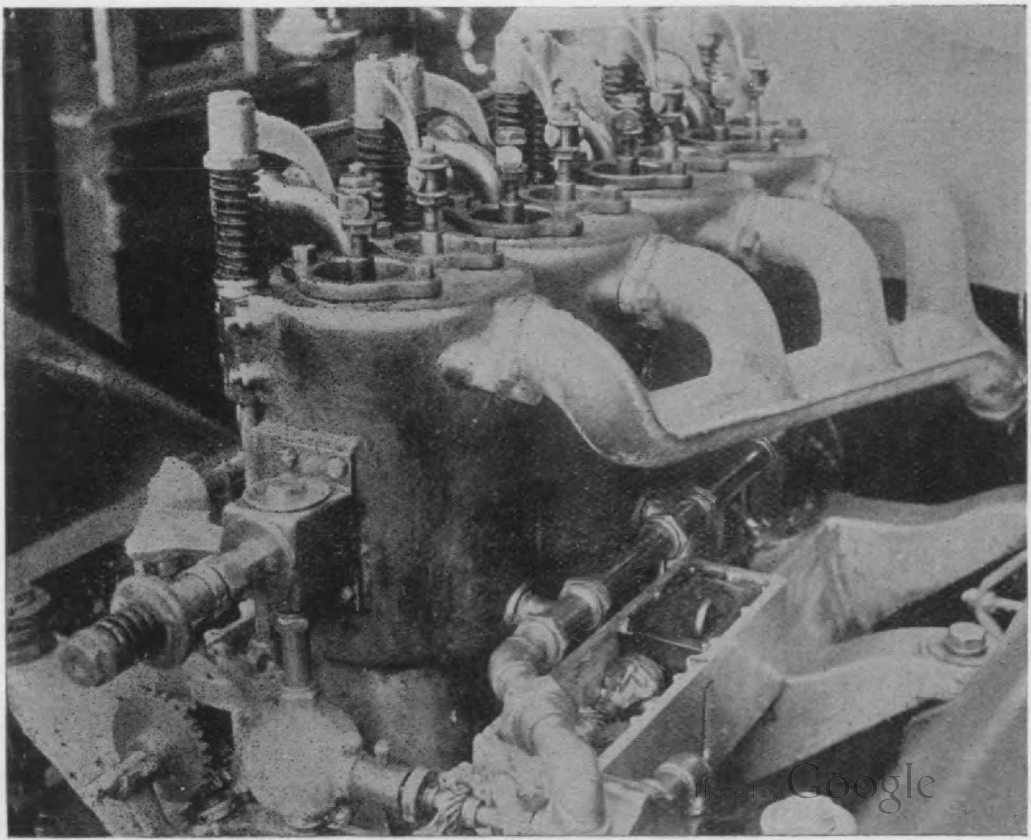
ADVANTAGES.

he car here illustrated and described
ws the motor carried on small-move-
nt springs on the chassis frame, and the
neau carried on split rear springs. It
shows springs placed in the control
tages, so that any control change can be
by jump-spark and hammer-spark so com
bined that the one timing control advance



Menges 1908 Car, rear springs and radius rod co
struction. The springs are split lengthwise, so as
make four rear half-elliptics instead of two, givi
one spring on each side of each side-frame spri
hanger, and making a balanced and symetrical spri
construction. This gives very easy riding and a
prevents bouncing to a noticeable extent.

or retards both. The jump-spark pl
electrode serves for that of the hamme
spark also and one instantly removable a
replaceable member, of small dimensio
and weight, carries both the hammer-spa
and jump-spark actions.



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A WORLD'S "RECORD" BY

STEVENS-DURYEA BIG SIX

REGULAR STOCK, REGULAR GEAR

At the races given by Lowell, Mass., Automobile Club, in July, the STEVENS-DURYEA BIG SIX with touring car body and containing seven people, traveled a mile on the rough road in 51 seconds flat. This equals 70¾ miles per hour and establishes a world's road record.

The same car went 5 miles in 5 minutes on a very narrow road which had numerous short curves besides. The car was compelled to avoid a wreck in middle of road thereby losing some seconds in time.

The regular stock BIG SIX, stripped, covered a mile in 46½ seconds, equalling a rate of 78 miles per hour.

A telegram from F. W. Eaton, Delmonte, Cal., states "BIG SIX just off freight car. Made fastest 5 miles at Delmonte track today, five forty-four and half."

STEVENS-DURYEA cars lead from "ocean to ocean."

Write for SIX CYLINDER Literature.

STEVENS-DURYEA COMPANY

700 Main Street,

CHICOPEE FALLS, MASS., U. S. A.

Member A. L. A. M.

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is now certain that the Menges 4-cyl-
ler motor, here shown, can drive the car
m a slow walking pace, about 2½ miles
hour, up to a very high speed, prob-
y 65 or 70 miles, on the high gear, with
changes save those made by sliding the
n-shaft endwise to vary the closing time
the intake valves.

t is also certain that the four rear
ings give a very soft and easy support
the tonneau.

LARGE PISTON AREA.

Menges assumes that the piston area
ould be sufficient to do all hard-surface
d work on the high gear, hill climbing
luded, and that the low gear should be
ed for low speeds necessitated by sand
d mud, only. The Menges four cylinders,
x5½ ins., are, so far as the writer's
owledge goes, the largest shown in any
e touring car. But the motor weighs
ly about 600 lbs., which is not excessive.
r all ordinary good-road work the in-
e valves are held open until the piston
within about 1¼ ins. of the end of the
mpression stroke, which gives something
s than 15 lbs. compression, with a very
ge expansion and of course low terminal
essure and temperature. With this small
ction of a full charge the car makes 40
45 miles with great ease and smooth-
ss of motor action.

BRAKES AND CONTROL.

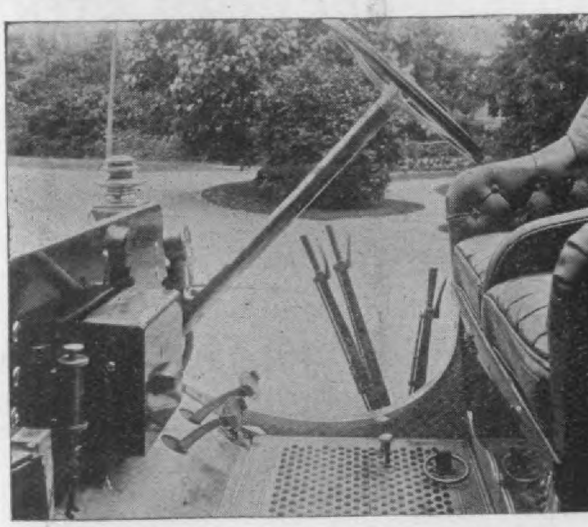
The car has external and internal rear
b drum brakes. The internal brake-drum
12 ins. dia. by 2½ ins. face. All brakes
e worked thru equalizers, and both brake-
oes and brake bands are faced with
andy belting.

Jump-spark plugs only were fitted to the
r when the accompanying illustrations
ere made. The spark and charge volume
ntrol levers are on top of the steering
heel, and there is also a small horizontal
ccelerator" pedal at the extreme right of
e foot board, which opens a throttle
lve between the carburetor and the intake
ping. The right-hand vertical pedal ap-
es the internal ordinary brakes to the
ar hub brake-drums. The left-hand verti-
l pedal operates the clutch, and is inter-
kt with the carburetor, as previously
entioned.

There are two plunger pedals, in the rear
the brake and clutch pedals. The right
e engages the starting pinion and spur
ar, by a linkage including an eccentric
rangement which disengages the starting
nion and the starting gear. The left
unger pedal is deprest to pull the cam-

bulk of charge with a compression pr
sure of about 15 lbs. gage. The cylin
bore is 6⅛ ins., and the dome-shaped co
pression chamber diameter is 6¼ ins. Wh
the cylinders are filled with cold air
maximum compression is 60 lbs. T
muffler is cut out by a small pedal.

The hand oil pump oils the piston pi
when the pistons are at the bottom o



Menges 1908 Car. Control. Caption in text.

of their travel. The outside hand lever
plies the internal emergency brakes by
pull and at the same time disengages
clutch; this lever is latched at both
tremes of travel. The middle lever
latched in 3 positions; extreme forward
sition gives low gear, extreme rear p
tion gives high gear and mid-position
engages all gears and leaves the car
for coasting.

The inside lever is latched in three p
tions, extreme position forward gives
reverse; in extreme rear position this
side lever gives low gear forward; w
latched in the middle the car is free
coast. The rear axle change gear gives
car two speeds forward and a reverse,
is made at Columbus, Ohio, by the "Di
Drive" Axle Co.

BEAUTY OF DESIGN.

The outlines of this Menges car body
highly satisfactory in points of symm
and proportion, the car as a whole form
a fine example of the straight line t

ON THE ROAD.

The writer had no opportunity to m
a long run on this car, nor to make
measured fuel runs. One run of 40 or
miles showed the control by varying
valve-closing time to be extremely pro
and flexible. The car is very still, and

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ANNOUNCEMENT
TO SPARK PLUG USERS

A Money-Back Guarantee
WITH EVERY
DIAMOND SPARK PLUG

The ONLY Plug which you can LOOK THROUGH and SEE THE SPARK in the cylinder

¶ Believing that proof is better than argument and that practical demonstration is the ***best*** proof, we make the following unexampled offer to Spark Plug users:

Send us $1.50 (Marine Engines $1.75) for each Spark Plug desired, in check, money order, stamps or cash, together with name of your car or engine, and we will send you, PREPAID, Diamond Spark Plugs to the amount of your order and under the following absolute

GUARANTEE

If within six months of date of purchase you are not entirely satisfied with the Diamond Spark Plug in every particular, write us to that effect, and the purchase price will be returned without question or quibble.

¶ Diamond Spark Plugs are made from the highest grade material throughout. The porcelain used is unbreakable, all metal parts nickeled and polished and cannot rust.

¶ There is no short circuiting. No packing to blow out. No cement or shellac used. The sparking points are non-corrosive throughout.

¶ These and other features make the Diamond Spark Plug a ***serviceable certainty.***

¶ Send to-day, while the offer is fresh in your mind, for your first perfect Spark Plug and end your sparking troubles.

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WILLYOUNG APPLIANCE CO.
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SELLING AGENTS:

MOTOR PARTS CO., No. 25 West 42d St., New York City

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n product, suited to high altitude condi-
ons. This machine is high-grade in
very respect, and is the product of the Col-
urn Automobile Company, of Denver, Col.
he accompanying photograph of the com-
ete car gives a good idea of its general
ppearance.

The valves are located in the head,
ing a very compact combustion cham
which insures the highest possible
efficiency, this being an especially g
form in this altitude (Denver, Col.), wh
clearance space should be relatively sm
er for the same amount of compressio

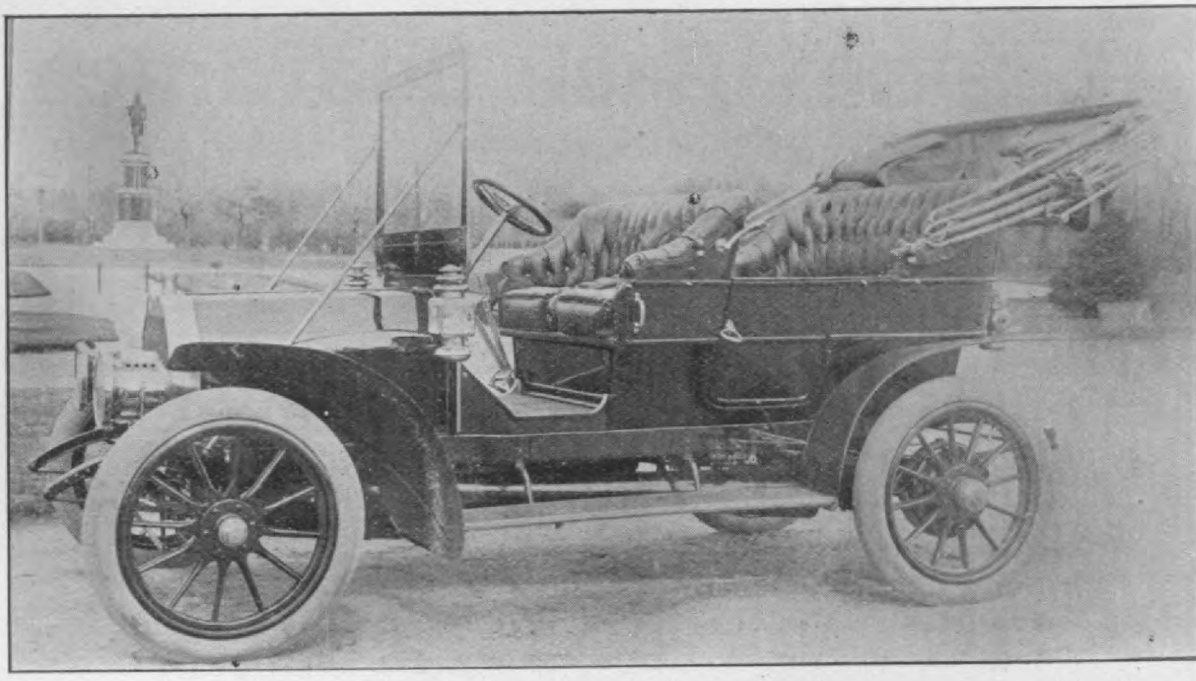

Fig. 1. The Colburn Automobile; 4-cylinder, 28-32-H. P.; 4 forward speeds, selective type transmissi direct drive on third speed; high tension magneto, also battery and coil; valves in cylinder heads; c clutch with inserts; Timken bearings in runnings gear, D. W. F. bearings in transmission; chrome ni steel gears; Venturi tube carburetor; 4 brakes with 338 sq. inch braking surface on the rear whe Price fully equipt with top, lamps, horn and tools, $3250.

The car weighs, complete, 2400 pounds,
nd is luxuriously equipt. The tonneau is
oomy and accessible by large side doors
inged at the rear.

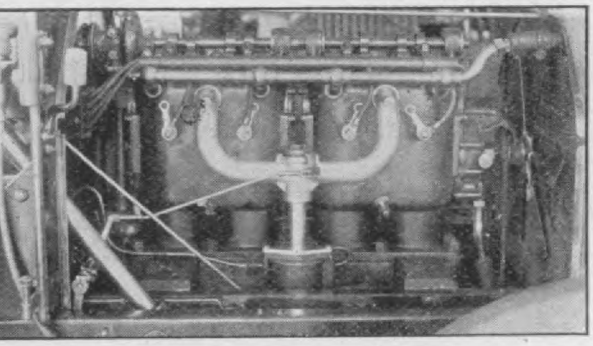

Fig. 2. The Colburn Motor, inlet side. 4¼ bore by inch stroke, cylinders cast in pairs and mounted on anganese bronze crank case. Note the overhead cam haft mounted on Hess-Bright bearings and acting di ctly on valves in the cylinder heads; also the throttle rangement at the junction of the inlet pipes.

THE MOTOR.

The car is fitted with a 28-32 H. P. 4-cyl-
nder engine of 4¼ bore by 5-inch stroke.

sea level, the atmospheric pressure at
locality being but 12.2 pounds instead

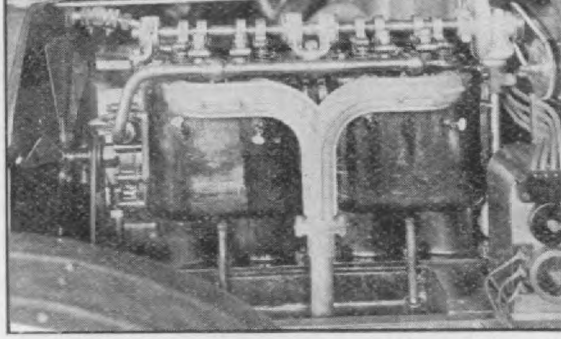

Fig. 3. The Colburn Motor, exhaust side. The and rollers of the overhead cam shaft are h and run in oil. The cam shaft is driven by gears, also housed and running in oil. Note the tension magneto and the steel belt driving the from the rear of the cam shaft.

14.7, the pressure at sea level. The va
are readily removed or inserted by
screwing a lock ring without changing
timing.

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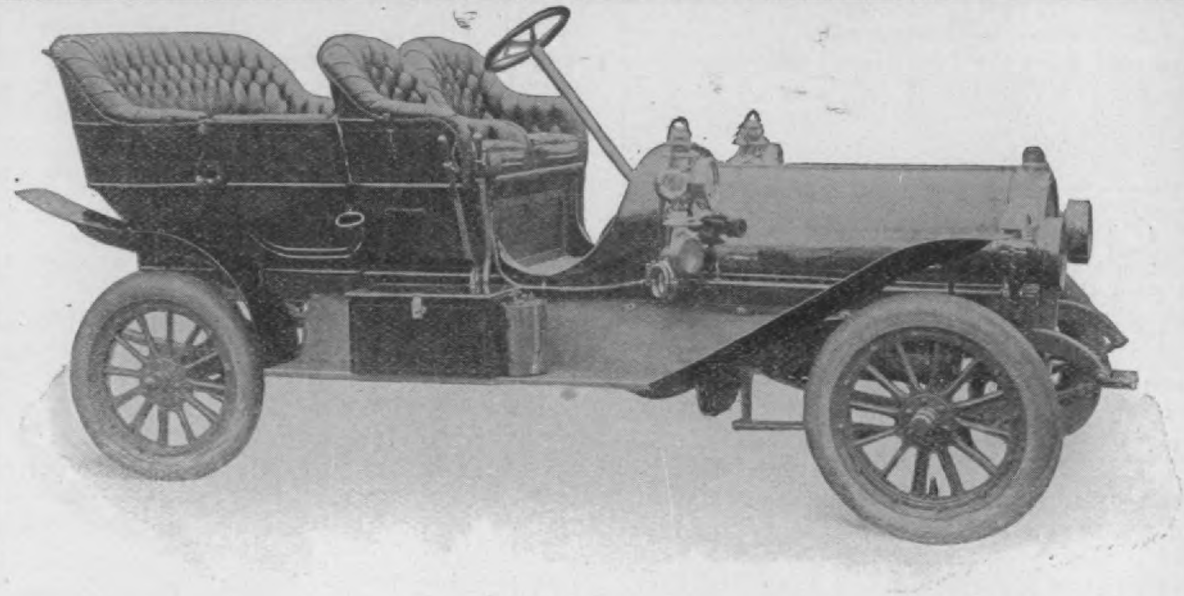
LAMBERT Friction Flyer



Model H, $2000

The Friction Drive is indorsed and recommended by America's greatest mechanical experts.

Write for our art catalogue.

BUCKEYE MFG. CO.

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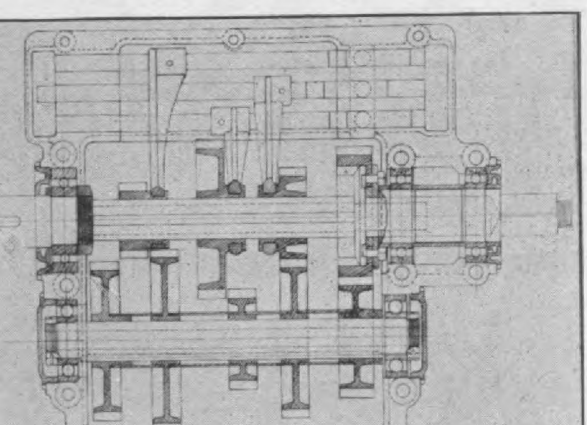
y as to keep them at a uniform tempera-
re thruout. The water being taken in



ig. 4. The Colburn change speed gear. Chrome
kel steel is used for the gears. The shafts are
unted in Hess-Bright bearings. There are 4 speeds
ead with the direct drive on the third speed.

the exhaust side at the top and running
t at the intake side. This prevents dis-
rtion from heat and relieves binding and
cessive wear on certain spots in cyl-
ders.

LUBRICATION.

Each cylinder has individual lubrication,
ere being a compartment for each cylin-
r into which oil is forced by a mechani-
l lubricator located on the dash and steel
lt driven from the rear of the cam shaft.

the nozzle and mounted on binnacle piv
keeps the level in the nozzle the same
any angle of the car.

CHANGE SPEED GEAR.

The transmission is driven thru
conical leather-faced clutch with adjusta
inserts to insure easy engagement.
tween the clutch and transmission there
a floating or universal joint, which preve
any lateral thrust on the bearings cau
by twisting of the frame on uneven roa

A selective type transmission, with f
speeds ahead and direct on third, give
good serviceable gear for moderate sp
capable of handling all usual road con
tions, while the special or high gear
be used for bursts of speed without rac
the engine. Hess-Bright bearings
chrome nickel steel are used thru
the transmission.

Both universal joints are set at the sa
angle, as in this position the second jo
corrects the irregularity of motion cau
by the first, giving a much smoother dr
than joints set in the usual way.

Both service and emergency brakes
mounted on the rear wheels, there be
an air gap or cooling space between
two. Collectively there are 338 squ
inches of braking surface, so that the
can be handled on long down grades wi
out heating brake drums.

A megaphone-shaped muffler working

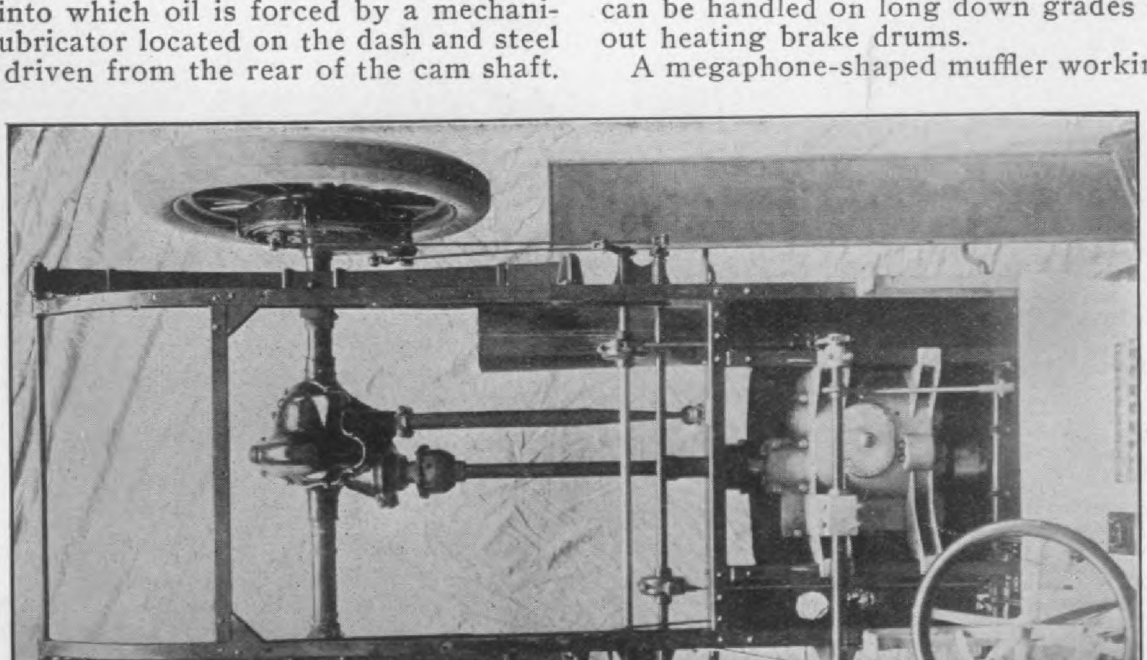


Fig. 5. Plan of the Colburn chassis, showing the double sets of brakes on the rear wheels separated
a annular air space for cooling, the large wide springs, 50x2½-inch wide, the method of suspens
the change speed gear case and the torsion rod and floating rear axle.

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TIRE TOOL

Tire Tool Folded. Fits in the Tool Box.

Rolls the most obstinate tire on or off in a few minutes time, with remarkable ease—

No expert knowledge or practice required to operate it. Simply insert the tool, turn the handle slowly, and the result is accomplished—

Cannot possibly injure the inner tube. This feature alone insures a saving of many times its cost—

MUST BE SEEN TO BE APPRECIATED

Call at our Show-Rooms

and we will gladly give you a practical demonstration. If you cannot come to us, let us send descriptive catalogue to you.

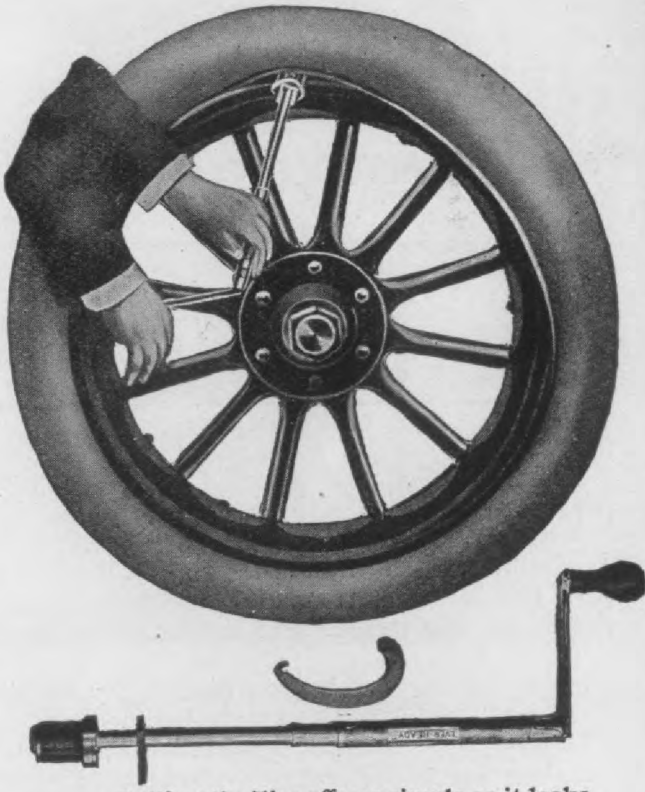
Price Complete, Including Clamp

and special hook for replacing or removing lugs.

$8.00

We also manufacture a number of other automobile improvements, which increase the efficiency of every motor car.

ADDRESS DEPARTMENT 5.



Rolling the Tire off—as simple as it looks.

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AUTO IMPROVEMENT COMPANY

ont axle and clutch-driven rear axle, 34x4

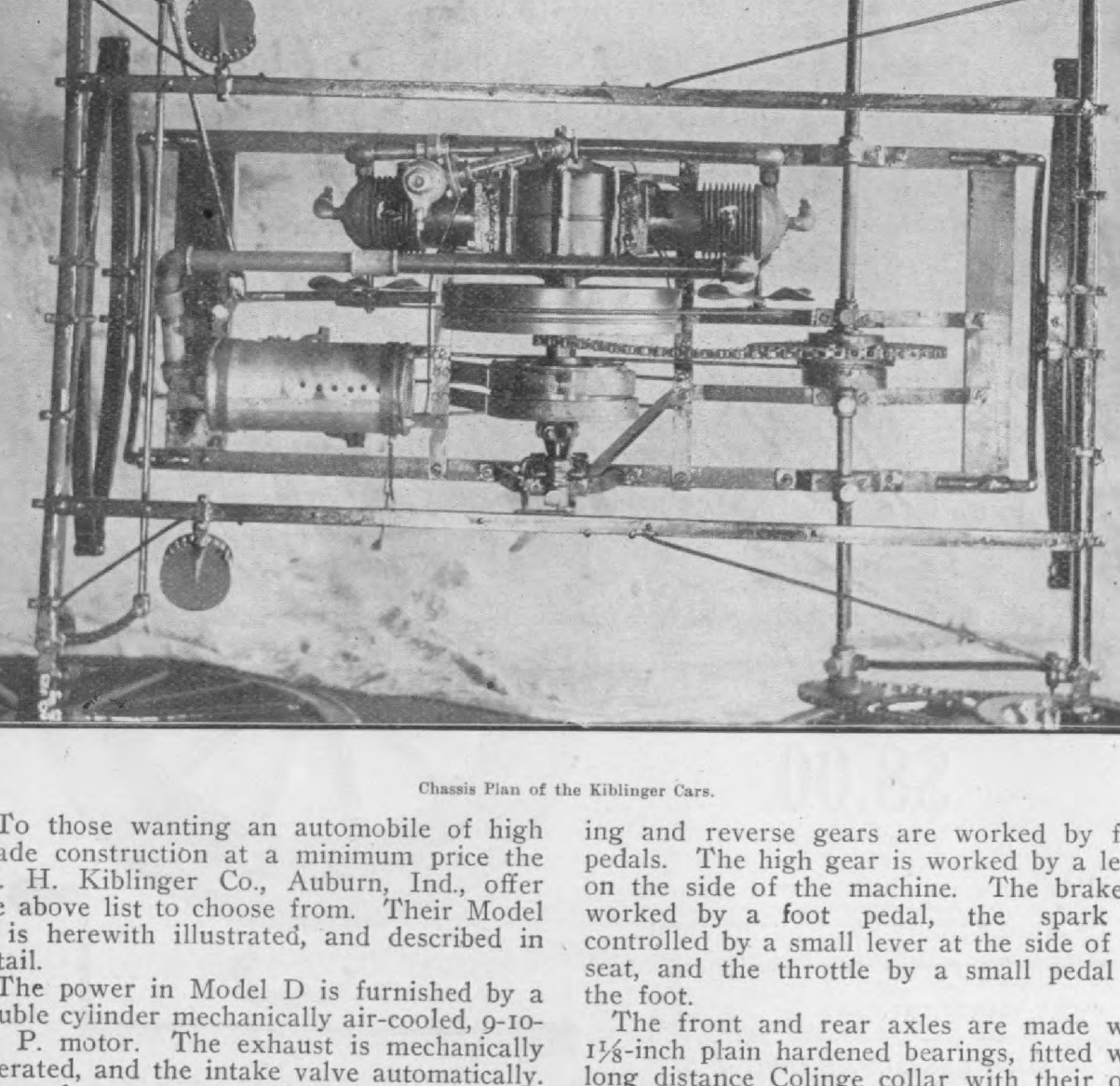
duces the best possible combination this mountainous part of the country.

The "Kiblinger" Automobile

The Kiblinger automobile is made in six odels, viz., Model A, 4-H. P. motor, list-g at $250; Model B, 6-H. P., $300; Model 6-H. P., $320; Model D, double cylinder, 10-H. P., $375; Model E, double cylinder, 10-H. P., $395; Model F, double cylinder, 10-H. P. motor, folding tonneau, $450.

The transmission is of the planetary ty giving two speeds forward and one reve All transmission bearings are made bronze and all gears of steel, cut and gro to perfect fit. The gear case is oil-tight all gears run in an oil bath.

The speed control, the low or hill-cli



Chassis Plan of the Kiblinger Cars.

To those wanting an automobile of high ade construction at a minimum price the . H. Kiblinger Co., Auburn, Ind., offer e above list to choose from. Their Model is herewith illustrated, and described in tail.

The power in Model D is furnished by a uble cylinder mechanically air-cooled, 9-10- P. motor. The exhaust is mechanically erated, and the intake valve automatically. e valves are made of drop forgings, per-tly ground. All wearing parts are made tra large to insure long wear. The bear-

ing and reverse gears are worked by f pedals. The high gear is worked by a le on the side of the machine. The brake worked by a foot pedal, the spark controlled by a small lever at the side of seat, and the throttle by a small pedal the foot.

The front and rear axles are made w 1⅛-inch plain hardened bearings, fitted w long distance Colinge collar with their o make of lock washer. The wheels are the Sarven patent, No. 3 flange type. T are 28 inches in diameter front and r

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Cost of Maintenance

There is much talk of operating cost, some fact, more fiction.

Mr. E. S. Gerling, who is a man of method and details, has kept an accurate account of the running expense of his Rambler Type One and furnished Mr. W. K. Cowan, from whom he purchased the car, with the appended statement of maintenance. It speaks for itself.

LOS ANGELES, CAL., July 3, 1907.

I, E. S. Gerling, of Pomona, Cal., purchased a Surrey Type One Rambler, in 1906, from W. K. Cowan, of Los Angeles. Covering a period of nine months from date of purchase, my car ran 3750 miles. I kept a strict account of all expense to machine and tires, also gasoline, lubricating oil, waste, polishing material, and in fact every item of expense and up-keep connected with the machine, including in this expense the cost of gloves. This total expense at the end of nine months mentioned, amounted to $1.05 per 100 miles, making a total of $39.37, this being absolutely the total cost to me in money of running this machine 3750 miles, and covering a period of nine months.

I certify that the above is correct.

E. S. GERLING.

Subscribed and Sworn to before me this 8th day of July, 1907.

J. A. GALLUP, Notary Public in and for the county of Los Angeles, State of California.

THOMAS B. JEFFERY & COMPANY

Main Office and Factory, Kenosha, Wisconsin

Branches and Distributing Agencies

Chicago, Milwaukee, Boston, Philadelphia, San Francisco

REPRESENTATIVES IN ALL LEADING CITIES

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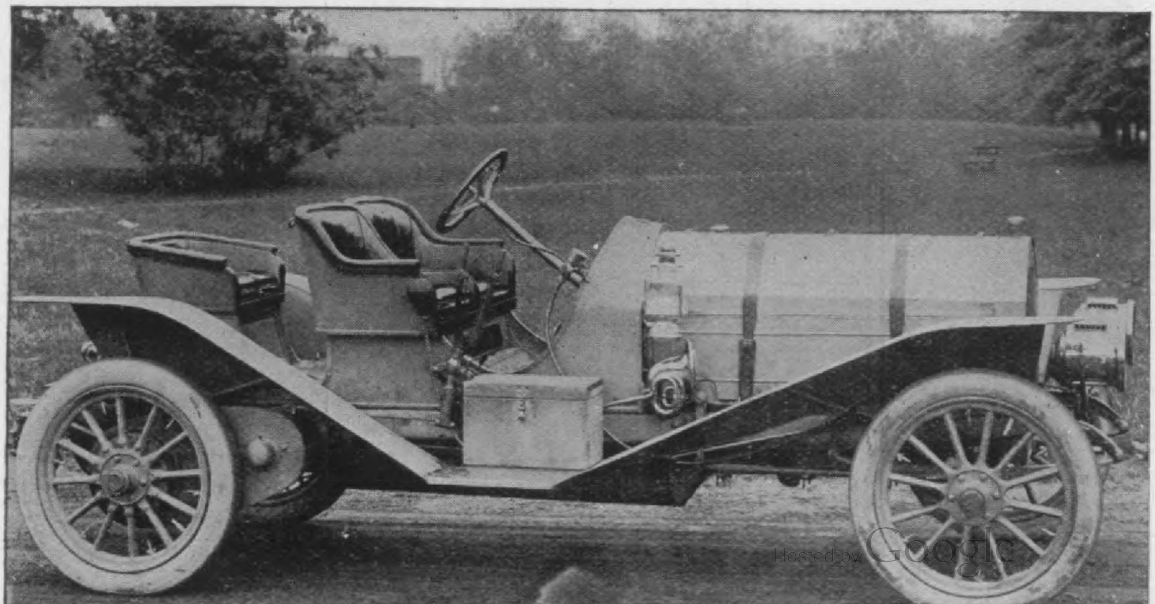
g. The clutch is fiber faced. Kingston

The "Kiblinger" Model D Automobile.

pruetor is used. Steering is by tiller, g knuckle and yoke on front axle. The y is of the piano-box type, seats trim- l with artificial leather, dark green. The y is painted in black, with running gear in nine. The net weight of car is about 690

top and roll front, $25.00; No. 2 oil lamp $15.00; ball bearings, $25.00; No. 1 oil lamp $10.00; horn, $2.50.

The general specifications for the oth models are the same as for Model D, wi the exception of the motors.



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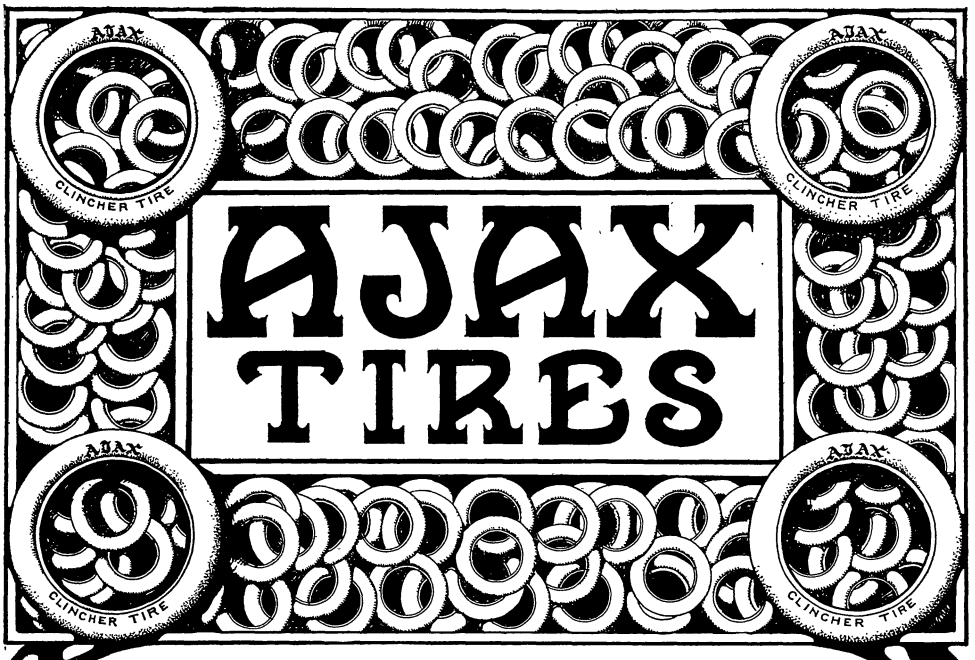

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1907 Glidden Tour

MR. J. D. MAXWELL SAID:

"You can truthfully say that the AJAX Tires on the "Maxwell" Pilot Car made the entire journey of 1,600 miles with even one puncture."

This is another proof that the tire good enough to be

Guaranteed for 5,000 Miles

is the most durable and reliable tire on the market. Write for copy of Guarantee, stating what size tire you are using.

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Boston, 801 Boylston St.
Porto Rico, 32 Marina, San Juan.
Baltimore, 20 St. Paul St.
Seattle, 1419 Broadway
Philadelphia, 1413 Race St.

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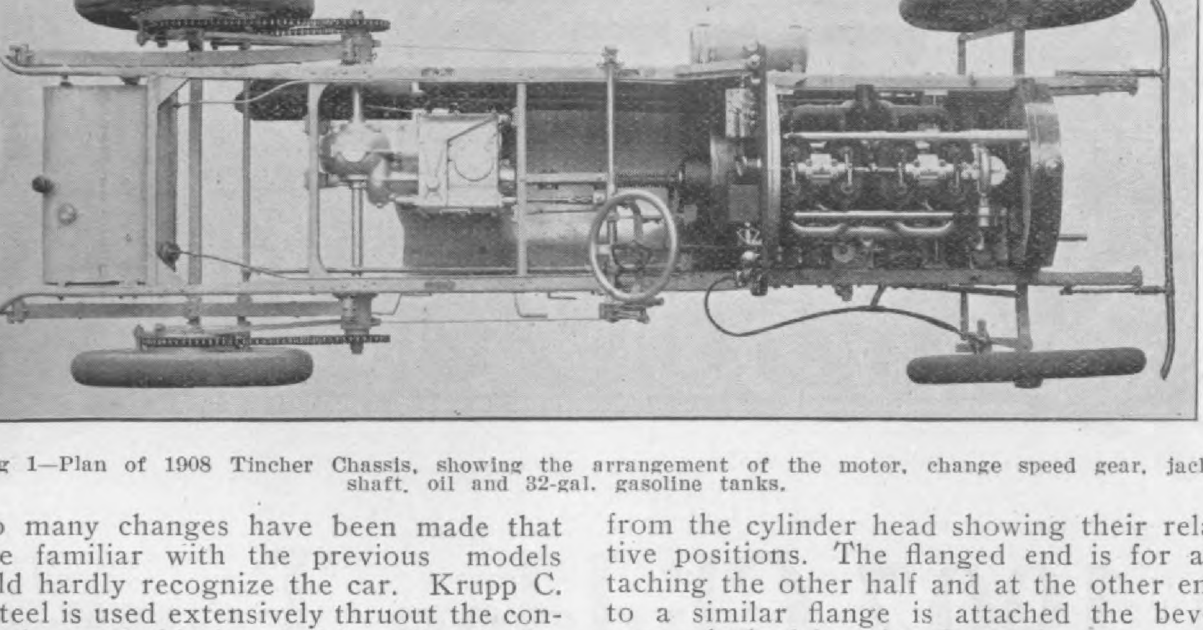
7 cars each season, now, however the of a lot of eighteen cars are on the l for their try out. The change in tac- followed the reorganization of the com- y and its capitalization at $200,000, a -story factory having been secured at th Bend, Ind., in January, 1907.

being united by bolting together the integr flanges. This construction permits of r moving one-half of it or two cylinders wit out molesting the other half. The accon panying cut Fig. 2 illustrates half the ca shaft and one-cylinder with the valve hou ing removed and the parts lifted somewh



g 1—Plan of 1908 Tincher Chassis, showing the arrangement of the motor, change speed gear, jac shaft, oil and 32-gal. gasoline tanks.

many changes have been made that e familiar with the previous models ld hardly recognize the car. Krupp C. teel is used extensively thruout the con- ction and this has had its effect in the ged appearance of many of the parts.

ne car is a large 7-passenger machine, l with a 50-60 H. P. 4-cylinder motor of h bore by 6-inch stroke. The drive is ide chains, the wheel base is 127 inches 36-inch wheels, with 4-inch front and h rear tires are used. A double igni- system of battery and imported mag- are employed.

SPECIAL FEATURES.

n overhead cam shaft cut from solid N. steel with integral cams and end ges is used. A single cam operates the ke and exhaust valves of each cylinder. er novel features are the 6-inch band h, the peculiar mounting and driving of magneto. Chrome steel is used for crankshaft, change speed gears, cam- t and in the frame. The valves are 35 cent. composition of nickel steel.

most every part of the car is made at factory, a large number of the parts g cut from solid C. N. steel stock vn as E. F.-60.

THE MOTOR.

llowing Tincher practice this 50-60 H. notor has its cylinders cast separately small integral valve chambers on op- te sides in the top of which the valve

from the cylinder head showing their rel tive positions. The flanged end is for a taching the other half and at the other en to a similar flange is attached the bev gear which drives it. It carries two cam A and B. A operates the valves of th cylinder shown and B the valves of th

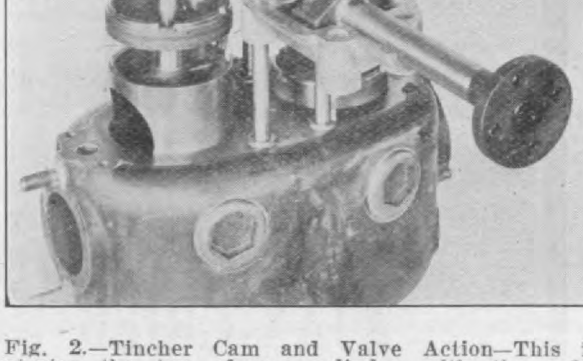


Fig. 2.—Tincher Cam and Valve Action—This lustrates the top of one cylinder with the val cages, cam shaft and other parts raised up o of position. The single cam A operates the roll arms E and F, which are rigidly connected to arm C and D, which give the valves their ½-inch ope ing. The shaft of F passes thru the hollow shaft E. The other cam B operates in a like manne both valves of the next cylinder. This mechanis is enclosed in an oil-tight aluminum case. The e haust operating arm E is fitted with two rollers

Here is a plain reason why

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In a recent issue of the India Rubber World the following pertinent observation was made respecting tire-selection:

> "What does A or B or C care who makes his tires, or how he makes them, so long as they render a service, for which he cheerfully pays, whatever is charged. He asks simply that the tires will take him out, and home again, without accident.

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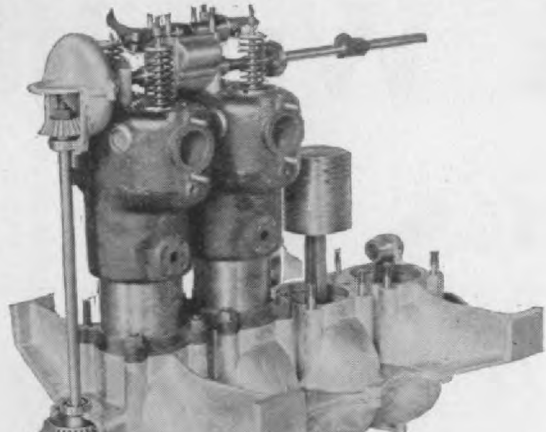
in turn by the single cam A in its rota-



. 3.—1908 Tincher Motor partly assembled, show-the overhead cam shaft and valves in the head, e and exhaust both operated by a single cam Fig. 2), the bevel gear drive for the two-piece shaft, the individual cylinders and the peculiarly aluminum crank case construction.

. The valve cage and its retaining w ring are shown raised and separated. below the screw ring is a spring prest or plunger in the cage which when the e is in position shoots into its socket he casting and prevents the cage from ing.

The cylinders are bored and reamed a finished by lapping. The four throw cra shaft, a special alloy forging, is carried five bearings 2 inches diameter by 4 inch long, except the rear one, which is 5 3 inches in length. These bearings and tho in the lower connecting rod ends are Parsons white brass. The wrist pin bus ings are adjustable, but of bronze. In Fi 3 is given a general view of the partly a sembled engine. The cylinders are ca individually and slightly separated, giving stronger construction and allowing the u of longer bearings. The crankcase is a tw part casting, the upper half with integr supporting arms taking the crankshaft bea ings and the lower portion very restrict in size and with a separate compartme beneath each cylinder, forming four pockets. Between the compartment benea the first and second cylinders is a hole f maintaining the crankcase compression. F lowing Tincher practice, the top half similarly restricted, giving the case peculiar globe-like appearance. The co struction is extremely rigid. The large p tons carry 4 diagonally cut eccentric rin above the pin and at the bottom 5 grooves are employed. The bevel gear dri for the cam shaft is clearly shown. In Fi

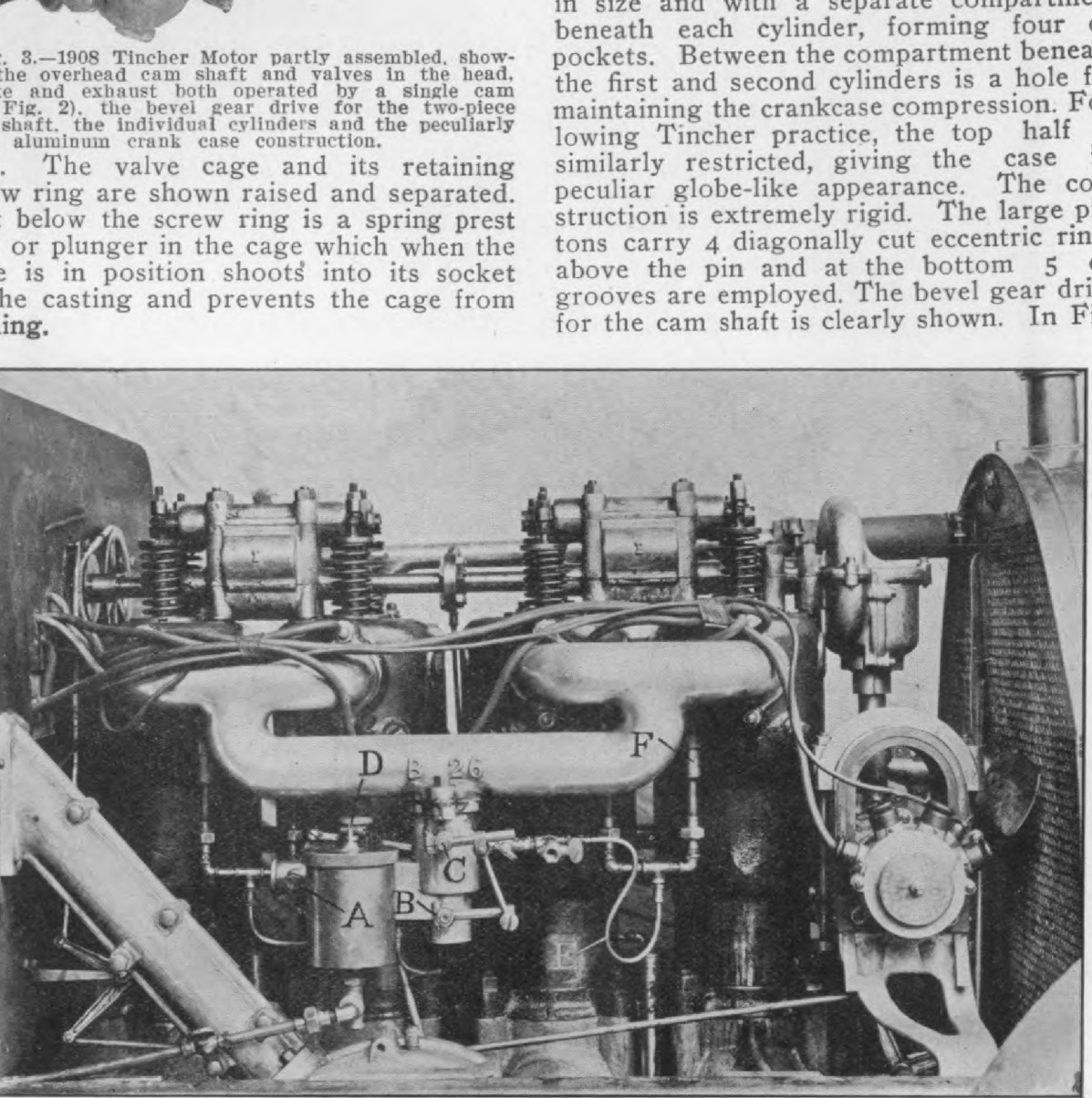


Fig. 4.—Tincher Motor Complete, showing the location and mounting of the Gianoli high-ten- magneto (in the finished models the wiring will be carried in insulating tubes), the arrange- of the intake pipes and carburetor and the peculiar auxiliary intake system consisting of

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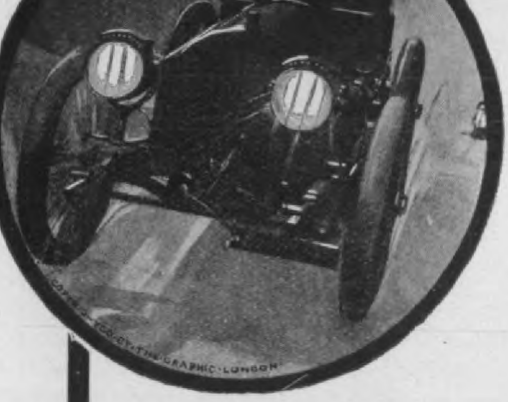

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four methods of control all interconced and operated by one lever on the ring wheel. A is a butterfly throttle controlling auxiliary air, B is another terfly throttle controlling the direct air t, C is still another in the mixing cham-

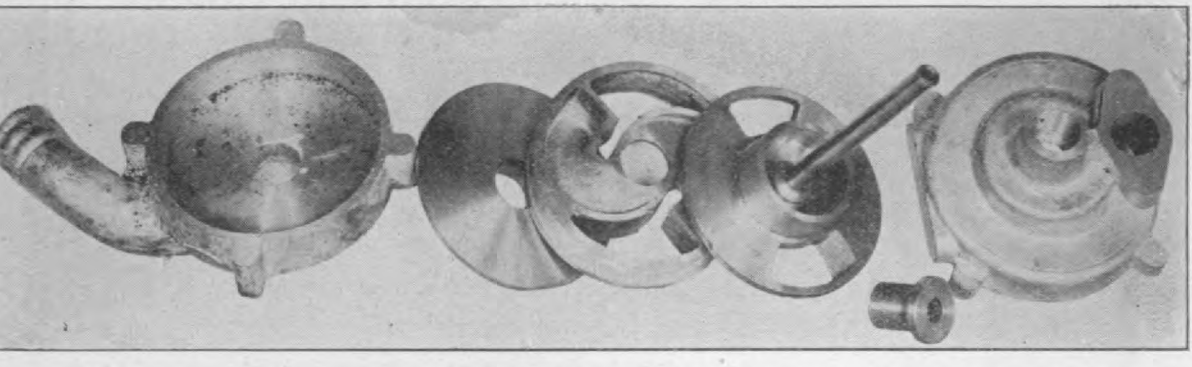

Fig 5.—Tincher Pump parts—The central portion is a bronze casting and corresponds to the blades o er centrifugal pumps. The outside casing is of aluminum in two parts. The water is taken in a center and discharged at the periphery. The pump is mounted at the left side of the vertica ft at the forward end of the motor and is gear-driven from the vertical shaft.

itself and is the main throttle controlling mixture to the engine. D is an arm ch from closed to open position of the ttle lever gives the needle of the needle e a thirty degree rotation. With the ttle C wide open the main air inlet B hree-quarters open, the auxiliary intake even-eighths open and the needle valve has completed its 30 degree revolution, g lifted by its threaded stem. interconnecting arms are adjustable, but properly set at the factory. The square tion of the carburetor between the two nbers is divided by a horizontal partition hat in cold weather warm water from jackets circulates thru it. The most liar feature of the entire inlet system e use of small auxiliary pipes E, which vey at all times even when the throttle losed a small amount of mixture to the bustion chambers at a point close to spark plug terminals. The small pocket t the cylinder is fitted with a ball check e and with the throttle closed this auxil- system is arranged to run the motor bout 70 revolutions per minute. This or convenience in allowing the motor un idly while the car is standing.

hirty-two gallons of gasoline are car- in a tank at the rear and fed by a two- nd pressure to the carburetor. A hand p on the dash is used for the initial sure.

OILING.

4 feed McCord oiler mounted on the side of the rear of the dash is wire belt en from the rear of the cam shaft and vers oil to the second and fourth

IGNITION.

Dual ignition is supplied, both using t same spark plugs. A Gianoli high-tensi magneto is placed at the front on the le side on a special bracket and is driven b bevel gears from the vertical shaft whi drives the cam shaft. This magneto is f ted with a distributor, but this is not use a Leavitt high-tension distributor being a ranged on the rear of the cam shaft a visible to the driver thru a hole in the das The magneto wire leads to a dash swit and thence to the distributor and plug

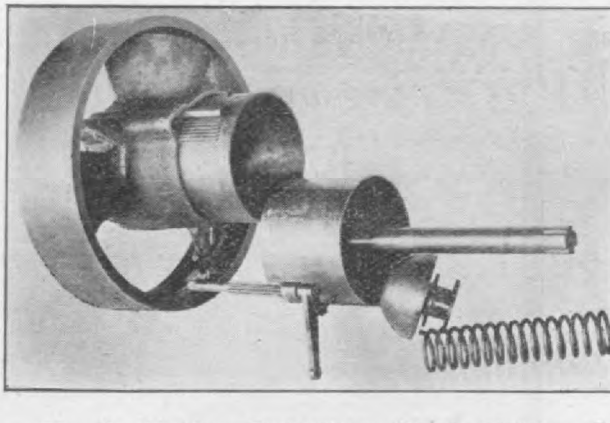

Fig. 6.—Tincher Contracting Sleeve Clutch. T clutch consists of a split sleeve 6 inches long, sho partly withdrawn from the fly-wheel hub. T sleeve is contracted upon the bronze drum attach to the transmission shaft by means of the long, t pinion and arm shown below. The pinion rushes w teeth out in the outside of the split sleeve or ba The pinion operating arm is given its motion by ball end being in contact with the semi-spherical me ber, which slips over the shaft and is given a re procating motion upon it by the clutch pedal. T spring gives the engaging motion.

The fibre tubes for conducting the wire a not shown in the photo herewith repr duced. The second system consists of storage cell, Gianoli single coil and t same switch and distributor.

WATER CIRCULATION.

A centrifugal pump, the parts of whi are shown in Fig. 5, forces the water th a 13-inch pipe to the cylinder jackets at

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so well that the trade showed its appreciation by adopting the use of them on high grade cars throughout the country. We will take advantage of our increased facilities to further improve the quality of our product.

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gear driven. The brackets are bronze and enclosed by a divided aluminum case.

CHANGED SPEED GEARING.

'he change speed gears as shown in Fig. re of C. N. steel mounted on annular l bearings and give 4 speeds forward. gears are cut in their own factory from blanks and have five pitch and 1 1-8 inch e. The two sliding sets on the main shaft rk on four integral keys on the shaft. All large gears are of the ring type attach- to integral shaft flanges by means of ht bolts, which pass thru the gear hubs l the flanges parallel to the shaft axis.

'o facilitate dropping into high or direct ve one set of teeth is beveled off, but to vent disengagement when the car is sting the opposite side is retained aight.

Gearshifting is accomplished by the selec- e method one lever working in a one-slot drant, but which has three vertical posi- ns. The lower position is a short half- t for the reverse, access to it being by ress button on top of the change speed er. The intermediate slot has a forward l back position for fourth and third eds respectively. The top slot possesses positions, the rear one for slow speed l the forward for second speed. In get- g from the top slot to the middle or top change speed lever is arranged to drop tically. It is lifted to go from third or rth speed to first or second speed, but ps when falling again to the third or rth. The connection between the bot- n of the lever and the three shifter rods ich are placed one above the other to respond with the three-slot quadrant is ross lever hinged at its outer end to the gearsets simultaneously. As in all cha driven cars the transmission is housed a central extension at the rear of the ge box. The jackshaft is a pair of chro nickel steel drive shafts squared into t differential gears, carried on a race of a

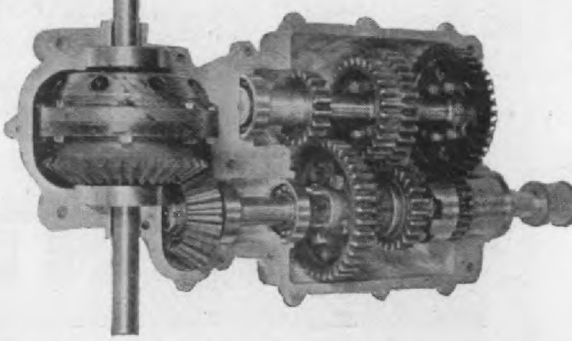

Fig. 7.—Tincher Change Speed Gear, giving 4 spe ahead. The gears and shafts are of chrome nic steel. There are two sliding members operating four integral keys on the shaft. The large ge are of the ring type with hubs which fit over integ shaft flanges and are each held by eight bolts, wh pass thru the hubs and flanges parallel to the shaf

nular ball bearings and housed in sleev thus constituting a floating shaft. The ge set housing is a two-piece aluminum co partment. The top half for covering pu poses is well webbed.

BRAKES.

Double brakes are located on drums the rear wheels. The emergency set bei expanding bronze bands and the serv brakes being camel's hair belting lined co tracting bands applied by foot pedal. T drums and rear wheel sprockets are in gral forgings bolted to each of the spok They are 12 inches diameter and 2 1-2 inch face. Application is thru cable passing th equalizers.

CLEVELAND NEW YORK

n the
1906
Glidden Tour

In th
1907
Glidden Tou

Last year the Warner Auto-Meter was used on 38 out of 62 Cars entered for the Glidden Tour.—Of the 13 Cars that finished with perfect scores 10 had Auto-Meters on their dashboards—Read the other side for our 1907 Record.

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The Warner Instrument Compan

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ochester, N. Y., U. S. A., Julius Jack-
n, president; John W. Breyfogle, vice-
esident and treasurer; Burton T. Kins-
an, secretary; George D. Wilcox, gen-
al manager, will offer for the season of
08 three different models of cars, the
Gearless Great Six," a seven-passenger

no internal friction nor rolling con
everything relatively stationary the
tire mass of the transmission unit rev
ing as a fly-wheel.

The low forward speed is had by
frictional engagement of five large "
cial-fiber" coned rolls, revolving on

Fig. 1. The Gearless Transmission 1908 7-passenger touring car. Wheel base 128 in
Gage 56 ins. Tires, 36x4 ins. front, 36x4½ ins. rear. Motor, six 4-cycle, water-cooled, 4 13-1
½ ins., cylinders showing 75 H. P. at 1350 R. P. M. Gearless transmission, no toothed gea
ng in the speed-change, tonneau body, side doors swinging to the rear, with revolving chairs f
wo tonneau passengers, in addition to rear tonneau seats for three. Weight, 3375 lbs., tan
illed. Price, $4000, with 5 lamps, mats, horn and tools, ready for the road. Cape top, $150 extr

uring car, the "Gearless Model 60," a
ve-passenger touring car, furnished with
vo chairs additional when so ordered,
nd "The Gearless Greyhound," a semi-
cer, with a three-seated roadster body.
he gearless seven-passenger touring car
nd the "Greyhound" use the same six-
linder motor. The "Model 60" uses a
ur-cylinder motor.

in an exterior and interior cone. Th
two cones coact with a sliding, dou
faced, solid-jaw clutch which is moved
forward extreme to obtain the low-sp
drive forward and to rearward extr
position to obtain the reverse drive.
internal cone is constantly spring-pres
towards the external cone, so as alw
to assure "bite" enough to make the

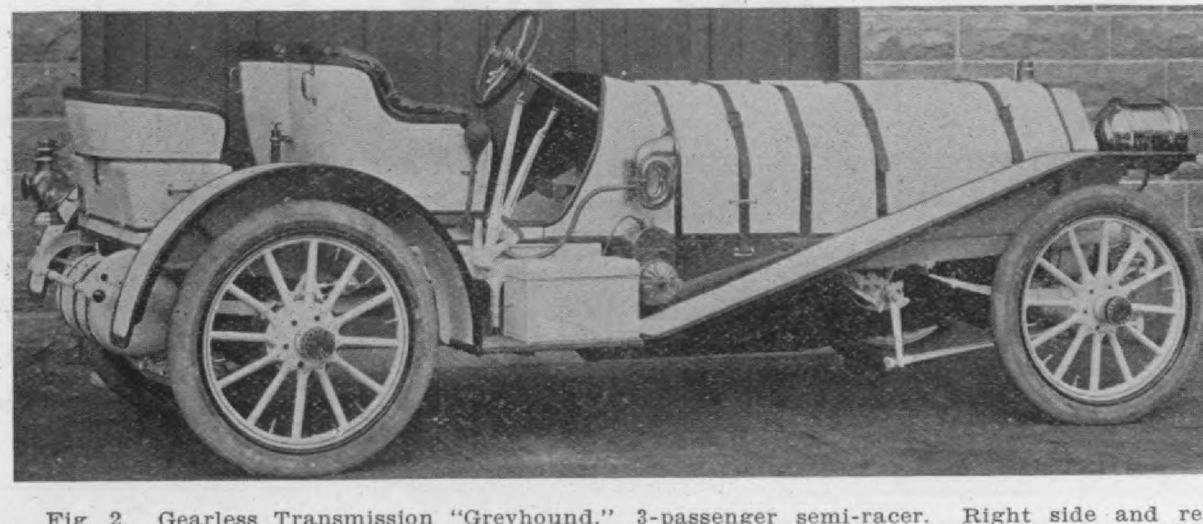

Fig. 2. Gearless Transmission "Greyhound," 3-passenger semi-racer. Right side and re
Wheel base, 128 ins. Gage 56 ins. Tires, all 36x4 ins. Motor, six cylinders, same chassis as t
Gearless 7-passenger car, Fig. 1. Seats for 3 passengers. Rumble seat supported permanently
front, and either on folding legs in the rear, or with legs folded, the rumble seat rides on ru
per cushions on top of the removable locker, here shown as occupying the otherwise vacant spa
under the rumble seat. Speed 75 miles per hour. Weight as shown 3000 lbs. Price, $4000, w

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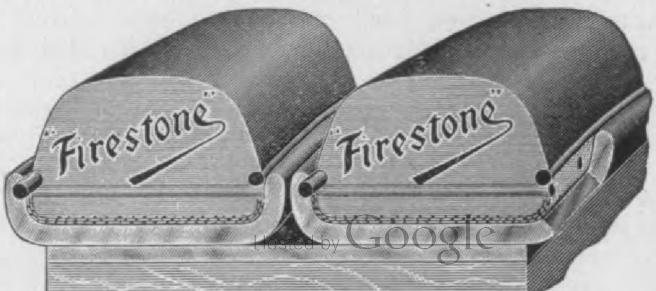

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planetary two-forward speeds and a reverse drive, and requires two exterior friction bands, but is wholly without toothed-gearing, whence the name "Gearless Transmission." As the speed-change selection is made operative by friction-band application any desired change can be made at any time. The reverse drive is at a somewhat higher rate than the low forward speed.

This Gearless Transmission has the great advantage of no change-gear friction whatever on high-speed, rolling friction engagement in the low-speed and reverse, with no tooth-friction since there are no gear-teeth, and perfectly silent action, and is ideal in handling, any change being possible under any and all conditions.

dered. Weight 3150 lbs., tanks filled. Price $3500, including 5 lamps, mats, horn and tools, ready for touring.

This "Gearless Greyhound" is a design with many novel features besides the gearless speed-change. The very long hood covers two front-boards. The gasoline tank is carried between the two front-boards, and the hood also covers the Gearless speed-change, which gives direct drive, low-speed and reverse. The six cylinders are each 4 13-16 ins. bore and 5½ ins. stroke. This car can make all the speed any gentleman driver wants on the road and is silent and very easily controlled. This Gearless Greyhound is an attractive model to the large class of motorists who want a car that looks like speed and can

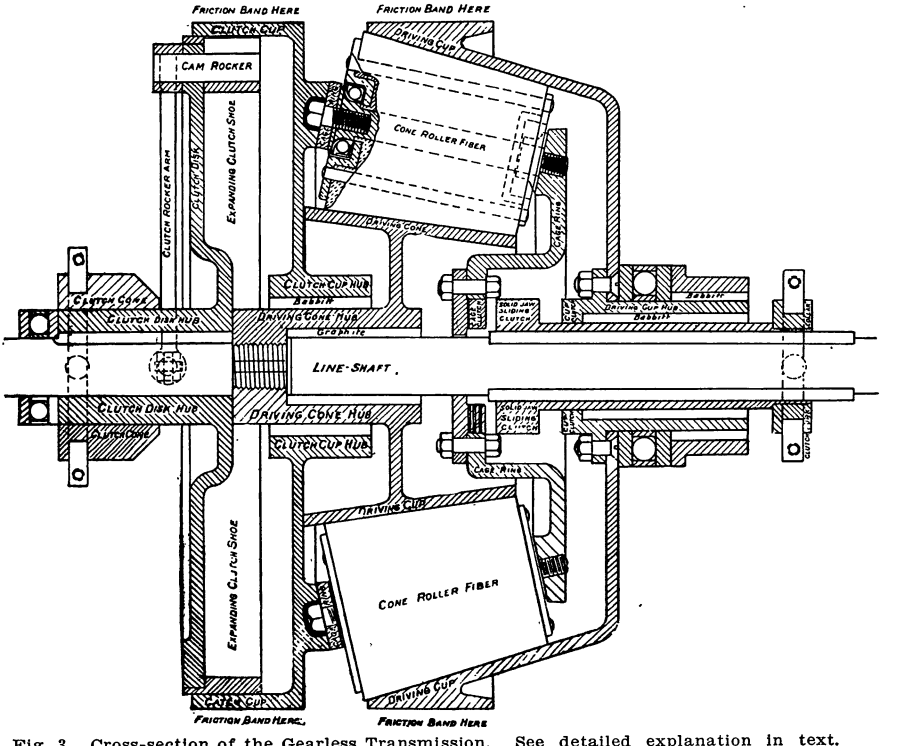

Fig. 3. Cross-section of the Gearless Transmission. See detailed explanation in text.

The Gearless Transmission 1908 cars are all large and powerful machines, having all the speed and hill-climbing powers which any motorist can ask for. All the "Gearless Transmission" motors are fitted with double ignition systems, two jump-spark plugs in each cylinder, with storage battery and Bosch magneto current supply.

The Gearless Transmission 1908 4-cylinder 5-passenger touring car is very similar in general appearance to the 6-cylinder car. Its wheel base is 126 ins., gage 56 ins., tires 36x4 front and 36x4½ ins. rear, motor four water-cooled 4-cycle 5x 5¾ in. cylinders, showing 60 H. P. at 1250 R. P. M. There are two forward speeds and a reverse, tonneau body, side doors, swinging to rear, to seat 5 passengers, two revolving chairs added in tonneau if or-

live up to its appearance when called upon to do so.

The Gearless Transmission cars have long wheel bases, large wheels and powerful motors and brakes. Two of the models, the 7-passenger touring car and the 3-passenger "Greyhound" have six-cylinder motors, cylinders 4 13-16x5½ ins., while the 4 cylinders of the "Model 60" are 5x5½ ins. The axles are by Weston-Mott, ball bearings in front and Hyatt rollers in rear, and the steering is by a screw and nut, Elyria Company. The ignition is double, two jump spark plugs for each cylinder, with storage battery and Bosch magneto.

The distinctively novel feature of the "Gearless" line of cars is the friction speed-change, which uses five large cone-

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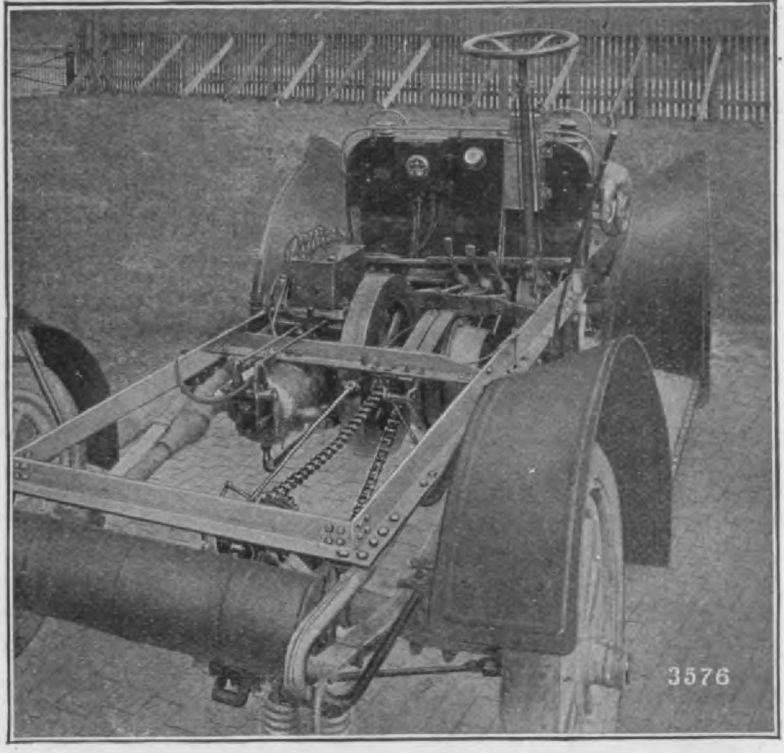

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r as a unit, together with one for-
low-speed and one reverse.

s Gearless Transmission is patented
owned by the Gearless Transmission
pany and is used in all cars built by

e Gearless Transmission involves an
clic action, but can be fully compre-
ed by an attentive reader of ordinary
igence.

e ordinary form of friction drive is a
g disk of aluminum alloy, that metal
thought to have highly advantageous
on-producing qualities supposed to
peculiar advantages for friction driv-
The "paper wheel" used with the
num disk for motor car speed-
ges has a cylindrical working face
hence must have some slip in driving,
as an indeterminate pitch circle, caus-
vear and loss by undesirable friction.
the ordinary forms of disk and paper

means of the ordinary, pedal-actuated
cone sliding on the clutch disk hub to op-
erate the cam-rocker lever and so expand
the clutch-shoe. As this clutch-shoe is
internal the cam-rocker arm is made with
two members to neutralize centrifugal ac-
tion, and a strong closing spring, not
shown, is applied to hold the jaws against
opening and causing the clutch to drag at
high speed when the clutch cone is in for-
ward, non-engaging position. The clutch
shoe runs normally free from its surround-
ing clutch-cup, internal cylindrical sur-
face, but the shoe is forced into driving
engagement with the cup by sliding the
clutch cone to the right. The clutch cone
is fitted to slide freely on the outside of
the hub of the clutch disk. The driving
cone is fixt to the tapered rear end of the
crank-shaft by means of a large filister-
head screw and a Woodruff key; the cone
hub is bushed with "graphite" anti-friction

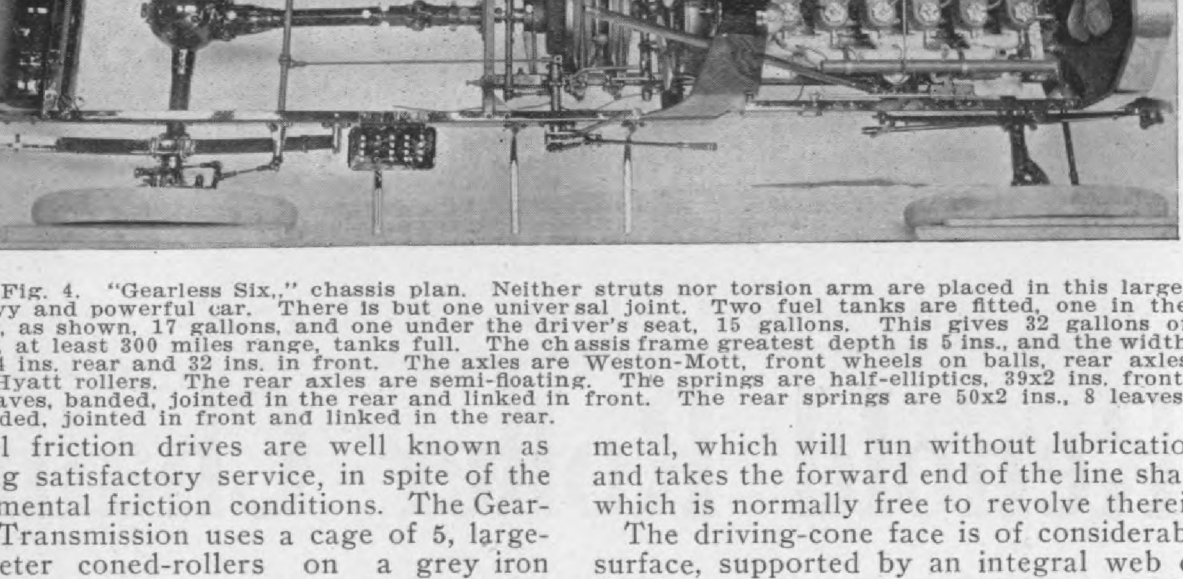

Fig. 4. "Gearless Six.," chassis plan. Neither struts nor torsion arm are placed in this large,
vy and powerful car. There is but one universal joint. Two fuel tanks are fitted, one in the
, as shown, 17 gallons, and one under the driver's seat, 15 gallons. This gives 32 gallons of
at least 300 miles range, tanks full. The chassis frame greatest depth is 5 ins., and the width
4 ins. rear and 32 ins. in front. The axles are Weston-Mott, front wheels on balls, rear axles
Hyatt rollers. The rear axles are semi-floating. The springs are half-elliptics, 39x2 ins. front,
aves, banded, jointed in the rear and linked in front. The rear springs are 50x2 ins., 8 leaves,
ded, jointed in front and linked in the rear.

l friction drives are well known as
g satisfactory service, in spite of the
mental friction conditions. The Gear-
Transmission uses a cage of 5, large-
eter coned-rollers on a grey iron
fixt to the motor crank-shaft and
five coned-rollers are surrounded by
nternal conical surface, or cup, of grey
concentric with the line-shaft of the
The cone, roller and cup-face an-
are such that the three elements roll
ther without any sliding and hence
out sliding friction, save in case of
ing of the five rollers. To avoid the
ing of the rollers on the cone or in

metal, which will run without lubrication
and takes the forward end of the line shaft
which is normally free to revolve therein

The driving-cone face is of considerabl
surface, supported by an integral web o
the hub, and the cone angle is such tha
the axial lines of the coacting, cone-roller
when prolonged meet in a common poin
in the line shaft axis.

The 5 fiber cone-rollers are on ball-bear
ings on stationary axles which are fix
to the front and rear cage-rings, so tha
the cage-rings and rollers are normall
free to revolve as a unit on the driving
cone surface. The front, left cage rin

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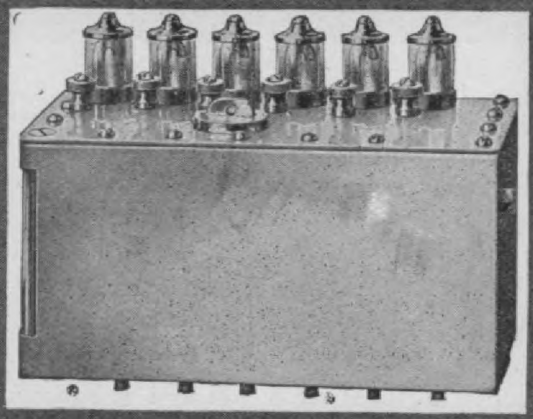

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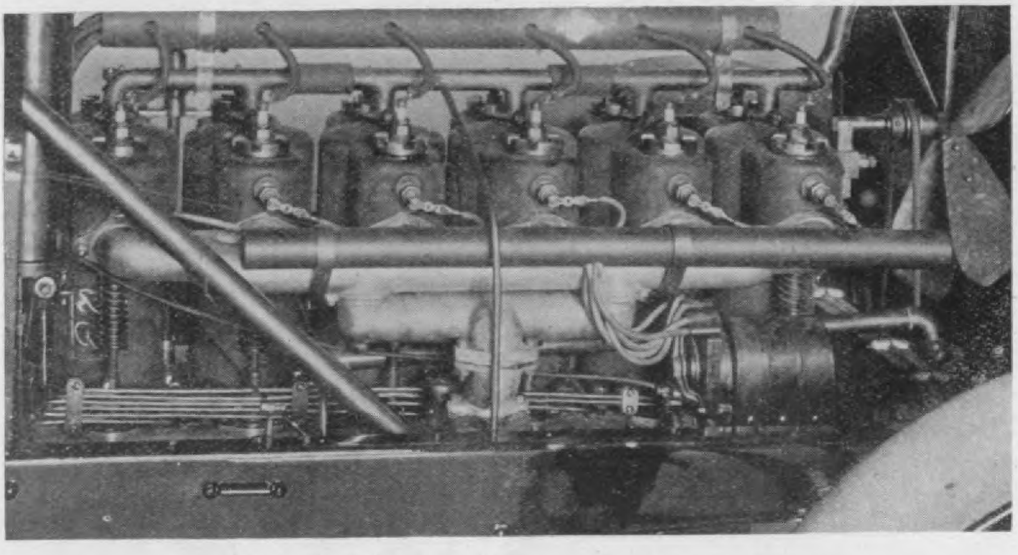

Fig. 5. Right side of motor. The construction is standard, best material only. The oiling is by orce pump thru unobstructed pipes to the crank-shaft bearings and thru the crank arms to the nk wrist and rod bearings. No splash is used. The crank-base is drained to a well in which a inion oil pump is placed with oil pipes to the seven crank shaft bearings. The whole engine ample surfaces, with Parson's white bronze journal boxes. All of the gears are either bronze steel.

which is fixt to a long babbitted hub, nally free to slide on the body of the -jaw clutch, concentric with the line-t.

ne pressure-bar hub is babbitted and nted to slide on the driving cup hub, is always prest strongly against the

tion, in which the sliding clutch engage nothing and the cage of rollers and th driving cup are free to turn. This is th solid-jaw clutch position shown in Fig. 5

The third position of the solid-jaw clutc at extreme right engages the driving-cu clutch member and forces the driving-cu

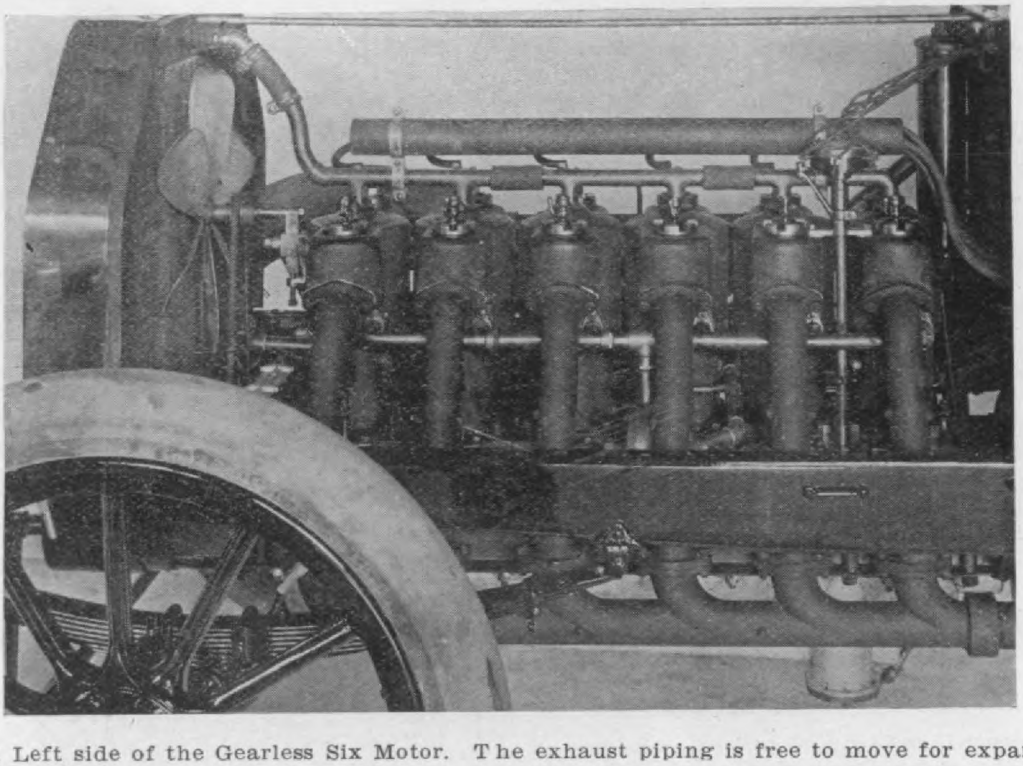

Fig. 6. Left side of the Gearless Six Motor. The exhaust piping is free to move for expansion.

ing cup web, to press the cup forcibly the ring of 5 fiber rollers, so as to

and the line-shaft to turn together. Th pressure-bar spring-thrust is taken on

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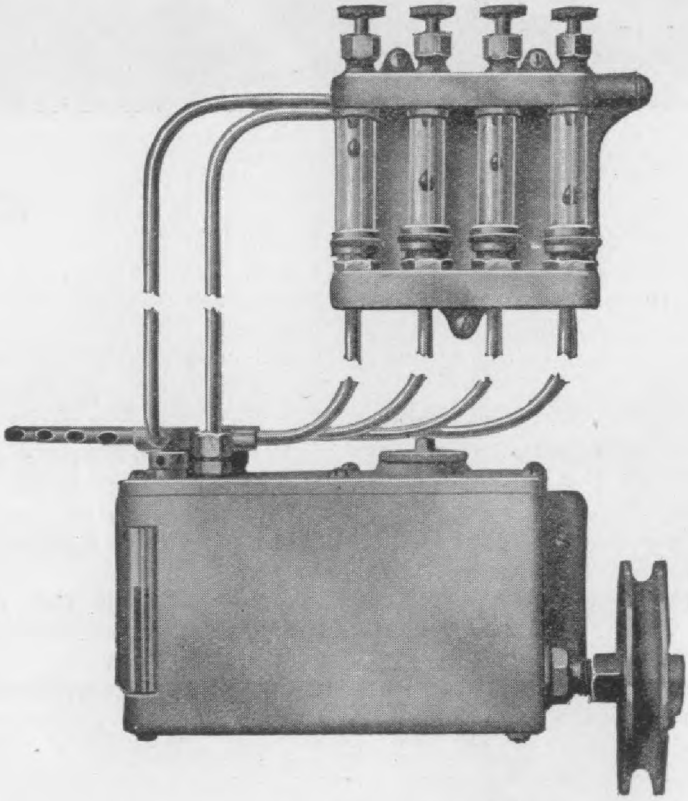

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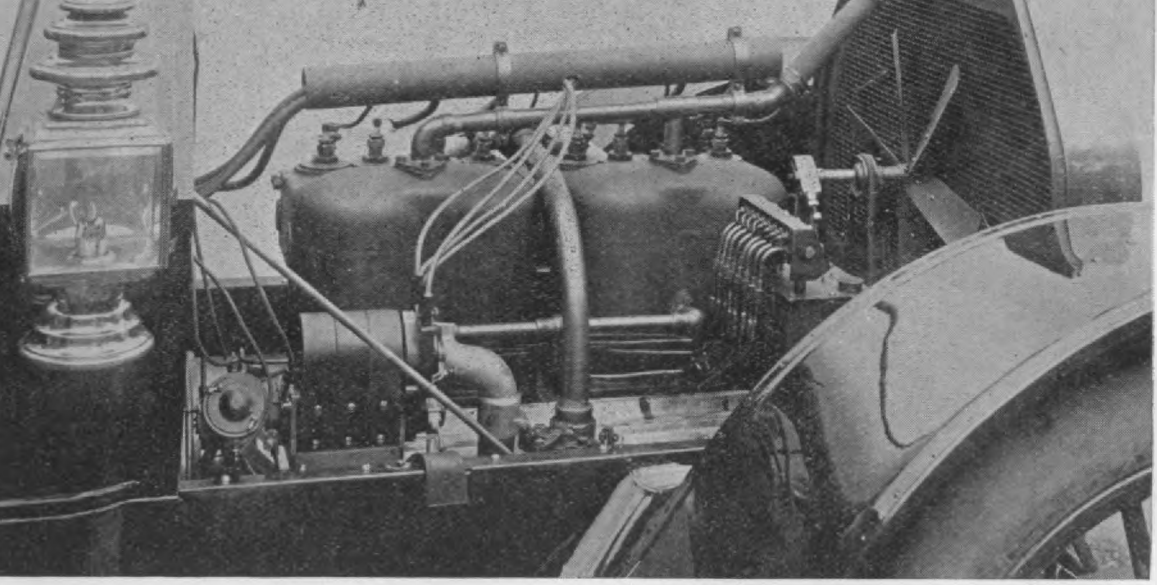


ig. 7. Gearless Model 60, right side of 4-cyl inder motor. Same general construction as the 6-
ler motor, but the oiling is by an 8-lead me chanical oiler as shown.

e friction-rings, jointed, only one of can be engaged at one time.

EARLESS TRANSMISSION ACTION.

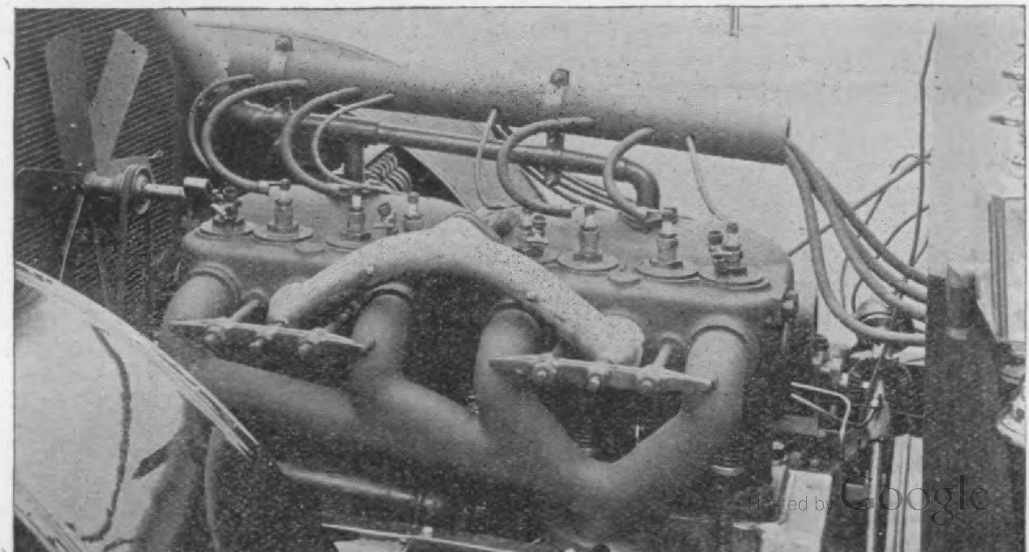
shown in Fig. 4, with both friction- free and the solid-jaw clutch in neu- osition and with the expanding clutch- lisengaged, the car is free to coast, ut turning any part of the assembly , save the sliding clutch, which is l to and turns with the line-shaft.

LOW-SPEED.

solid-jaw clutch is moved to extreme pulling the inside hand lever. This the ring of caged rollers to make urns with the line shaft and if the shaft is turning and the friction band ied to the driving cup by pushing the pedal, then the turning of the driving cone will cause the cone rollers to run around in the driving cup carrying the cage rings, the cage ring clutch and the line shaft with them. The diameters are such that the line-shaft, in this low-speed forward combination, makes one turn to three turns of the crank-shaft.

HIGH SPEED.

With the low speed engaged, pressure on the left pedal releases the driving-cup friction band, leaving the driving cup free to turn, and the left pedal is pushed forward to expand the clutch shoe and engage the clutch-cup with the crank-shaft, and the whole transmission then turns as a unit at crank-shaft speed, with no internal friction of the transmission parts on each other.



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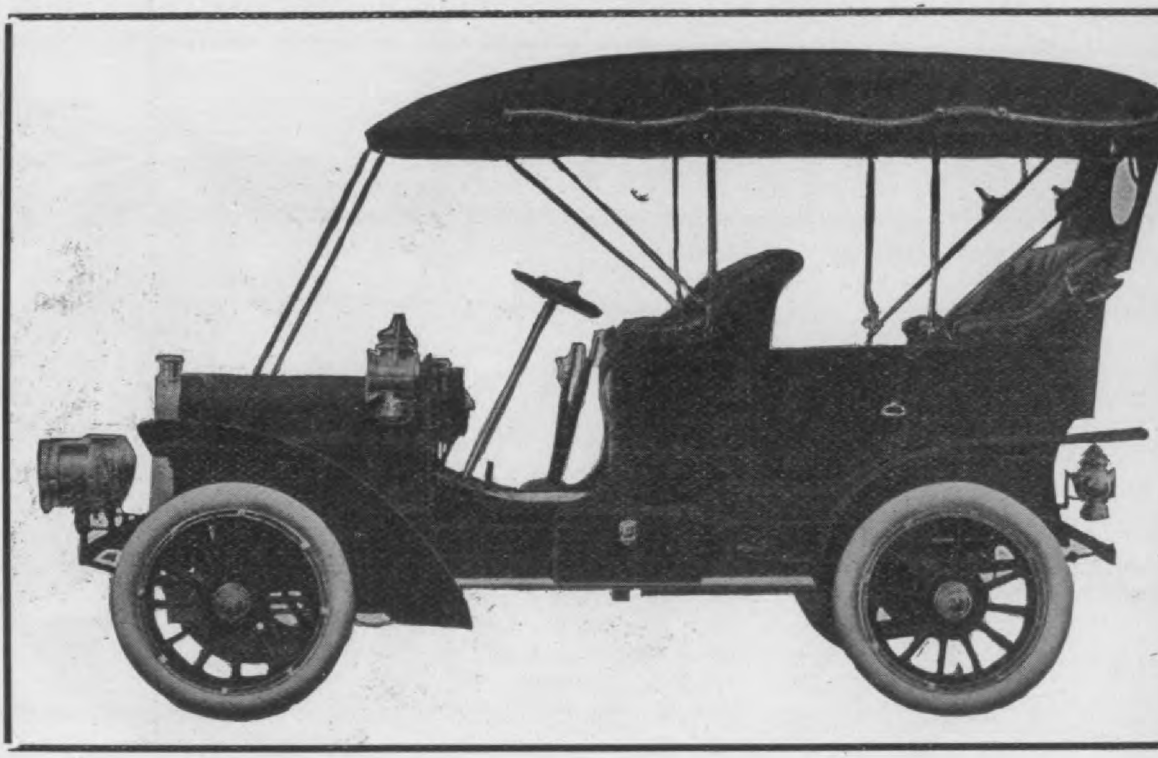

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d extreme, which moves the solid-jaw
ch to extreme right position and locks
driving cup to the line shaft, so that
e two members move as one; then the
t, or reverse, pedal is pushed forward,
ying the exterior friction band to hold
clutch-cup stationary. Then the turning
ne driving-cone fixt to the crank-shaft,
es the rollers to revolve in the opposite
ction on their axles and transfer the
on to the larger-diameter driving-cup,
h conveys a reduced reverse motion to
line-shaft thru the solid-jaw clutch by
h it is lockt to that shaft.

CONTROL.

The steering action is a screw and trunio
nut. The spark and throttle levers are o
top of the steering wheel. There are tw
outside vertical hand-levers. The outer on
is latched, and is pushed forward to simu
taneously apply both the external and inte
nal rear hub-drum brake shoes.

The inside hand-lever, also latched, move
the solid-jaw clutch to its 3 positions fo
low speed, neutral and reverse.

There are 3 vertical pedals, the left on
is pushed forward to engage the clutch, th
middle one is pushed forward to obtain lo

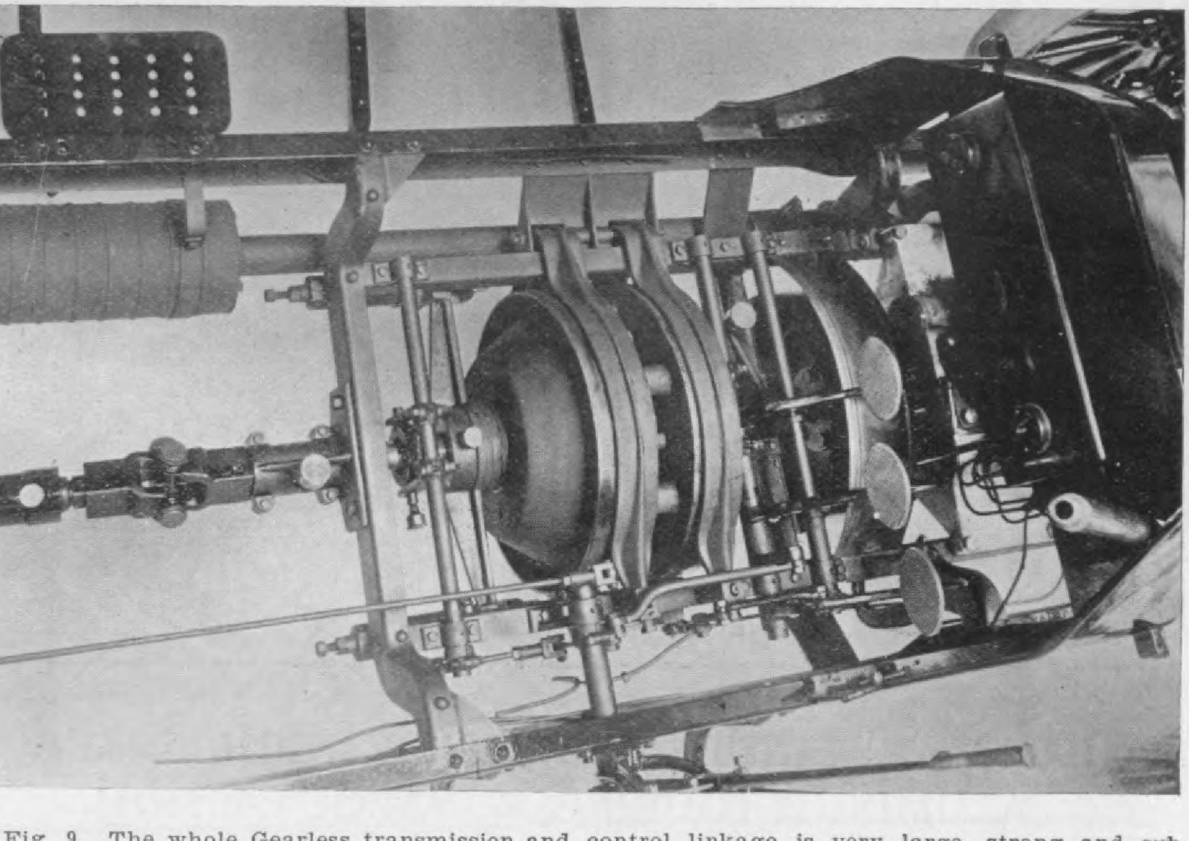

Fig. 9. The whole Gearless transmission and control linkage is very large, strong and sub-
tial, giving expectation of long life and reliability. Nothing spared to make the control ac-
s certain, and the very large diameter and great width of the friction bands permit the trans-
sion to be used as the ordinary brake without wear or injury. The friction bands are bronze,
are fitted metal to metal to the steel driving cup and clutch cup exterior surfaces. See text
head "Brakes." The control is most simple, very easily learned and not likely to be mis-
dled.

BRAKES.

ere are exterior and interior rear-hub
-brakes, internal shoes metal to metal,
cup and bronze shoes, exterior band
ly-belting faced, which are all four
ed thru eveners at one and the same
by pushing the outside hand lever
ard. This combined external and inter-
ear-hub brake resistance is ample to
the rear wheels, and is the emergency
action.

THE SERVICE BRAKE.

is effect is obtained by pushing the

speed and the right pedal, when pushe
forward, holds the clutch cup still to giv
the reverse.

ON THE ROAD.

In the afternoon of August 14, a 4-cylin
der Gearless "Model 60," Mr. Breyfogl
driving, an invited friend and one of th
Gearless testers in the tonneau and th
writer as observer, left the Gearless Fac
tory, Rochester, and was driven to Batavi
by the long road, 41 miles, and back fro
Batavia to the factory by the direct road, 3
miles, 79 miles total.

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from raw material to finished product at every stage—machining—cementing—hardening—tempering—grinding—gauging—testing and inspecting—represents the best that science and manufacturing skill can do—yet the final test that

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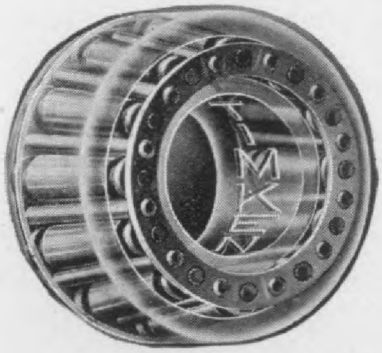

Timken Roller Bearing

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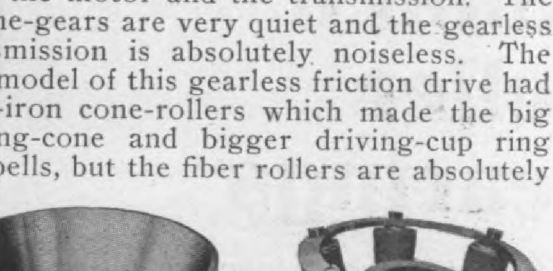
rver's mind the morning of July 10, n the bunched Glidden cars traveled n Cleveland to Toledo without being to see a car-length ahead.

is particular Gearless Model 60 was just finished on the day of the run and the first one of the new Schebler carators in use for the first time, which had no adjustment on the road and was n too saving of gasoline when we start- nd not quite liberal enough at any time, seemed to work extremely well.

e first thing noted by the observer was very smooth start and the silence of the motor and the transmission. The ne-gears are very quiet and the gearless mission is absolutely noiseless. The model of this gearless friction drive had -iron cone-rollers which made the big ng-cone and bigger driving-cup ring bells, but the fiber rollers are absolutely



. 10. The Gearless Transmission elements in ective, showing the cup, cone and cage of See caption of Fig. 3 in text.

less. The next point noted was the me readiness of speed-change, all ges made regardless of anything, and hird thing brought forcibly to the ob- r's attention came when the only acci- of the trip occurred. This was not so serious. The Tester's cap went adrift we were running about 30 miles, and Breyfogle, who is not a light-weight, perhaps wished to show the observer the Gearless transmission could do, ne of his feet against a pedal and made heels slide, and the next instant the r was hustling backward over the road trieve the blown-away head gear, all ence and more quickly than it seemed ble to stop and reverse the direction of of so heavy a car going at a good

erward, on pavement, with about a e rate, the reverse was put in when r was on high gear forward, with the of a perfectly smooth, quiet stop and quick start backward. One demon- on of the powers of the transmission was also made which nearly passed

headed our way, and gave us successive dus baths that made us regret our absent gog gles. The dust was deep enough to mak the car skid in many places as if on snow and the long road to Batavia, thru Cal donia and Le Roy is very crooked all th way and gullied, stony and rough in man places, and full of little, steep hills, all mak ing it a slow, bad route.

We picked up one dust-cloud after another each one containing a big car, and all bu one or two of these were cars that claim place in the front row, and none of ther waited for us to pass. We went by all bu one of them, which was traveling at abou our clip and raised such a dust that we with our unprotected eyes, did not care t chase it too closely, tho we passed it a soon as we struck Batavia pavement, havin done the 41 miles in 106 minutes tota elapsed time, which was very good indeed considering the rough roads, the new car the new carburetor and the dust-skid, which made the car try to stand crosswise of th road when any attempt was made to push i where the dust was deep.

The return was over a much better road some miles shorter, and with no cars i front of us. The carburetor did not giv quite enough fuel for best pace, and ou high rate was not more than 45 or 48 miles and that for only one or two short spurts as this road is crooked all the way and Mr Breyfogle is far from being a reckless driver We reached the Gearless Factory after a slow run thru police traps and the streets of Rochester, our total elapsed time for th 38 miles being 101 minutes. The fuel burn- ed was almost exactly 6 gallons for the 79 miles, which is a very good showing for a new car and 5 passengers, one of whom weighed 200 and the driver 225 pounds, so the car had a good 5-passenger load.

The clutch was tightened at Batavia, and this adjustment and that of the carburetor were all the new car had. This run was made on a Gearless 4-cylinder model 60 instead of on a Gearless Six, because there was no 6-cylinder car available. The Gearless cars are all shipt as soon as may be; this 4-cylinder car was ordered to be run all night so as to ship it at noon next day.

Mr. Breyfogle said the 4-cylinder could do about all the 6-cylinder could do, save to accelerate on long hills. We found plenty of hills between Rochester and Batavia, some of them very steep, but all short and these were rushed by the Gearless model 60 without much retardation.

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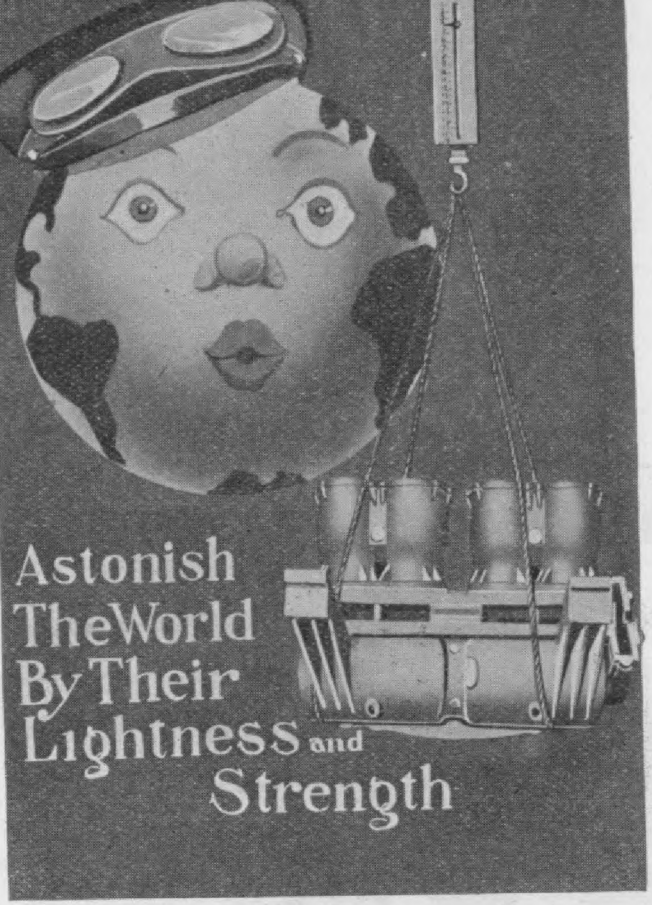

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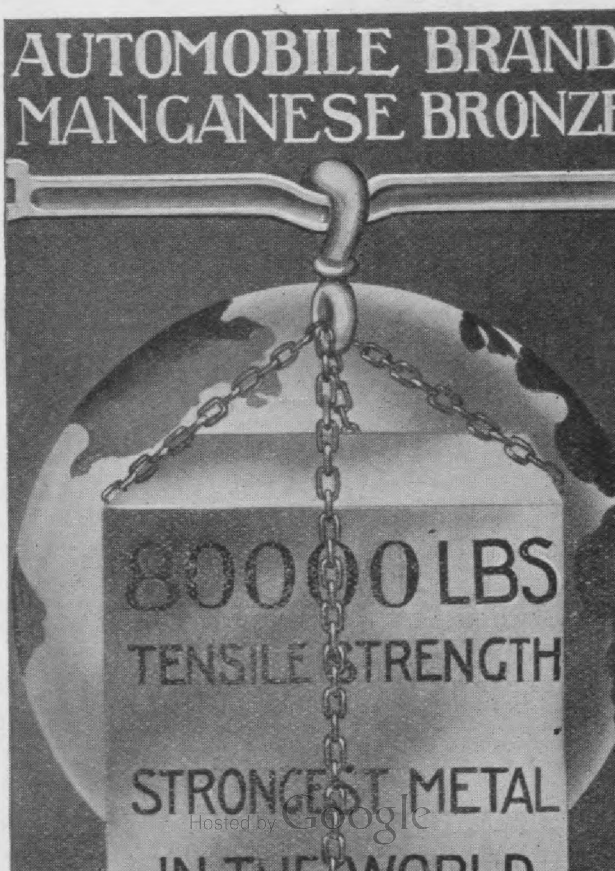

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was first directed to six-cylinder ex-
nental work, then under way and he
so favorably imprest with the advant-
of that type that he decided when the
rican public were educated to the proper
he would place such a model upon
market. The 1908 Winton Six-Teen-
is the result. The statement is made
altho the output of the factory has
as high as 1000 cars per year, only 500
e new models will be made, the man-
ent believing that more care and in-
ual attention and a better car can thus
uilt than if the factory is rushed or
ged to increase the output.

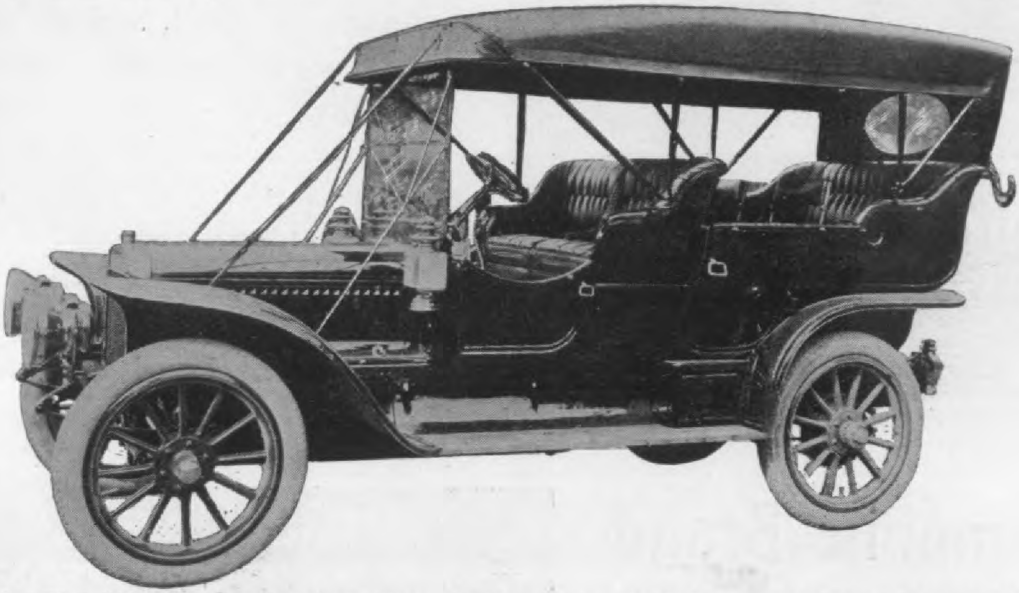

Fig. 1. The 1908 Winton Six-Teen-Six. Motor six vertical dual cylinders water cooled, 4½ by
ches stroke. All working parts fully protected from mud and dirt. Mud guards webbed
e frame and shield between the running board and body with steel pan from front to rear
hange speed gear under the car. Three speeds forward and one reverse, selective type.
an shaft drive, floating rear axle. Wheel base, 120 inches, clearance 10½ inches; wheels, 36
es. Price, fully equipt as a touring car, $4500; as a runabout, $4500; as a limousine, $5750.
pment consists of five bow top, glass front, two gas head lamps, two oil side lamps, one oil
lamp, gas tank or generator, horn and set of tools.

s new Winton production, as will be
from the accompanying photo, is a
luxuriously equipt machine which will
modate seven passengers. Doors en-
both the front and rear seats, the ton-
doors being 19 inches wide and hinged
rear. Two auxiliary seats with backs
rranged to fold up against the tonneau
The machine has a road clearance of
inches, 120-inch wheel base and 56½
gage. Its extreme length without lamp
p is 14 feet six inches. The bonnet
ng the six-cylinder engine is but 43
long. The car completely equipt will
or $4500, either as a runabout or tour-
r, and $5750 if fitted with a Limousine

THE SIX-TEEN-SIX MOTOR.

six-cylinder motor is composed of

detachable steel plates, as shown in Fig. 2, o
the right side of the motor. The aluminun
crank case has large hand hole inspectio
openings and is split into right and lef
halves which makes it possible to easil
remove the crank shaft cam-rods and piston
without disturbing the cylinders or connec
tions. This is a decided step toward th
very desirable quality accessability. Th
main bearings are clamped to the stationar
side of the crank case and are therefor
not disturbed. The inlet and exhaust mani
folds are held in position by yokes detach
able by a single nut each. All the working
parts are completely enclosed in dust an

oil tight housings. The fan is gear driven, but with a friction clutch connection interposed between it and the last gear to allow for sudden starting of the engine. All these gears as well as those used to drive the magneto are enclosed. This Eisemann high-tension magneto is mounted on an integral crank case bracket on the right of the motor and driven by a shaft with flexible connection from the gear combination at the forward end. These gears are of hardened steel meshing, either with brass or white fibre according to the duty required of them. An auxiliary ignition system is supplied consisting of single non-vibrating coil and an accumulator. The magneto carries its own distributor.

LUBRICATION.

The positive lubrication of all the motor

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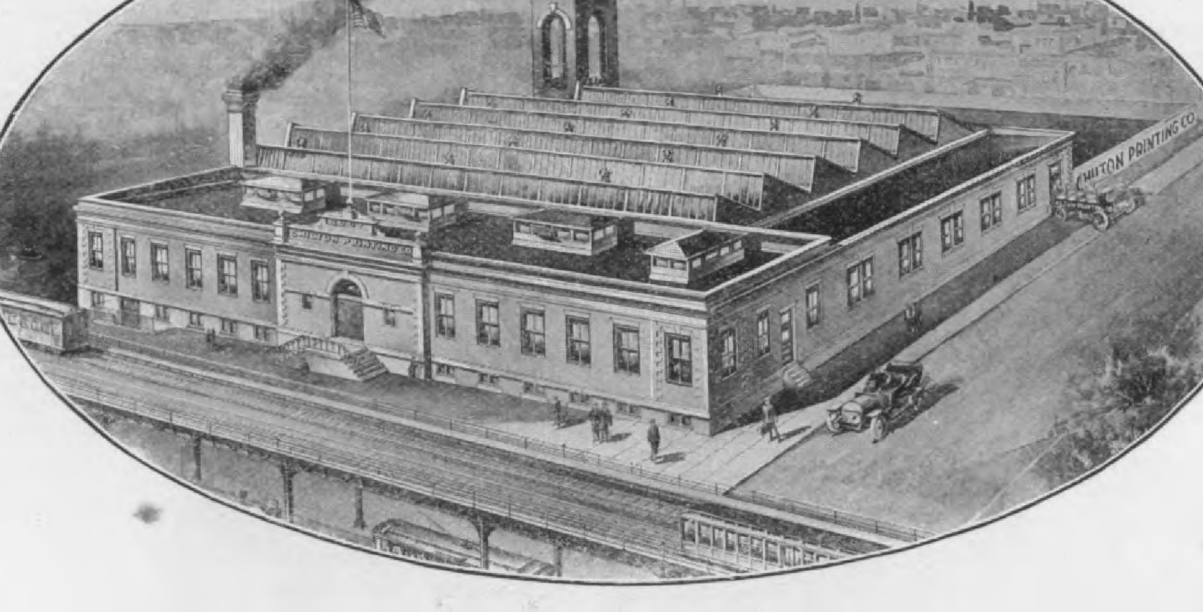

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will be published by the CHILTON PRINTING CO., at its new Daylight Plant, southeast corner of Market and 49th Streets. This company has succeeded to the business of the Trade Advertising and Publishing Co., for many years located at 1213-1215 Filbert St. The change is one of name and not of management, for the same officers and stockholders operated both the Chilton Printing Co. and the Trade Advertising and Publishing Co. The consolidation which went into effect August 1st will result in increased facilities and consequently better service for the patrons of the

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CHILTON PRINTING COMPANY,

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ires minimum oil expense.

the left of the motor and a Y branch pi

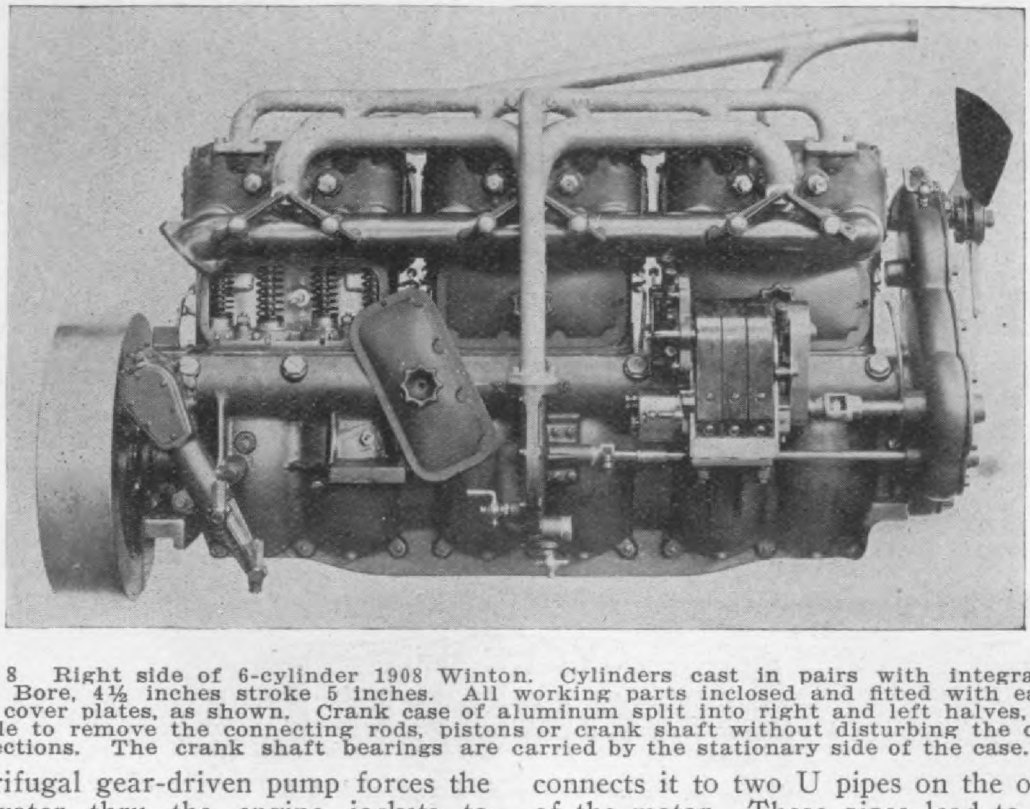

Fig. 8 Right side of 6-cylinder 1908 Winton. Cylinders cast in pairs with integral water ckets. Bore, 4½ inches stroke 5 inches. All working parts inclosed and fitted with easily re- ovable cover plates, as shown. Crank case of aluminum split into right and left halves, making possible to remove the connecting rods, pistons or crank shaft without disturbing the cylinders connections. The crank shaft bearings are carried by the stationary side of the case.

centrifugal gear-driven pump forces the ing water thru the engine jackets to extra large radiator of finned seamless ber tubes. The circulation is peculiar in it enters the cylinder heads at the ex- st side and passes out again of the head he opposite side.

connects it to two U pipes on the other si of the motor. These pipes lead to central located chambers between the dual cylinde their inner ends uniting and entering t chamber of the middle set of cylinders. A gallon tank with gage is carried at the re of the frame and carries a 3 gallon reser

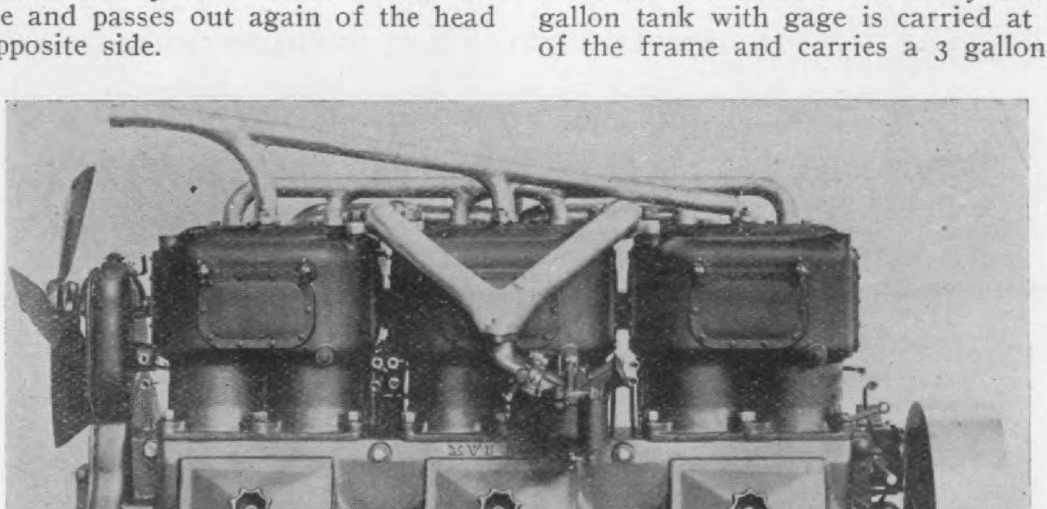

Fig. 3. Left side of Winton Six-Teen-Six motor, showing the crank case hand hole plates, new multiple jet Winton carburetor and the gear driven fan, all gears being incased. Dual ition, storage battery and non-vibrating coil forming the auxiliary system and an Eisemann h-tension magneto with included distributor the other. A gear-driven Hancock oiler supplie

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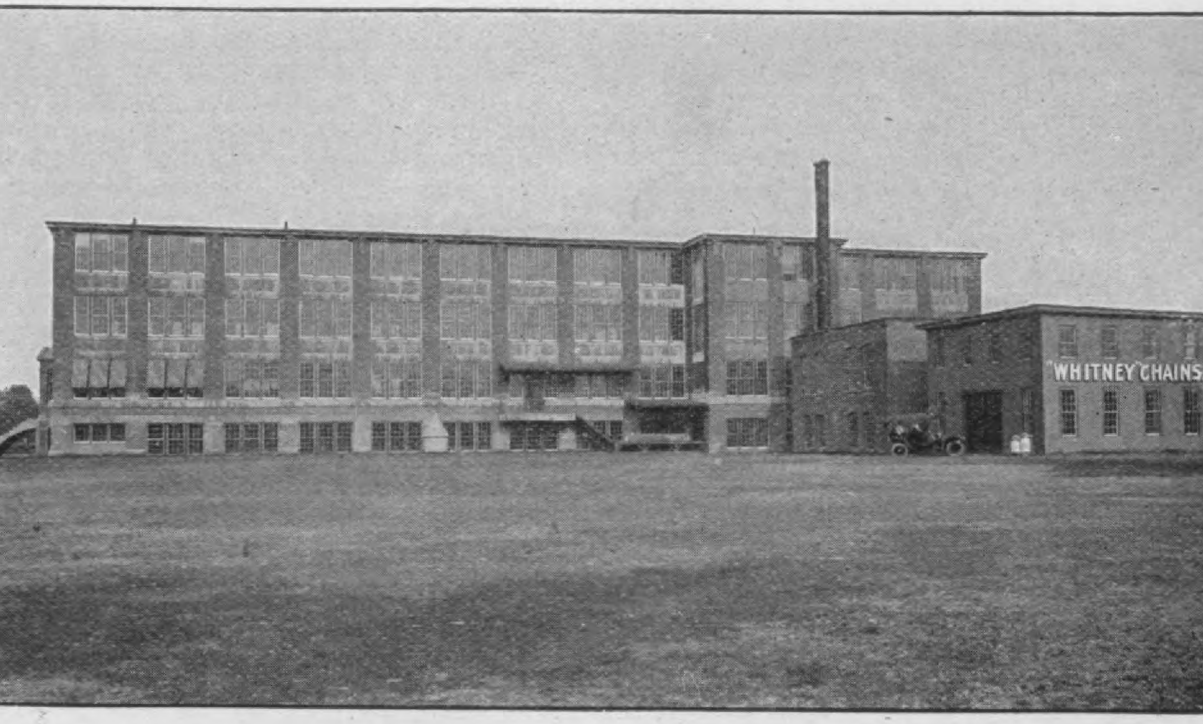

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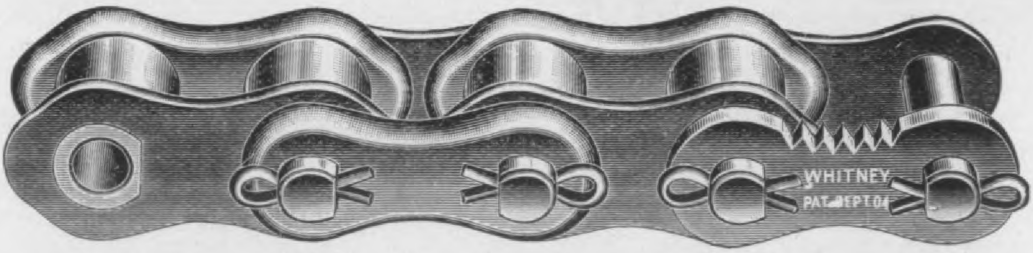
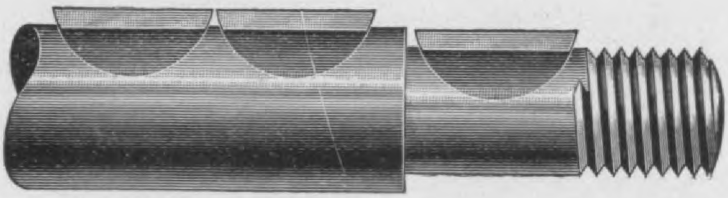


Headquarters for Automobile Chains and Woodruff Patent Machine Keys.



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bearings and running in oil, flexibly but powerfully connects the engine to the change gear. The discs are forcibly engaged by a ring of six springs which distribute the pressure equally over their surface, giving much more uniform distribution than when only one central spring is used. The clutch is accessible for adjusting and is operated by a foot pedal independent of the brakes. A three speed and reverse selective type change speed gear is used, giving direct drive on the high, with a gear reduction of 2.64 to 1. The change gears are mounted on ball-bearings and an enclosed interlocking mechanism is provided.

The drive is by a cardan shaft practically horizontal and fitted with roller type universal couplings. An improved flexible coupling is also used between the engine and change speed gear. The entire driving mechanism is housed and securely protected from mud and dirt, no mud exposed chains or chains of any kind in fact, being found in the well-protected mechanism of the Winton. A steel dust pan extends from the forward end of the motor to the rear of the change speed gear case and an apron extends from the radiator to the pan, thus the entire under side of the car is thoroly protected. The mud guards are of prest steel of original design, webbed to the frame so as to completely protect the body from road wheel splash. The space between the running board and the frame is also fitted with a shield extending from the pan to the rear guard.

AXLES AND SPRINGS.

The rear axle is of the floating type, carries no load and is stayed by ball jointed torsion and radius rods of improved design. The axle shaft, differential gear and pinion shaft can be removed with the car standing on its own wheels, not even a jack being necessary. Timken roller bearings are used. The front axle is a one-piece I beam section Parsons manganese bronze casting. The well-known patented Winton twin springs are retained by a single clip which passes thru the center of the axle bed. The front end of the front and the rear end of the rear springs are banded to protect them against breakage by rebound. The front springs have 9 leaves and are 1¾ by 39¼ inches. The rear springs are 2 inches wide, have 11 leaves and are 52 inches long. Both are of the usual semi-eliptic form.

The frame is of prest steel, the sills or side members and the drop cross members being made of one piece, channel section. The intersections are strongly reinforced by gusset plates. The drop part of the frame carries the motor, clutch and change speed gear. The dash is of mahogany with a steel hood and carries nothing but the small auxiliary gasoline tank and the coil. The engine bonnet is of aluminum held by spring plungers.

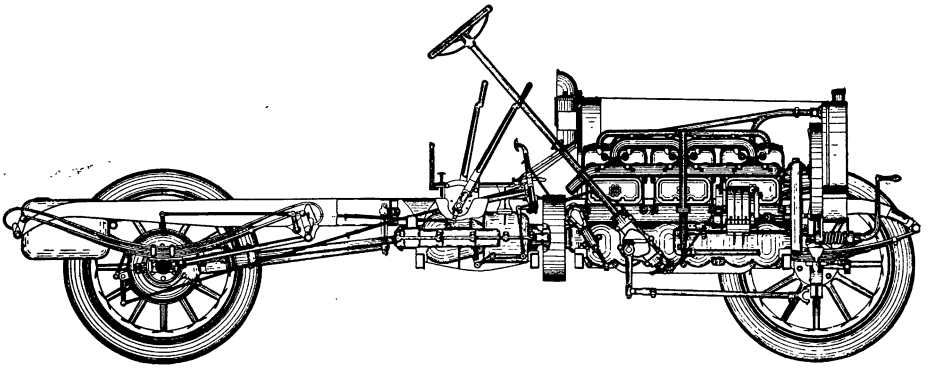

Fig. 4. Chassis of the Winton Six-Teen-Six. Motor six cylinders, 4½x5 inches. Prest steel frame of channel section, with sills and cross members of one piece, no sub frame. Winton patented twin springs, three-speed and reverse, selective type change speed gear. Double set of equalizing brakes on rear wheels. Mechanism pan protected and all moving parts inclosed. No belts or chains are used anywhere in the construction, even the fan being gear-driven. Wheel 36 inches, wheel base 120 inches. Multiple disc, ball bearing clutch. Gasoline tank at rear with auxiliary gravity feed tank on the dash.

STEERING AND CONTROL.

The steering gear is of the screw and nut type with ball thrust bearings and the connecting linkage joints are fitted with heavy bushed bolts, no taper pins being used in the construction. These bolts are locked by cotter pins.

The steering knuckles are mounted on roller bearings. The usual spark and throttle levers are on top of the steering wheel but are friction retained in any position by the use of taper plugs spring prest into a V groove in the stationary sector. The outside hand lever controls the internal expanding brake and also releases the clutch. The inside hand lever controls the change speed gear. Two push pedals and an accelerator button are provided, the left pedal operating the clutch and the other the external brakes and is independent of the clutch. Both brake levers and brake pedals can be locked in any position. The brakes are operated thru equalizers and will hold equally well in either direction.

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THE RUSHMORE FACTORY

will be more than doubled in capacity by the new buildings now approaching completion.

For nearly a year we have run night and day in the endeavor to keep up with our orders. For the season of 1908 we shall be able to make

Prompt Deliveries

on all sizes of the famous Rushmore Searchlights, Headlights, and Generators.

The new buildings adjoin the old factory, and are constructed of reinforced concrete throughout. The equipment will be the most modern of any plant of the kind in the world. The separate power house shown in the foreground will contain a 200 h. p. Koerting producer gas engine, and one of 75 h. p. for reserve use. Producer gas will be used for all annealing, brazing and soldering, and the buildings will be warmed by the waste heat from the engines. A separate brass foundry (not shown) will have a capacity of 15,000 lbs. of castings per day, and will deliver work to a number of outside concerns. An industrial railway will connect all departments of the new and old factory. All parts of our product will be manufactured in our own plant, and we shall purchase only the raw materials. With a capacity of 40,000 lights for 1908, we shall be able to handle the entire demand for the finest class of goods.

Rushmore Dynamo Works

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nder opposed car to the public. The gen-
ral lines of the car are good as shown
y the accompanying cut. The control is

and rear cross brace. The side angles
2x3¼ inches and tapered for 36 inches
from each end. This equalizes the v

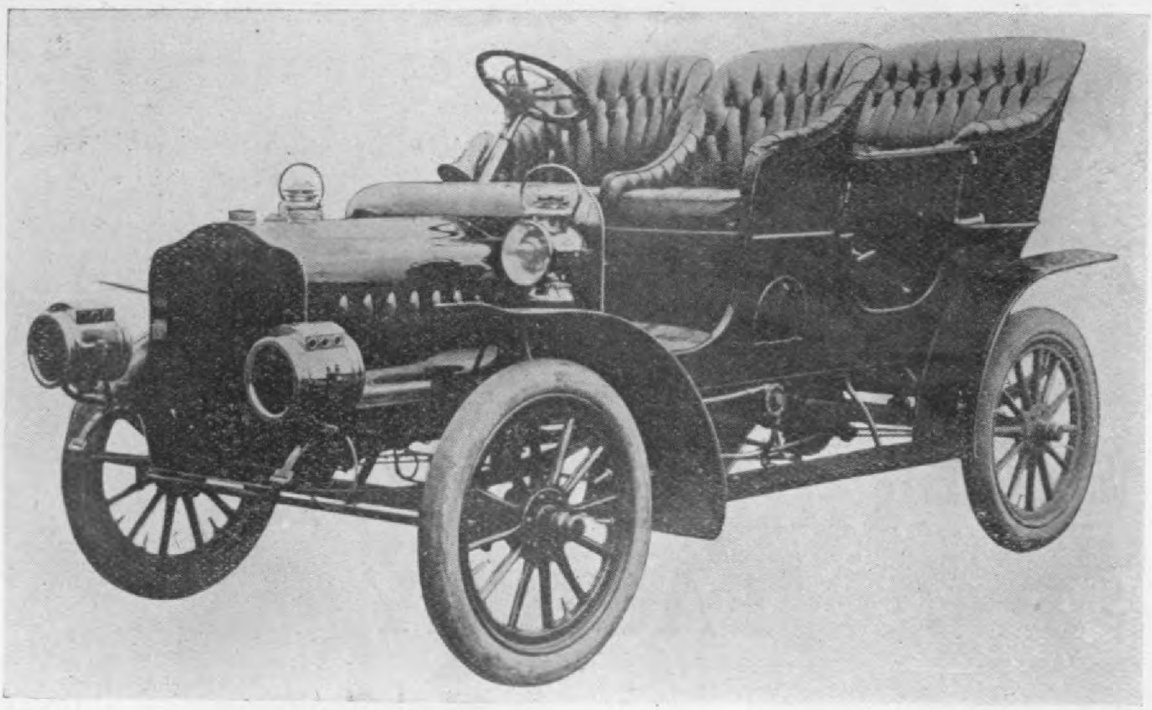

Fig. 1. 1908 Mason Touring Car, fitted with double opposed motor of 5-in. bore and 5-in. stroke, pla
longitudinally under the body, 2-speed and reverse planetary change speed gear, single chain drive to
divided rear axle; wheel 32 inches and tires 3½ inches.

mple and it is claimed the car is a spe-
ally good hill climber. The general con-
ruction follows approved practice for this
pe of car, the engine being located length-
ise under the body and driving to the rear
xle differential by a single chain. The

tion and avoids the breaking of an
This motor is 5x5, the cylinders being
ished by grinding. The inlet and exh
valves are in cages in the cylinder h
and are operated by long push rods
rocker arms. The valves have heads

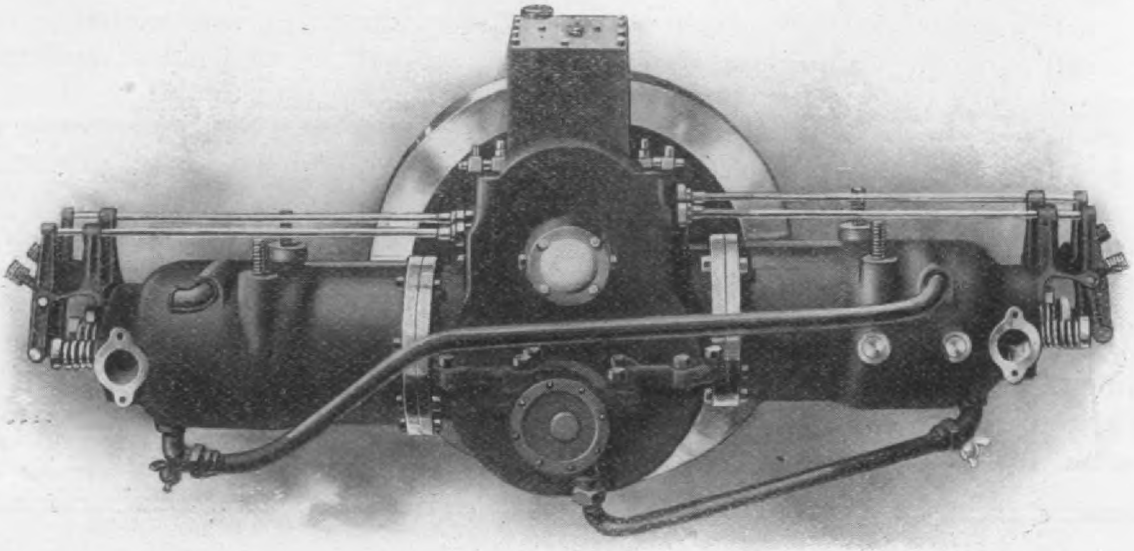

Fig. 2. The Mason double opposed motor, 5x5 inches, valves mechanically operated and both
the heads.

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ngine is mounted on two steel channel

stems integral of nickel steel. The v

E. W. STEVENS
PRESIDENT

WILLIAM A. SAKER
VICE-PRESIDENT

G. A. THOMPSON, JR.
SECRETARY & TREASURER

The E. W. Stevens Company

MANUFACTURERS OF

"THE SCIENTIFIC CARBURETOR"

EAST NEW MARKET, MARYLAND.

AUGUST 15, 1907

PUB. OF THE CYCLE & AUTOMOBILE TRADE JOURNAL,
PHILADELPHIA, PA.

DEAR SIRS:—

In reply to yours of the 5th inst. asking our reason for not beginning our publicity campaign in your August issue, as it was our intention at first to do, will state that it was because of the fact that we were afraid that we would be unable to make deliveries of our carburetor in such quantities as the introduction of an instrument, accomplishing the results that it does, would create a demand for, by the time that the August issue was in the hands of your readers; but as with this writing, Mr. Stevens' book, "Carburation," intended for free distribution, is in the hands of the printers, and the attempt to manufacture these carburetors in large quantities has advanced to a degree where some promise of being able to deliver with certainty in the near future is assured, we ask that you simply reproduce a fac-simile of this letter in the September number of the Journal.

As regards advance information of the device which we are about to offer to the trade, we hereby submit the following few words of explanation: We wish to explain that this company was formed for two express reasons: First, for the purpose of giving adequate financial protection to Mr. Stevens' patents covering an invention producing the remarkable results which it does in the gasoline engine field; and second: to assure its production in such large quantities as its introduction must certainly create the demand for.

As to the carburetor itself: However wonderful the statement may sound, it is nevertheless perfectly true, that in the practical testing of this device, we have found THAT WITHOUT ANY ADDITIONAL CHANGE TO THE ENGINE OTHER THAN THE ATTACHING OF OUR CARBURETOR WE ARE ABLE TO SECURE FROM 30% TO 50% (AND IN SOME TWO CYCLE ENGINES EVEN 75%) INCREASE OF POWER over that obtainable when using either the ordinary float feed, jet vaporizing carburetor having the auxiliary air inlet, or the later developed, float feed supplied system employing the Venturi tube method of vaporization, which types have been considered, up to the present time, the most perfect devices known for carburation.

As to the mechanism and operation of our carburetor will say: As is well known, the three essential constituents that go to make up a gas having the highest degree of explosive power are hydro-carbon, air and heat; in our carburetor these three elements are accurately measured (which measurements vary proportionally with the degrees of throttle opening). Next, these three components are thoroughly intermingled by contact with the vanes of a fan wheel revolving many times as fast as the initial velocity of the mixture, which fan wheel is actuated by its direct connection with a turbine wheel introduced into the path of flow of the exhaust gases. The combination of these two elements in operation produces the following results: First, the production of a gas (not vapor) always of absolute homogenity and correct proportions, which insures the highest initial explosive pressure upon ignition. Second, the assurance of a much fuller charge as the gases are forced into the cylinder under pressure from contact with the vanes of the fan wheel revolving at a high velocity. Third, the high momentum of the turbine wheel, having an average gas propelling velocity nearly equal to that of the exhaust gases when the exhaust valve is first opened, upon the decrease of the first exhaust pressure produces a vacuum in the exhaust pipe, resulting in a much more thorough scavenging of the cylinder, which leaves only a small amount of burned gases to mix with the fresh charge, which result alone, it has been shown by actual test to be capable of increasing the explosive pressure of the charge, upon ignition, from 15% to 25%.

A combination of the above mentioned operations, besides giving the already mentioned increase of power also produces the following results: 30% cooler engine, an entire absence of carbon deposit in the cylinder, an odorless exhaust, an actual saving of 25% in gasoline and 20% in lubricating oil, a much greater amount of flexibility, reliability and speed, a wonderful decrease in ignition troubles, and an entire absence of the need of regrinding valves.

With this much information borrowed from Mr. Stevens' "Carburation" and with apologies to its author,

We remain yours, for a bigger future for the internal combustion engine,

WAS / CHS THE E. W. STEVENS CO. WM. A. SAKER, Vice Pres.

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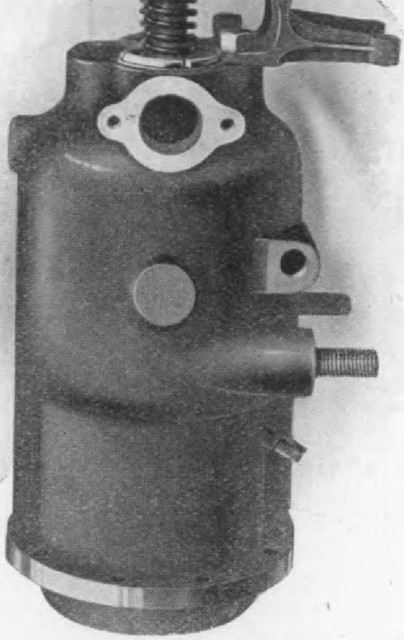

'ig. 3. Closer view of one of the cylinders which finished by grinding; note the heavy integral lugs supporting the engine and also note the valve chanism on the head.

hich are hand-scraped to insure perfect and alignment. The connecting rods are so drop-forgings, grooved to conduct oil the wrist pin bearing, which are also

the crank case, but in addition a Trim cision Oiler mounted on top of the c and driven from the cam shaft, gives p tive force feed lubrication in proper qu tities to the upper side of the cylinders to the main bearings.

A rotary pump on the end of the cr shaft forces water from the tank under hood to the bottom of the rear cylin jacket from the top of which it is piped the lower side of the forward cylinder thence to the special radiator of their c design, containing over 10,000 sq. inches radiating surface, with accessible tubes soldered joints at corners.

IGNITION.

The jump spark system, current from sets of 6 dry cells each, is used. A co mutator of their own design is mounted the cam shaft, has wide contact surfaces is so arranged that it is lubricated from crank case oil.

TRANSMISSION.

The change speed gear is of the planet type, giving the usual two speeds forw and one reverse, and is controlled by a gle lever for low and high gear and b foot pedal for the reverse. The mechan is of the three pinion type, all the ge being cut true and case hardened. On l

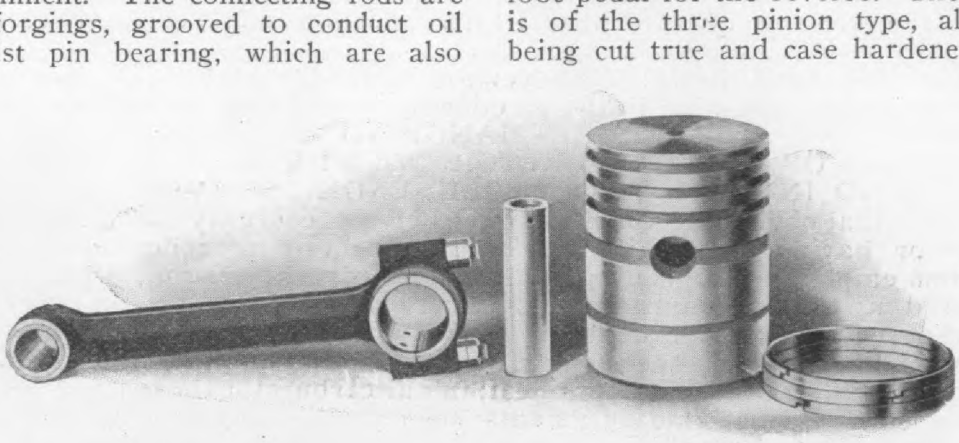

Fig. 4. Mason piston, pin, rings and connecting rod.

hite bronze. The connecting rod caps are ld in two studs by lock nuts and split ns. The pistons are long and carry at e top three step-jointed eccentric rings, cked to prevent their turning. There are

speed the motor runs 35-12 revolutions one of the rear wheels and on low g there are nine revolutions of the engine one of the wheels.

The frame is of channel and angle s

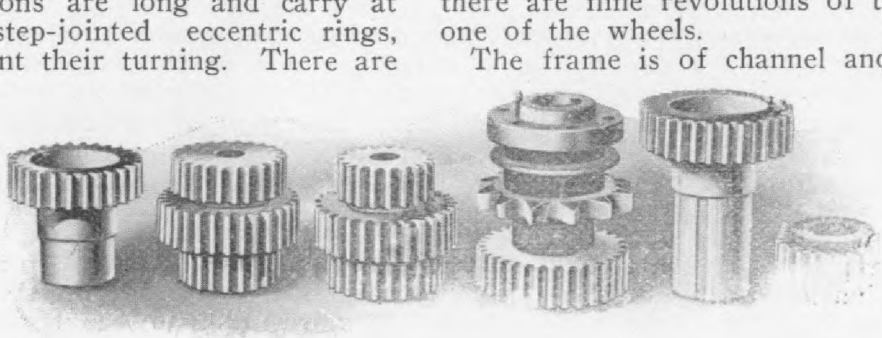

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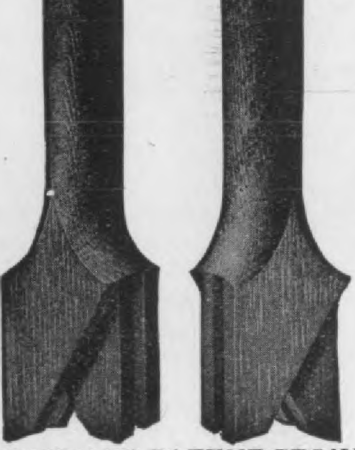
Fig. 5. Parts of the Mason Car planetary change speed gear.



SCHWARZ PATENT SPOKE

The SCHWARZ WHEEL

FINISHED WOOD WHEEL

The tenons of the spoke are grooved and mortised for interlocking.

They are put together at one time, under pressure.

WHEEL COMPLETE

The wheel can be made complete and shipped without the hub.

For Automobiles and Heavy Vehicles. The best and strongest artillery wheel made. Spokes can never loosen. Wheel will stand where every other fails.

APPROVED AND ADOPTED BY LEADING AUTOMOBILE MANUFACTURERS

Send for illustrated booklet.

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THE SCHWARZ WHEEL COMPANY

try roads. This is an important feature if country touring is intended.

CONTROL AND BRAKES.

In the control of the car the hand lever on the right side combines both low and high speeds and when this lever is pushed back it applies a brake on the rear axle, which is ratchet-retained and is released merely by pressing with the heel a small plunger rod which is situated in the floor directly under the driver.

The throttle and spark levers are situated upon the top of the steering wheel, where they are within reach of the thumb and fingers at all times without removing the hand from the steering wheel. The reverse speed is operated by the right foot pedal.

The left foot pedal disconnects the engine and applies a brake upon the rear axle that may be applied at any pressure the operator desires.

A very prominent feature is that a person may use either the left foot pedal, the right foot pedal, or the hand lever at the side of the car, or any two of these, or all three of them for braking, as they all act as a brake upon the car.

The body is handsomely upholstered, being one of the features the makers pride themselves upon as well as the hill climbing qualities of the car. It is claimed nothing but the best leather and curled hair are used. The wheels are 32-inch fitted with 3½-inch tires. The equipment consists of two gas lamps and generator, two side oil lamps and tail light and a long tube horn.

The Packard Factory—Detroit

HUGH DOLNAR.

The Packard Company produced a total of 1129 cars from Sept. 1st, 1906, to June 1st, 1907, all either touring cars, limousines or runabouts. No Packard commercial cars were supplied during the time specified; the Packard Company has not abandoned the commercial car idea, but has been constantly building experimental trucks and delivery wagons, tho no final type of this class of motor vehicle has yet been fully decided upon as standard.

Of the 1129 Packard 1907 cars, 125 had both touring and limousine bodies fitted to the one chassis, making a total of 1254 car bodies of all three styles placed on Packard cars sold during the year. In addition the Packard factory is now filling orders for 100 limousine and 12 landaulette bodies to go on Packard cars of the 1906-7 models which were fitted with touring bodies only; these additional bodies will be completed late this summer. The Packard year ends June 30th. The Packard car bodies are composite constructions, wooden frame and sheet aluminum seat backs and panels, etc., requiring a very large floor-space in construction.

The Packard factories are among the world's largest, but not nearly large enough for the work in hand, and are now being increased by a new front building, reinforced concrete, 501x60 feet, two stories high. Something more than half of the first floor of this new front building will be used for the factory offices and the remainder will house the experimental department. This new front building faces south. The second floor will be occupied by the Packard general offices, at the west end, over the factory offices and the remainder of this second floor will be occupied by the drawing room and physical and chemical laboratories. The old offices in the southwest part of the previously erected Packard factory buildings will be used for factory offices when the general offices are transferred to the new front building.

Besides this new front building, now under construction, the Packard Company has this year added a third story to last year's front and east side buildings, 957 feet total length and 60 feet wide, also a connecting building, 128x60, three floors, now almost ready for use, which will be occupied by body-making and upholstering, and second stories have been added to two of the transverse buildings, each 200x 50 ft. This added floor, 200x50 ft., on the west side will be used as the rough store room, and that on the east for a factory restaurant on the first floor and tool-maker's department on the 2nd floor.

A restaurant has been maintained for the past two years in the Packard factory, supplying about 300 meals per day. This restaurant was turned over rent-free to a keeper who supplied meals to workmen as a private business venture of his own. This same man will have the new and very much larger restaurant on the same terms; the first was far too small to accommodate the workmen.

The Packard Company owns a flat plot of 23½ acres, with the Boulevard running thru it East and West, and Concord street bounding it on the east side.

The shops were removed from Warren, Ohio, to Detroit, early in 1903, and the Detroit buildings have been in course of enlargement almost constantly ever since, and when the new front building is completed the Packard factory will have 435,000 feet of floor space.

The original buildings are all of brick, all newer buildings are reinforced concrete.

The Packard pay roll has carried as many as 1846 names, which number will be largely exceeded in 1907-8.

The General Vehicle Company, of Long Island City, N. Y., heretofore manufacturers of heavy commercial electric vehicles, will add a light pleasure car to their productions. The new car is scheduled to make its appearance on the market early in the fall.

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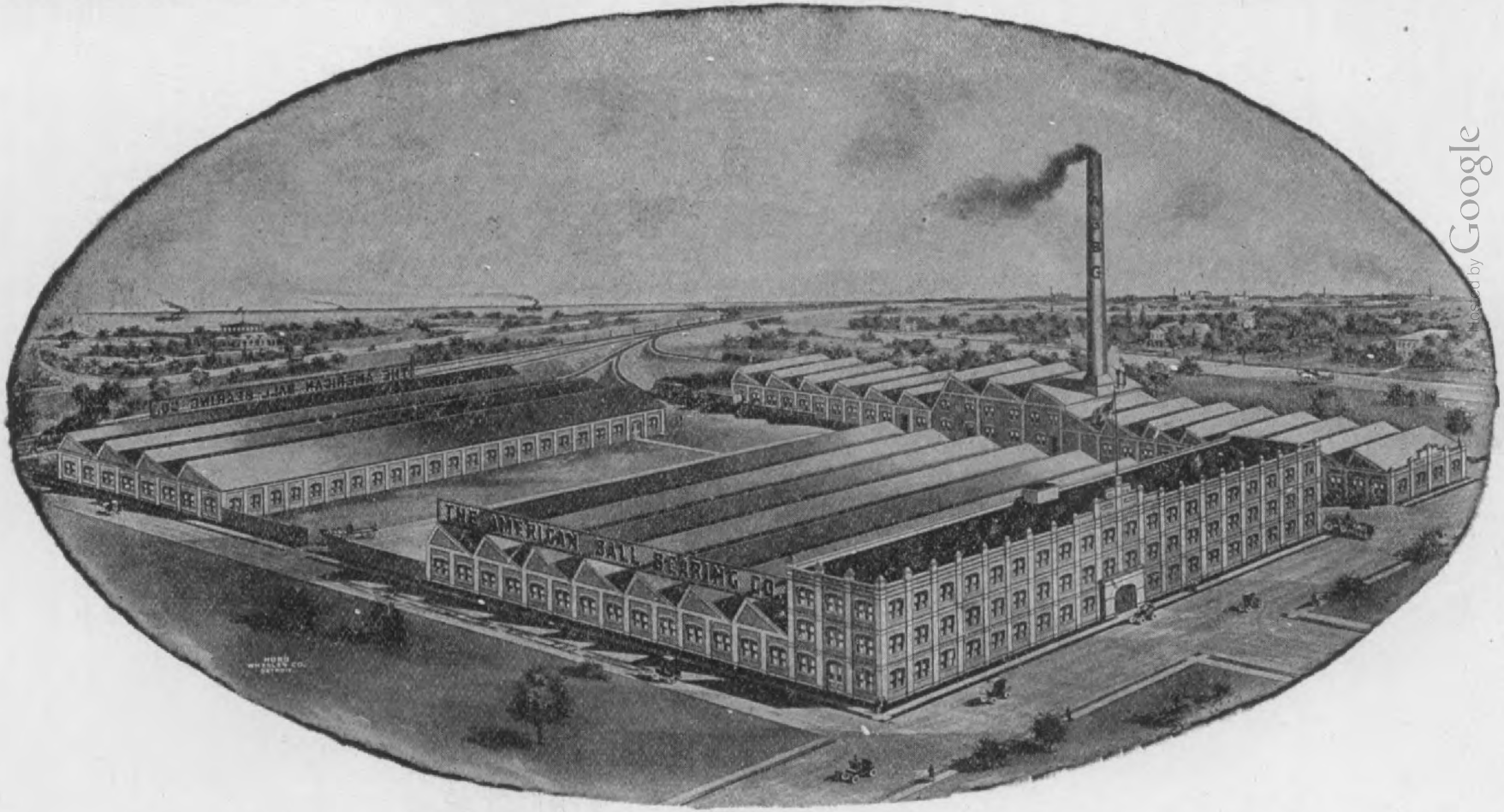

The output of complete Front and Rear Automobile Axles of this plant exceeds the capacity of all competition combined.

The American Ball-Bearing Co. L. S. & M. S. Ry. & Edgewater Park
CLEVELAND, OHIO, U.S.A.

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1908 Motors of the Continental Engine Co.

The Continental Engine Co., 503 Fisher Building, Chicago, Ill., has recently brought out a new line of motors that have been designed along lines embodying foreign practice.

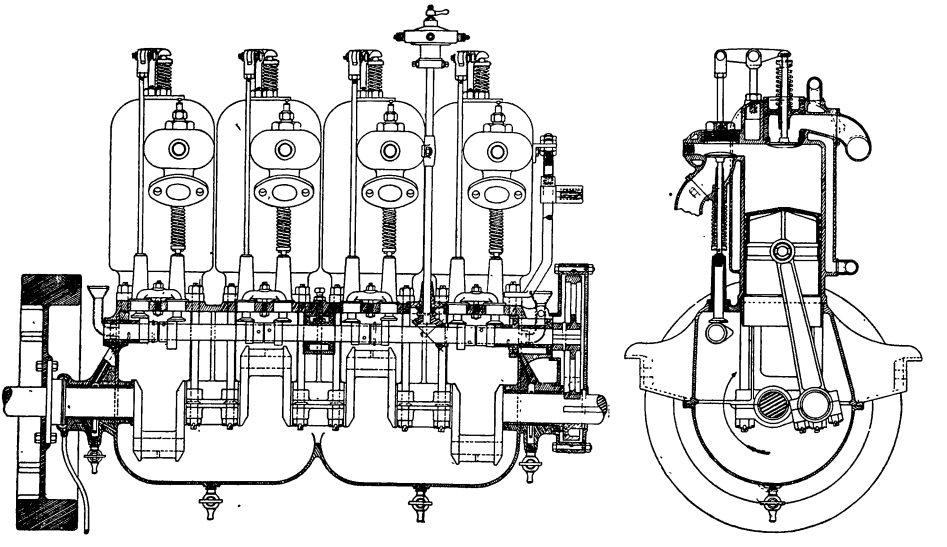
The engine is of the separate cast cylinder type, with five main bearings, and uses oil rings in the long end bearings. The diameter thruout of these and the crank bearings is 1¾ inches.

The exhaust valve was, after tests, placed centrally at the top of the cylinder in a removable cage for easy access and absolute seating. This method allows of direct exit for the exhaust, and enables the exhaust pipe to be placed on one side with the intake on the other, yet have but one set of cam gears. This system of long intake ports and short (entirely surrounded with water) exhaust, it is claimed, gives cooling facilities that enable motor car builders to reduce their cooling source at least 10 per cent. over the twin cylinder type, as can be proven by the company's tests.

The exhaust pipe is of the tapering type, increasing in volume to suit the continual expansion of the gases and fits a 3-inch muffler pipe connection. This system is claimed to produce silence without special muffler provision, and reduces back pressure in any portion of the pipe to two ounces per square inch.

The cam gears are made of bronze and cast iron cut herring-bone style, so as to insure absolute silence without using flexible material subject to excessive wear. These gears, as well as the pump drive gear and magneto drive, are all housed in an easily removable case in front of the motor. Pump is furnished either of the centrifugal or gear type to suit, direct driven from gear in front. Commutator shaft is vertical to above cylinders, and is driven by housed-in mitre gears. Provisions are made for magneto, direct driven by gear in front.

Accessibility to parts on this motor is one feature of the design and the large handhole plates on the side are removable by simply loosening the nut in the middle and turning spanner bar over same. The cam shaft is in clamped bearings removable from front in assembled condition by simply loosening a clamp bolt. The plunger rod guides are also easily removed. Fly wheels are made to suit any clutch or to fit the new multiple disc clutch of the company.



Sectional view of 1908 Continental motor, 45 H. P. at 850 revolutions. Bore 5 inches, stroke 5½ inches. Speed from 150 to 1600 revolutions. Complete weight 480 lbs. Height from center of shaft to top 23½ inches, and from center of shaft to bottom 5½ inches. Width between hangers 17 inches. Length over all, including flywheel, 38½ inches. Price, with standard equipment, $800.

STANDARD EQUIPMENT.

Metal spiral cam and pump gears in complete housing, water circulating pump built with and geared to engine, intake manifold, carburetor pipe, exhaust manifold, complete brass ball "T" joint water pipes and connections, commutator, spark plugs and clutched starting crank, with counter clutch for same on engine shaft; balance wheels furnished of different diameter to suit any clutch. Arrangement for magneto attachment and direct drive mounted as part of motor.

DOUBLE OPPOSED AIR-COOLED MOTORS.

The company has also just completed a line of air-cooled and light-powered motors in addition to their line of water-cooled motors.

The engine is four-cycle, with mechanical exhaust, automatic intake, self-contained cooling fan fly wheel, special white metal bearings thruout, and provided with absolutely automatic lubricating facilities, built

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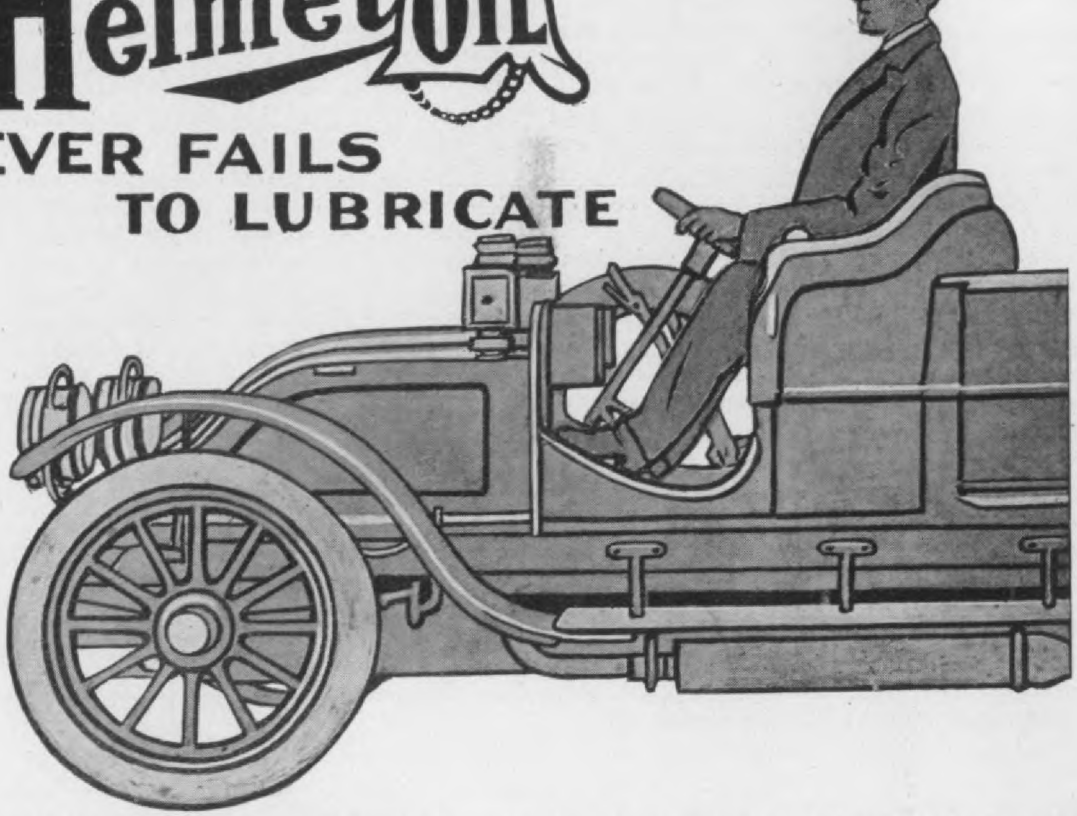
Helmet Oil

NEVER FAILS TO LUBRICATE



HELMET OIL is a hard oil. It is not a common liquid oil, but has "body" or density that *resembles* lubricating grease. Helmet Oil will give satisfaction on every bearing of your automobile.

Try it on the bearings that give you the most trouble and you will find that t will give perfect lubrication.

The crankshaft bearings and the gears generally give the most trouble because of the enormous pressure, which forces common liquid oil out at the sides or burns t up into a tar-like substance or residue. Some oil manufacturers do not even claim that their oil will effectively lubricate these parts.

Helmet Oil will not only lubricate crankshaft bearings and gears, but it will ubricate every other bearing on your automobile effectively.

The reason that Hemlet Oil gives such good service is on account of its "body" or density. It can't be forced out at shaft ends, and it is such a thorough ubricant that the bearings cannot become hot and bind. The bearings are always as clean and as bright as the metal itself. There is no black, tar-like residue.

Arguments and statements of facts are all right, but—***we will prove ours to you.***

A Trial Test Free

We will give you enough to try it on your car. Put it where you are having the most trouble.

Send us the name of your dealer and we will have him give you a quantity to test.

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he type "B" is a double-opposed 10-horse ver motor at 850 R. P. M., so designed o meet the requirement of a motor suit- for cross or lengthwise hanging in a ssis or frame of any kind, and yet re- e but a comparatively narrow frame, as following specifications will readily w:

ore, 4 1-16 inches; stroke, 4 inches; th over all, 26½ inches; distance be- en hangers, 17 inches; weight (complete 5-spoke fan fly wheel), 130 pounds; cen- of cylinder to centre of hanger vertically, inches; diameter of fan fly wheel, 17 es outside; diameter of crank shaft bear- , 1 5-16 inches; length from outside to side of main bearings, 9½ inches; cranks 80 degrees and running in white metal rings.

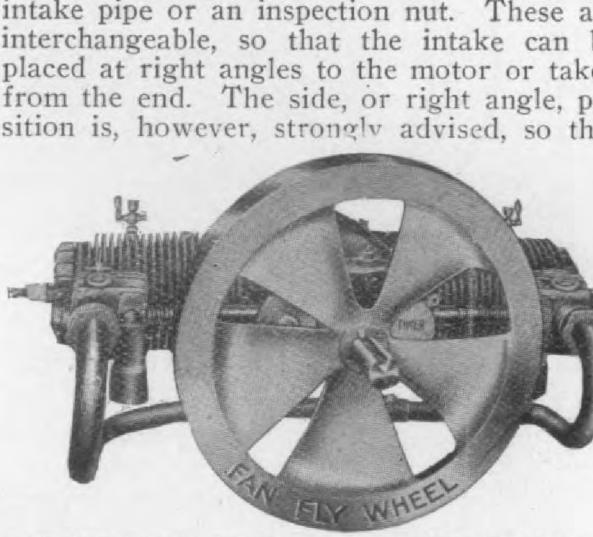
SPECIAL FEATURES.

pposed cylinders on one casting. Ex- st directly down. Intake made inter- ngeable to the side or end. Removable e-seated cylinder heads avoiding gaskets. nk case and cylinders rigidly cast in one e. Large removable cover over top for ection of moving parts. Hanging, suit- for any frame, on 1-inch standard pipe, s also the exhaust pipe. Normal speed, revolutions per minute. Cam shafts on izontal line, with crank shaft to admit access to all parts from top by removal one plate without interference with cam ft. Intake tube of rolled brass, with matic intake valves inside of pipe to d all leakage and yet made for easy ection by simply loosening one nut. Steel am section, adjustable connecting rods special non-heating bearings. Hollow lened steel piston pins. Double spark system and easily removable exhaust e.

he balance of all moving parts, they be- inclosed and supplied by oil direct from k case, the exhaust and intake piping bined to one outlet in each case and the ging being suitable for any frame, with cooling provision embodied within the vheel, and the extreme over-all length of 26½ inches makes this a most de- ble and specially-adapted outfit for motor cles and portable work. The heads of cylinders are so made as to prevent heating, contain one provision for a k plug, are screwed into a bevel seat to in absolute tightness without depending the thread for the same and without ets of any kind.

he cam gears are placed horizontally in with the crank shaft inside the case, cylinder. This makes a definite constru tion, and is an oil and dust-tight compar ment for the cam, which can be filled wi hard oil so as to insure protection from u necessary wear.

The exhaust valve stems have lo guides and are directly in line with t plunger rods, so that no irregular or twi wear is presented to the action. The guides are integral with the main castin as is also the valve seat, the throat of whi is 1½ inches diameter, with plenty of g clearance around the seat in the valve char ber. This valve chamber is also cast integr with the main casting and has two outle for the insertion of the intake, one endwa in line with the exhaust valve and the oth at right angles, going horizontally to the sid and both being made to either receive t intake pipe or an inspection nut. These a interchangeable, so that the intake can b placed at right angles to the motor or tak from the end. The side, or right angle, p sition is, however, strongly advised, so th



1908 Type N, 10 H. P. air-cooled Continent Motor, fitted with flywheel fan. Bore 4 1-16 or inches, stroke 4 inches. Length over all 26 inches, distance between hangers 18 inche Weight complete with flywheel 140 lbs. Price $1 The intake can be placed at the side or end. T heads are valve seated without gaskets, and t cylinders and crank case are cast integral.

the blind nut can be placed at the e thru which the exhaust valve could removed and inspected without disturbi the intake piping, which contains the in valve and valve housing in such a mann as to make the whole retained by a hex n screwed into the cylinder casting. This co struction admits quick and easy access wi an absolute air-tight arrangement so nece sary for automatic valves. This compan after thoroly trying out, as stated abov both automatic and mechanically-operated i takes, definitely decided on the latter f water-cooled engines and the former for ai cooled products.

MODEL "L" MOTOR.

The 6-horse power double opposed 3½ 3½-inch motor is of the usual and mo

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Don't Fool YOURSELF

HAPHAZARD guessing is easy but it doesn't put any money down in your pants pocket. Don't guess. Don't experiment. Don't fuss. Get what you ***know*** is right—what you ***know*** you can depend on—what you ***know*** is the best that brains can make—

Get An XLCR Battery

Why Is It Best?

Because its grid (the backbone of any battery) is made of pure lead without alloy—because its grid is heavier and is made of more active material than any other—because no plates are assembled or used green—because all connections are burned lead to lead, and are therefore acid proof—because the jars are made of the best rubber that can be got—because ***everything*** about this battery is the best that skill and care and money can produce—that's why the XLCR Battery is best.

EVERYTHING

IN AUTOMOBILE SUPPLIES

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ɔe "N" is out of the question. Bearings d internal construction are similar to the ɔe "N," and the shaft bearings are 1¼ ches diameter thruout.

New "Rands" Runabout Top

Rands Mfg. Co., 51-55 Macomb street, etroit, Mich., has just added to its line tops a new style for high-powered run-outs. The new top is very practicable for s type of car and has won favor in the inity of Detroit.

There is no bow extending from the side the seat to the front part of the top and erefore, no obstruction in the way when e is mounting the seat. The top is long ough to extend over the dash and when ed with a wind shield gives ample pro-tion in inclement weather. Two side cur-ns can be attached to the edge of the front at with fasteners which can be left there rmanently if desired.

New "Rands" Top for High-Powered Runabouts.

On some cars this top can be folded back thout interfering with the occupant of the ar seat. It is raised or folded by means two thumb screws, being detached from e upper part of the center socket and ced at bottom of same socket.

1908 "Vivax" Sparking Battery

Vivax Storage Battery Co., 2228 Michi-n avenue, Chicago, have made some im-ovements in their storage ignition battery 1908, and herewith we give a detailed de-ription of the new model of this battery, ich has been but briefly mentioned in ese columns.

The elements are in rubber cells and the lls are enclosed in an oak case made of -inch material, dovetailed. The bottom grooved in all around, so that it cannot op out. Corners are rounded. The case

The 1908 "Vivax" Sparking Battery.

their own grids and plates. The active m terial is so lockt in that no particles c become detached and fall to the botto but to doubly guard against this contingen a half-inch space is left between the bott of the plate and the bottom of the jar. P forated, hard rubber separators are used tween the plates.

After the cells are placed in the ca the space between them and the inside of case, about ⅛-inch all around, is filled w a composition which holds the battery one solid mass and which does not m from heat or crack from cold.

The covers which go over each of compartments fit tightly around the term als and over these covers is flowed ab ¼-inch of composition, which prevents acid from creeping from the poles. Insu ing wire which is imbedded in the compo tion, prevents creeping of any acid fr the poles to the terminals.

The capital stock of the Hartford A Parts Company, Hartford, Conn., has been increased from $10,000 to $35,000.

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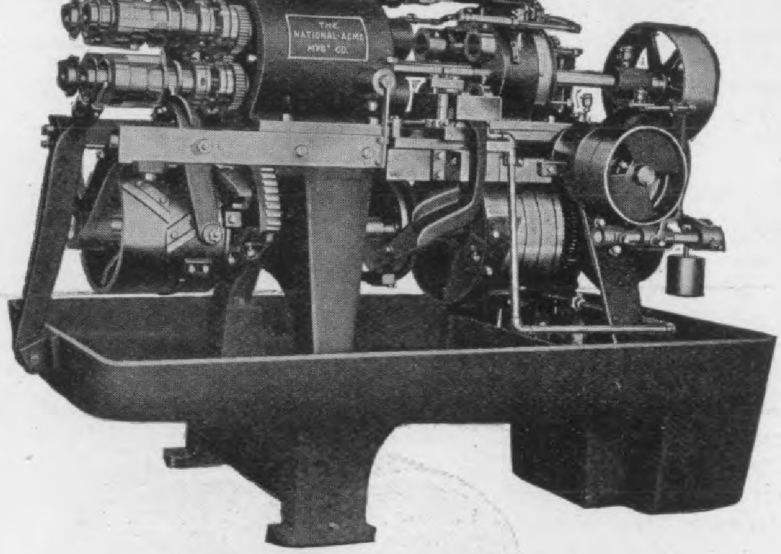


THE ACME AUTOMATIC MULTIPLE SPINDLE SCREW MACHINE

With This Machine

You can make your

DUPLICATE PARTS

just as good, much quicker and far more economically than by any other method—provided they are made from the bar and are $2\frac{1}{4}''$ in diameter and $10\frac{1}{2}''$ long or less.

Send us your samples for estimate.

THE NATIONAL-ACME MANUFACTURING CO.

CLEVELAND, OHIO

Branch Offices:
New York,
Boston,
Chicago.

General Foreign Representatives:
Alfred H. Schutte,
Schuchardt & Schutte.

Write for new booklet describing the Acme.

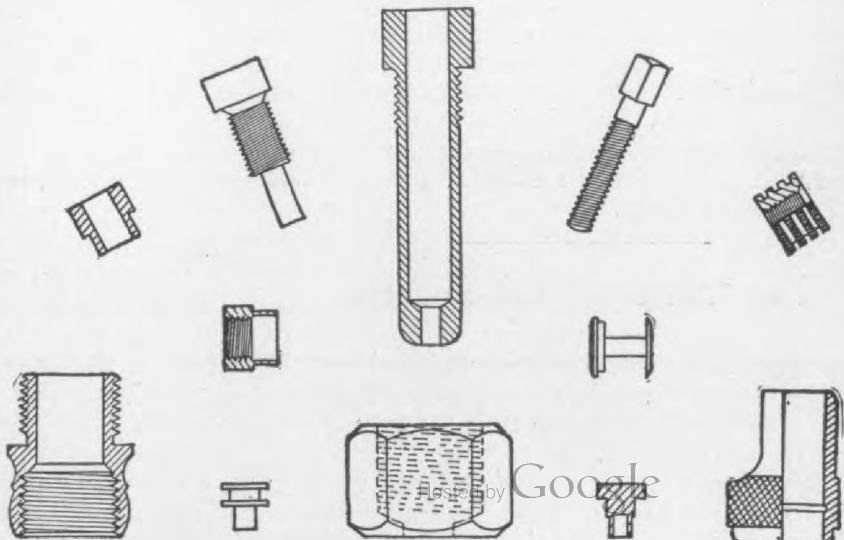
Or

We will make your

MILLED GOODS

for you at attractive prices and give you prompt deliveries.

We have particularly good facilities, at present,



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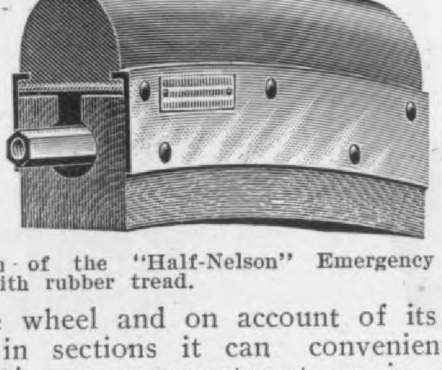
ed by the Half-Nelson Emergency Tire
, 305-309 South Third street, Minneapo-
Minn.

The particular features of this tire are
t it can be easily and quickly mounted



ection of the "Half-Nelson" Emergency Tread,
ed with rubber tread.

the wheel and on account of its being
de in sections it can conveniently be
red in one compartment or in several
ferent places about the car.

The tire is made in six sections. Five of
couplings by which the six sections are
ned into one exactly circular tire consist
a strong hasp and a double curved hook
t cannot come apart except by a peculiar
uble motion. These joints lock perfectly
en the sections are in place, making a
mplete circle. The sixth coupling is

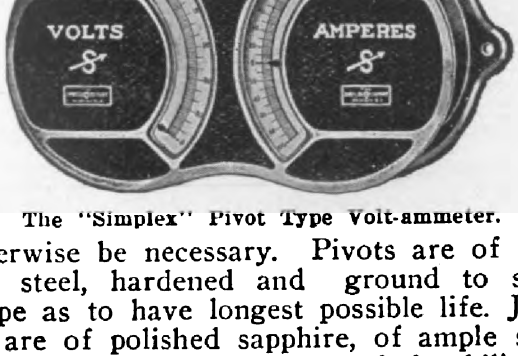
Making the joint with the "Half-Nelson."

own in the two illustrations which give
detail. This coupling is similar to that
gas pipes, except that it is six-sided so
to be easily screwed up with a wrench.
Besides being made with rubber tread as
ustrated, it is also made with rope tread
d wood rim. The tires are manufactured
all sizes from 28x3 inches, listing at $36,
to 36x5 inches, listing at $56, with rub-
r tread. Prices, with rope treads are $18
$28 respectively.

The "Simplex" Volt-Ammeter

The Simplex Instrument Company, of
ewark, N. J., have recently placed on the
arket their new pivoted type Volt-am-
eter, suitable for electric automobiles,
nches, and charging boards. It pos-
sses some interesting features, not the
st of which is its neat, artistic appear-

are mounted, together with a soft iron c
core, upon a one-piece structure, renderi
their mutual alignment permanent. T
moving system consists of a flat rectang
lar coil wound on a light aluminum dampi
frame, which is riveted in the center, ma
ing it very rigid and not liable to spri
out of shape. It is supported by means
pivots and jewels and revolves about
soft iron core, and between the pole piec
and can be easily removed for repairs wi
out disturbing the magnetic system. Be
entirely enclosed by the pole pieces, it
its entire surface active in cutting magne
flux, thus allowing a lighter coil than wo



The "Simplex" Pivot Type Volt-ammeter.

otherwise be necessary. Pivots are of s
cial steel, hardened and ground to s
shape as to have longest possible life. J
els are of polished sapphire, of ample s
and selected for hardness and durability

The instrument scales are hand drawn
a special white enameled scale plate, t
eliminating buckling, which happens
quently in meters where paper scales
used.

The case is of aluminum, black enam
ed with polished aluminum trimmings,
is made moisture proof, to withstand sev
weather conditions. The electrical conn
tions are brought out underneath the c
and are not exposed.

A New "Winchester" Model

To meet the demand for a speedome
that possesses all desirable features a
price that all motorists can afford, the W
chester Speedodometer Co., Motor M
New York, has introduced a new model
the Winchester Speedodometer.

The reduction in price has been m
possible, without in any way changing
mechanism, material or workmanship,
far as the speed indicating portion is c
cerned, by using a smaller odometer. T
change has resulted in making a spee
dometer about one-third less in size wit
proportionate reduction in price.
High-Speed-Record-Hand, showing

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Conover
Wind Shield

(Patent applied for)

To equip your Car with "any old kind" of a Wind Shield will protect you from the wind and dust, but don't overlook the appearance of the outfit after it has been on for a while.

Many Cars are judged by the quality of the equipment placed thereon. The more you think of your Car the greater the reason for your applying a

CONOVER FOLDING WIND SHIELD

on the dash. It will enhance the appearance of your Car in the same proportion that a fine silk hat does the well dressed man.

SEND FOR DESCRIPTIVE CIRCULAR

CONOVER MOTOR CAR COMPANY

PATERSON, NEW JERSEY

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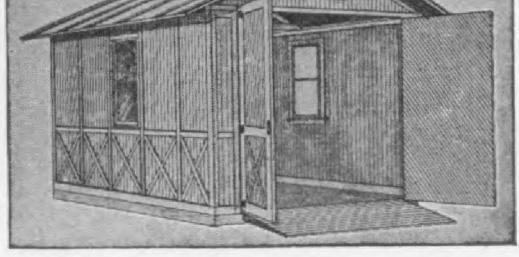
ng Co., of Owosso, Mich., which is prepared o furnish portable buildings for any purose and with either single or double walls. ach section of a "Perfection" portable ouse is of convenient size for handling by ne man and can be instantly detached by ightly inclining it forward. When in potion the sections are so rigid that they vill stand alone on the sills. The attaching evice is patented. It is made of forged teel and each one is capable of supporting vertical lifting strain of 1000 lbs. This de-



A "Perfection" Portable Garage.

ice is invisible and inaccessible from the utside so that no one could gain admitance to the building without actually tearng it to pieces.

The sections are of uniform size and interhangeable. No screws or bolts are necesary. The gable end pieces are secured by few special key bolts and small steel lates. The simplicity of the fastening deices used in assembling these houses makes he work of erection very quick and easy f accomplishment.

These buildings are guaranteed wind and vater-proof. The floors are solid and will vithstand heavy weights.

used by automobile manufacturers.

"Crown" Manganese Bronze is a m which stands very heavy strain. It is quite extensively for gears, and automo manufacturers are using it in large qua ties for various parts where great stre is required. "Crown" White Brass is st ly a bearing metal for high-speed beari It has a very smooth enamel-like finish, the makers claim will keep cool under severe service. They have no special tures of aluminum, altho they mix the m to suit customers' requirements. "Cro Bearing Metal is a high-grade metal for general bearing purposes.

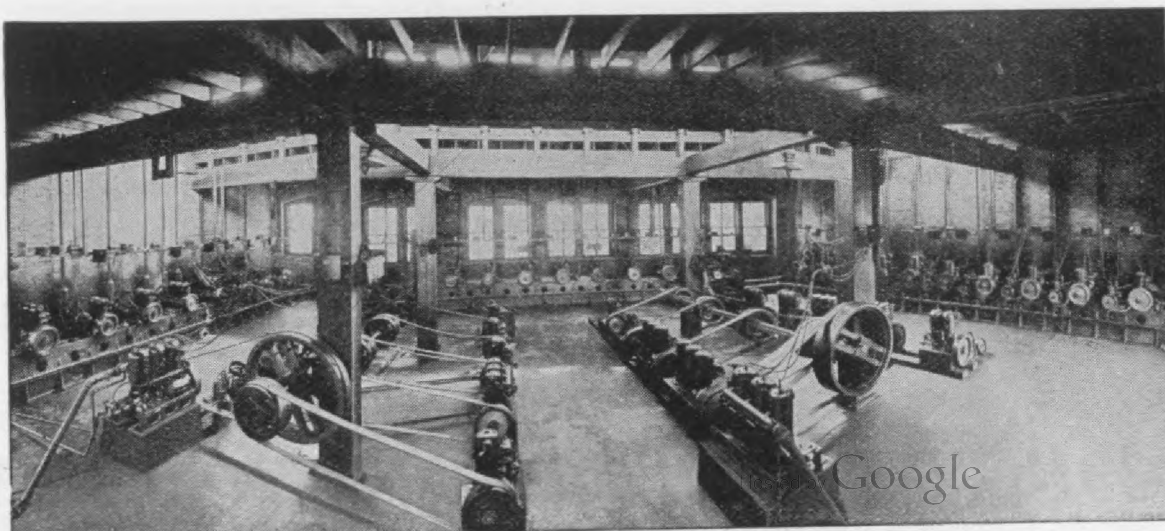
Besides these metals this concern is pared to furnish brass nuts, semi-finis not tapt, in a large number of U. S. st ard sizes.

They also have patterns for furnis round or hexagon bushings and stick b in practically all needed sizes in the ro 12 inches long.

The Leather Tire Goods Company Newton Upper Falls, Mass., manufact of the Woodworth tread, has opene branch store at 1662 Broadway, New Y City.

Mr. F. E. Miles, formerly with the ance Motor Car Company, of Detroit, M has been appointed purchasing agent o Mora Motor Car Company, at New N. Y.

The Holsman Automobile Company Chicago, has removed its offices from sixth to the fourth floor of the Monad block, where it has the entire end o building, with more than double its vious floor space.



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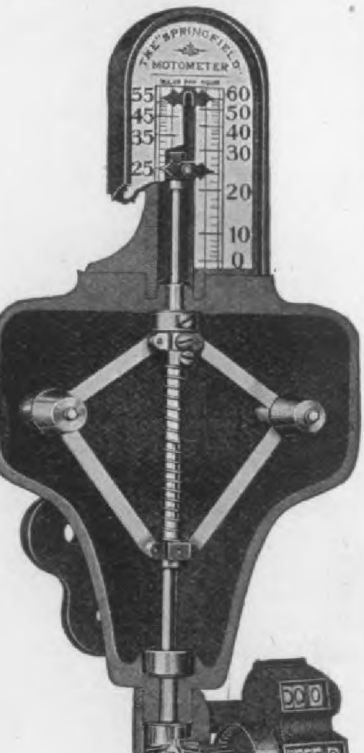
The Springfield Motometer



Now offers, covered by the same guarantee and backed by the same record of proven goodness as for the two seasons past,

These New and Valuable Features:

A Maximum Hand which is Perfection.

Travels up the scale with the regular pointer but remains at the highest speed reached until released by the pressure of a button when it instantly drops to the point where the regular pointer may be standing at the moment. It can be made inoperative in an instant, traveling with the regular pointer up and down and being invisible.

The Handsomest and Most Readable Dial Made.

Large, Symmetrical Figures in jet-black fired enamel, on a perfectly white enamel ground. Read with ease from the back seat of any tonneau. It will please all critics of the old one.

New Oil Tempered Spring Steel Reinforce,

at each end of the shaft. Prevents a short bend. Compels the easy curves necessary to smooth running and long life, which no make-shift in the way of gears can replace.

The Non-Clogging Pinion.

Will not hold mud. A straight-forward and correct mechanical device of absolute efficiency.

These are additions, not changes. With them the Motometer is even more than before "The Speedometer For Service."

50-Mile Model, $45.00. **60-Mile Model, $50.00**

Either with Maximum Hand, $5.00 Extra.

THE R. H. SMITH MFG. CO.

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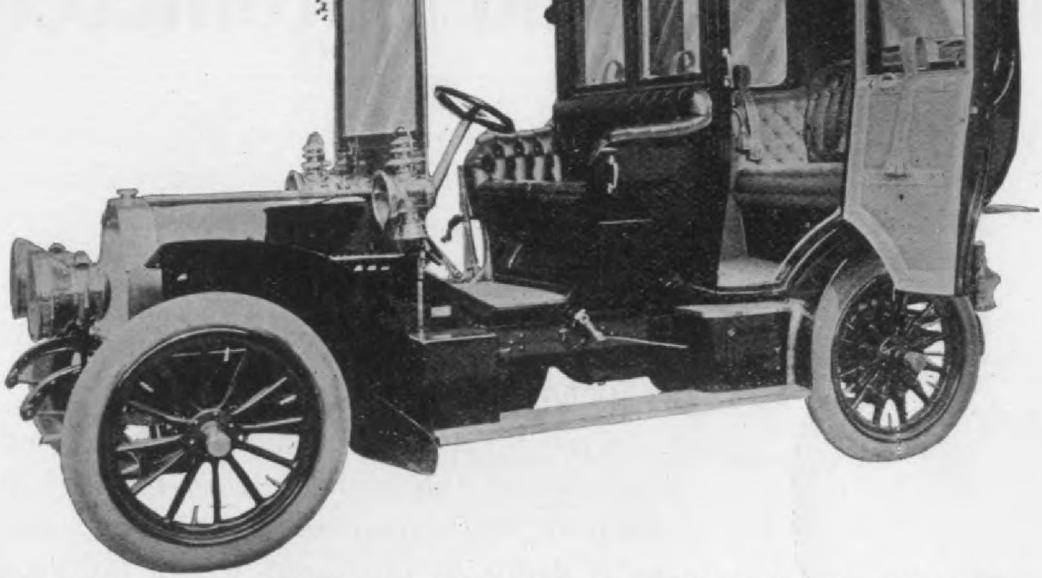


Limousine body made by the Bridgeport Vehicle Co., for Mr. E. G. Burnham, of the firm of Eaton le & Burnham, Bridgeport, Conn.

Bridgeport Automobile Bodies

ne Bridgeport Vehicle Body Co., Bridge-t, Conn., was formed over a year ago Mr. Harry D. Miller, and seven practi- body makers who have been connected n one of the largest carriage manufactur- concerns in the State of Connecticut. company builds a line of high-grade ousines, Landauletts, Victorias and ring bodies of every description.

hey make a specialty of limousine and ring car body work. The bodies are structed of selected, thoroly seasoned k and are assembled by skilled work-n. The painting may be of any com-tion of colors; upholstering may be of rocco, satin or broadcloth. The bodies furnished with an equipment usually nd in high-grade work, such as clock, et case, card case, megaphone or speak- tube, roll up silk curtains inside, sliding revolving seats, dome electric light, etc. outside fittings are of best quality brass. de appointments may be of brass or sil- finish. Side lamps wired for electric ts are furnished, if desired. The body supplied with storm front, folding into when not in use.

he bodies are made in both wood and ninum. This concern has also a special department where they build tops to or- also, wind shields, slip covers, lamp ers, etc.

The "Autochime Junior"

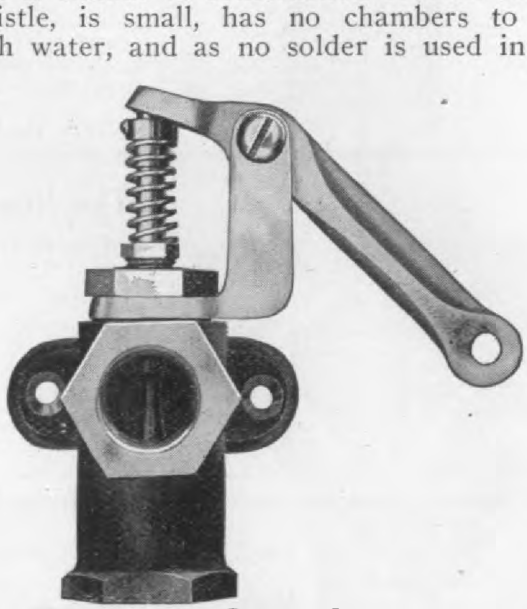
he "Autochime Junior" was recently ed on the market by the Gray-Hawley Co. 605-609 W. Fort street.

is shorter, measuring only 2x9 inches, whi the standard Autochime measures 2x15 i ches. The tone is also somewhat high pitched. It works equally well on hi powered cars and is also a most desirab size for steam or air pressure.

The "Gray-Hawley" Steam and A Valve

Gray-Hawley Mfg. Co., 605-609 W. Fo st., Detroit, Mich., recently placed on t market a new steam and air valve, he shown.

It is similar in construction to their chir whistle, is small, has no chambers to f with water, and as no solder is used in i



The "Gray-Hawley" Steam and Air Valve.

construction it is not affected by the inten heat and pressure of superheated steam

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¶ The one vital point of a searchlight, and the point that determines its light value, is not the amount of metal, or the size of the flame, but the refraction of the light rays. And that is what our Mangin Lens Mirror does—it condenses the light pencils and utilizes the light that is otherwise scattered.

CAREFULLY conducted experiments prove that a searchlight fitted with the

Bausch & Lomb Searchlight Mirror

will give 50 per cent more light than with the ordinary reflector. The reason is that with our Mangin Lens Mirrors the greatest possible number of the light rays is used—they are reflected and refracted into a solid beam of light, so that instead of the light rays being wasted they are all concentrated within the area required to light the roadway.

¶ It is *used* energy that counts, *used* light that illuminates.

¶ The genuine Bausch & Lomb Mangin Lens Mirror bears the mark "B. & L." on its face. Insist upon having a lamp fitted with our mirror.

¶ "PRISM" IS A LITTLE MAGAZINE we publish monthly. Not a mere advertisement, but a beautifully made and printed little publication about that world of wonder and beauty seen by the lens. Send us your name and we will enter your subscription FREE.

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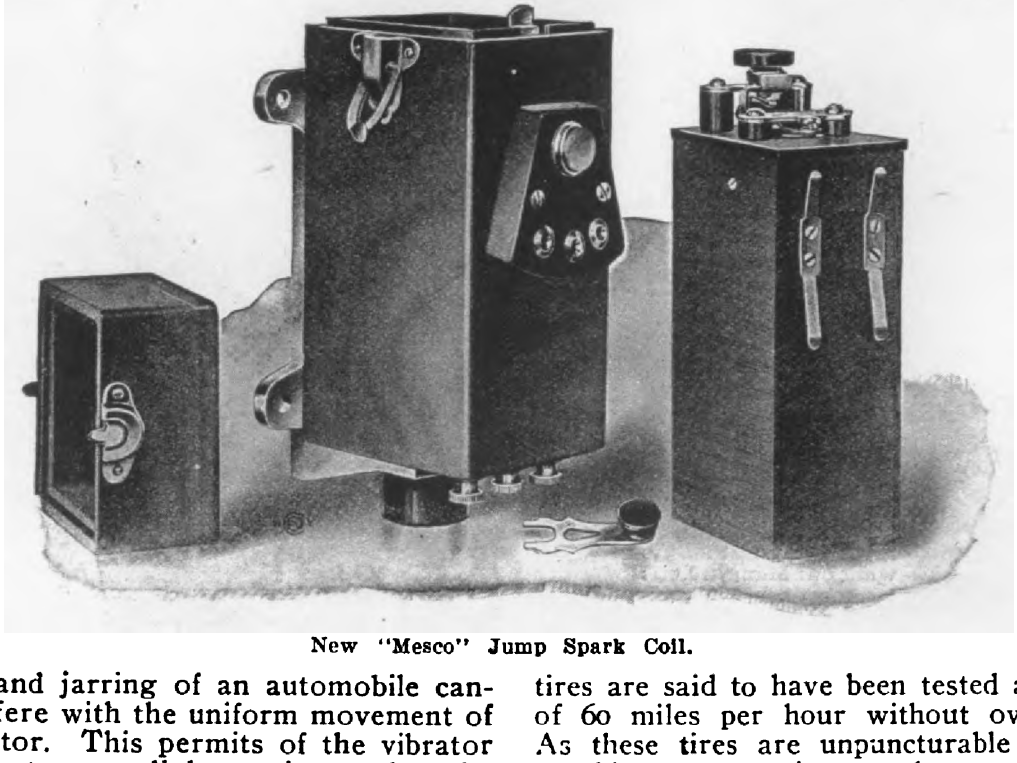
furnish a reliable spark on a minimum rrent consumption. This is accomplished t only by the correct proportions of the mary and secondary coils and conden-s, but by the use of a balanced vibrator, exclusive feature of this coil, which is ly protected by patents. The armature is unterbalanced in such a manner that the



New "Mesco" Jump Spark Coil.

aking and jarring of an automobile can-t interfere with the uniform movement of vibrator. This permits of the vibrator ng set at a very light tension, and as the nature is of light weight it responds in-ntly when contact is made at the timer, d there is no loss of current or time in rting the vibrator and securing the spark. Adjustment (which can be made while nning) is by one screw only, which turns ely but is held against accidental move-nt by a locking spring.

The best iridium-platinum is used for the ntact points. The parts carrying these nts can be readily replaced by anyone en renewals are required, but there is so le sparking at the points that they last ch longer than is usual.

The dashboard type is made for one to cylinder machines, with removable units ich automatically make contact when slipt o place. Both dashboard and marine es are very small and compact. The kers claim that a sufficient spark for iting any gas engine is obtained by a cur-t consumption not exceeding three-ths of an ampere.

Columbia Machine & Malleable Iron Co.,

ufactured without the use of bark. It produced by a secret process said to re in a much superior leather at a much sm er cost and in less time than bark-cu leather.

Antioak tires are made of two and th thicknesses of Antioak leather with an a friction coating between the layers. Th tires are said to have been tested at a sp of 60 miles per hour without overheati As these tires are unpuncturable and c not blow out or rim-cut, they appear to a promising proposition, especially as makers claim great resiliency for th They are also impervious to oil, water, li or heat and cannot lose their shape as stretch is taken out of the leather. A st lug tread is another feature of Antioak ti

---

"Rubberlife"

"Rubberlife" is, as its name suggests, preparation for increasing the life of r ber. It is made by Rubberlife Specia Mfg. Co., Grand Rapids, Mich., and has b given a thoro test during the past two ye on lithographers' rubber blankets, etc., a for some time past on automobile tires.

It is a semi-liquid about the consiste of sour milk and the color of rubber. is composed of 16 ingredients and is the sult of over two years of experimenting Mr. Norman Pellow, who was formerly the lithographing business.

The price of this preparation is $6 gallon and this quantity will last about year, giving a full set of automobile ti four treatments. It soaks into the ti

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nd to all the leading jobbers in the line.

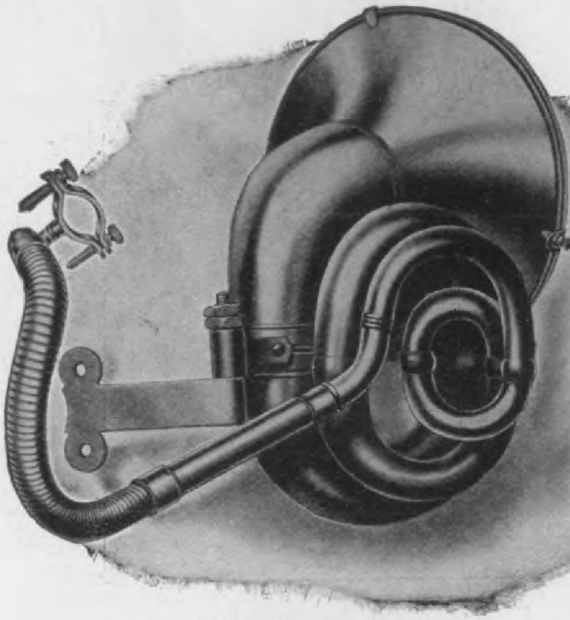
Success is due to the absolute perfection of our horns for to nd quality.

Nothing Better on the Market

'Beware of cheap imitations.'' *Get the be*

Send for general catalogue and for list of Auto-makers that have used our horns.

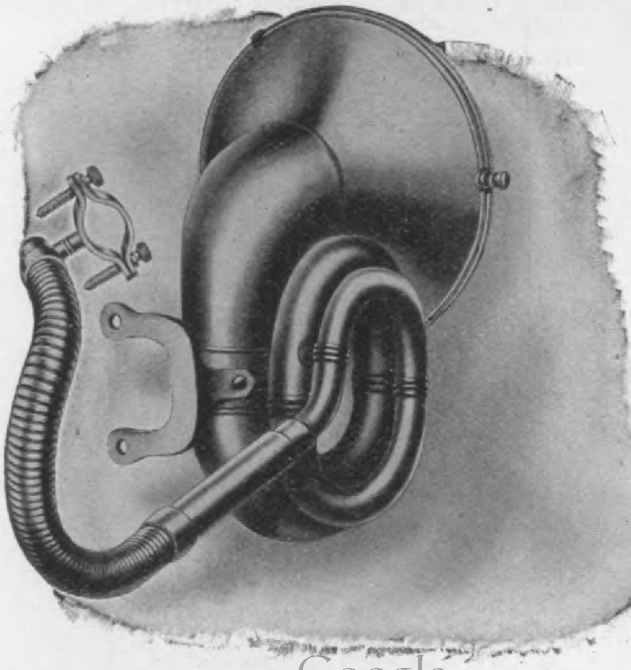
Large Oval Triple Twisted



Large Dragon Triple Twisted Swivel—Bracket

TEN NEW STYLES OF HORNS

The French Style Oval 7 in. bell and 8¼ in. bell



Dragon Horn with lyre bracket, 6¼-7¼-8¼ in. bell

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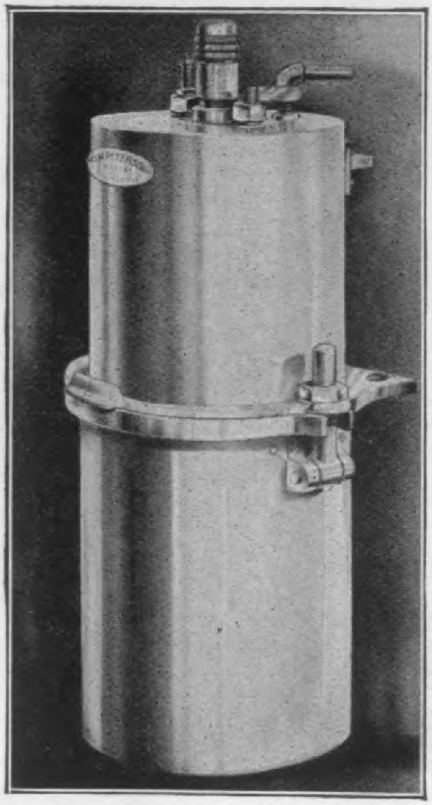
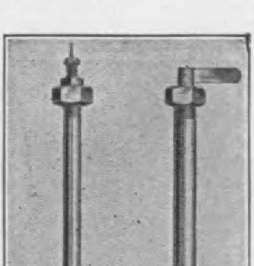
Michigan avenue, Chicago, embodies two el features in its construction—an auto-



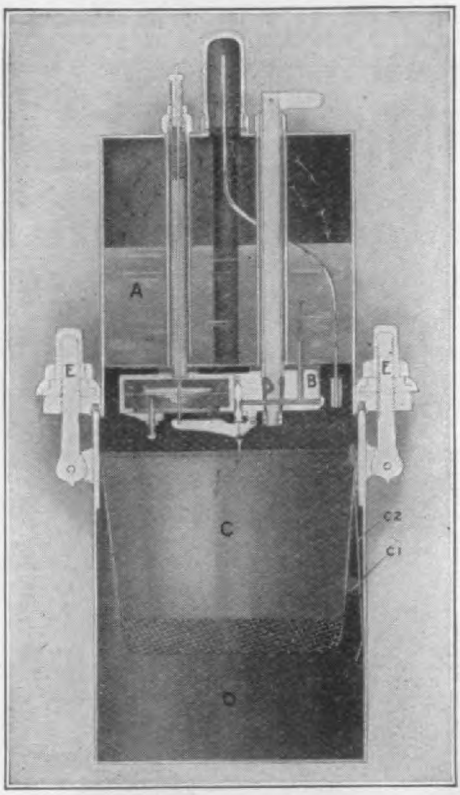
'he "Peterson" Automatic Generator No. 2.

ic device for controlling the water feed an automatic tossing carbide basket. he water feed device is a needle valve diaphragm which so operates by the gas ssure that the water feed is automati- diminished, stopt or increased. This



ve fitting of the "Peterson" Automatic Generator. fitting contains all the mechanism and working of the generator, detachment being made by ly removing two nuts on top.

e, together with the water passageway all the mechanism, is contained in one ovable fitting which can be quickly and



Peterson Generator, Sectional View.

is exposed to the water, and the used ca bide down next to the grate so that t waste is eliminated. The capacity of th generator is 3½ pounds of carbide.

Thompson's Body Work

The E. H. Thompson Body Co., 139-1 Seventh street, Pittsburgh, are doing strictly custom business, manufacturi high-grade limousines, touring bodies, t Thompson detachable limousine, semi-li ousines, cape tops, wind shields and s linings. They are making a specialty their detachable limousine.

They equip a touring car with their d tachable top complete, beautifully appointe trimmed and finished, and leaving nothi desired on the part of the user that th would not have in a full limousine car the highest type. They build for this j a set of full coach doors with drop sa instead of piercing the doors as is som times done.

Granger's Drop Forgings

The Granger Drop Forge Co., 25-27- South Canal street, Chicago, Ill., make specialty of drop forge and steam hamm work, including crank shafts, connecti

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WHAT OTHERS SAY

CHAS. E. MILLER & BRO.
Ford and Reo Automobiles

Washington, D. C.
July 17, 1907.

Stewart & Clark,
Diversey Blvd., Chicago, Ill

Gentlemen—We are delighted to report that we have used and sold 15 of your fine instruments, obtaining same through The Post & Lester Company, of Hartford, Conn. We are wedded to your instruments, being the finest we have handled, especially for the price asked. We hope to sell a large quantity, and are installing them on all of the cars we possibly can, as soon as sold. Very truly yours,

(Signed) CHAS. E. MILLER & BRO.

J. A. NEWBY

New Castle, Ind., July 24, 1907.

Stewart & Clark Mfg. Co., Chicago, Ill.

Gentlemen—Received your letter, and will say I have been selling your Speedometers exclusively this year. Have equipped Nationals, Stoddard-Daytons, St. Louis and Maxwell cars this season. Yours truly,

(Signed) J. A. NEWBY.

Stewart Speedometers are guaranteed for five years against everything but misuse

---

PRICES

No. 3.	Combination	Speedometer-	Odometer,	full size	dial,	(4-inch)	50-Mile,	$	40.00.
No. 4.	"	"	"	"	"	"	60-Mile,		60.00.
No. 5.	"	"	"	"	"	"	90-Mile,		75.00.
No. 6.	"	"	"	"	"	"	120-Mile,		100.00.

We can make immediate delivery on 50 and 60 mile instruments

We are told our new catalogue is the handsomest and most comprehensive book on speedometers yet published. Copy sent on request.

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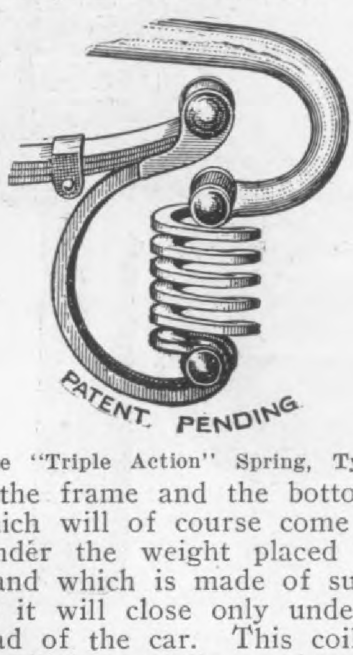
Stewart & Clark Manufacturing Co.

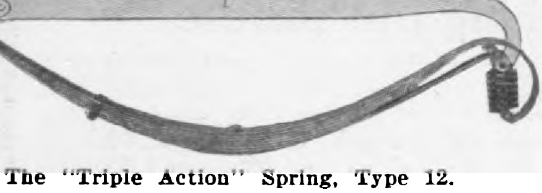
e Triple Action Auto Spring Company, 5 Michigan avenue, Chicago. It is the ntion of Mr. D. R. Close, of the Garden Spring Works, who has applied for gn and domestic patents.

om the illustrations herewith it will be that the side spring in itself has ac- y been lengthened nearly one-third out additional leaves or thickness of l whatever, this being made possible his form of construction. A compres- coil is placed between the hanger or



The "Triple Action" Spring, Type 11

on the frame and the bottom of the l which will of course come first into n under the weight placed upon the gs, and which is made of such a ten- that it will close only under the ex- e load of the car. This coil is made eel, rolled especially to give the great- vertical travel and length of wire with- e space it occupies, and of such diam- and pitch that a weight of but 25 ds will start its compression, thereby elling it to absorb entirely all the l vibration consequent upon road sur- , such as cobblestones, car tracks, etc. rting to the side spring only such ks as would approach the maximum re- nce of the coil.



The "Triple Action" Spring, Type 12.

e makers claim to obtain fully 75 per of the spring value of the metal used his large scroll, which they claim is en by the fact that outward thrust of coil maintains it always in a vertical ion, regardless of the compression and gation of the side spring.

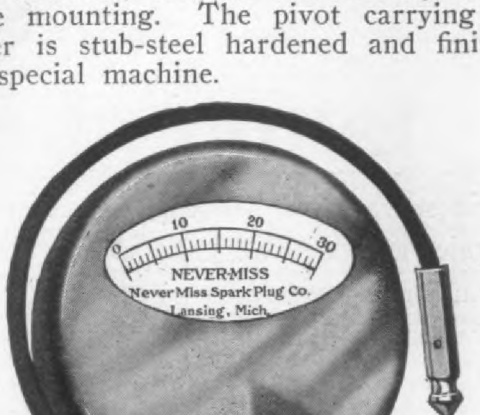
jectionable side motion is entirely elim-

connection with the spring on the car, th other end supporting the compression spring which in turn supports the hanger or stu of the frame.

The "Never-Miss" Ammeter

The Never-Miss Spark Plug Co., Lansing Mich., has just placed on the market a new ammeter, a combination volt-ammete and a voltmeter.

Materials used are of the very best; th labor employed is high-class, and especiall skillful on fine electrical work. Bras stampings are used, which insure uniformity and consequent accuracy in the instruments The coils are wound on brass spools care fully insulated, and all are thoroly teste before mounting. The pivot carrying th pointer is stub-steel hardened and finishe in a special machine.



The "Never-Miss" Ammeter.

The cases and covers are drawn from 1 gage brass, tightly fitted, and the instru ments are dust-proof. Each instrument i calibrated to correspond to a standard Wes ton, and is guaranteed to be permanentl accurate. Each one is put up in a substan tial leather case, of an ideal size for an owner using dry cells.

The Ammeter retails at $3.00, the Combin ation instrument at $4.00 and the Voltmete at $3.50. The makers guarantee to replac any defective instrument within one yea from date of purchase.

At the regular monthly meeting of th directors of the Monarch Motor Car Com pany, held July 23, at the company's office 404 Monadnock Block, Chicago, the follow ing changes were made in the executiv staff: The office of vice-president and as sistant to the president was created, and J.A Ward was promoted to fill that office. S. M

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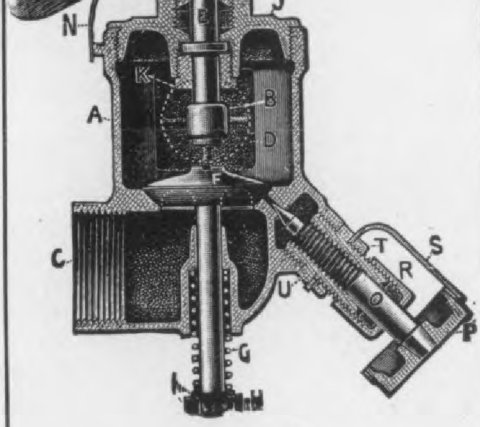
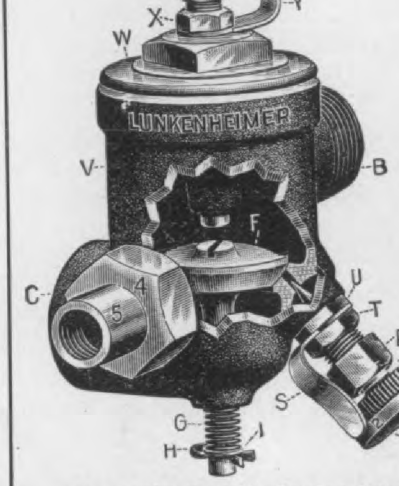


TYPE "A"
with device for regulating outlet supply

HAVE YOU HEARD

of the wonderful results obtained from gasoline engines equipped with



TYPE "B," with device for ulating lift of disc.

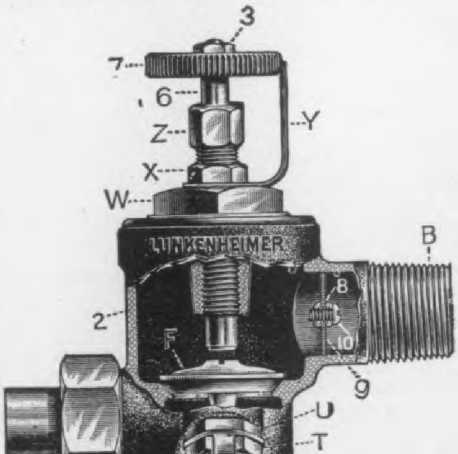
Lunkenheimer Improved "Nonpareil" Generator Valves?

Gasoline engines that could not be made to work satisfactorily, gave results when equipped with our improved generator valve.

Made in four different styles as shown in illustrations.

If your local dealer cannot furnish them, notify us.

TYPE "C," with devices for regulating outlet supply and lift of disc.



THE LUNKENHEIMER CO.

Largest Manufacturers of high grade engineering specialties in the world.

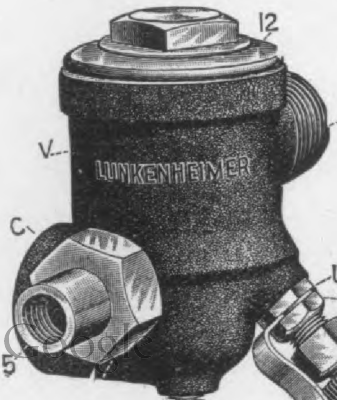
GENERAL OFFICES AND WORKS:

Cincinnati, Ohio, U. S. A.

Branches:

NEW YORK, 66-68 Fulton St.

TYPE "D"
Plain Pattern



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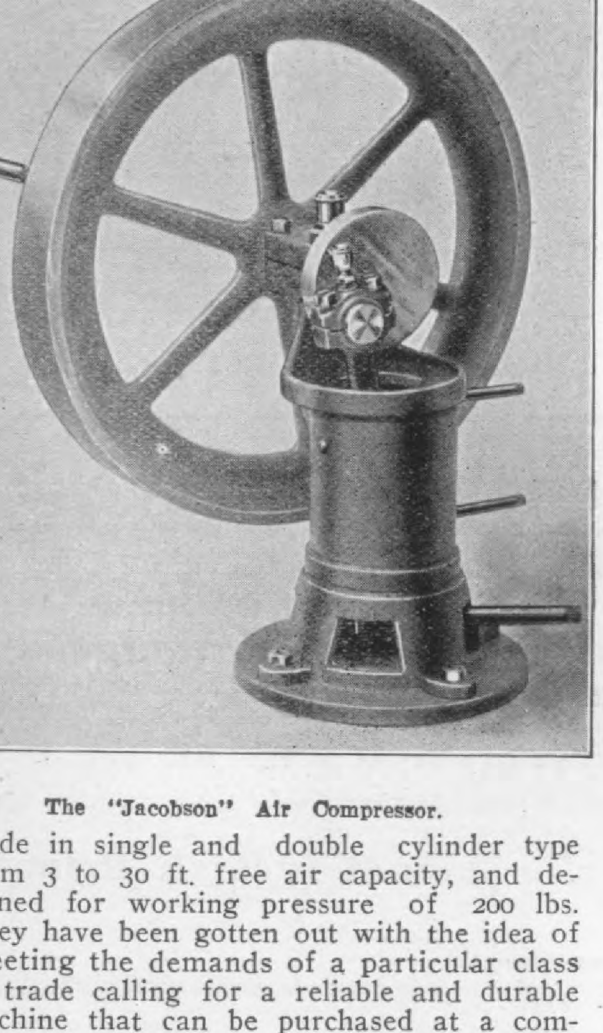
rting gas and gasoline engines where a mprest air system is used. They are also ll adapted to the service of domestic eumatic water supply outfits, also to the mprest air requirements of automobile re-ir shops, small machine shops, etc. These chines are single stage, single acting,



The "Jacobson" Air Compressor.

de in single and double cylinder type m 3 to 30 ft. free air capacity, and de-ned for working pressure of 200 lbs. ey have been gotten out with the idea of eeting the demands of a particular class trade calling for a reliable and durable chine that can be purchased at a com-atively low price. The compressors are built to standard jig, making it possible duplicate all parts very readily.

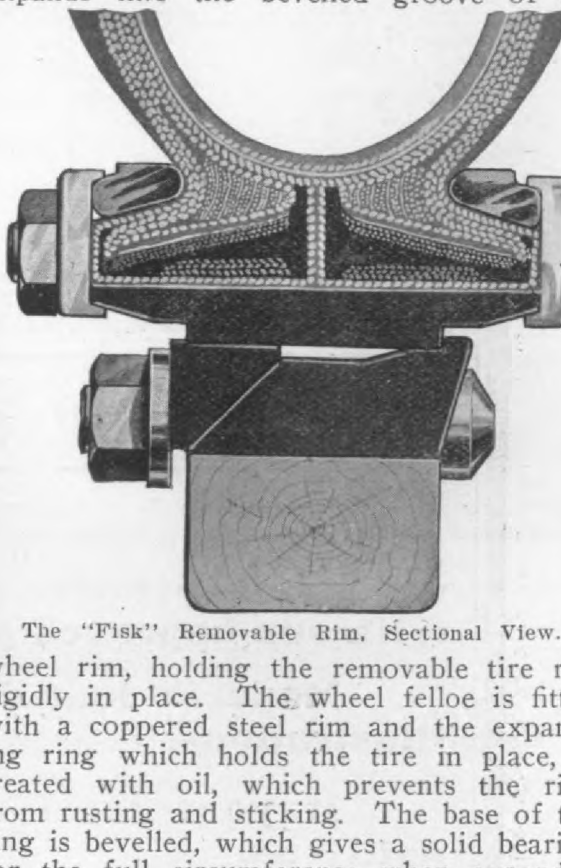
The "Best" Dry Cell

'he "Best" dry cell has been recently ced on the market by the Ampere Igni-n Co., 408-412 West Thirteenth street, w York City. Their No. 6 cell is espe-ly suited for automobile, launch and all engine ignition work.

'he cell is made by automatic machinery l consequently every cell is uniform. The kers claim that this cell has little or no ernal or local action, and that it shows a

attached. The wheel is fitted with a spe steel rim, one edge of which is flanged provide an abutment for the tire rim; other edge being bevelled to provide a cess for a specially constructed expand ring.

The felloe and expanding ring are pier at intervals by bolts fastened so that t cannot fall out or turn. When the rem able rim with its tire is placed in positi the nuts on the bolts are tightened, the r expands into the bevelled groove of



The "Fisk" Removable Rim, Sectional View.

wheel rim, holding the removable tire r rigidly in place. The wheel felloe is fit with a coppered steel rim and the expan ing ring which holds the tire in place, treated with oil, which prevents the ri from rusting and sticking. The base of t ring is bevelled, which gives a solid beari for the full circumference when expand to fit the galvanized rim to which the t is fastened. The different treatments giv the three pieces of steel render the surfa as nearly dust-proof as it is possible make them.

"Reed" Crucible Castings

The Reed Steel & Mfg. Co., Kalamaz Mich., are maufacturing crucible steel ca ings specially for automobile constructi They are running five four-pot furnac with a capacity of about 3½ tons per da They claim their metal to be soft and eas machined and at the same time very stro A recent test gave them a tensile streng of 78,000 pounds per square inch. Th are also able to furnish castings for spec purposes that will temper like tool st

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DIETZ MOTOR LAMPS

OIL AND GAS

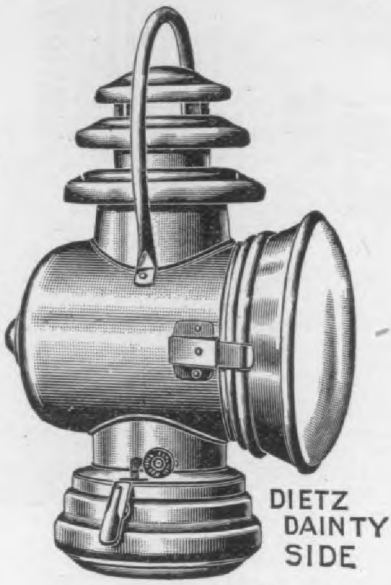
DIETZ "DAINTY"

SIDE *and* TAIL LAMPS

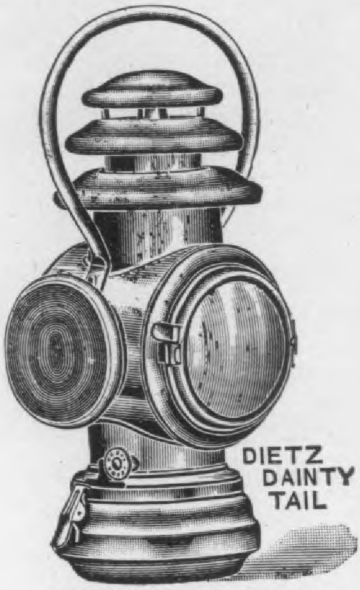
Cold Blast Principle

DIETZ

"DAINTY" side lamps are especially adapted to small motor vehicles—They are of medium size, are very durable and satisfactory.



$5.50 EACH, LIST



$6.00 EACH, LIST

DIETZ

"DAINTY" tail lamps are filling a large demand for a clean and reliable rear signal of medium size. They are popular on all makes and sizes of cars.

Our "Presto" (acetylene) and **"Comet"** (electric) burners are adapted to our **"Dainty"** lamps—Change in one minute from oil to acetylene or electricity.

WRITE FOR CATALOG AND DISCOUNTS OF OUR FULL LINE OF MOTOR CAR LIGHTS

R. E. DIETZ COMPANY

Largest Manufacturers of Lanterns in the World

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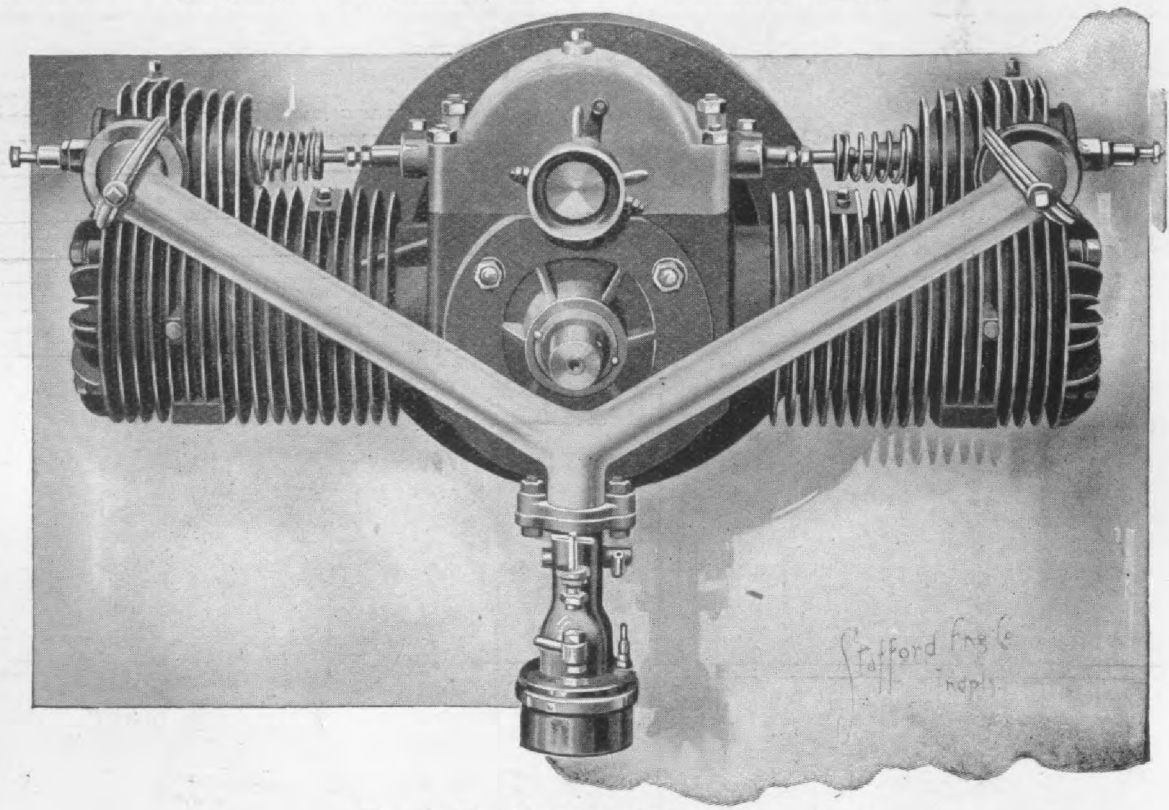
to its line of gasoline automobile mo- a 2-cylinder opposed motor especially gned for motor cars of the buggy type, light deliveries. This motor is air-cool- and its cylinders are 4x4 inches. It de- ps 10 to 12 horse-power on the brake.

he dimensions are 30 inches long, 16¾ es wide and 17 inches deep, including wheel. Without fly wheel it is 11½ in- s deep. The motor is made of the same erial and high-grade workmanship that

The Bullard Speedometers for 1908, ma by J. H. Bullard, of Springfield, Mass., a furnished in two styles, and are now rea for delivery. One of these models is so a ranged that by pressing a button the ha will remain stationary at the maximu speed, and by releasing the button it will i stantly return to the speed then being mad In the event of danger or a "red-flag pressing button will show exactly the spe at that instant and hold the hand in that p sition until released.



The De Tamble Buggy Type Motor.

made the "De Tamble" four-cylinder air- ed motor manufactured by the same pany, famous. It is claimed that this or has been run constantly under load for six hours without show- the least signs of distress from over- ing. The piston rings and pins are ac- tely ground. Crank shaft is drop forged of extra heavy dimensions, made from ial high-grade steel and accurately und. Connecting rods are of special car- steel and very rigid. Wrist pins are und and run in plastic bushings of su- or quality. Exhaust valves are mechan- y operated; inlet valves automatically. e gears are of hard bronze and steel rately cut from the solid and run in oil. construction thruout has made it with- d the most severe usage by unskilled ators. Its outside dimensions are small, the entire motor including fly wheel

The advantages claimed for this constru tion are, that it does not bring any drag any kind on the hand or impair its accura in any degree, that the hand is as free a sensitive to the slightest change of speed tho it was not a part of the instrument, a no jar or jolt of the car can shake it. the same time it does not complicate the i strument, and if one does not care to u the button, the mechanism operates precise as tho the button was not present. It also claimed for it that a single hand th can be set at maximum speed is simpl than a separate maximum hand.

A feature of the Bullard instrument that it moves very slowly, its shaft turni only 1½ times as fast as a 30-inch aut mobile wheel. The shaft is attached to universal bracket, which allows applicati to any car without producing any sho

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PANHARD

CYLINDER
ECESSITY

"PANHARD" OIL

A Move in the Right Direction

The importance of good oil cannot be over estimated. The efficiency of your motor car depends upon perfect cylinder lubrication. The best oil on the market is "PANHARD." This fact is acknowledged by the Automobile Trade in general.

"PANHARD" will not gum the cylinders. Prevents carbon and residue from clogging the piston rings and spark-plugs, and militates against the ruinous effects of pre-ignition.

If you'll
insist upon getting the best
Then you'll
insist upon getting

"PANHARD"

The oil in the checker-board can

GEO. A. HAWS No. 72 Pine Street NEW YORK

THE OIL THAT WILL NOT CHAR

THE OIL IN THE CHECKERBOARD

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quirements of the road, at the same time oducing the most powerful light obtain-le from acetylene gas.

These lamps are the product of the Wes-rn Lamp & Mechanical Works, 835-47 outh Los Angeles street, Los Angeles, alifornia, who manufacture them in all zes for either swing or rigid brackets as ay be desired. The illustration shows the mp with the fitting used for attaching to curved dash-board. The lamps are con-ructed thruout of the best material and gh-class workmanship, and are put to-ether with rivets and screws, thus making em exceedingly strong and durable and

The "Western" Spherical Lamp.

endering it impossible for parts or fittings work loose thru the constant and violent rring to which lamps are subjected. The asings and fittings are made of heavy yel-w brass, highly polished and finished. The ont doors are made of heavy polished cop-er. The best grade of Bausch & Lomb langin Mirror Lenses are fitted the front eing a perfectly flat polished French plate nse which the manufacturers claim to be uperior to any other type.

The Western Spherical lamps are also rovided with a special equipment for use in ounting these lamps upon sailing vessels, ower craft, launches, etc. The lamps are ade in 7, 8½, 10 and 12 inch sizes, listing

Clover Brand Valve Grinding Compo

The Clover Manufacturing Company, 228 West Fifty-eighth street, New Y has devised a new form of grinding c pound called the Clover Brand. This gr ing compound has no emery in it, but mixed with a heavy consistent cutting which does not melt or change its co tency up to temperatures of 125 degree is put up in double cans with a cover each side, one side containing coarse ture for starting the operation and other side containing fine mixture for fi ing.

The advantage claimed for the Cl Valve Grinding Compound is that it a lutely remains on the seat while the pro of grinding takes place. In addition to a small quantity only is needed, whic applied directly to the valve seat, whe remains, no chance whatever being give the grinding mixture to get down into working parts.

Another advantage lies in the fact th may be carried in a tool chest without ger of spilling and getting among the t as in the case of powdered emery. Clover Brand Valve Grinding Compo altho only recently placed on the ma has already met with great success thr the country.

"Wallace" Bending Tools

The Wallace Supply Co., 56 Fifth ave Chicago, make a line of bending tools bending metal either in the hot or These machines are of special interes automobile manufacturers requiring bending of small parts.

The Angle Bending Tool bends flat up to 2 inches wide by ⅜ in. thick, and r or square stock up to ¾ inches hot. bends angle-iron if a "V" shaped piec stock is cut from one leg and will any angle from zero to 90 degrees. A less than 90 degrees may be made by use of a special "sharp angle die." hardened steel dies are recommended cold bending. The list price of this be with regular dies is $20.

Their Eye Bender No. 1, takes stoc to and including ½ inch. It bends rings eyes up to 2¾ inches, outside diameter. price of this size with one size forming is $25.00. Extra forming pins list at each.

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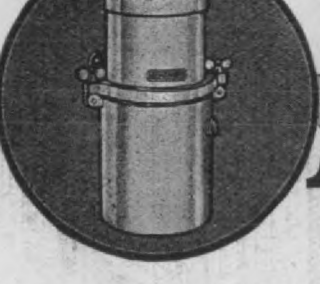
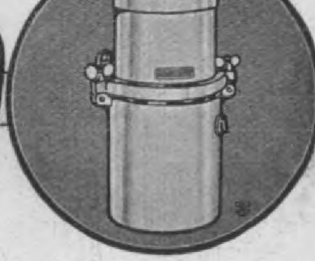


ATWOOD

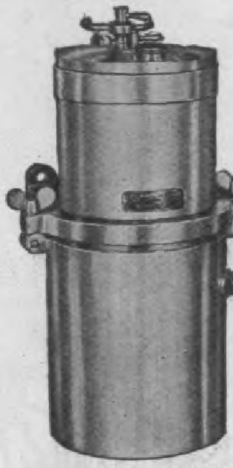


Quality Lamps

re mechanically perfect and are built of the best material pr rable. There is no better or efficient lamp on the market y price. Their excellence in construction backed by the A ood guarantee means a greater beam of light; means less troubl eans economy—less cost for "up-keep"; means unequaled servic

Square lamps will be greatly in evidence during the year 1908. Atwood square lamps will lead as usual, in dignity, beauty in design and strength in construction.

The Best Generator in the World.



The Atwood No. 42 Generator is acknowledged be the best generator in use to-day. It is und on every car whose owner desires high- ade, efficient equipment. It has no wick, is sim- e in construction, and the regulation of the water- ed is uniform when controlled by the **Atwood** ater valve. This generator is round and seamless d is made of heavy gauge brass. It cannot leak; nnot come apart and is easy to attach to any car. has a water jacket; the carbide basket has a grate; the wate ed is positive and automatic. A decided improvement fro ery standpoint over the early generators now in general use.

Write for catalog.

ATWOOD MANUFACTURING COMPANY

Amesbury, Mass.

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Rear view of car fitted with the new Brown Dust Guard. Note that dust does not rise as high as the top of the rear seat back.

New "Brown" Dust Guard

William Hiram Brown, Lennox Bldg., Cleveland, Ohio, has lately brought out an improved form of the Brown Dust Guard. This new Brown Guard consists chiefly of a sheet of water-proof cloth and a pair of rods, upper and lower, on which it slides like a sash curtain.

The new Brown Dust Guard fitted to rear of car.

The bent irons are bolted to the top socks and the straight irons to the bottom of the seat extending sidewise. The guard is attached to these with straps. The guard hangs loose when the car is standing, but when the car is in motion it fills like a

Rear view of a car not fitted with the Brown Guard, but going at the same speed over the same road as the one shown herewith fitted with one of these guards.

For carrying with luggage the guard may be rolled up, in which shape it is about inches in diameter and 14 inches long over all.

The A. S. M. Co.'s New Oval Horn

A new type of oval horn has recently been brought out by the Automobile Supply Mfg. Co., 139 Emerson Place, Brooklyn, N. Y., which they claim possesses a very rich and penetrating tone. The horn is made very

The Automobile Supply Mfg. Co.'s New Style of Oval Horn.

compactly so as to take up very little space. A new type of metal reed is used which they claim will not corrode nor lose its tone producing qualities. This company's horns are now used by 46 automobile makers.

An addition five stories high is being built to the plant of the H. H. Franklin Mfg. Co.

The Bartholomew Company, of Peoria, Ill., inform us that for 1908 they expect to continue their model G car without change

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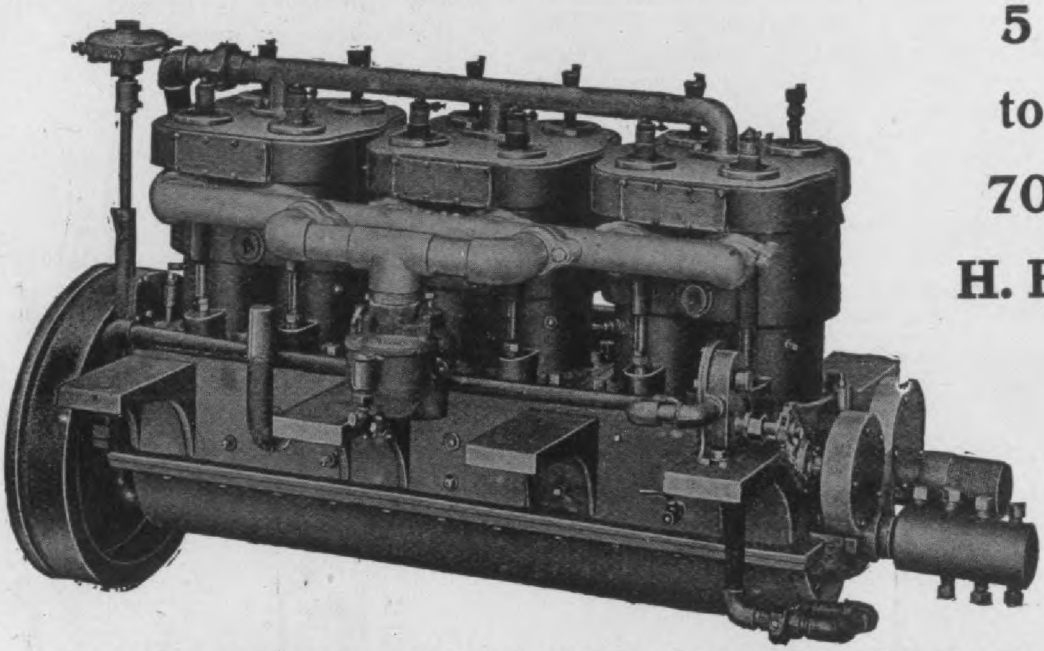
Motors

TRANSMISSIONS and CLUTCHES for AUTOMOBILES and MOTOR BOATS

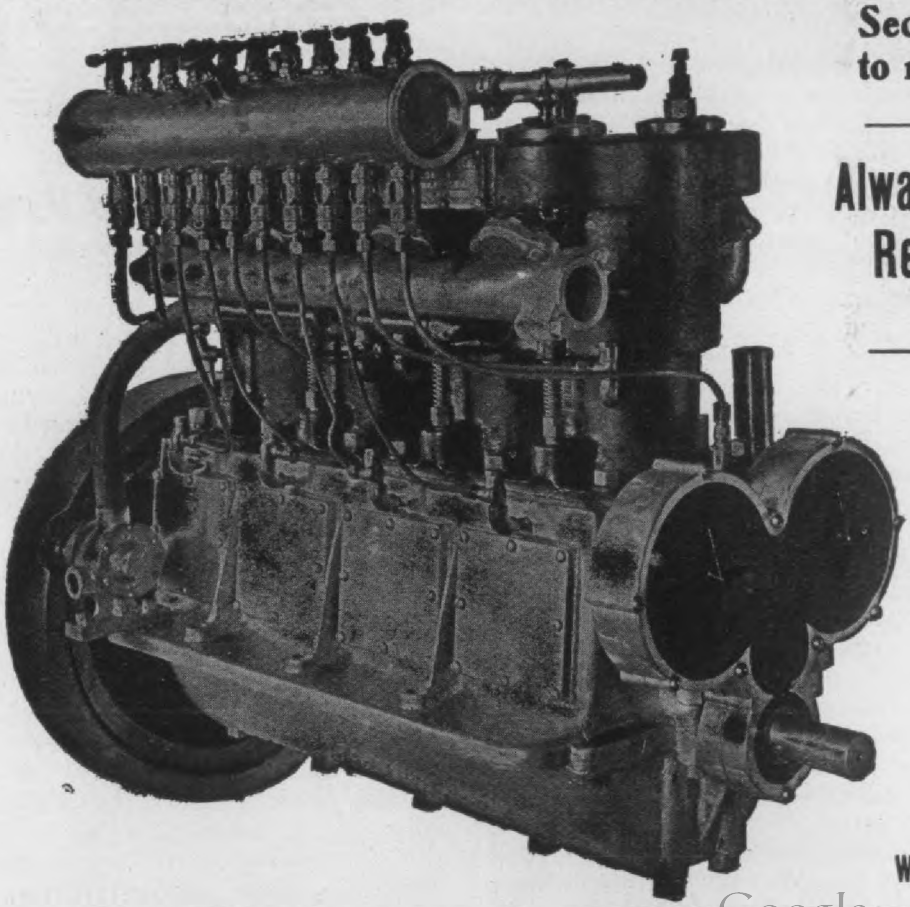
5 to 70 H. P.



6 CYLINDER, 45 H. P. AUTOMOBILE MOTOR.

Second to none.

Always Reliable



Write for Catalog and Prices.

Air and Water Cooled

4 CYLINDER, 35 H. P. MARINE MOTOR.

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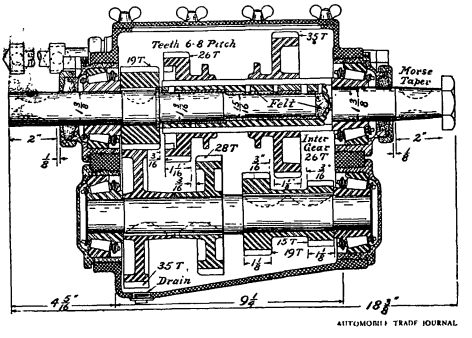
"Wabash" Automobile Parts

The Wabash Auto Gear Works, Terre Haute, Ind., have recently placed on the market a line of automobile parts, some of which are herewith described and illustrated.

Their selective type transmission gear is made in two sizes, one of 20 to 40 H. P. capacity and one of 40 to 80 H. P. The sectional view of the transmission gears shows a hollow axle which is larger than usual and is fitted with 4 keys milled solid on the shaft. This shaft is made out of Special 40 Pt. Axle Steel and the primary



The "Wabash" Transmission Gear No. 1. 20 to 40-H. P. Selective Type.

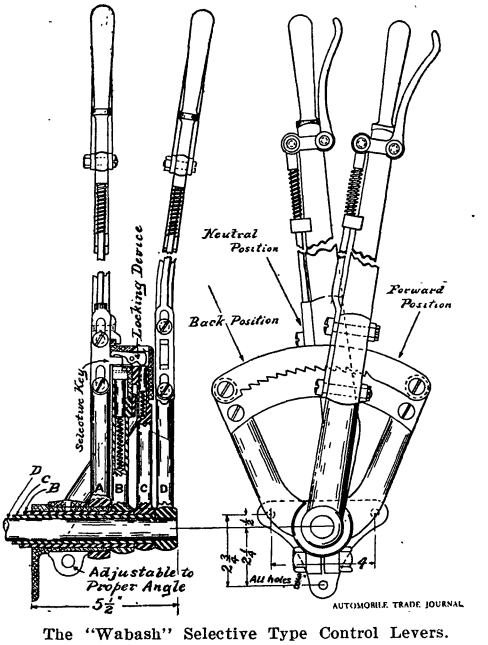
axle, made of the same material extends almost clear thru the transmission proper, and runs in fine special bronze bearings. A notable point in this gear is its lubrication which is accomplished by inserting a felt sleeve around the primary axle between the two bronze bearings and filling the cavity at the inner end of the primary axle with felt so as to have the primary axle run against oil soaked felt all the time, thereby insuring perfect lubrication. The gears are all of large diameter and are secured to the shafts by long hubs and heavy keys. The small countershaft gear is made a part of the low speed gear, and therefore cannot slip, while the long hubs to the countershaft gears keep them from slipping, or getting out of true.

The countershaft is placed under the hollow axle so the gear will lay down in the car out of the way, which allows the reverse gear to always run in oil. The case will bear filling to the top, and is provided with packing glands to prevent leaking.

While roller bearings are shown, the same gear case can have annular or bronze bearings, as it is made to interchange perfectly. The pull rods are adapted to be easily fastened to the Wabash control set, which are of the selective detachable lever type.

In the cut of the Wabash control lever set, the device is seen to be a complete unit, as the emergency brake lever is carried by the same bracket which bolts onto the frame so as to allow placing it to the best advantage. The angle of the levers can be set to suit the car, as the frame of the bracket is adjustable, as shown, and can be pinned or riveted when set properly.

Both levers are made from the same forging, and have the regular grip handle. This grip controls a little key on the selective lever and causes it to pass up or down from sub lever B into sub lever C, etc. The spring at the top of the control lever handle holds the key at the top position which keeps the key engaged with the sub lever C, which sub lever is brazed to tube C, and if this tube is connected to the pull rod con-



The "Wabash" Selective Type Control Levers.

trolling the low and reverse speed and the sub lever B connected to the pull rod controlling the middle and direct speed, then the action will be levers in normal position push forward to get low gear and pull clear back to get reverse, and come to neutral position and press the handle grip which will send the selective key down into the top of sub lever B then we have direct speed forward and middle clear back, or the levers may be connected so as to give the high and middle gear in the normal or top position, and low and reverse in the bottom position. They also make a cone clutch which fits the majority of automobile engines that are using cone clutches. The cone clutch is furnished with control rollers and bolts for them to run on, and proper nuts for fastening. The clutch is provided with a leather face which covers the whole face of the cone. The connection for the coupling to the transmission is furnished with each clutch complete for installation.

The John Obenberger Co., 220-224 Lake street, Milwaukee, Wis., manufacture a general line of hammered forgings, crank-shafts up to 1000 pounds, and all kinds of gear blanks and special forgings. They also do rough machine work or finish complete.

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When the Storm breaks Solar Lamps will continue to Show the Way To a Safe Port meantime

BADGER BRASS MFG. CO. HEREBY GUARANTEES

to assume the defense, stand all the expenses necessary to defend and in every way hold harmless and relieve each and all of its customers from expense and trouble, by reason of any suit brought by the Rushmore Dynamo Works or any other concern or person for the use or sale of SOLAR LAMPS of our manufacture.

We decline to enter into a public contest of scurrilous advertising with the Rushmore Dynamo Works.

Our New 1908 models and prices are ready.
You will want to see their features.

BADGER BRASS MFG. CO.
KENOSHA, WISCONSIN,
AND NEW YORK CITY

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, as it is called. This bag is well illus-
ed in the accompanying cut.
is suspended from the coat rail, and is
of the most useful and handy devices
touring. There are suitable pockets for

The "Nathan" Coat Rail Bag.

l maps, goggles, veils, hats and coats.
akes up very little room and is prac-
ly water-proof. Three sizes are made,
30 and 36 inches wide respectively, to
he various size rails. They are made of
mackintosh, black rubber cloth, or
ic leather, in all colors.

The "Moss" Automobile Wrench

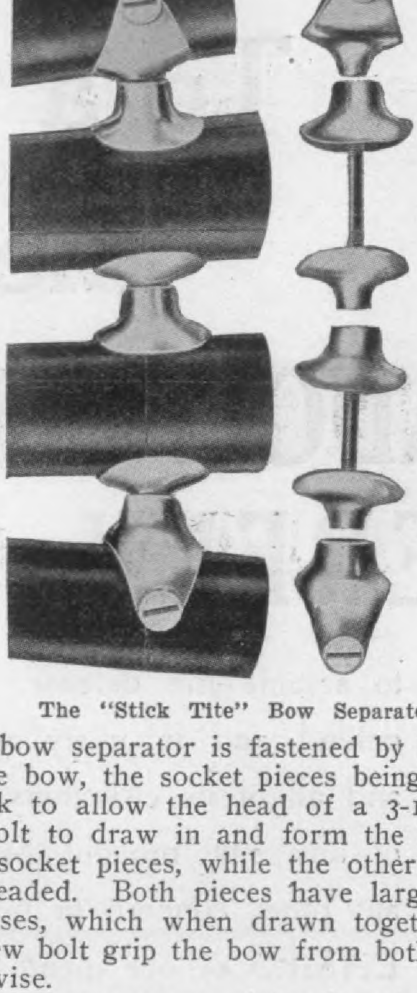
wrench which is claimed to be entirely
ue and novel in its operation has recently
placed on the market by Augustus L.
s., Sandusky, Ohio. The particular fea-

The "Moss" Automobile Wrench.

tool box. The wrench complete lists at $7.5

The "Stick Tite" Bow Separator

The Michigan Top Co., 15-17 Duffie
street, Detroit, Mich., recently placed on th
market the Stick Tite Bow Separator, he
shown.



The "Stick Tite" Bow Separator.

This bow separator is fastened by boltin
thru the bow, the socket pieces being cou
ter sunk to allow the head of a 3-16 inc
stove bolt to draw in and form the botto
of the socket pieces, while the other piec
are threaded. Both pieces have large co
cave bases, which when drawn together b
the screw bolt grip the bow from both side
like a vise.

These separators are claimed to hold th
bows in perfect line, and to prevent a
chafing of the top material.

The Overland Automobile Company, o
Indianapolis, Ind., makers of the Overlan
automobile, have outgrown their prese
quarters at Standard street and the Belt, an
are erecting a new factory, 304x80 fee
which will be ready for occupancy abou
September 15.

The F. A. Seitz Co., of Newark, N. J
is bringing out for 1908 an entirely ne
motor designed especially for automobile
It is a light-weight high-grade motor, fou

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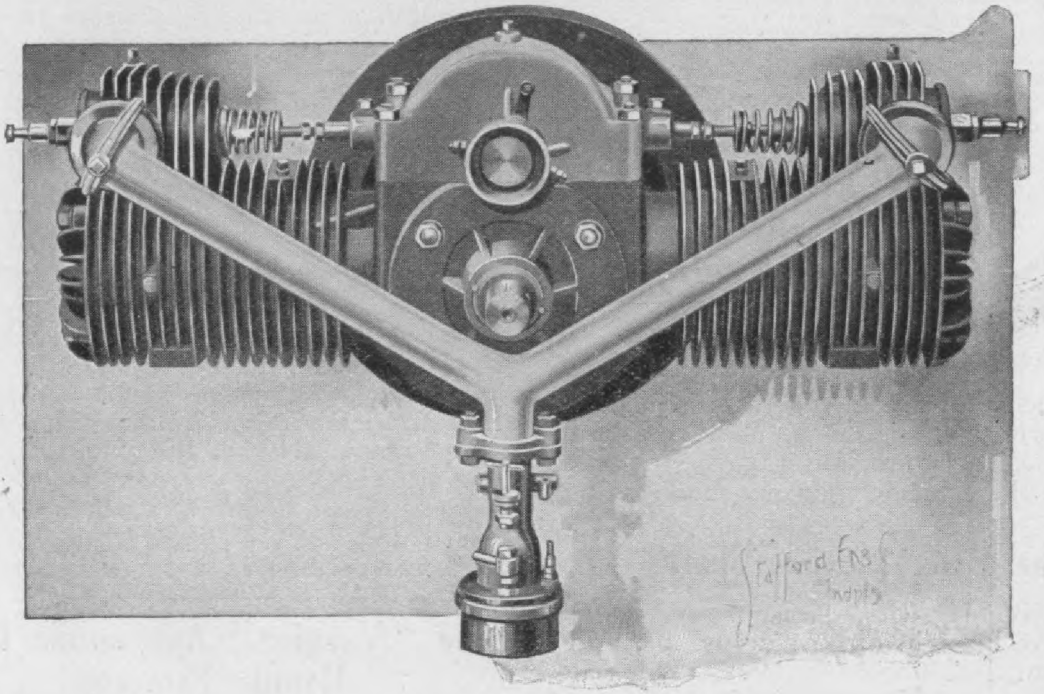
Universal Type Engine



The One Best Engine For Buggy-Type Automobiles

Suitable for any light runabout or light delivery wagons, but designed especially for buggy-type rigs.

Two cylinders, 4x4 double opposed.

Conservative power rating, 10-12 H. P.

Weight, including flywheel, 180 lbs.

Over all dimensions, including spark plugs: length, 30″; wihth, 16¾″; depth, 17″. Depth without flywheel, 11½″.

Perfectly balanced. Entirely free from vibration.

Air-cooled, and **cooled** beyond question. Has been run at full speed for six hours without a sign of distress. Big exhaust valves. Careful construction. Best materials.

Every engine fully guaranteed to deliver the rated power and keep cool.

Prompt delivery on any quantity to those who order promptly. Attractive prices in quantities.

Hosted by Google

pers, have recently placed on the market sheet metal step hanger shown herewith.

he "Crosby" Stamped Sheet Metal Step Hanger.

he special advantage of this method of ufacture are lightness, cheapness, and ngth. The manufacturers are prepared urnish these hangers in any number.

The Helix Flexible Shaft

he Helix Mfg. Co., of Stapleton, Staten nd, have brought out a new flexible wire for fan and lubricator drive. This belt a new form of connection (patent ap- l for) which is extremely simple, and claimed does away with the breakage at joint. The belt is made of one piece of o wire, joint included, and is connected he use of the hands only, no tools being ired and the attachment or detachment ng less than a minute to effect.

he Helix wire shaft is made of 16 nds of high tensile strength German o wire, wound in four layers of four nds each, each layer alternating in di- ion of winding with the superposed r. The effect of the process of winding l only by this company is to produce a ible shaft which, it is claimed, is without buckle common to the ordinary wire t, and gives extreme resistance to torque ied at the end because of the disposi- of each strand to act as a tension or pression member in resisting the load. load put on this shaft is distributed ormly thruout the whole and does not e upon the ends nor does it come upon surface layer, and the shaft will work lly well running right or left hand.

his shaft was developed by Mr. H. W. ob from a scientific study of the defects the wire shafts formerly in use. Find- that these shafts would break under a l which was far smaller than the known ngth of the wire units composing the ft, he sought a proper method of distrib- adaptation of design.

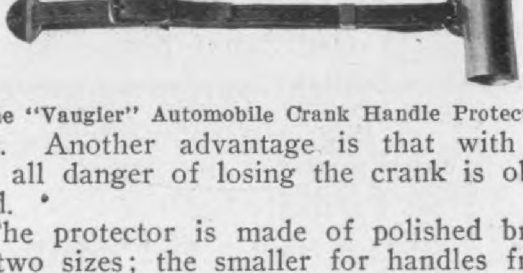
They have given this belt a long and se vere test before placing it on the marke and claim to have found that the joint equally as strong as the rest of the belt. Th connection is practically invisible, and as is of the same diameter and of equal flex ibility thruout, the drive is noiseless. Th belt can be adjusted for length or for stretc thru long use by the simple process of cuttin off a length from one end. The highe grade piano wire obtainable is used, the se vice requiring a high elastic limit. They a in all sizes from ¼-inch to ⅜ diameter. special introductory price of $1.50 for fan c lubricator belt has been made, and the guarantee satisfaction or refund the mone

The company make all sizes of flexib shafts for speedometers, odometers and s rens, and claim the Helix shaft has bee adopted by nearly all the principal speedo meter makers, and is rapidly becoming th standard shaft for this work. They als state that it is the only wire shaft that giv dead beat reading in a speedometer.

The "Vaugier" Automobile Crank Handle Protector

The accompanying cut shows the Vangi crank handle protector, recently placed c the market by the Vangier Specialty Mf Co., Piqua, Ohio.

With the use of this device the cra can be drawn up from the perpendicular any desired angle, and as the protector gri the handle firmly it eliminates all rattle a also keeps the handle free from mud a



The "Vaugier" Automobile Crank Handle Protecto

dirt. Another advantage is that with use all danger of losing the crank is obv ated.

The protector is made of polished bra in two sizes; the smaller for handles fro ½ inch to 1⅜ inch in diameter and t larger size for handles up to 1⅝ inch. double compound spring contained inside t protector makes it self adjusting to any si handle within the sizes mentioned.

Mr. Chas. S. Crawford, late of the Lozi Motor Works, Plattsburg, N. Y., has su ceeded Mr. F. D. Carrico as Mechanic Engineer for the Speed Changing Pull Co., Indianapolis, Ind.

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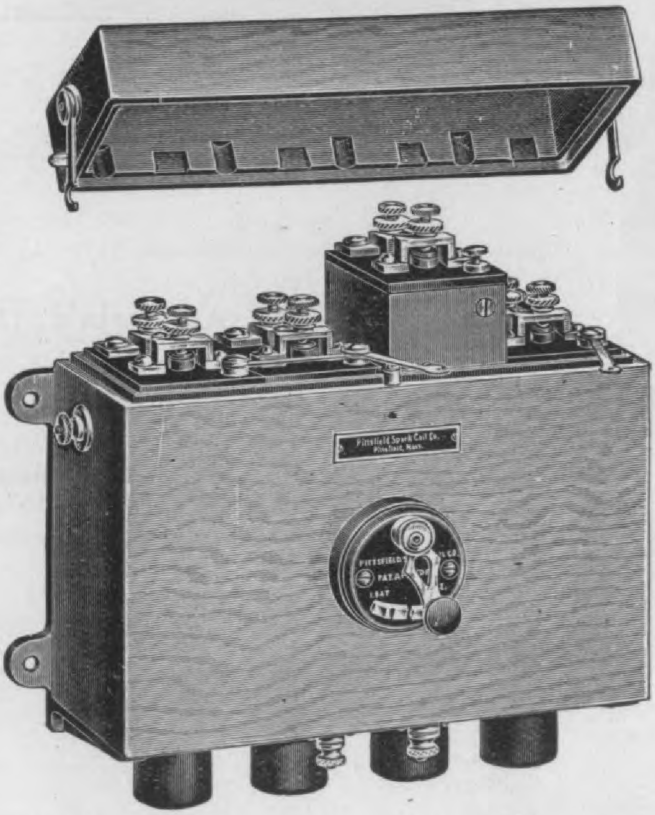
it wagon will go without grease, but it goes hard. An automobile will run with other than

PITTSFIELD IGNITION



but if you want it to go smoothly and with the least amount of trouble try

Pittsfield Magnetos, or Pittsfield Spark Coils, Pittsfield Timers and Jewel Mica Spark Plugs.

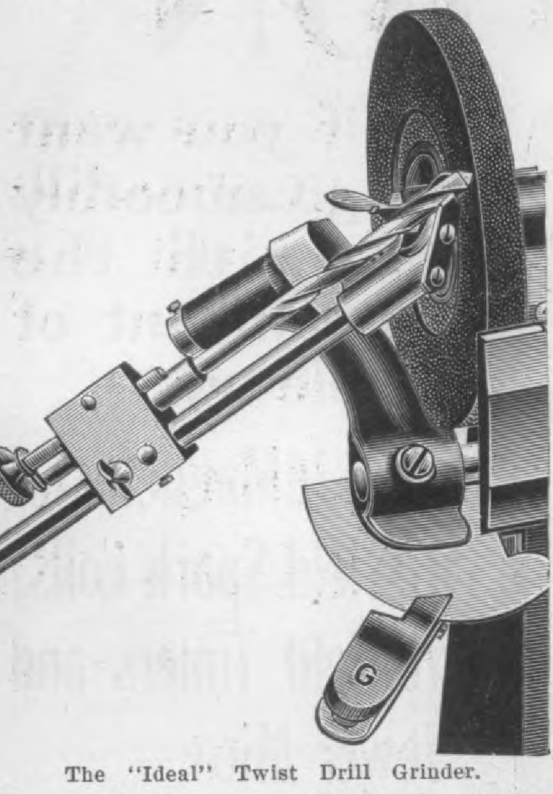
They will put new life into your car. The first cost is a little more, but a few dollars don't count against satisfaction and freedom from ignition troubles. Our printed matter will prove interesting.

Hosted by Google

Pittsfield Spark Coil Co.

pecial machine for sharpening drills, hav
features of great value. It is so thoro-
utomatic that it is not necessary to touch
drill with the hand while sharpening it,
drill being held to the grinder mechan-
ly and at just the right angle. This as-
es each lip being of correct shape and
ngs the point of the drill exactly in the
ter.

The machine is small, low priced, easily
ndled by anyone, efficient and economical.
e illustration shows the part of the ma-
ne which embodies the automatic drill
der. The makers will send one on ap-
val to any responsible firm.



The "Ideal" Twist Drill Grinder.

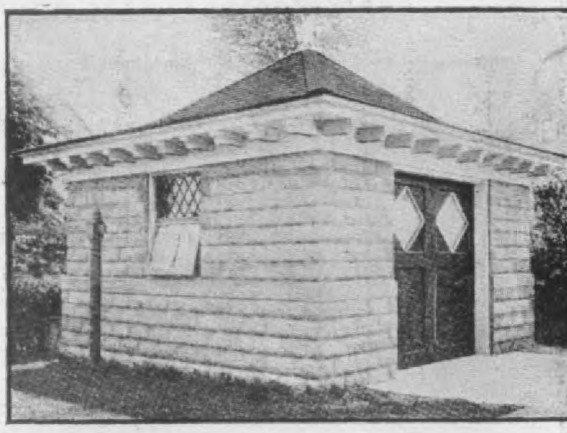
No. 2 "Ideal" twist drill grinder sharpens
lls from No. 70 to 3/8-inch. It lists at
. No. 2½ takes drills up to ½-inch and
s at $40.

The "Ideal" grinder is affixt to an iron
se, 6 inches square, adapted to stand on a
nch, bracket or pedestal. The emery wheel
5 inches in diameter and the whole outfit
12 inches high. It can be operated by
nd power, electricity or from a special
untershaft which they furnish. This
untershaft is arranged to start or stop by
pull of a chain. It can be placed at any
nvenient height or position and operated
m any point. It is operated by gravity
d has no springs. Six sizes are furnished.

"National" Steel Garages

is made of metallic shingles.

The garage is fitted with a work-benc
and closets, oil shelf and a steel oil trou
placed in the center of the floor. The



The "National" Steel Garage.

trough is intended to catch the oil, wat
etc., that drips from the car while the lat
is standing still. A garage combining
the above features, size 10 ft. by 20 ft.,
sold for $100 complete, freight paid to a
point east of the Mississippi river.

The "Genesee" Automobile Tire

The Genesee tire is the product of
Thos. D. Buick Co., Flint, Mich., who cla
that no radically new purposes or ideas
involved in the manufacture of this tire,
that it is nothing more than a first-cl
high-grade clincher tire, made upon hon
and constructed of the very best mater
procurable.

This tire is not sold thru dealers but
marketed direct from the factory. It
made in all sizes from 26x2½ inch, list
at $14.47, to 36x5 inch, listing at $79.10

A chauffeur's school was recently est
lished on Wabash street, between Third a
Fourth streets, St. Paul, known as
Automobile School of Minnesota.

The Ventilated Cushion & Spring Co
pany, manufacturers of springs, has recen
removed its main offices from 2014 Fis
Bldg., Chicago, to Jackson, Mich.

The Bendix Company, of Chicago, rece
ly organized and capitalized for $200,0
having purchased the factory, machinery a
equipment of the Triumph Motor Car Co
pany, Cragin Station, Chicago, and h
taken possession of the plant. This r
factory will give them a capacity of o
1000 complete cars a year. The follow
officers were recently appointed:

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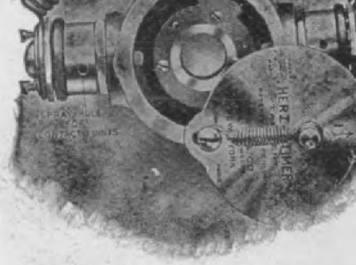
HERZ-DISTRIBUTOR—1907
Absolutely Sparkless.
oil for all Cylinders. Exquisite
Workmanship.

SPECIAL NOTICE!



HERZ-TIMER-TANGENT
20 Different Models, to fit any
Sticking of Vibrators impos

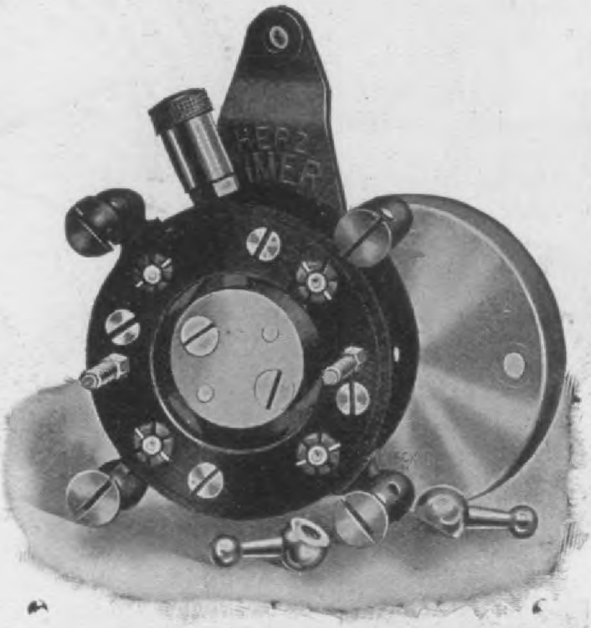
OUR NEW

BALL-BEARING TIMER

is ready. It represents perfection in the Science of Timing!

This bearing will eliminate any possibility of ordinary wear and tear. Friction is reduced to a minimum.

The Bearing is self-adjustable and absolutely dust-proof.



Thorough and severe tests prove that the Herz Ball-Bearing Timer stands up under strain better than any other Circuit-breaker ever devised.

HERZ-TIMER STANDARD MODEL

Tool-steel vs. Tool-steel. Patented Snap-off Contact.

IERZ
. B.
PUMP

pplies
essure up to
) pounds
uaranteed)
blow
istle or
rn, pump

BOUGIE MERCEDES
The World's
Best Spark Plug

HERZ & CO.

CIVIL ENGINEERS
203 LAFAYETTE ST.
NEW YORK

Ask for our new "Ignition Book."
IT'S FREE.

Double
Stone
Guaran-
teed never

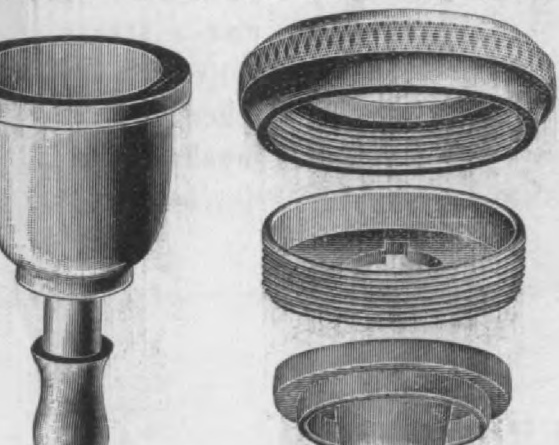
Hosted by Google

ile specialties, has recently placed on market the "Eclair" pump connection, shown.

The "Eclair" Pump Connection.

his connection is universal, being adapted ny automobile tire, valve and pump. It ttached to the tire valve by simply pres- it on, and removed by simply pulling ff.

he apparatus consists of a compression mber hermetically closed by a rubber her of special construction. This wash- s held in place by a metal disc, which crewed into a removable ring placed



"Eclair" Pump Connection Disassembled.

the compression chamber, and is drawn ightly against a flange by means of a l disc. The washer will stand between and 5,000 inflations and when neces- a new washer can be inserted in less a minute. The device is attached to ump hose in the ordinary manner. It at $1.00.

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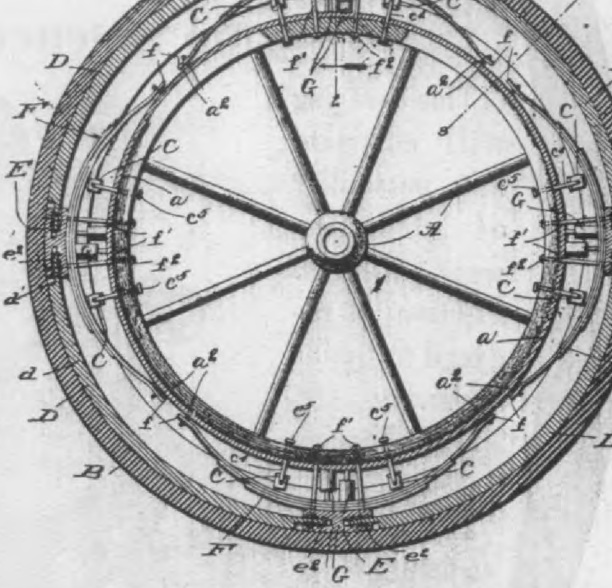
or oval shapes, according to special requir ments. This sheet asbestos is bound wit thin, soft copper, forming a resilient gask et, claimed to be indestructible by heat, an capable by reason of its copper binding c withstanding the violent explosive pressur occurring in Hydro-Carbon Engines. The manufacture round gaskets in any diamete thickness or width.

The "Lightette" Air Spring Wheel

A new automobile wheel has recently bee placed on the market by J. L. Fawks, 36 I High street, Detroit, Michigan, show herewith.

It is composed of an outer clincher rub ber tire placed on a clincher rim. The rub



The "Lightette" Air Spring Wheel.

ber tire is supported by four egg-shape aluminum sections, which rest on four hal elliptic springs which are clearly seen i the cut. Beneath each spring is an air com pressor or air cushion. This constructio practically makes a 6 inch tire out of a inch clincher rubber tire.

At the annual election of officers of th E. R. Thomas Motor Company, Buffalo, N Y., E. R. Thomas was elected president Edwin L. Thomas, vice-president; J. M. Ec sall, treasurer and Ellicott Evans, secretar

R. B. Crawford, president of the Craw ford Automobile Company, Hagerstow Md., has announced that the Crawford fa tory will be increased for the 1908 outpu

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SPLITDORF
TRADE MARK
N·Y·
LABORATORY

What Does This Trade-Mark Mean?

It means that into every piece of Ignition Apparatus turned out by SPLITDORF is put as much skill, as much pains, as much fine material, as if that one piece were the only one to be produced—the only one by which the reputation of SPLITDORF were to be judged.

It means ABILITY gained by the LONGEST EXPERIENCE of any coil maker in America to make the **Most Efficient, Most Reliable, Most Economical** Ignition Apparatus on the market.

This is why every SPLITDORF COIL is up to the same high standard. This is why "Splitdorf" always means the same—judged by the one sterling quality—merit.

It is just as easy and costs no more to have the best.

Ask Dept. N for Catalog.

C. F. SPLITDORF

The Oldest and Largest Coil Maker in America

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Trade Printed Matter

The most elegant and pretentious piece of automobile advertising literature extant is the latest catalog issued by Packard Motor Car Company, of Detroit, Mich. This handsome production is the result of the combined efforts of E. Ralph Estep, designer and writer, several prominent illustrators, the Peninsular Engraving Co., and the Matthews-Northrup Co., printers. They have reason to be proud of their work for the publication they have produced is too handsome and effective to be described and it sets a pace in the automobile advertising world not likely to be exceeded. It is enveloped by a folder covered with illustrations of the Packard radiator and enclosed in a neat cardboard box containing in gold the name of the recipient. The decorative scheme includes two highly illumined pages in antique style and is thruout attractive and appealing to good taste. The reading matter is forceful and impresses the reader with the carefulness and thoroness with which every operation in the production of "Packard Thirties" is performed—from the designer's conception of his ideal to the final and very thoro test given to each new model before it is sold to users.

A very neat and elegant little catalog was recently issued by the Pope-Waverly factory at Indianapolis, Ind., advertising their electric Phaeton and showing its especial adaptability to varied uses; for women, for example, as a lady's runabout, Victoria phaeton, park phaeton, open Victoria and with folding buggy top. This catalog is gotten up in tasteful form, which will appeal strongly to the refined instinct of the gentlewoman to whom it is addrest.

Breeze Carburetor Co., Newark, N. J., have taken advantage of the fact that the Christie Grand Prix racer is fitted with their carburetor by issuing a folder containing a picture of the racer illustrations of the Breeze carburetor and Breeze gasoline strainer and several strong testimonial letters.

A small, but comprehensive, instruction book has lately beeen issued by Witherbee Igniter Co., 541 W. 43rd St., New York, for the benefit of Witherbee storage ignition batteries. It contains in its 16 pages all the information necessary to obtain the best results from these well-known batteries and explains fullly and clearly the operations of charging, etc.

Cadillac Motor Car Co., Detroit, Mich., have issued a set of 8 photographs all on one large sheet, illlustrating a Cadillac car carrying mail in Hawaii.

C. Cowles & Co., New Haven, Conn., have lately isssued what is doubtless the largest and most comprehensive catalog of automobile hardware and top fitting that has yet appeared. It contains 170 large-sized pages and is printed on a fine coated paper on which the many illustrations show up to excellent advantage. Several fine limousine fittings are shown in addition to a very extensive line of usual top irons, screws, bolts, strap buckles, and other commmon fittings.

The advantages of using "Prest-O-Lite" gas tanks are very convincingly and clearly set forth in a neat brochure recently sent out by the manufacturers, the Prest-O-Lite Co., Indianapolis, Ind. A number of very effective illustrations are used, chief among which is one of a limousine car lighted entirely exteriorly and interiorly from a "Prest-O-Lite" gas tank.

The Gasket Supply Co., 1516 Sansom St., Philadelphia, Pa., have issued a new catalog of gaskets, which covers every requirement in this line, and will prove of value to any mechanical man having steam, water, air, etc., joints to pack, for between its covers he surely will find illustrated and described a gasket that will meet with his requirements. It is a very pretty book, printed in two colors and enclosed in a beautiful embossed cover, which does credit to both printer and designer.

On account of frequent requests for suggestions, plans and specifications received by S. F. Bowser & Co., South Bend, Ind., that company has recently issued a book entitled "Plan Drawings of Model Oil Storage Systems," which they are placing in the hands of those interested. This book contains a full set of plans to meet every phase of the oil storage question, giving sizes of oil tanks, dimensions of oil houses, proposed layouts for public and private garages and all other necessary information for the equipment of garages, factories and stores with oil handling devices. The plans have all been compiled from actual installations.

The instruction book of the Correspondence School of Motor Car Practice, the issue of which was delayed by a disastrous fire in the printing plant, has at last made its appearance and is a 175-page book containing a large amount of rudimentary and technical knowledge regarding the construction, care and operation of motor cars. This course of instruction is the work of the Maxwell-Briscoe Motor Co., of Tarrytown, N. Y., and is furnished to Maxwell owners at cost while to others a slightly higher charge is made.

The Auto Top & Trimming Co., of Pontiac, Mich., manufacture a complete line of automobile bodies, tops, trimmings, etc.

Auto Accessories Sales Co.

The Auto Accessories Sales Co., 227 Victoria Building, St. Louis, Mo., has recently been organized for the purpose of representing the manufacturers of high-grade automobile specialties, and consists of Mr. A. Hollaender and Mr. Geo. W. Edge. Both of these gentlemen have been connected with the automobile business for the past six years.

They are western and southwestern representatives for the "Springfield Motometer," "Fleur de Lis" Dry Cells, "American" Ignition Apparatus," "P. D." Storage Battery Rechanging Panels, "P. D. Connectors," Standard Lamps, and Eldredge Electrical Instruments.

They now have a man in the extreme west and one in the southwest, in the interest of the manufacturers whom they now represent, or for any others who desire representation in those districts.

"Blue Ribbon" Varnishes

Beckwith-Chandler Varnish Co., 320 Fifth avenue, New York City, devote their entire efforts to the production of high-grade varnishes and make a specialty of varnishes for automobile finishing. Their line of motor car varnishes is called the "Blue Ribbon" series, and includes "wearing body" varnish for finishing coats on the best work; "medium wearing body" similar to "wearing body" but a quicker hardener; "durable coach," a heavy body finishing varnish which hardens more quickly than the two afore mentioned; "durable gear" and "quick gear," for running gears; "elastic rubbing"; "quick leveling," "quick rubbing," "black enamel," for iron parts; rough stuff for either wood or metal bodies and "wood priming."

They claim that these varnishes flow perfectly, are easy to work and absolutely uniform. They possess the characteristic of extreme paleness and produce a very brilliant and durable finish.

The Calhoun-Bancroft Co., 506 Third avenue, Seattle, Washington, representatives of automobile and launch accessories, are offering Eastern manufacturers an exceptional opportunity to place their goods before the trade in Washington, Oregon and British Columbia. They are in the market for any good lines not conflicting with those they already have. The following are among the firms already represented by them: Connecticut Telephone and Electric Co., Vesta Accumulator Co., Progressive Mfg. Co., and the Hercules Auto Specialty Mfg. Co. Mr. Calhoun is an expert electrician and battery man, and Mr. Bancroft has had a broad experience in general supplies, having formerly been with the Motor Car Supply Co., and the Franco-American Auto and Supply Co., both of Chicago.

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Dealers' Department

The Problem of the Grafting Chauffeur

Brewer, Maine.

The practice of paying commissions to chauffeurs on account of sales of tires, accessories, fuels and repairs is indeed a fit subject for discussion at this time.

This abominable condition was brought about in the early days thru keen competition and business rivalry among the dealers and repairmen and the then small sowing of thistles, has taken such firm root and spread so rapidly, that they now over-awe all who would attempt to stem the tide of their progress.

Thruout the breadth of this fair land this system of graft has sped from the great cities, contaminating the local chauffeurs, dealers, garage and repairmen until all are heartily sick of it except the grafters.

Most small dealers and repairmen are afraid to make a decided stand for fear of losing their trade to some rival in business and so they submit without protest. Not only do the grafters boldly claim their commission, but worse yet, they seek to, and in many cases make the garage and repairman their instrument in assisting to rob their employers.

For instance, a driver brings his employer's car to my place for certain repairs and replenishments, etc., "How much gasolene did you furnish?" Eight gallons, I reply. "Make a bill for ten." How many hours' labor, etc.? Three hours at sixty cents per hour. "Well, make the bill read four hours." Then he counts you out the price of the actual repairs or jots down in his graft book the amount of the "Commission" due him, when his employer settles the bill.

I read in some trade paper last Spring that several leading garage men in New York, with a view to stopping the abuse, had decided to notify owners of the grafting propensities of their chauffeurs. Did they do so, and what were the results? I doubt much if any such action was ever taken, but think the plan a good one if a firm stand by all in the business could be brought about and an open avowal and agreement made to absolutely refuse to do business thru such chauffeurs, and then adhered to until the graft situation was absolutely stamped out.

If a few in the large business centers would take some such action it would doubtless be followed by local organizations in the smaller cities and towns and in time the nuisance would be largely abated.

A thoro canvassing of the subject and much publicitiy are very desirable as they serve to intimidate the enemy and make the attainment of victory, less strenuous.

In going over this whole question with a brother repairman recently, I put the question: Well, what is the remedy? He took time to think deeply then brightened up as though he had solved the problem and said: "Forget it," and unfortunately this seems at the present time to be the general attitude toward this shameful situation.

THE BREWER BICYCLE & AUTOMOBILE CO.

Geisel Automobile Co.'s New Garage

Geisel Automobile Co., Springfield, Mass., has just had completed a new garage which is constructed with a trussed roof so that there is not a post in the building, a feature of especial and obvious value in an automobile garage. The dimensions of the building are 52 x 126 feet. Windows are on the east side, and run the entire length of the building, extending clear to the roof and making the garage as bright as outdoors.

There is a front door 14 feet wide, and at the southeast corner there is another door 16 feet wide. A washstand is located in the northwest corner and is 18 x 24 feet. It is equipt with an overhead washer which can be swung around the largest cars.

On each side of the garage are seven drop lights with 25-foot cords, so placed as to be handy for any desired inspection.

This model garage is in the center of the city within one block of the railway station close to the best trade, and conveniently located for getting the transient trade. Already plans have been made for a 50 x 90 foot L addition to be used as a repair shop.

The large garage of the Keystone Motor Car Company at 216-18-20 North Broad street, Philadelphia, is now in course of construction. The garage will be of fire-proof construction thruout, and will cost $50,000.

Some timely hints on the care of tires comes from Mr. J. C. Matlack, of the International Tire Co. Many motorists are having difficulty this hot weather with the patches coming off the inner tubes. It is a mistake, says Mr. Matlack, to depend upon patching, particularly during this hot weather, as the heat of friction together with the heated condition of the atmosphere loosens up the patch. Motorists would save time and money, to say nothing of temper, if they would send their inner tubes to some reliable supply house and have them vulcanized. This insures a lasting repair.

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Philadelphia Branch Winton Motor Carriage Company

One of the progressive agencies of the Quaker City is the old-established branch of the Winton Motor Carriage Co., at 246 North Broad street, Philadelphia. This has been a branch of the Cleveland plant since 1901 and has been since that date under the personal management of Mr. A. E. Maltby, one of the pioneers in the automobile business. A large and well-equipt garage and machine shop adjoin the spacious show room and offices.

Substantial business methods are responsible for the growth and permanency of this branch. All advertising is controlled by the main office in Cleveland, where a campaign for the season is laid out and rigidly adhered to. Allotments of advertising copy are sent to each branch for the newspapers and periodicals. No special window or street advertising is resorted to, and the statement was made that by far the largest part of the purchasers came not thru advertising, but by personal contact with Winton users. Daily paper advertising is simply depended upon to keep the name before the public. No regular system of follow-up letters is employed, the management believing that most of such matter receives very little attention and goes into the waste-basket, and that more actual progress can be made in five minutes conversation than in several letters. When a name is received one of the salesmen is detailed to see the prospective purchaser, talk Winton, get his interest aroused, take him for a demonstration and at any cost make a friend of him, whether a car is sold or not. Occasional visits are paid him until he either buys a Winton, some other car or signifies his intention of waiting until the following season, in which case his name and the state of affairs are recorded and filed either as a live prospect or to be held over a season.

Mailing literature to names on license lists, even when up to date, has been abandoned, owing to the fact that it is impossible to distinguish owners from chauffeurs. The management believe firmly in "casting bread upon the water" by making a friend of every prospective purchaser, and the number of sales made to persons who were at times enticed in other directions, but ultimately returned, is proof of the correctness of the principle. When a salesman after expatiating upon the good points of the car feels that the customer is yet in doubt he usually refers him to some owner, whose few words of recommendation are likely to carry the deciding weight.

Satisfied purchasers are the first consideration. All Winton owners receive the same attention, it being sufficient that they belong to the class of owners. If in trouble at any time a telegraph or telephone message will be instantly responded to, even if necessary to send a mechanic by railroad to the vicinity. If a recent purchaser lives at some distance, useful information which he would otherwise be unlikely to get is mailed to him, at the same time accompanied by a letter of inquiry as to his success with the car. If a repairman goes into his neighborhood he is instructed to drop in and look over the car and report. Every effort is made to keep all purchasers entirely satisfied, and thus live advertising mediums for the company.

The shows are believed to be very profitable, as they bring those most interested into direct contact with the salesmen, who thus secure a valuable list of prospective purchasers. Twenty-five sales are said to be directly traceable in this way to the Philadelphia show of last year.

BUSINESS SYSTEM.

In connection with the garage a daily floor card or printed form is used. Upon this a complete record of the going and coming of the car, the work done upon it

WINTON MOTOR CARRIAGE CO.

WEEKLY REPORT.

Philadelphia, Pa. 190

Mr. . . . . .

We beg to advise you that our books report your Car OUT AND IN our Station for last week as follows:

	OUT	IN	OUT	IN	OUT	IN	OUT	IN
SUNDAY . .								
MONDAY . .								
TUESDAY . .								
WEDNESDAY								
THURSDAY .								
FRIDAY . . .								
SATURDAY .								

Yours very truly,

WINTON MOTOR CARRIAGE CO.

Per

As this Report is prepared for your protection, a careful and [illegible] is requested.

Fig. 1. Winton Motor Carriage Co.'s Philadelphia Branch weekly report to Winton owners. This system absolutely prevents the illegal use of cars by the drivers.

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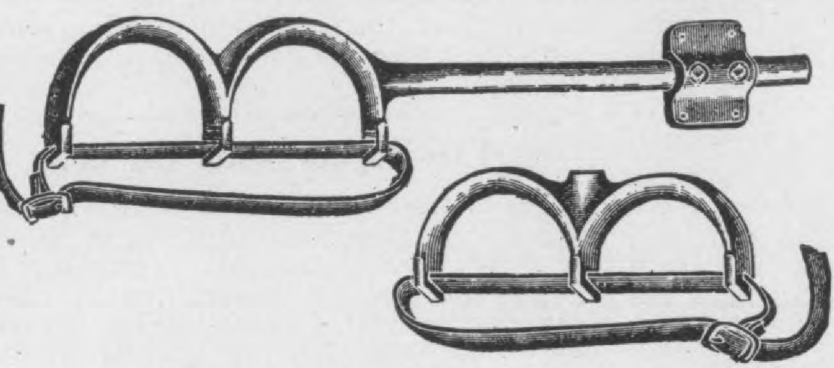
ADJUSTABLE TIRE HOLDER



Will Fit any Car a
any Size Tire

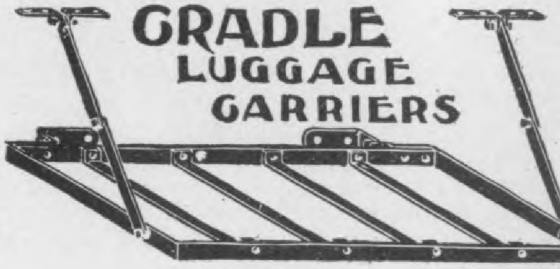
Made of a fine quality brass. Will hold eit one or two tires. Set c sists of two long and short piece.

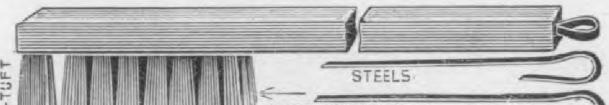
List Price - - $7

Luggage Carriers

Constructed of steel solidly riveted. Made either stationary or folding styles. The races on the folding carrier are provided ith knuckle joints so that when the rack not in use it can be folded up.

ist Price stationary - - $ 9.00
" " folding - - - 16.00





"Continental" Spark Plug Brush

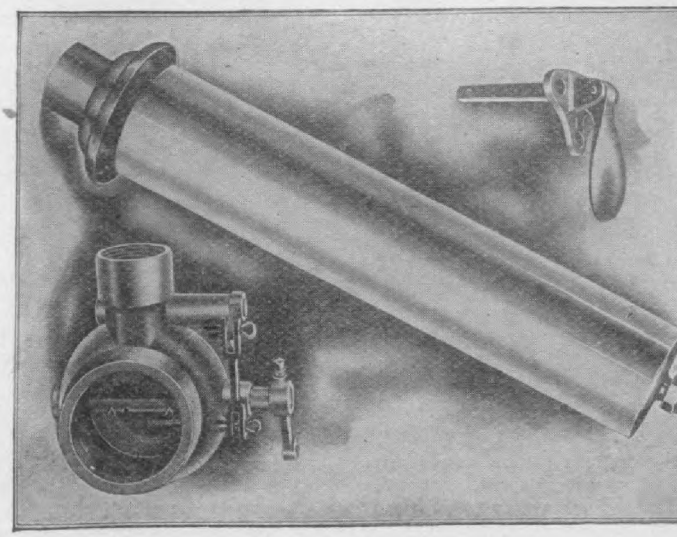
A very handy article to clean your sp plugs with. Has strong wire for grease dirt, bristle hair for finer parts and two t pered thin flat steels with which to reach inaccessible parts. **Price - $0**

"Continental" Four Tone Motor-Chime

The "Continental Motor Chime" onsists of a tube, 2½ inches in diameter and 15 inches in length, made f Special Brass, having four compartments of harmoniously blended ones. They are applicable to any lass of motors, will pass Government nspection for launch work and under avorable conditions can be heard ten iles distant. A double opposed butterfly system is used in the construction of the valve, which is unaffected y heat or soot, and throttles the tone erfectly. The valves are made to fit ron exhaust pipes from 1 inch to 3¼ nches outside dimensions, smooth or tandard thread.

Price, Complete, with 1½ or 2 inch alve, **$15.00.**

Price, Complete, with 2½ or 3 inch alve, **$17.50.**



The dealer who desires to handle the BEST line of Automobile Specialties would do well to investigat our line of splendid and profitable goods. Our new 128 page catalog will be sent upon reques

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and also the supplies furnished is kept. The headings are as follows: Owner, Out, Taken by, Check by, In, Returned by, Check, Washing, Lamps, Gas, Check, Gear oil, Check, Cyl. oil, Check. From this it will be seen that not only are the amounts recorded, but the persons who put the work, oil or gasoline upon the car are known and also those who took the car in or out. From this form a weekly blank as illustrated in Fig. 1 is mailed to all owners who have chauffeurs in charge of their cars. The drivers object, but the system is very satisfactory to the owners.

In connection with the daily floor card a monthly record blank is use. The daily records are copied into this blank, a duplicate of which with its carbon impression is filed in a loose leaf binder and furnishes the totals for the day book, the original being mailed as an itemized bill direct to the owner. Records of all shop work are kept on a working order blank. On the front of this is the job number and statement of the necessary work. On the back is kept a record of the materials and parts used. Repairmen use a Perry time stamp on the job cards to record the exact time of starting and stopping on each job or ringing off or in on another job. Every piece of material taken from the stock room requires a requisition blank with the same number as the job and these requisitions are then filed by the foreman with the working order blank under the proper number, thus giving a complete record of the work done and by whom.

EVILS OF PAYING COMMISSION TO SALESMEN.

All the salesmen in this branch are on salary only, no commissions whatever being allowed, the management believing that many evils are due to the commission system. For example, a customer takes a fancy to a certain dash fixture and desires it as part of the equipment—the salesman on commission, thinking he may otherwise lose the sale, furnishes the required device out of his commission. The next customer probably asks something more than the former one and perhaps gets it from another salesman, etc. If such promises of accessories and parts happen to be made by a salesman who leaves the company's employ before the sale is consummated, trouble will surely follow, as the firm naturally refuse to cut prices in this way, as that is what it really amounts to, and the customer is disgruntled because he has heard of others who did get certain things thrown in. This condition is somewhat like an endless chain, and there is no knowing the amount of complications that may arise.

Salesmen on commission if unable to sell their own models are often found selling some other make of machine in which there is a good "rake-off" for them. Salaried salesmen of the right kind usually have been found to stay longer than those on commission, and no difficulty has been experienced by their showing lack of interest in making sales. In regard to larger commissions for the agents, the statement was made that usually in a similar way an exceptionally large percentage when given by the manufacturer to the agent is used as a lever to cut prices, the agent feeling that he can afford to sacrifice a little in order to make sales, with the inevitable result, that there is immediately trouble with the other agents who have thus been undersold.

Foss-Hughes Motor Car Co.

The Foss-Hughes Motor Car Company began at 201 North Broad street, in November, 1905, as Philadelphia agents for the Pierce, Cadillac and Baker Electrics. Both Mr. Foss and Mr. Hughes had had previous experience in selling cars, both having been with the Pope Motor Car Company from the very first, as Boston and Providence agents respectively.

The first cars were not on the show floor until January 27, 1906, but their first sale, a Pierce Great Arrow, had been made in December, 1905, and seven more cars were sold before the new firm had one single car to show. The sales have increased rapidly, the total number for 1906, being 172. This success is attributed, first, to the good quality of the cars handled, and, secondly, to the close attention paid to the requirements of purchasers after a sale was made and money paid. In all cases the demands for repairs and instructions and general aid and assistance was promptly attended to. Daily advertising was used continually.

The demonstrating was incessant in the first year, but is now much less, the Pierce, Cadillac and Baker cars being now well known and generally accepted as standards in their respective classes.

The principal points emphasized to influence new trade are, excellence and reliability of cars handles, and the efforts of the firm to keep cars on the road and in satisfactory condition after they are paid for. That their theory is sound enough to bring results, is shown by the fact their sales to April 25, amount to $417,957.92 for 1907, or nearly four times the sales totals for the first four months of 1906. A blank accessories list-form, which is filled to suit each individual car sale, is used and submitted to the customer for approval, so that the buyer need not be caught on the road without things he needs to have. One customer ordered the complete list suggested for a Pierce Great Arrow, total value $757.

Nothing can go further towards satisfying a car owner than a full road equipment, and no car driver can easily avoid a friendly feeling for the selling agent whose thoughtful anticipation enables him to triumph over unexpected contingencies on the road.

J. W. Wilcox has been elected president of the Automobile Dealers' Association of Southern California, to succeed A. J. Smith, who was prevailed upon to accept the berth of vice president. Leon T. Shetler was re-elected secretary.

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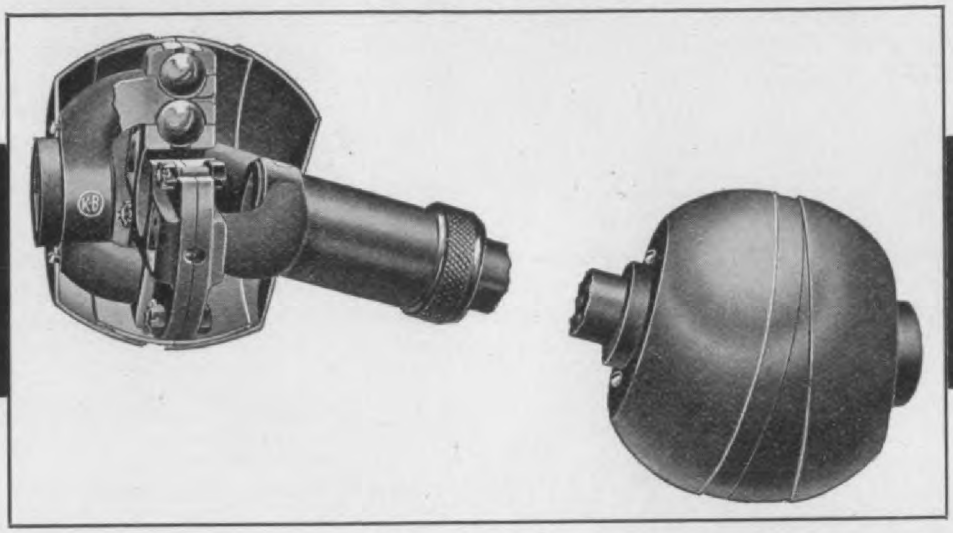
K-B Ball Bearing Universal Joints



Simple, Strong and Durable. Perfect Lubrication

THE KINSLER-BENNETT CO., HARTFORD, CONN.

THIS WILL PUT **MONEY** IN THY PURSE

Folding Wind Shield

NO GLASS TO BREAK. No vibration or strain on even the lightest dash.

Weight Only 5 Pounds

Shipped ready to attach to dash. New lights furnished by mail at $1.00 each.

Birch-Mahogany Frame, Solid Polished Hinges and Brackets, Solid Brass Tubular Braces, Heavy Celluloid Lights.

Just think of the price, $20.00, for a full size Folding Front for Ford,—Maxwell,—Reo or any runabout.

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$20.00

Send paper pattern of dash if not

Retail Notes

Auburn Automobile Company, Auburn, N. Y., has taken possession of its new garage on Water street.

Akron Automobile Garage Company have purchased the Huber property on Buchtel avenue near South Main street and will erect on the lot a large garage, 165 feet by 70 feet wide.

Auto Transit Company of Philadelphia, Pa., let contracts for the erection of two garages, one at Thirty-first and Dauphin streets, covering 82x166 feet, and the other at Thirty-first and Nevada streets, which will be 128x168 feet.

Browne-Frund Motor Co., will handle the Mitchell cars in Milwaukee, Wis., at 230 Wisconsin street.

Bellefield Motor Company of Pittsburg, Pa., has taken the agency for the De Luxe cars.

Bullard Garage is the name of the new garage which was recently opened on Putnam avenue, west, Greenwich, Conn.

Brewster, J. B. & Company, Forty-ninth street and Seventh avenue, New York city, manufacturers of carriages, have made arrangements for the agency of the Acme car, manufactured at Reading.

Bellinger, Charles H., garage, on Lander st., Newburg, N. Y., is now open for business.

Calhoun, John E. & S. F. Bancroft, formerly connected with the Motor Car Supply Co., of Chicago, have formed the Calhoun-Bancroft Co., in Seattle, Wash., where they will handle several well-known cars.

Capitol Hill Garage, 615 B street, Southeast, Washington, D. C., has been appointed Washington agent for Rambler and Mitchell cars.

Crane Automobile and Garage Co., of Providence, R. I., is making ready to build a garage on the south side of Potter avenue, near Hamilton street, that city.

Columbus Buggy Co., of Columbus, Ohio, manufacturers of the Columbus electrics, has established an agency in Ponce City, Porto Rico, with Mr. Robert Graham.

Continental Auto Mfg. Co., manufacturers of the Continental cars at New Haven, Conn., will soon establish a branch in New York City on Broadway, near 52d street.

Case, Harry, Logansport, Ind., garage business has been purchased by Arthur and Herbert Dunn.

Camden Auto Exchange Company has been incorporated with $25,000 to store, repair and sell automobiles in Camden, N. J.

Doll, Augustus, has been appointed sole agent for York and York county for the Columbia automobile, manufactured by the Electric Vehicle Company of Hartford, Conn.

Dulmage-Rose Auto Company, composed of L. H. Rose H. O. Bell and W. S. Dulmage, have secured the large garage on Second avenue, between Jefferson and Adams streets, where they will handle the Haynes cars.

Dragon Automobile Co., of Philadelphia, Pa., in addition to their factory, they have established headquarters at 143-145 South Broad street, this city.

Electric Garage Company has recently incorporated and leased a one-story building at 1920 Farnam street, Omaha, Neb.

Eagle Repairing Co., New York, has removed to larger quarters at 1780-82 Broadway.

Goelet, Robert, is erecting a large six-story garage in New York City, at the northeast corner of Broadway and Sixty-fourth street.

Houpt, Harry S., of New York City, has secured headquarters at 139-141 S. Broad street, where he handles the Thomas line of cars, formerly handled by the United Motor Car Co., 215 N. Broad street.

Hamilton Garage and Motor Co. has opened a garage at 162-164 Bullsferry road, Union, N. J. The company has the agency for the Detroit and American.

Kirk Bros., Automobile Co., 915-917-919 Jefferson avenue, Toledo, Ohio. Ezra E. Kirk has resigned and H. W. Fraser has been elected president and director to fill the vacancy.

Lewis, Jr., H. H., of Fort Worth, Texas, has been appointed agent for the Rainier car for the entire State.

Morley, James, of Los Angeles, Cal., has closed a contract for the agency of the well known Matheson car.

Moseley-Haigler Electric Co. has opened an electric machine shop at 308-310 Lee street, Montgomery, Ala. A specialty will be made of automobile repairing.

Mercedes Import Co., of Philadelphia, southeast corner of Broad and Race streets, agent for the Mercedes car, has been succeeded by a new company known as the West-Stillman Motor Car Company. Mr. Stillman, manager of the former company, will also be manager of the West-Stillman Company.

Motor Transfer Company, Inc., Richmond, Va., has removed to its new garage at 605-607-609-611-613 West Broad street.

Moeller & Larson have etsablished a garage at 1023 First street, La Salle, Ill.

McAfee, A. L., has leased the new garage on West street, Healdsburg, Cal.

McCullogh, R. J., Wheeling, W. Va., is building a new garage at Sixteenth and Eoff streets, 100x70 feet, with accommodations for 50 cars. A fully-equipt repair shop will be installed and kept open night and day.

Ollier & Worthington is the name of a concern recently organized as manufacturers' agents in Los Angeles, Cal.

Pope Auto Company is the style of the new concern selling Pope Hartford cars at Newark, N. J. The garage is located at Cedar & Halsey streets.

Parlman, L. H., 1871-1875 Broadway, New York City, has secured the New York agency for the Aerocar.

Rosenberg, Louis, with temporary headquarters at Broadway Central Hotel, Greater New York, has been appointed representative for the George W. Dover Co., 80 Clifford street, Providence, R. I.

Standard Garage Motor Car Company, of Scranton, Pa., have taken the agency for the Waverly electric automobiles.

Shaffer, S. N., has opened a garage and repair shop on Main street, St. John, Mich.

Smythe, Robert A., Rockford, Ill., agent for Pierce & Maxwell cars, has broken ground for the erection of a new 70x35 feet garage, to be two stories high.

Swampscott Garage, Swampscott, Mass., has been purchased by Edwin L. Brown, who will conduct it under the name of Swampscott Auto Station. He has the agency for the Mitchell line of cars.

Southern Automobile Company is building a one-story brick building at Mobile, Ala., located at 3 South Government street.

Seattle Automobile Company, of Seattle, Wash, has moved into its new garage at 1423-1425 Tenth avenue.

Stamp, Jason, of Wheeling, W. Va., is building a large garage at Sixteenth and Chaplin streets.

Sport's, Ltd., of New York, city agents for the Royal motor cycle, the R. S. motor cycle and dealers in automobile, motor cycle and bicycle accessories and supplies, have moved from 1775 Broadway near Fifty-seventh street, to 2049 Broadway, near Seventy-first street, where they have much larger quarters.

Slater & Swanson have broken ground on Holman street, Attleboro, Mass., for the construction of a garage. It will measure 30x40 feet.

Taylor, Charles S., of Great Barrington, Vt., has opened a garage on Railroad street, which has a capacity of about 25 cars.

Titman, Leeds & Company, of Philadelphia, agents for the Studebaker & Matheson cars, have also secured the agency for the Pope line, formerly handled by the Quaker City Automobile Co.

West, Walter S., Ballston Spa, N. Y., has entered into partnership with his brother, George West, in the garage business located at Front street and Milton avenue.

Cimiotti Bros., agents for the Mora, Corbin and Waltham-Orient cars, are the latest local dealers to join the New York Automobile Trade Association. The association has just established a collection department for the benefit of its members, and has under consideration the organization of an Employment bureau thru which members may secure reliable salesmen, mechanics or chauffeurs.

W. B. Hurlbert, for the last three years manager of the New York branch of the Packard Company, has resigned and associated himself with the New Garford Motor Car Company, of New York. The latter concern is capitalized at $300,000 and will handle the product of the Garford Company, of Cleveland and Elyria, which concern has begun the construction of a high-class automobile. Mr. Hurlbert is president and general manager and Mr. Teaboldt secretary and treasurer.

F. J. Pardee, sales manager of the St. Louis Car Co., has resigned.

The Winton Motor Carriage Co., of Cleveland, O., will, on September 1, open its own branch house in San Francisco. The new building is extremely spacious, occupying the territory on Van Ness avenue between Birch and Grove streets. Charles M. Brown, who has scored such a success as manager of the Chicago branch, will be manager of this new branch. The San Francisco branch is the tenth established by the Winton Company, the others being located in London, New York, Boston, Philadelphia, Pittsburg, Cleveland, Detroit and Seattle.

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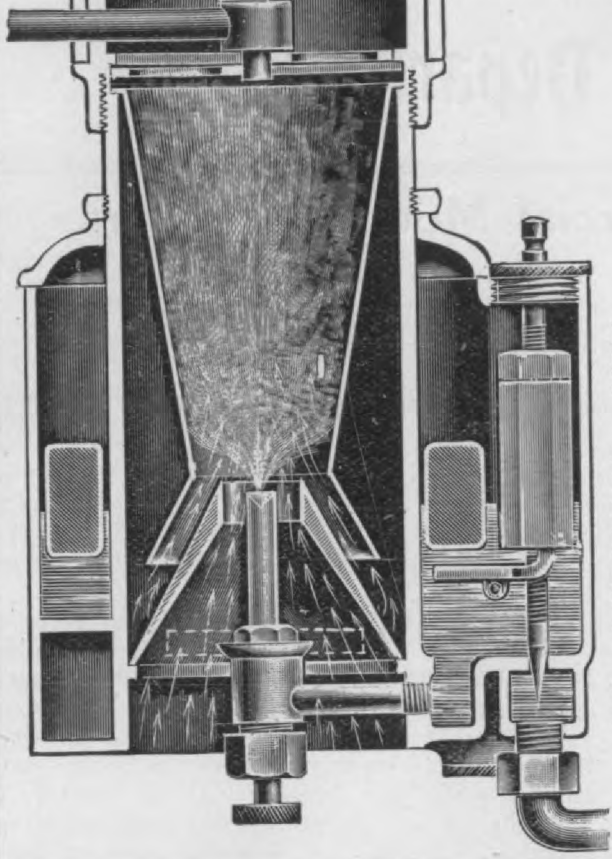


(PATENTED)

THIS INSTRUMENT PRODUCES THE

MAXIMUM EFFICIENCY

FROM INTERNAL COMBUSTION MOTORS

INCREASING THE

POWER, SPEED,

AND FLEXIBILITY ON A MINIMUM FUEL CONSUMPTIO

It functions on correct scientific prin pals and is greatly superior in its method gas formation, workmanship and finish, any carburetor ever brought out.

Our modern new factory, allows us make prompt deliveries. We will be pleas to forward sample instruments to manufa turers who are interested for this season's a next requirements, and believe you c hardly over-look this opportunity of incre ing the popularity of your cars, by securi absolute perfection in carburation.

Owners of cars, who have ideas of larg motors are advised to try a Bowers Carb retor first, it makes giants of the weaklin

CATALOG FOR THE ASKING

The F. E. BOWERS COMPANY

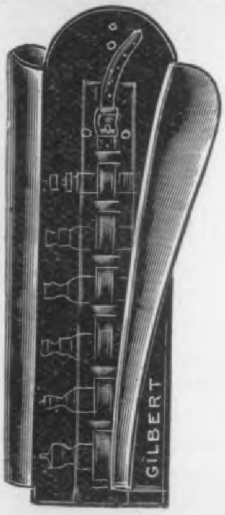
New Haven, Conn.

GILBERT AUTOMOBILE

THE ONLY ONES WORTH YOUR MONEY

FABRIC SUPPLIE

QUALITY .... SUPERIORIT



TIRE CASE

STORM HELMET

WE MAKE EVERYTHING IN RUBBER FABRIC

Sold

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Commercial Motor Car Department

Experience of Commercial Motor Car Users

Six "White" Steamers Replace Thirty Horses

The Sol Mier Co., of Lingonier, Indiana, are using six White steamers in the livery business, having by the adoption of motor cars displaced about thirty horses and 15 carriages. The 2-horse teams were able to cover only about 50 miles a day, while the motor cars cover as high as 200 miles, carrying loads weighing up to 800 lbs. The horse-drawn outfits were of course unable to cover anywhere near the area that the cars operate in, as the cars cover a radius of 200 to 300 miles. This concern considers the motor car outclasses the horse vehicle three hundred per cent. They care for the cars at their own garage.

Gasoline costs them from two to three dollars per day per car, and lubricating oil 60 cents to $1.20. Repairs and new parts run high, the figure they quote being $200 per month for each car. They pay operators $100 per month and helpers $2 per day. They claim that cars depreciate 60 per cent. per annum; that they should be made stronger thruout and the engines improved. In spite of these statements, however, they say that the motor car is away ahead of the horse-drawn vehicle for their purposes.

Motor Cars Deliver Brooklyn "Daily Eagles"

In addition to using 17 one-horse single wagons five two-horse double-platform wagons and one extra large two-horse newspaper van, the "Brooklyn Daily Eagle," of Brooklyn, N. Y., is using two Locomobiles, one Pope-Toledo, two Knox cars and one Columbia Electric. For delivery of the Sunday Eagle three large box trolley cars, in addition to wagons and automobiles, are used.

Each automobile makes an average of 21 miles per day and cover a radius of about 10 miles. The gasoline cars cost $3500 and up, the electric $1000; average monthly cost of gasoline is $11 for each car; lubricating oil $1.25 each. They store their own cars. The operator's wages are $100 per month and the helper's wages $40. They figure the cars depreciate about 12½ per cent. in value in a year.

The horses cost $250 each; wagons, $600; set of harness, $60; care and feed of each horse, $15; shoeing, $2.50 each; cost of repairs to each vehicle, $5 per month; horse driver's wages, $69.60.

The Pope-Toledo which they use has a capacity of 1500 pounds—1000 Sunday papers or 3000 daily papers and a speed of 50 miles per hour.

The two Knox cars are of the two-cylinder delivery truck type, 20 H. P., 3000 pounds capacity each—3000 Sunday papers or 9000 daily papers; speed, 20 miles per hour.

The Olds is a two-cylinder water-cooled delivery wagon. Its capacity is 2000 pounds—2000 Sunday papers or 6000 daily papers; speed, 25 miles per hour.

Their 15-20 H. P. Locomobile has a capacity of 1000 Sunday papers or 3000 daily papers and is capable of a speed of 40 miles per hour. The total average monthly expense for running one of their autos for one month is $12.25, as against $22.50 for keeping a horse and team.

Can Make Much Longer Trips and Prompter Deliveries

According to the experiences of M. O'Brien & Son, 208 Wabash avenue, Chicago, Ill., with the commercial motor car, horses will soon be forced to take a back seat.

Their first car was bought in 1902 from the Chicago Motor Vehicle Co., and was run all thru the winters of 1902, '03, '04, '05 and '06 with practically no trouble at all. The total cost of maintenance of one two-horse wagon for twelve months, including board, shoeing, veterinary, repairs to wagon and harness and painting, was $581.00, monthly average, taken on a three-year basis, was $48.42.

The total cost of maintenance for the Chicago Motor Company car for twelve months, including board, gasoline, lubricating oil and repairs to machine and tires and painting, was $512.56. The monthly average for three years was $42.72.

Their present motor car they purchased one year ago from the Kansas City Motor Car Co., and state that it has been very satisfactory. We quote herewith their own statement regarding the superiority of the motor car:

"As a general proposition the automobile has proven itself much more satisfactory. We can easily do the work of two wagons and can make much longer trips. Our de-

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RELIANCE MOTOR TRUCKS

For Freight and Passenger Service.

¶ In successful operation under all kinds of conditions and service in all parts of the country.

¶ Sold under a liberal guarantee by a company in position to back it up.

¶ Manufactured complete in our own large plant which is devoted exclusively to the production of high grade commercial vehicles.

¶ Not an evolution from a pleasure vehicle, but designed strictly along truck lines with a surplus of strength in all parts.

¶ One man and a **Reliance Truck** will do the work of three men and three horse-drawn trucks, with an operating cost about equal to one horse-drawn truck. (We give you data and names of users to prove it.)

Write for catalog, and state kind of service in which you use trucks.
Some good territory open for responsible agents.

Hosted by Google

RELIANCE MOTOR CAR CO.

liveries are more prompt. We cannot do without one now and would not think of going back to horses again. The gasoline motor car is without question on its way, and we believe that all commercial houses will be forced to adopt them."

"The two principal drawbacks are the carelessness and negligence of operators and the fact that most cars are greatly overloaded, which naturally puts a very great strain on the engine. It seems almost impossible to impress this point upon the users of these vehicles. If you can obtain a good operator and can personally watch the car yourself, at least to some extent, the commercial car is bound to prove an economical proposition."

Using Motor Cars for Hauling Safes, Boilers, Etc.

The Rochester Carting Co., Rochester, N. Y., is using two commercial cars for hauling general freight, safes, boilers and all kinds of machinery.

The cars are electrics, manufactured by the Vehicle Equipment Co., of Brooklyn, N. Y., and cost $3000 and $4000 respectively. The cars carry loads of 1-3 and 1-5 tons respectively. The cost of charging these cars is 40 cents per day each. The average monthly cost for repair work and repair parts is $75 each. They store their own cars. Operator's wages are $14 per week. They figure that a car depreciates 20 per cent. in value in a year.

The motor cars now employed replace 4 horses and 2 trucks, two horses being used to each truck. Average weight of load carried was 4 tons. The trucks cost $400 each; horses $250 to $300 each, and harness $75.00 per set. Average monthly cost of shoeing each horse was $1.50; repairs to each vehicle $10.00; weekly wages of driver $12.00. The depreciation in value in a year is also figured at 20 per cent.

The most needed improvements suggested by their experience are better tires and batteries. They state that the advantages of the motor car over the horse vehicle depend on what they are used for. They claim the advantages for freight work are many if it were not for the cost of maintenance.

Fire Company Will Increase Motor Propelled Equipment

Radnor Fire Department, Wayne, Pa., have in use a motor propelled combination fire apparatus and will shortly add a motor fire engine to their equipment, being highly pleased with the success attending the use of the combination wagon. The two cars will displace 5 horses and the saving will be about $55 per month over the old method.

This fire company is entirely satisfied with the vehicle they are now using and have no improvements to suggest. Of course they care for the machine at the fire house. As would be expected their service is much more effective, being quicker, than the old outfit.

The car they now use is a 20 H. P. D 6 Knox chassis with suitable body for their requirements. It carries a load of from 2000 to 2500 lbs. The cost of operation includes $4 per month for gasoline, $2 per month for lubricating oil and $1 per month for ignition battery charging. The car averages 8 to 10 miles per day and operates over a territory of 24 miles radius.

Commercial Vehicle Notes

The regular schedule of the recently established automobile line between the Cumberland Hotel, Ocean City, N. J., and the Stockton Hotel, Cape May, went into effect July 30.

An automobile street car line is proposed for the city of Waterloo, Ia., and its promoters have asked a franchise of the City Council.

It is reported that the Manhattan Transit Company, which owns franchises for stage and 'bus lines thruout New York City, will begin September 1 the operation of a line of gasoline auto 'buses from Cortlandt street ferry across the Brooklyn Bridge to the Flatbush avenue station on the Long Island Railroad. The company will also run a line on Fifth avenue, from One Hundred and Twenty-fifth street to Fourteenth street, and thence across town on both East and West Fourteenth street, and from Fourteenth street down Broadway to the City Hall and across the Brooklyn Bridge to the Brooklyn Borough Hall. Transfers will be issued from one line to the other.

The Salvage Corps, of St. Louis, Mo., will be furnished with an automobile wagon for the corps' use.

Three motorcycles have been purchased by the Chattanooga (Tenn.) Electric Light and Power Co. for the use of its linemen in repairing broken wires.

Motor 'buses are to be operated between Kirkland and Fall City, Wash.

Chidsey Express Company, of Elizabeth, N. J., has placed an order for twenty Rapid Motor delivery wagons.

Charles A. Stevens & Co., dry goods merchants, of Chicago, Ill., were the first to use commercial buckboards in that city, having placed in service three Orient buckboards in their delivery service.

The Steelton Store Company has recently purchased from the Harrisburg Automobile Company a 6000-pound Logan truck.

The Board of Education in New York city has authorized the expenditure of $4500 for the purchase of a motor truck to transport school supplies.

The Mogollon Motor Road Company has been organized with a capital stock of $50,000 and will establish a motor car service between Mongollon mining district and Silver City, N. M.

The Punjab Motor Transport Co., of India, has recently placed in service ten 30-horse power White steamers, fitted with wagonette bus bodies.

Morton Truck and Storage Co., of Toledo, Ohio, has recently placed in service a Studebaker electric truck for the hauling of pianos for private parties and Whitney & Currier.

Thomas Keery, Sr., proprietor of the Hancock Transfer Co., has purchased a large automobile, capable of carrying 20 passengers, for use on the transfer route between Cadosia, O. & W. depot and Hancock village.

Alex. Campbell Milk Company, of Brooklyn, N. Y., is using a fifty-horse power Mack, five-ton gasoline truck in transporting milk in cans to Richmond Hill, Coney Island and Jersey City.

3 TON "Manhattan" 5 TON
Commercial Trucks and Sight Seeing Cars
Buy the Best and save money and annoyance.
MACK BROS. MOTOR CAR CO., - Allentown, Penna.

THE "RAPID"
The Ideal Commercial Car
SIMPLE---SAFE---SATISFACTORY
Write For Printed Matter To
B. M. HENRY, Sales Manager
Pontiac, Michigan

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A light and powerful

DELIVERY CAR

Correctly designed and carefully built

Load capacity, 1000 lbs.
Price F. O. B. Lockport, $1000.00

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MOTOR VEHICLE COMPANY,
Lockport, N. Y.

COMMERCE TRUCKS

TRADE MARK

Built for **Commercial** Purposes

4-CYLINDER 4-CYCLE

POWERFUL — ECONOMICAL — RELIABLE

2½ to 5 Tons Capacity

BODIES, TRUCKS, SIGHT-SEEING BUSSES, MOVING VANS, HOTEL BUSSES, ETC.

Full particulars on application.

AMERICAN MACHINE MFG. CO., - DETROIT, MICH.

The Car of Quality

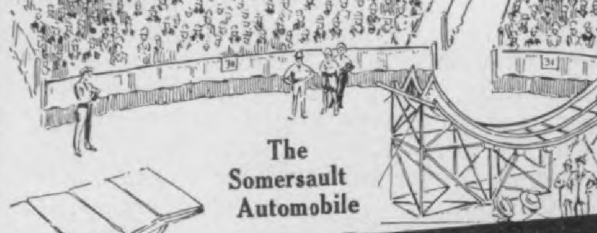
The SOULES LIGHT DELIVERY CAR, 22 H. P., two 5½ x 5 horizontal opposed cylinders, sliding gear transmission, bevel gear drive. THE CAR THAT HAS BEEN TRIED AND FOUND NOT WANTING. Agents wanted. Correspondence solicited.

Soules Motor Car Co.

Sales Dept., 736-740 WOODWARD AVE., Detroit, Mich.

THE HUBBARD PATENT TIRE

ONLY PRACTICAL TIRE FOR THE COMMERCIAL VEHICLE.



The Somersault Automobile

—What Mak
This Great Feat Possibl

Is it the skill of the daredevil girl in the car? a bit of it. Is it the correct mathematical const tion of the incline? Partly. But this act woul **absolutely impossible** if it were not for the that the automobile is equipped with

INDESTRUCTIBLE STEEL WHEEL

Twice daily this car rushes off the end of the inc at a speed of 42 miles an hour—shoots into the completes a somersault—and drops a sheer 30 striking the immovable earth with a dead weigh 9,000 lbs. Would the strongest wood wheel stanc

Mr. Ringling says: "We broke one or more w wheels at each performance—the strength and durance of your steel wheels is phenomenal, anc think a great improvement over a wood wheel."

Our Indestructible Steel Wheel is bound tc universally adopted for automobiles, trucks wagons in a very short time, because it is the really **safe** wheel for vehicles which attain speed or carry great weights.

Automobile wheels often make 440 revolutio minute—yours have done this often. At each r lution they receive racking jolts and vicious tw The smallest **defect** in a wood wheel when assa with such giant wrenches may give way—what th

Our Indestructible Steel Wheel cannot collap **no matter what happens.** It is the **only au mobile wheel made** that cannot.

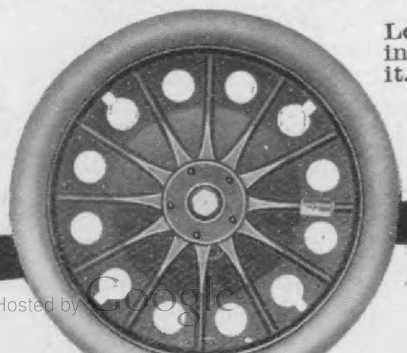
It is as mechanically correct in each detail as greatest steel bridge ever engineered.

It weighs no more than a wood wheel—costs more—fits **your hub** and **rim.** It is easier clea —more beautiful—collects less mud and dust— most resilient—saves axles.

Write for full information and catalogue—we only tell you half the real advantages in this ad tisement. Let us quote you a price for a set attac to your present hubs and rims for your touring runabout, truck or wagon.

We make all kinds of Automobile Steel Stampi

Write us today



Lo int it.

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buses now being operated on Broad and mond streets, Philadelphia, by the Auto nsit Company, have attracted consider- attention, being of the double-decked don type, and have already shown them- es to be popular with the public. These tric buses were built by the Commercial ck Company of America, with offices at Arcade Building, and are of the 4- el drive type, giving them exceptional tion qualities, reducing the tire wear and a large extent eliminating skidding, as shown by tests made by the manufactur- Non-skidding is also secured by the of twin tires and altho the weight of machine is great, excessive tire trouble ot anticipated as the route is over good ement.

full, appears with the words "No seats." A present this makes it necessary to refus many, but when the service is comple many more can be accommodated. The fa is only five cents and is collected as c street cars by a conductor.

A complete description of these vehicl cannot be published at this time but a fe of the main features will be spoken of. Th most radical construction is the 4 moto drive, each motor and its wheel weighin about 690 lbs. All four wheels are alik The wheel base is 10 feet 6 inches and th tread 5 feet 10 inches. The length over a is 19 feet and the height to the top of th rail is 11 feet 6 inches. The extren stability of the machines is shown by a co

One of the London type of double-decked electric buses recently placed in service on Broad and amond streets, Philadelphia, Pa., by the Auto Transit Company of that city. The machines are now nning at 7-minute intervals and as soon as the 25 buses now nearing completion are placed in opera n a 3½-minute schedule will be maintained. The fare is 5 cents and when 34, the seating capacity s been reached a sign bearing the words "No Seats" is displayed and no more passengers are taken.

he first cars were put in operation about middle of July, 1907, over the route n Spruce north on Broad to Diamond thence to Fairmount Park, a distance bout four and a half miles, or nine miles the round trip. At the time of this ing, August, 1907, sixteen of the first nty-five cars are in daily use, each mak- 12 trips, or about 108 miles per day. present a seven-minute schedule is main- ed, but when all the buses are in opera- the machines will only be about 3½ utes apart. The running time is about minutes or an average of about 7.7 miles hour, including stops. The buses are ble of 12½ miles an hour, four for- d speeds being provided.

he cars seat 16 persons inside and 18

sideration of the weights. The wheels a motors weigh 2760 lbs. and the 42-cell Exi battery weighs in the neighborhood of 30 lbs., to say nothing of the springs, axles a frame; so it will be seen the center of gra ity is very low. The bus complete weig 11,500 lbs.

The top is well supported, altho not hea in appearance. Heavy steel strips are e bedded in the cross supports of the ro and in the uprights.

The batteries consist of 42 Exide 21 pla M. V. cells, and will drive the bus thr trips, or 36 miles on one charge.

GARAGE AND CHARGING STATION.

A new power plant, at 31st and Dauph streets, is now nearing completion and w

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INCORPORATED 1905

TIMES BUILDING - NEW YORK, N. Y.

We furnish Business Automobiles of all types and makes—machines exactly suited to any class of service.

Business houses contemplating changes or additions to their Delivery and Transportation Systems, should send for our new folder and information blank.

AGENTS

"A Few Plain Facts and Some Ideas" about Motor Trucks would interest you.

A BOOKLET *WRITE FOR IT*

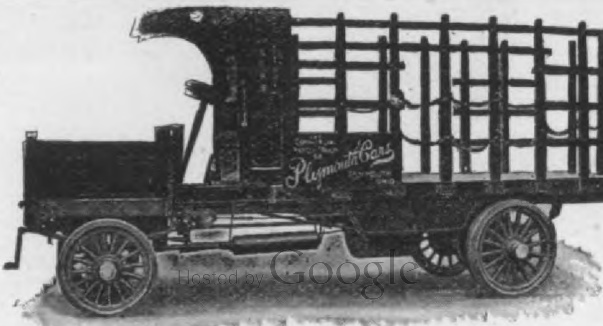
Works:
Caledonia Street,
Lockport, N. Y.

The American Motor Truck Co.

Western Office:
Monadnock Block,
Chicago, Ill.

PLYMOUTH CARS

Sight Seeing Cars--Trucks



The Powerful 4 Cyl. Motor, 35 to 40 H. P.—in conjunction with the famous Duplex Friction Transmission, enables the

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and into the truck at the same time the
battery shoves the discharged one out
the opposite side onto another hand-car,
that it can be run under an electric trav-
g crane which hoists it rapidly and low-
it into position for being tested, inspect-
and recharged. The recharging is done
the three bus bar system, no resistances
ng used, but the voltage being stept
from 96 to 102 and 110. Current is fur-
ned by three De Laval steam turbines,
h geared down 10 to 1, to drive two 50
owatt generators giving a plant of 6 gen-
tors. The plant is well laid out and
en completed will doubtless be very effi-
nt.

Anheuser-Busch Co. Order Fifteen Pope Electrics

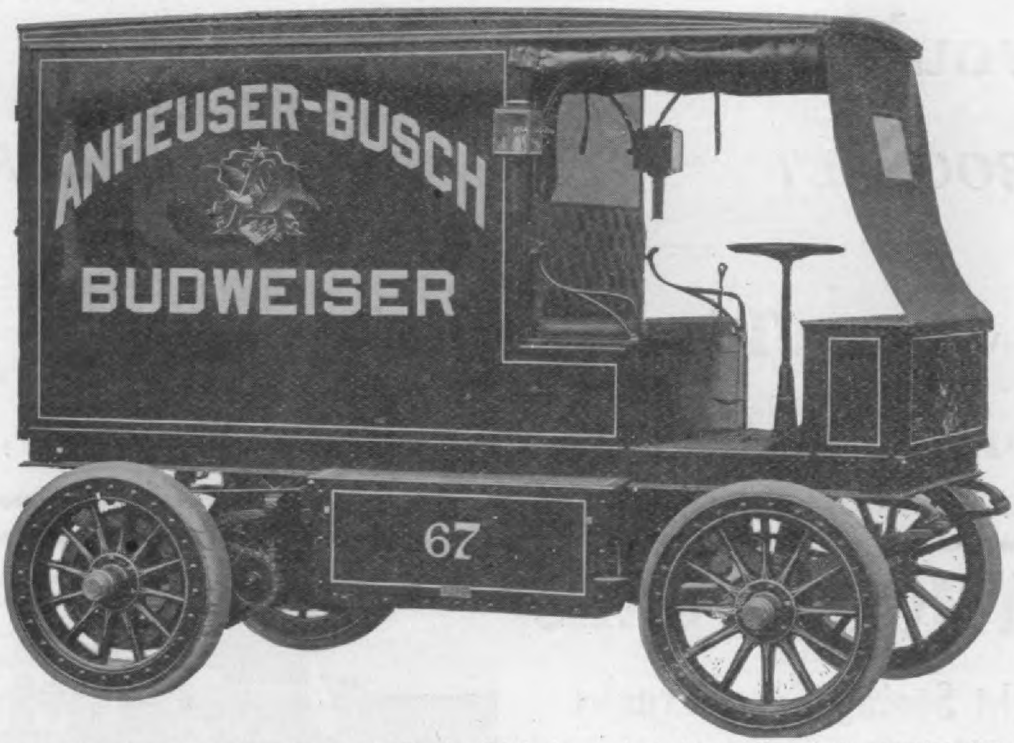
A single order given at one time by one
n for fifteen Pope-Waverley electric de-
ry trucks is the best possible evidence
t goods transportation by electric motor
ver becomes daily more and more prac-
l, efficient, and popular. Recently the
heuser-Busch Brewing Association of St.
uis, Mo., placed such an order with the
pe Motor Car Co.'s Waverley depart-
nt, Indianapolis, Ind., after a very thoro
estigation of the merits of these cars.

front, sides and back appears the ornamen
monogram, or trade mark, of the Anheuse
Busch Brewing Association, showing t
eagle, shield, etc., in artistic colors. T
handsomely cushioned driver's seat is pr
tected by a storm apron as well as by dr
side curtains, and the whole effect is at on
solid, substantial, comfortable and exce
ingly attractive to the eye, no detail bei
slighted that could in any way add to t
convenience and handsome appearance
the conveyance.

The motive power is furnished by fort
two cells of fifteen plate battery and tw
eighty-volt motors, double reduction, hu
from chassis and connected thru the cou
tershaft by a chain drive to the rear whee
The power developed has shown itself suf
cient for the most exacting demands of
quick delivery service extending over t
entire city of St. Louis and beyond its co
fines into the hilly suburbs.

The wheels are heavy artillery type, 36
diameter fitted with solid rubber tires, fou
inch front and five-inch rear.

There are no less than 55 entries receiv
to date for the Commercial Vehicle Tria
to be held by the British Royal A. C., th
fall.



Pope-Waverley Electric Wagon, 15 of which have just been placed in service by the Anheuser-Busch Brewing Association, of St. Louis.

Thirteen of them are at present doing de-
ry service in St. Louis for the Anheuser-

The John C. Roth Packing Co., Cinc
nati, Ohio, have been using electric mot
trucks for five years, and at the prese

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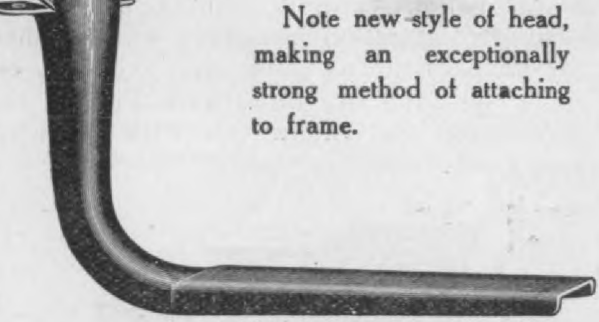

Note new-style of head, making an exceptionally strong method of attaching to frame.

Patented March 5th, '07

STAMPED STEP HANGERS

Neat—Light—Strong

Made in several lengths and drops

The CROSBY COMPANY

BUFFALO, N. Y.

L. CHAS. KENEN

French Automobile Designer

We furnish designs, with complete working drawings, specifications for materials, best treatment of steel, etc., for motor cars, trucks, omnibuses, delivery wagons, auto boats and railway motors.

Our experience, gained by many years of work in the best French shops, assures rapid and successful results, without experiments whatever.

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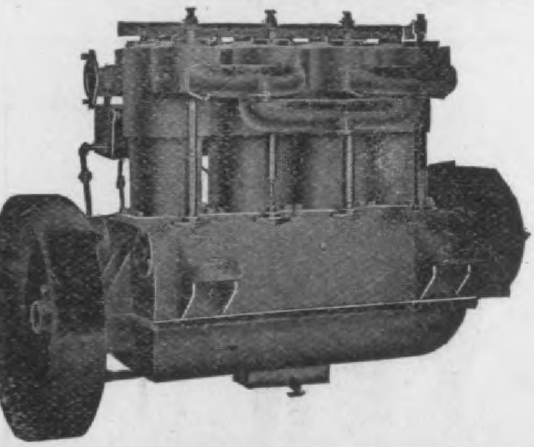


Automobile and Truck

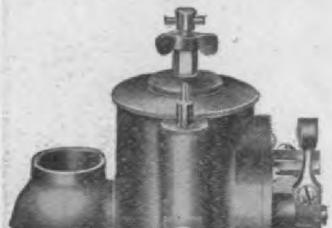
MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

HERSCHELL-SPILLMAN CO

W. Tonawanda, N. Y.

A Word to the Autoist



FOR BEST RESULTS USE

Palmbla Carburetor

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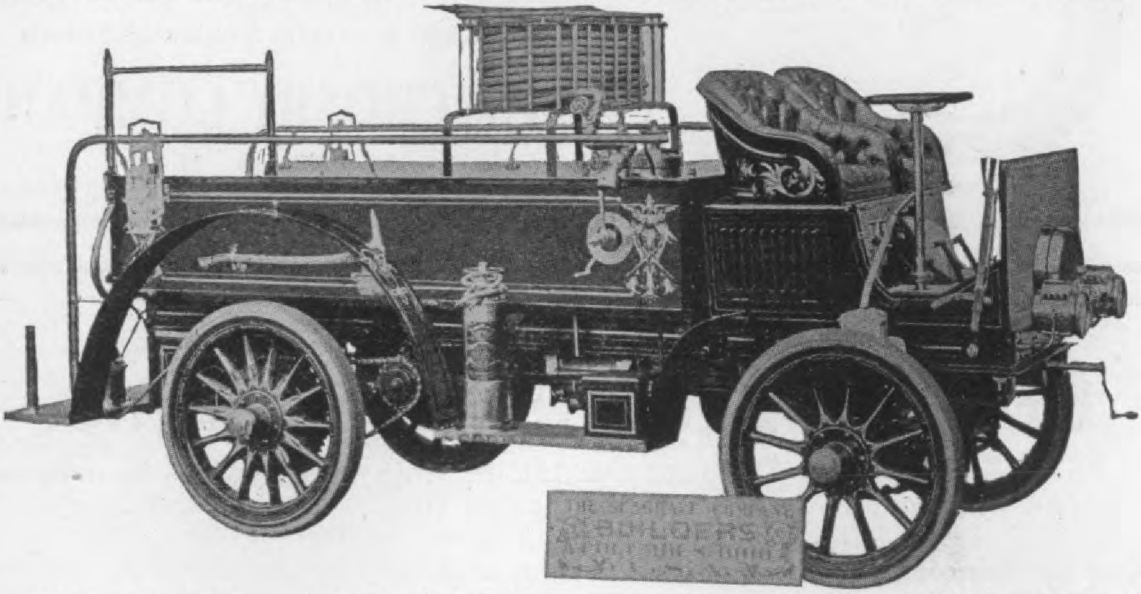
rol service. The Seagrave Fire Wagon , Columbus, Ohio, have appreciated from first that this new system would be in nand, and in 1905 began investigating and erimenting, and arranged with the Oscar

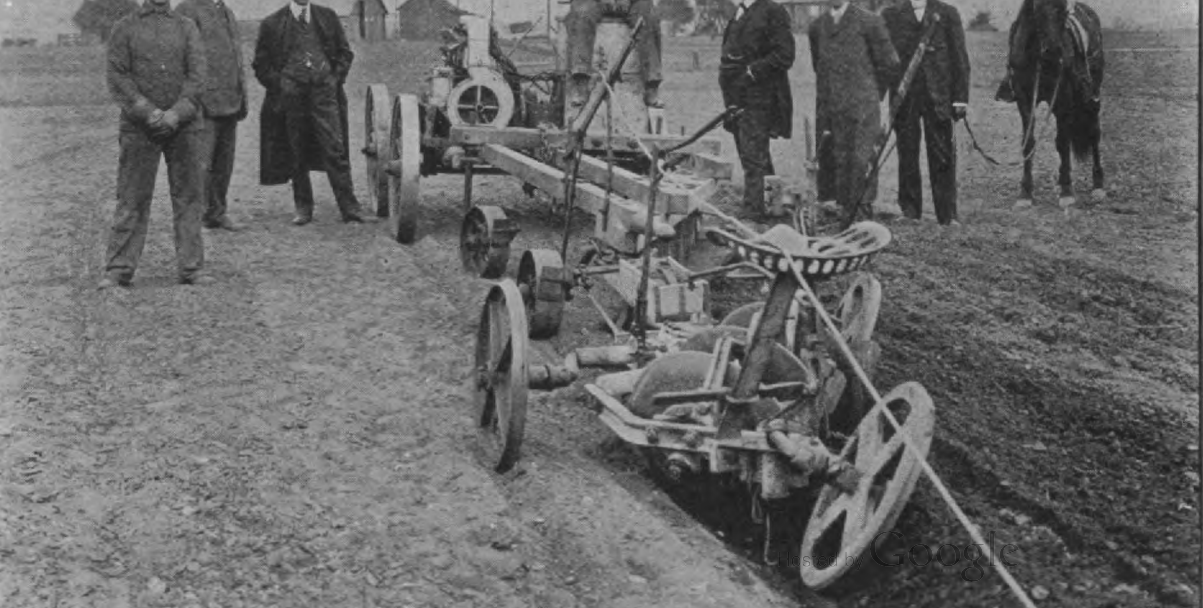
has 40 gallons capacity with 150 ft. chemi hose, two 3-gallon Seagrave extinguishe gas lamps, lanterns, gong, axe, crowbar, et etc. The axles are fitted with Timken ro er bearings and the wheels with Swineha



Combination Hose Wagon and Chemical Engine, built by the Seagrave Co., on chassis made by Osca ar Automobile Co.

r Automobile Company, also of Colum- , to develop an engine suitable for this rk, with the result that they have built Frayer-Miller air-cooled engine in 4 and ylinder types with capacity of 24 to 45 P., and arranged with the Seagrave Com-

clincher tires. The car is said to ride co fortably at 20 miles per hour. During a t made recently the car was run from Colu bus to Chillicothe, a distance of 105 mil in 8 hours, 17 minutes, making an avera of nearly 13 miles per hour.



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Motor Cycle Department

The F. A. M.'s Annual Meeting a Great Success.

The 1907 annual meet of the Federation of American Motor Cyclists, commencing with an endurance run from New York to Providence and ending with the annual meeting of the organization, on August 3, was a great success not only as an enthusiastic trade meet, but as an advertisement of the durability and efficiency of the motorcycle.

THE ENDURANCE RUN.

Fifty-five contestants started in the endurance run, five of the 60 original entrants having failed to appear. The start was made from Broadway and 88th street, New York City, at the break of day on Tuesday, July 30, four contestants being started at a time with one minute intervals between them.

Of the 55 starters, only one completed the endurance run, the hill-climb and economy test with a perfect score. This was B. T. Barrows, of Springfield, Mass., who rode a 2¼ H. P. Indian. Tied with him when they reached Hills Grove track outside of Providence were three other contestants of Class A, viz., F. A. Baker, Brooklyn; G. N. Holden, Springfield, and J. A. Schleicher, of Mt. Vernon, N. Y., all riding 2¼ H. P. Indians, but in the economy test these ties were obliterated, and Barrows was left the only perfect score man, and consequently winner of the diamond medal in Class A, single cylinder machines.

In Class B, multicylinder machines, A. Cook, of Hammondsport, N. Y., riding a 5 H. P. Curtiss, won first place, with a score of 998 points to his credit, having lost two in the economy test.

Honor medals in Class A were won by 10 other riders besides the perfect score men, and in Class B there were four honor men, including Cook.

It was the hill-climb and the economy test that cut down the number of perfect score men. Disregarding the points lost in these two events of the endurance test, there were 34 perfect scores, eight of whom, four in each class, survived the hill-climb with unimpaired scores.

The first to meet with trouble was Dr. J. P. Thornley, riding an Indian. He was so far behind the schedule at the first control, Poughkeepsie, owing to a bruised leg due to a bad fall, that he continued to Providence by rail. T. J. Deupree, on a 4 H. P. 2-cylinder Indian, was out of the running after less than three miles traveling because of exhausted ignition cells and, later, carburetor trouble. Tho hopeless of making a showing in the scoring, he afterward resumed the trip and completed the run to Providence alone. E. Y. White, on a machine of his own make, also had ignition trouble, his magneto getting out of order before he had covered 15 miles. J. F. McLaughlin, on a 3¾ H. P. N. S. U., met with an unusual accident before reaching Poughkeepsie; the stand fitted to his machine having become detached, ripped out the spokes of the rear wheel. He returned to New York, got a new wheel and went by a short route to Springfield, where he arrived that evening. Two others also went down in this first section of the run, E. Brereton and H. Jarmie, both riding R-S machines. They abandoned the run near Peekskill, the former because of ignition trouble and the latter because he had lost so many points by staying to help Brereton, who was from the same town.

The roads got worse after Poughkeepsie was past, being hilly and, beyond Lenox, soft and rough. On one of the hills, George A. Snow, driving an R-S, had a bad fall and was laid up two days with a lame back in consequence. Between Poughkeepsie and Springfield nineteen men were penalized for various causes. Three of these received further penalization between Springfield and Worcester besides one who had carried a perfect score thus far, and three dropt out of the race. Three more got penalties before reaching Providence and three dropt out.

THE HILL CLIMB.

Thirteen of the perfect score men received penalties in the climb up Morley's Hill, which is a succession of inclines ranging up to 18 per cent. The course covered about 300 yards. Speed was not a factor in this part of the contest, but penalties were imposed for pedaling or stopping.

THE ECONOMY TEST.

The "endurance test" portion of the meet ended with an economy test on Hills Grove track on the outskirts of Providence. Fuel tanks and carburetors were emptied and each contestant was furnished with one pint of gasoline, after which they were all sent off in batches of eight or ten and required to maintain an average speed of 15 miles per hour. Bar-

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rows, one of the few perfect score men at this stage, kept up his good work in the economy test, and, by covering 24 miles 3490 feet on his pint of fuel, won first place in the 1907 run. In the multicylinder class Hedstrom, on a 4 H. P. Indian, took first place, running 15 miles 925 feet. As he had lost 50 points in the hill-climb, however, his good work in the economy test cut no figure in his final score, first place in this class going to Cook, who, tho he lost two points in the economy test (going 11 miles 4852 feet) had a perfect score up to that time.

Following are tables of machines, weights, penalties, etc., of the 26 finishers, in Class A, and the 11 finishers in Class B:

CLASS A—SINGLE CYLINDER MACHINES.
Penalization in Points.

H.P.	Machine	Weight of Machine	Rider	Weight of Rider	Poughkeepsie	Springfield	Worcester	Providence	Hill Climb	Economy Test	Total	Final Score
2¼	Indian	110	B. T. Barrows...	158	0	0	0	0	0	0	0	1000
2¼	Indian	150	F. A. Baker.....	150	0	0	0	0	0	1	1	999
2¼	Indian	110	G. N. Holden....	140	0	0	0	0	0	6	6	994
2¼	Indian	120	S. T. Kellogg....	136	0	0	0	0	10	3	13	987
2¼	Indian	140	T. K. Hastings..	180	0	0	0	0	10	4	14	986
2	Yale Cal.	125	A. B. Coffman...	143	0	0	0	0	10	10	20	980
2¼	Indian	135	J. A. Schleicher.	142	0	0	0	0	0	20	20	980
3	Harley-Dvsn.	155	R. Sporleder.....	150	0	0	0	0	25	2	27	973
3	R-S	140	J. S. Seidell.....	170	0	0	0	0	10	18	28	972
2¼	Indian	120	Percy Drummond	134	0	0	0	0	25	5	30	970
2	Yale Cal.	125	J. W. Tassell...	140	0	0	0	0	25	7	32	968
2¼	Indian	110	Peter H. Cox...	140	0	0	0	0	25	8	33	967
1¾	Indian	120	J. J. O'Connor..	155	0	0	0	0	25	9	34	966
3	R-S	135	G. A. Tuckey....	217	0	0	0	0	10	25	35	965
3½	Hilaman	142	A. L. Hilaman...	170	0	0	0	0	25	11	36	964
3	Merkel	150	B. A. Swenson...	160	0	0	0	0	25	19	44	956
2	Yale Cal.	125	S. J. Chubbuck..	160	0	0	0	0	25	22	47	953
2¼	Indian	160	A. G. Schmidt...	165	0	25	0	0	10	17	52	948
3	Harley-Dvsn.	157	A. Klein.....	165	0	20	0	0	25	15	60	940
2¼	Merkel	110	J. S. Nisbett....	140	0	47	0	0	25	16	88	912
2¼	Racycle	160	Lyle Geiger.....	122	0	62	0	0	25	13	100	900
1¾	Indian	125	Geo. H. Ruck....	150	0	63	0	0	25	14	102	898
3	Armac	140	J. A. Turner.....	160	0	78	0	0	25	21	124	876
3	R-S	140	W. G. Schaeffer..	170	0	0	32	124	10	23	189	811
3½	Simplex	150	W. W. Savery...	130	0	42	40	174	25	24	305	695
2¼	Merkel	110	C. Loftes.....	145	0	56	102	150	25	12	345	655

CLASS B—MULTI CYLINDER MACHINES.

H.P.	Machine	Weight of Machine	Rider	Weight of Rider	Poughkeepsie	Springfield	Worcester	Providence	Hill Climb	Economy Test	Total	Final Score
5	Curtiss	150	A. Cook	157	0	0	0	0	0	2	2	998
6	N. S. U.	175	A. G. Chapple...	163	0	0	0	0	0	8	8	992
4½	Vindec	160	Russell Smith....	130	0	7	0	0	0	8	15	984
7	Simplex	150	H. K. Wray.....	135	0	37	0	0	0	1	38	962
4	Indian	140	O. Hedstrom.....	168	0	0	0	0	50	0	50	950
4	Indian	162	S. B. Rose.....	210	0	0	0	0	50	3	53	947
4	Indian	135	J. L. Pickering..	153	0	0	0	0	50	4	54	946
4	Indian	125	Chas. Van Sickle	140	0	0	0	0	50	6	56	944
3½	Bijou	140	Edw. Robling....	160	0	0	0	0	50	7	57	943
5	Simplex	170	W. H. Wray.....	170	0	22	0	0	50	9	81	919
4½	F. N.	165	W. F. Mann.....	180	0	79	0	0	50	5	129	871

The distance covered by the two-days' endurance run is 305.1 miles, divided into four controls, as follows: New York to Poughkeepsie, 78.3 miles; Poughkeepsie to Springfield, 122 miles; Springfield to Worcester, 52 miles, and Worcester to Providence, 52.8 miles.

ONE-MILE TRIALS.

Preceding the handicap road race on Blackstone Boulevard, on Thursday morning, 1-mile time trials were run off with the machines divided into two classes, one of not over 30½ cubic inches piston displacement, and the other of not over 61 cubic inches piston displacement. In both classes George H. Curtiss won in 56 4-5 and 51 1-5 seconds, respectively. He, of course, rode his own make of machine. W. H. Wray, with a 14 H. P. Simplex-Peugeot, in a free-for-all, did a mile in 44 3-5 seconds. These trials were on a straightaway course on the boulevard.

THE ROAD RACE.

On Thursday morning, August 1, a road race was held on Blackstone Boulevard. This event was won by J. S. Seidell with a 3 H. P. "R-S." The distance covered was 19.8 miles, six times around a 3.3-mile circuit, and Seidell made it in 29 minutes, 10 seconds, having had a handicap of 6 minutes, 40 seconds. The second man, B. A. Swenson, on a 2¼ H. P. Indian, finished in 28 minutes, 5 seconds. He had a 5-minute handicap. Peter Cox, riding a 2¼ H. P. Indian, finished third, time, 29 minutes, 50 seconds; handicap 5 minutes. Time prizes went to Stanley T. Kellogg (3 H. P. Indian), Chas. W. Van Sickle (4 H. P. Indian) and Swenson. Kellogg's time was 26.05 and Van Sickle's 27.39.

The course is smooth and gently undulating—ideal for a road speed test. Twenty-six contestants started, handicaps ranging up to 10 minutes.

G. H. Curtiss, a scratch man, had an accident in the first lap that put him out of the running. His carburetor leaked and the gasoline caught fire, for a time threatening serious damage to Curtiss himself as well as to his machine. Howard Wray had the same experience with his 7 H. P. Simplex-Peugeot.

Fifteen place prizes and three prizes for

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M. M. for 1908

This season we satisfied our customers with prompt deliveries, and shall continue this policy.

Our 1908 Models are now ready for immediate delivery. Following are brief specifications of the regular 1908 machine.

26 in. wheels, 2½ inch tires, frame dropped at seat post joint, 20 inches high; rims nickel plated with high finish, color bright vermillion; option, black or M. M. blue. The vermillion finish together with full nickeled rims and fuel tank make the handsomest machine ever produced.

Highest quality Barnes, endless, mineral tan belt, detachable through back stay of the rear jaw by simply removing one bolt and nut.

Cupped pet cock on cylinder head, together with priming device for priming engine with gasolene direct from tank by pressing a button, is a most ingenious appliance, and will be hailed with delight by those who have had trouble starting their machines in cold weather. This device also enables the rider to get gasolene for any purpose desired, such as cleaning plugs, valves, timers, etc.

This combination of 20-inch frame and 26-inch wheels enables any rider with 30-inch legs to put both feet on the ground when sitting on the saddle, which means perfect comfort at last for the short-legged rider.

Agents loose no time in renewing your contract for the sale of the M. M. for 1908.

American Motor Company

BROCKTON 715 Centre St. MASS.

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time were awarded as follows:

	Hdcp. M. S.	Time. M. S.
1—J. S. Seidell, 3 H. P. R-S.....	6.40	29.10
2—B. A. Swenson, 2¼ H. P. Indian..	5.00	28.05
3—Peter H. Cox, 2¼ H. P. Indian...	5.00	29.50
4—Stanley T. Kellogg, 3 H. P. Indian	1.00	26.05
5—A. Heilborn, 4 H. P. Orient.....	8.20	33.45
6—F. N. Horenburger, 4½ H. P. Vindec	3.40	29.15
7—A. T. Wilson, 3½ H. P. Simplex..	6.40	32.44
8—Russell Smith, 1¾ H. P. Indian..	5.00	31.45
9—Chas. Van Sickle, 4 H. P. Indian.	1.00	27.39
10—S. J. Chubbuck, 2 H. P. Yale-California	8.20	35.03
11—George N. Holden, 5 H. P. Vindec	3.40	29.47
12—A. G. Chapple, 6 H. P. N. S. U....	1.00	28.34
13—J. W. Tassell, 2 H. P. Yale.....	8.20	37.39
14—Walter Goerke, 3 H. P. Indian....	1.00	30.58
15—G. Goerke, 3 H. P. R-S.....	6.40	36.50
Time Prize Winners:		
1—Stanley T. Kellogg, 3 H. P. Indian	1.00	26.05
2—C. W. Van Sickle, 4 H. P. Indian	1.00	27.39
3—B. A. Swenson, 2¼ H. P. Indian..	5.00	28.05

TRACK RACES THURSDAY AFTERNOON.

On Thursday afternoon races were held on Hills Grove half-mile track, which had soft spots here and there, and a dusty surface. Several riders narrowly escaped injury in speeding on the curves of this small track. A sad and fatal accident marred the day's sport. J. L. Pickering had a fall which caused a fracture of his skull and ended in his death on the following Sunday.

The F. A. M. 2-mile national championship was won by Walter Goerke riding an Indian in 3 minutes 14 2-5 seconds. The mile free-for-all went to George H. Curtiss (Curtiss), time 1.33 2-5. A 2-mile open race was run in heats, three persons qualifying for the final, which was won by Stanley Kellogg (Indian); time 3.10. 5-mile handicap race was won by Peter Cox (Indian), time 7.45; handicap, 0.24. J. J. O'Connor on a 1¾ H. P. Indian won the one-mile novice race in 1.54 2-5.

FRIDAY MORNING HILL-CLIMB.

The motorcyclists tried for honors on Francis street hill on Friday morning, about one dozen participating. There were two classes in this event, one for machines of 30½ cubic inches piston displacement or under, and one for those of 61 cubic inches displacement or under. The hill is 200 yards long and rises at an angle of about 8 per cent. Only one machine could be sent up at a time, as the trolley cars were running up the hill and there were other drawbacks, such as a lack of police service. Curtiss made the climb in 11 3-5, winning first place in the first class, and Kellogg won in the other class, time 10 minutes flat. He used a 5 H. P. Indian. In a free-for-all race up this hill Wray ran his 14 H. P. Simplex-Peugeot up in 10 2-5 minutes. In this free-for-all Curtiss had a bad spill, in which he received some bad bruises and abrasions.

FRIDAY AFTERNOON.

Racing was continued on Friday afternoon at Hills Grove track, when the one and 10-mile national championships were run, both going to Kellogg, time of the 1-mile 1.37, and of the 10-mile 15.33 2-5. Kellogg also won the 3-mile open race for single cylinder machines in 4.38 4-5, and the 5-mile free-for-all in 7.38 2-5. The 10-mile handicap was won by Charles Van Sickle (Indian), time 16.28 4-5; handicap 25 seconds. During the running of this race Goerke collided with Cox, who was remounting his machine after a spill. Cox was badly injured, and Goerke got a bad cut in the forehead. The crowd swarmed on the track and the other contestants had to slow down. There was a 2-mile race for Rhode Islanders who had never won a first prize, and this was won by A. Heilbron on an Orient machine. He had a walkover. Time, 4.34 1-5. The proposed 50-mile team race was not run.

THE ANNUAL BUSINESS MEETING.

The annual meeting was scheduled for 8 P. M. August 3, but as many members were leaving after the races on Friday the hour was changed to 10 A. M. R. G. Betts was elected president for the ensuing year; H. J. Weyman, secretary; Geo. B. Gibson, treasurer, and the following vice-presidents: for the Eastern District, W. A. Suddard; Southern District, Edward Y. White; Western District, Irving R. Hall; Pacific District, R. H. Holmes.

In his annual report, President Betts recommended a change in the present plan of governing by districts with full appointive power vested in the vice-presidents of the respective districts. He suggested placing the appointive powers in the president. A motion was duly passed authorizing the appointment of a committee of three to plan a new method.

The treasurer's annual report showed the balance in bank to be $1402, of which the four districts have to their credit $771.40.

According to the secretary's report the membership is 1116, scattered over 36 States, the District of Columbia and Canada. Of this total, 792 members hail from the Eastern District.

A very encouraging report was rendered by the Competition Committee, showing that during the past year the registrations had increased fourfold and the sanctions twofold over the respective figures for last year. The chairman of this committee recommended, and his recommendation was adopted, that the present rule in regard to professionals be changed so that all professionals in other sports must also be rated as professionals if they enter motorcycle contests.

An appropriation of $200 was made as a testimonial of the service and devotion of H. J. Weyman, who has so faithfully served as secretary for some time. A motion was also past to appropriate $75 for the purchase of a testimonial souvenir for Chairman Douglas, of the Competition Committee, but he declined the honor on the ground that such action would establish a bad precedent.

The annual six-day bicycle race will be held in Madison Square Garden, beginning November 2.

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Scalps for the Indian

In the F. A. M. New York-Providence Endurance, H
limbing and Economy Test, July 30-31

Indian Motocycles

Finished 1, 2, 3, 4, 5

Also first in all National Championships, fastest time in H
limb and 20-Mile Road Race.

This should convince you of the superiority of the **INDIA**
r it is

First in { **RELIABILITY**, **HILL-CLIMBING**, **ECONOMY**, **SPEED** } **The 4 Essentials**

Catalogue on Request

HENDEE MFG. CO.

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Successful and Profitable Cycle Convention at Atlantic City

The annual convention of the cycle trade —the second annual mid-summer meeting of the Cycle Manufacturers' Association, the Cycle Parts and Accessories Association and the National Association of Bicycle Jobbers —held August 6 to 9, at Atlantic City, N. J., proved to be not only a very successful and inspiring gathering, but a much more satisfactory and profitable one than was expected. It renewed the enthusiasm of the members of the several associations present, and the coming years will no doubt show much increase in business and improvement in methods which had their inception in the Atlantic City gathering. Pleasure trips and functions were sandwiched in between the business meetings, so that while the trade's affairs were thoroly discussed, the desire for social recreation was not left unsatisfied.

W. H. Crosby, of the Crosby Co. addressed the gathering on the subject, "Trade Rocks and Shoals to be Avoided;" P. R. Robinson, of the New York Sporting Goods Co., on "Follies and Fancies to be Overcome;" E. S. Fretz, of the Light Manufacturing and Foundry Company, on "The New Opportunity and Its Demands," and E. L. Rosenfeld on "How to Regain Foreign Export Business."

The pleasure part of the program included, as one of its star features, a bowling contest held at the Columbia alleys, and participated in by four teams picked from the many who attended, the teams representing respectively the three trade organizations and the Traveling Salesmen. The highest scores in the trial games were made by the C. P. A. A. team and the Salesmen's team. These two teams then played a game of five frames to decide the leadership. The Salesmen proved the better bowlers in the final, score, 740. Detail scores follow:

TRIAL GAMES.

C. P. and A. A. Team—Wood (captain), 201; Price, 155; Mesinger, 86; Palmer, 118; Smith, 126; Heller, 134; Griswold, 111; Mossburg, 64; Gorton, 112; Wainwright, 123. Total, 1230; high-score man, Wood, 201.

Salesmen's Team—Edgar (captain), 88; Hill, 102; Buzby, 164; Snowman, 126; Field, 97; Hamilton, 111; Irland, 162; Page, 123; Brown, 89; De Silva, 141. Total, 1203; high-score man, Buzby, 164.

C. M. A. Team.—Schack (captain), 124; Schwinn, 69; Maguire, 107; Fretz, 68; Surre, 81; Wayler, 89; Lonn, 82; Cox, 155; Robie, 122; Ash, 113. Total, 1010; high-score man, Cox, 155.

Jobbers' Team—Willis (captain), 94; Robinson, 94; O'Dell, 56; Gibney, 63; Nock, 72; Leng, 129; Grady, 95; Alexander, 83; Stokes, 173; Voorhis, 81. Total, 940; high-score man, Stokes, 173.

FINAL. (Five frames).

Salesmen's Team—Irland, 81; Hamilton, 77; Field, 83; Snowman, 55; Buzby, 125; Hill, 48; Edgar, 57; Page, 84; Brown, 48; Stokes, 82. Total, 740; high-score man, Buzby, 125.

C. P. and A. A. Team—Gorton, 71; Anderson, 59; Griswold, 51; Cox, 48; Smith, 63; Palmer, 53; Mesinger, 46; Price, 73; Wood, 93; Wainwright, 69. Total, 626; high-score man, Wood, 93.

The bowling proved the most enjoyable feature of the recreation end of the program. Fully 150 persons attended, and both players and spectators were very enthusiastic. While several of the players were inexperienced, several were crack bowlers, as their good scores show. Wood, Price, Palmer, Smith, Heller, Gorton, Buzby, Maguire, Cox, Robie, Ash, Irland, Hamilton, Snowman, Page, De Silva, Leng and Stokes, all made scores of over 100, Wood passing the 200 mark by one and Buzby proving the high-score man on the Salesmen's team in both games.

SPEECHES, CLAM BAKE, ETC.

The address delivered by P. R. Robinson, of the New York Sporting Goods Company, was stirring and interesting. He reviewed in a forceful manner the several "follies and fancies" that threaten the cycle trade, among these the habit of allowing disparaging remarks about the cycle trade to go unchallenged and undenied; the lack of argument and information in manufacturers' advertisements; the unfair treatment of jobbers by manufacturers and by manufacturers' agents, who sometimes sell to dealers at jobbers prices; the evil of price cutting and the danger of a lack of competition.

W. H. Crosby, of the Crosby Company, spoke on "trade rocks and shoals" to be avoided, clearly and logically bringing to the attention of his hearers several questionable methods which to him seem to threaten the welfare of the cycle industry unless sighted and avoided by manufacturers.

First he spoke of the danger of overproduction, and suggested that it might be well to take some concerted action toward limiting outputs, as is done in other trades. The second "rock" he pointed out is the habit of too high a selling price; third, loose credit; fourth, our dependence on the home market for the sale of our factories' outputs; fifth, the bad habit of delaying specifications, and thus crowding the parts and material makers, and, sixth, the rapid introduction of untried methods. His address showed that he had given the subject in hand serious and intelligent thought, which, backed up by his wide experience, enabled him to make an address that appealed to the common sense and business instincts of his hearers.

E. S. Fretz, of the Light Mfg. and Foundry Co., gave a very practical talk on "The New Opportunity and Its Demands," leading up to his main proposition by a summary of the history of bicycling and pointing out, that with the bicycle business settled down on a firm basis of practical service and every-day pleasure, the opportunity was at hand to make bicycling universally popular. He advocated plenty of publicity and the encouragement of bicycle contests. His admirable speech is epitomized in the following extract from it:

"Now that the industry has assumed a more favorable situation, it is up to the

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New Departure

We'll Work Your Selling Plan And Plan Your Selling Work

if you sell the

INCOMPARABLE
NEW DEPARTURE
COASTER BRAKES

Our Advertising Department will be your Advertising Department—for the asking

Our Selling Helps will be your Selling Helps for the price of a Postage Stamp

ASK US TO-DAY

Advertising Department
New Departure Mfg. Co.
Office—Salesrooms—Factory
BRISTOL, CONN.

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manufacturer to conserve its best interests by pursuing a progressive policy in the manufacturing and advertising and a conservative policy in holding to the supply and demand that overproduction can be controlled. Overproduction, which naturally forces price cutting, is the death knell of any industry."

The last formal address was made by E. L. Rosenfeld, a member of the export firm, Guitherman, Rosenfeld & Co. He gave some sensible suggestions as to how to regain foreign trade, and, like the other speakers, advised, practically, a return to the methods which proved so successful in former years. The gist of his remarks is summed up in his closing paragraph:

"When we give due consideration to the customs and tastes of the various foreign markets; when we study the competitive conditions existing there and give such conditions intelligent recognition; when we are progressive and aggressive and bring new articles to the attention of trade from time to time; when we select the proper selling methods and follow the same consistently and give the business when obtained the proper care and attention, then we shall find that we are making rapid strides toward regaining that fair share of the world's trade in bicycles, bicycle parts and accessories which the resources of our country and the ability and energy of our people entitle us to."

On Wednesday, August 7, following the joint session, a clambake was held at the Inlet Pavilion, at which considerably over a hundred men and women thoroly enjoyed themselves.

To Repeat Brooklyn Motorcycle Club Economy Test

The Brooklyn Motorcycle Club has voted to repeat its road economy test which was one of the most interesting and instructive events of 1905. It will be held Sunday, September 15, in conjunction with the New York Motorcycle Club. The route will be from Brooklyn to Southampton, L. I., and return, a distance of approximately 200 miles. Tanks will be sealed at the starting point, and refillings and resealings be permitted only at given places en route. Two classes—users of single and of double cylinder motorcycles—will be provided for and the best prizes a silver cup in each class, will be awarded to the private owners making the most economical performances. In addition, there will be ten or fifteen other awards. H. J. Wehman, 108 Park Row, New York, will have charge of the entry list.

Harley-Davidson Winner at Milwaukee

Two motor cycle events were included in the program of motor vehicle races at the State Fair grounds, Milwaukee, Wis., July 27, and a Harley-Davidson machine, Davidson driving, won both. One was a 5-mile event for the Esser cup and Davidson's time was 6.36. However, the special event was the 5-mile match between Davidson, on a single cylinder Harley Davidson, and George W. Lyons, of Chicago, on a double cylinder five H. P. Simplex Peugeot.

Owing to the fact that Lyons was riding a double cylinder machine and Davidson a single, the judges made an allowance of 30 seconds handicap, but this was not needed, as Davidson got in 40 seconds ahead of Lyons. Time, 6.37.

At Reading, Pa., July 26, William Bewley, on an R-S, won a 3-mile motor cycle race on a half-mile track. He made the first heat in 4.27 1-5 and the final in 4.28.

L. A. W. Assembly in Boston

The National Assembly, League of American Wheelmen, will be held in Boston, September 12, with every prospect of a larger attendance than has been seen at an L. A. W. meeting in several years. An added attraction will be the Boston Bicycle Club's "Wheel About The Hub," which will be started this year on September 13th, with a fine showing of wheelmen.

U. S. Adjutant Uses Motorcycle

To economize time as far as possible in the performance of his duties, Captain W. A. Burnside, adjutant to the commandant of the Columbus, Ohio, recruiting station of the United States army, has just purchased a motor bicycle to replace the ordinary bicycle which he has been using for a year and more. The ground occupied by the Government reservation is so great that the officers find it a great saving to employ bicycles in going about from point to point. This, however, is the first instance in which the motorcycle has been resorted to.

Labor Day Race at Milwaukee

A 25-mile bicycle road race has been arranged for Labor Day at Milwaukee, under sanction of the National Cycling Association. The manager of the event is P. J. Sullivan, from whom all information concerning entries may be obtained.

Trade Printed Matter

Frank B. Widmayer, 2312 Broadway, New York, has just issued what is one of the most complete little catalogs of motor cycle accessories in print. While containing but 28 pages, it lists a large number of specialties all of which are clearly illustrated, the cuts showing up well, as a good grade of paper with suitable surface has been used. Each illustration is numbered to make ordering easy.

One of the most prominent British motor cycle makers is Brown Bros., Ltd., of London, and their latest catalog is convincing evidence of this fact. It is very attractive and is plentifully illustrated. One page is devoted entirely to reproductions of medals won by the Brown motorcycle, containing illustrations of 22 medals. The constructive details are fully illustrated and amply explained in the text. A 3-page insert contains numbered illustrations of all Brown motorcycle parts to facilitate ordering repairs.

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Your Prestige is Already Established
if you handle

KOKOMO BICYCLE TIRES

They are the kind that give satisfactory service, being durable and economical.

The Bicycle Tires are made in two models:

The "New Oxford" and "Kokomo Defender Special"

Let us give you further particulars.
It will be to your interest.

KOKOMO RUBBER CO.

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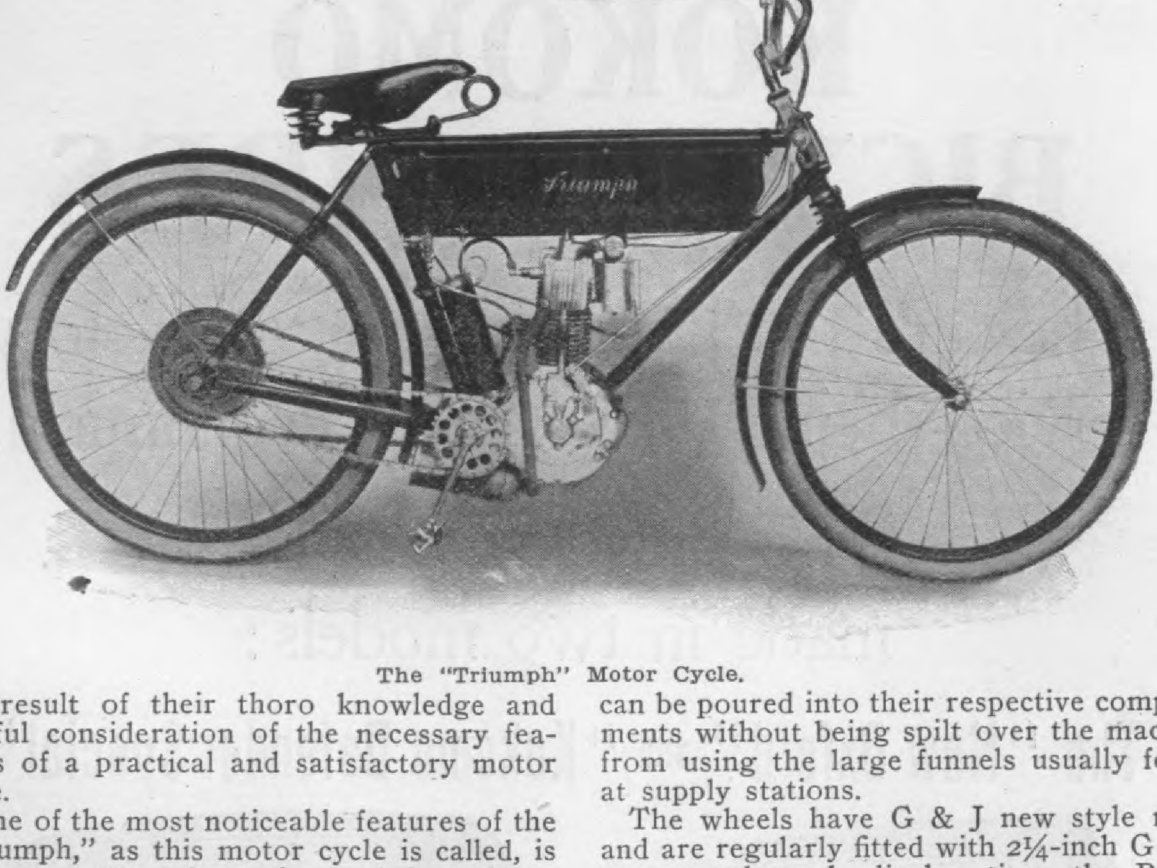
cycle and automobile trade put them in strong position not only for knowing the quirements of this trade, but for successly marketing this new product, which is

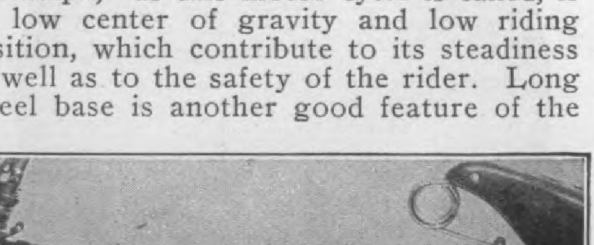
left side of the tank, while the fuel and compartments, 6 and 1 quarts capacity, spectively, are on the right side. La filler caps are provided, so that fuel and



The "Triumph" Motor Cycle.

result of their thoro knowledge and eful consideration of the necessary feaes of a practical and satisfactory motor le.

One of the most noticeable features of the riumph," as this motor cycle is called, is low center of gravity and low riding sition, which contribute to its steadiness well as to the safety of the rider. Long eel base is another good feature of the



ank on the "Triumph" Motor Cycle with side n, disclosing the dry cells in the battery partment.

chine, the length being 53 inches. Long ndlebars allow the rider to assume a comtable, upright position and a large coil ing saddle further insures comfort. The dle is low enough to allow both feet of rider to touch the ground.

can be poured into their respective compa ments without being spilt over the mach from using the large funnels usually fou at supply stations.

The wheels have G & J new style ri and are regularly fitted with 2¼-inch G & corrugated-tread, clincher tires, tho Bai tread tires can be had at an extra cost desired. A Thor motor cycle brake is fitt

The motor is the well-known Thor, 2 horse power, latest model. It is suspen from the lower parallel bar by the top the cylinder, and the base is clampt, fr and rear, to the frame. It is placed c trally in the frame in a vertical position insure thoro and uniform lubrication, c stant compression and hence maxim power. From a counter shaft to the r wheel the drive is by a straight line cha a Duckworth motor cycle chain being us The Brown compensating sprocket is us but, contrary to usual practice, is placed the rear hub instead of on the countersh which placing, they claim, gives grea efficiency to the sprocket in absorbing jer

The ignition apparatus includes a Pit field special motor cycle coil, which is firr secured to the seat mast tube by metal cli

Lubrication is accomplished by means a special sight feed, constant drip oil which assures a steady and uniform feed oil.

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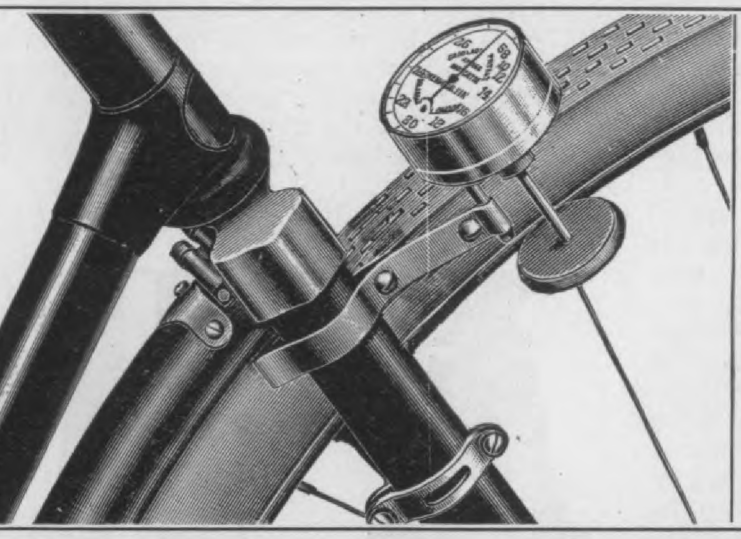
YALE AND SNELL BICYCLES

Product of the LARGEST Manufacturer of HIGH GRADE BICYCLES in the UNITED STATES. We have ALL satisfied agents and riders. They receive value for their money. Would you like to join our family?

A card will bring our catalogue.

The Consolidated Manufacturing Co.

STATION "B." **TOLEDO, OHIO.**



Motor Cycle Accessorie
THAT ARE WORTH WHIL

Simplex Speedometer
Accurate and Reliable, **$5.0**

Simplex Headlight
The very best imported, **$10.0**

Simplex Siren . . $16.0

Waterproof V Belts, Simplex Belt Hook Cable Clips, Bowden Wire, Belt Rims, et

Sole U. S. Agent for the
World Famous Peugeot Motors.

Prospect Motor Mfg. Co.
7-9 Park Place, Brooklyn, N.

Hussey Handle Bars

ARE THE BEST. Mr. Dealer,

Specify them on your bicycles regardless of make.

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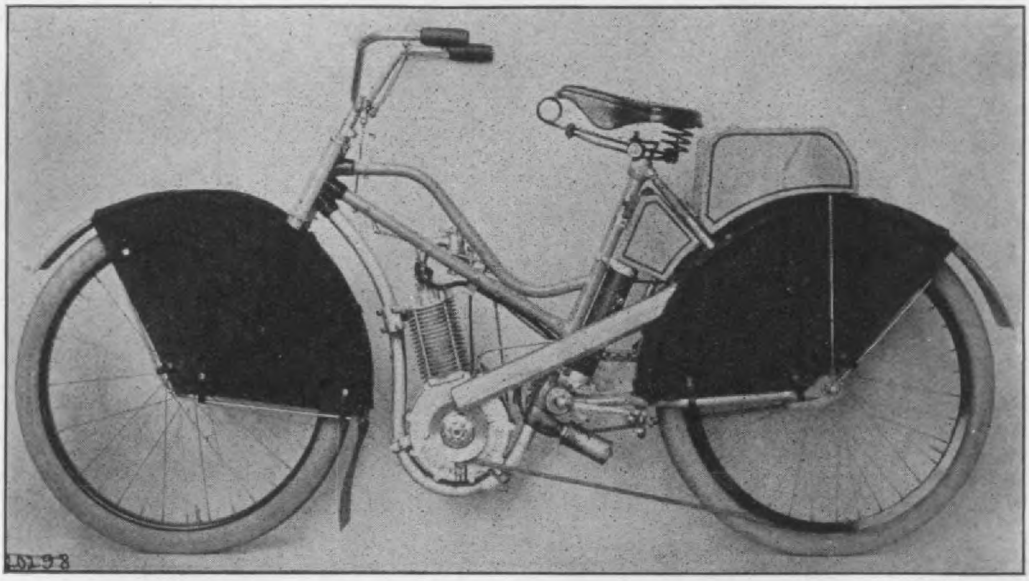
They will help make sales

t Peter street, St. Paul, Minn., has re-
ly placed on the market a ladies' model
agner" motorcycle which is shown here-
n.

mica bushing ⅜ of an inch, thus forming
insulative surface of ¾ of an inch, the wal
of mica being 1-16 of an inch thick. In ad
dition to this a porcelain bushing is used



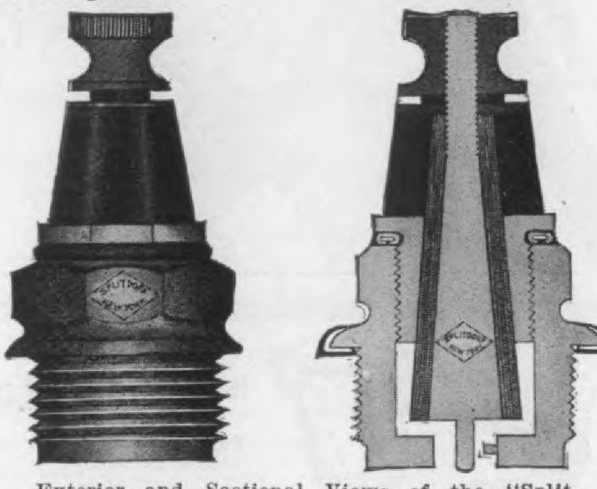
"Wagner" Motor Cycle, Ladies' Model; price $210; 3-H. P. "Wagner" motor; V-belt transmission; 28-
wheels, steel rims; 2¼-inch Goodrich or G & J, extra heavy detachable tires; sight feed lubricator.
ipulated from the saddle; 6-qt. copper gasoline tank; 1-qt. oil reservoir; Wagner carburetor; jump
rk ignition with 3 No. 6 dry cells; control in right grip; wheel base, 52 ins.; Person's motor seat;
row coaster hub; speed 4 to 35 miles per hour; weight 130 lbs.

heir regular 1907 model was described
ur February, 1907, issue, page 408. The
eral specifications, material, workman-
, finish and equipment are the same for
ladies' model as for their regular model
the exception of the frame, and the
ges in position of the tanks made nec-
ry in designing the drop frame.
feature of this machine that will appeal
he lady motorcyclist is its absolute
nness. Both wheels are covered with
canvas dust shields which thoroly pro-
the rider from the dust of the road.
chain and belt have metal guards. The
tion of the engine is such that the skirts
he rider cannot be soiled or burnt by
ing in contact with it, thus permitting
use of a riding skirt of ordinary length.
e frame is low, making the mounting
dismounting as easy as with an ordin-
bicycle. The saddle and bars are so
ed that the rider can assume a natural
ght position with ease and comfort. The
of the ladies' model is $210.

"Splitdorf" Motorcycle Spark Plug

specially designed spark plug particu-
adapted to the unusual conditions ex-
g in small air-cooled engines of the
orcycle type, has just been placed on the

insulate the outer shell of the main bush
ing which increases the insulating surface
1¼ inches. By the use of this large insu
lating surface the resistance to soot depos
is so great that the greater body of th
current will take the gap instead of allowin
it to be shunted thru the soot surface. A
the porcelain is held by soft gaskets n
strain comes on it from the expansion of th
metal parts.



Exterior and Sectional Views of the "Splitdorf" Motorcycle Spark Plug.

Another desirable feature of this construc
tion is that there is never any great amoun
of gas in the chamber of the plug, and ex

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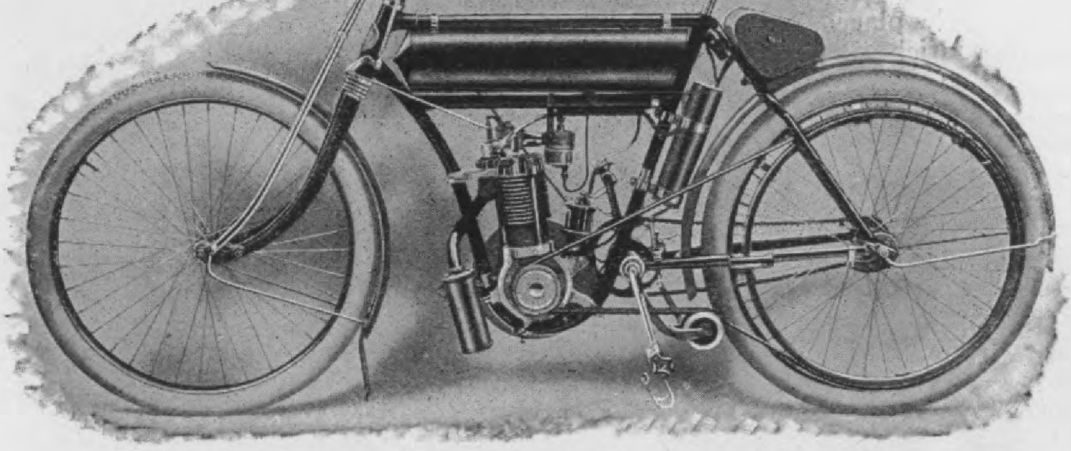


1907 YALE-CALIFORNIA MOTOR CYCLE---Price $185

In the Endurance Contest New York to Providence, R. I. July 30 an 31, 305 miles. Three Yale California Motor Cycles entered and all thre came through on time at every control making a showing not equalled b other makes double its power.

This is proof of Yale-California reliability.

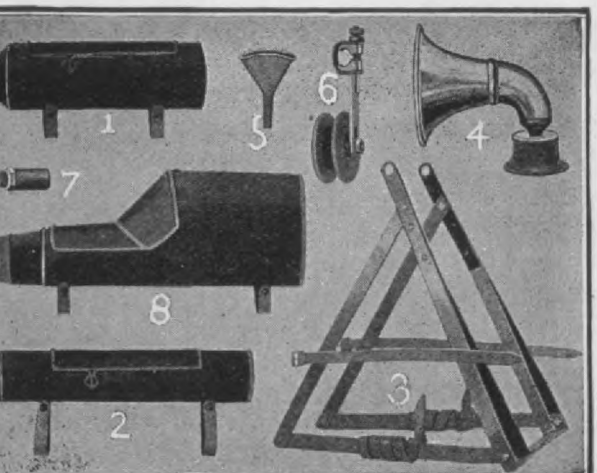
A Card Will Bring Our Catalogue. **We Ship Promptly.**

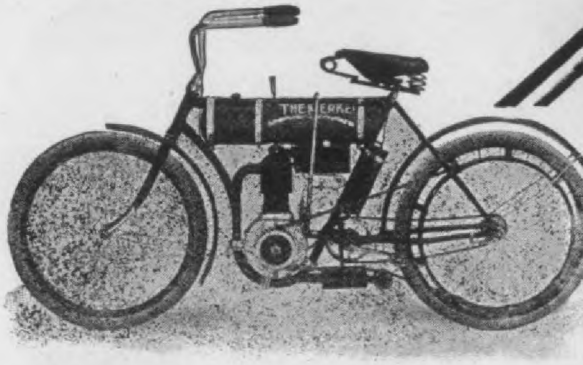
THE CONSOLIDATED MANUFACTURING CO.
TOLEDO, OHIO.

Motor Cycle Specialties

Tool Boxes, Battery Cases, Stands and Luggage Carriers, Idlers, Electric Horns, Lamp Brackets, Cyclemeter Brackets, Pocket Funnels, Etc.

Indian and Yale Motorcycles
PARTS AND REPAIRS.





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Its qualifications comprise of **Spee Control, Wear, Capacity, Easy Ri ing, Absolute Reliability,** and **Low est Price** of **$185.00;** it's **Guarantee**

The Merkel 3 horse power machine able to stand the hardest of use and w can prove it.

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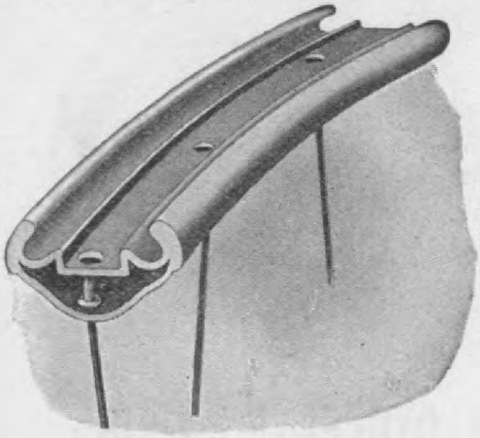
l rim recently placed on the market by B. F. Goodrich Co., Akron, Ohio.



The "Goodrich" Motor Cycle Rim.

'he general construction of this tire is same as their regular Goodrich motor le tire (which it is intended to supplant) epting the bead. In the double clinch the bead is soft, permitting much easier embling on the rim. In fact the tire can mounted on the rim without the aid of prodder and also detached easily and ckly. The flap is just the right width

'he "Goodrich" Double Clinch Motor Cycle Tire and Rim.

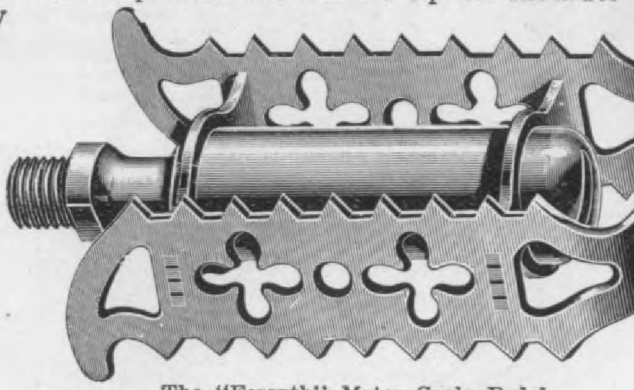
has an edge of pure rubber to prevent ing or pinching of the tube. The cover the point of contact with the rim is htly heavier, reducing to a minimum the nce for rim cutting.

he rim, which is of steel and of tubular struction, is slightly heavier, but stronger n the single clinch rim. The new tire also be fitted to the old style rim. It lso made with Bailey tread.

The "Forsyth" Motor Cycle Pedal

he Forsyth Manufacturing Co., 308-314

are lapt and are turned up to shoulder



The "Forsyth" Motor Cycle Pedal.

corresponding threads of barrel. Pins a of larger size accordingly and are especia hardened and tempered to stand the vibr tion of motor cycles.

The Chicago Motorcycle Club has decid to hold its annual endurance contest t year on September 14 and 15, over a 3 mile course.

Hartford Rubber Works Co., Hartfo Conn., have placed on the market a rubb grip for motor cycle handle bars. It is tw the length of the ordinary cycle grip, t additional length projecting beyond the ha dlebar proper and giving a good hold f the driver.

Mesinger "CAVALRY" Motor Saddl

Free action in front suspension spring.

The top is raised in front and back sufficient to prevent th rider from slipping forward or backward—is curled hair padde and has the form of a horseback saddle.

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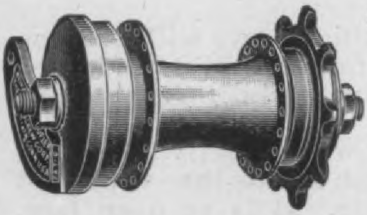
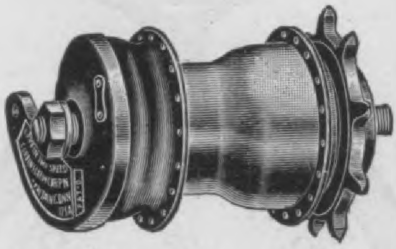
Corbin Hubs for 1907



"The Best By Test"



Corbin Duplex Brake
MODEL No. 6

Fits any wheel. Special models for chainless wheels and motorcycles with Front Hubs to match.

Corbin Two Speed Brake
MODEL No. 10

No shifting levers. Will run backward. Change of speed is made automatically.

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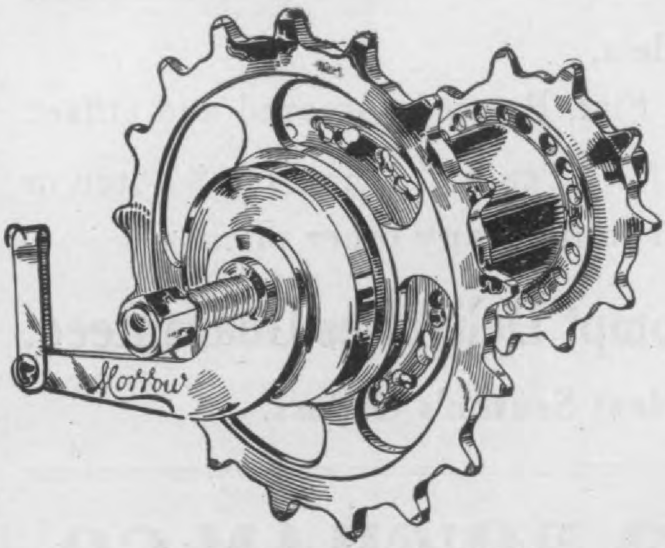
ONE SURE THING:

The motorcyclist whose mount is equipped with a

Morrow Coaster Brake



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is getting all the pleasure and satisfaction to be obtained from motorcycling, and has the assurance of safety besides, because the MORROW is a brake that really brakes.

A test will convince you. We make them for all styles of motor cycles.

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Buffalo, N. Y.

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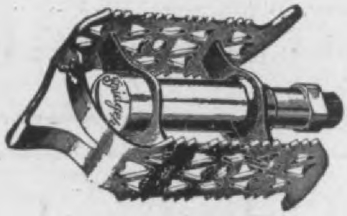

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Made for men's, women's or children' wheels.

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Easily attached to any bicycle or motorcycle. Absorbs all jars, jolts and vibration.
Send for catalogue.

J. Harry Sager
Rochester, N. Y.

added to this line a specialty of Tubings, Lugs, Stems, Stays and other fittings. All makes of Cups and Cones, to help the repair man.

Come to us with your troubles, and we will supply you. See Catalogue 1907.

Auto Line Tires, Tubes, Lamps, Generators, Goggles, Carburetors, Timers, Coils, Switches, Mufflers, Jacks, etc., at **Rock Bottom Prices.**

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BRADLEY MOTOR CYCLES
Single and Double Cylinder, $200 and $275
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Are said to be
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The Most Perfect Mechanically Constructed.
Power and Speed to Spare.
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a winner wherever it competes.
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Our own Spring fork
Ride comfortably
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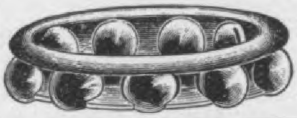
WHO, tell us?



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THE ERIE 2 H. P. attachment fits any frame without alteration. Easily attached by anyone. A hill climber. 1000 in use.

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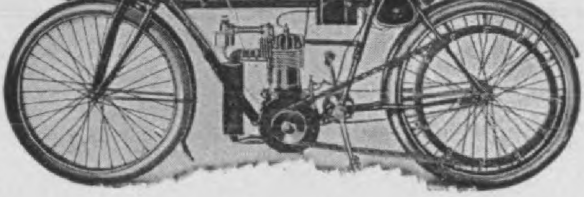

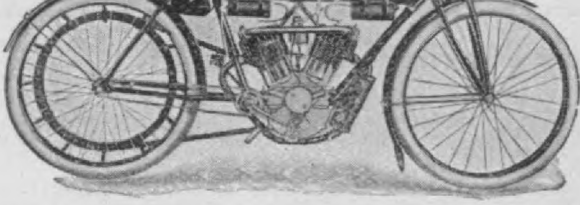

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win the principle events of the F. A. M National Meet, at Providence, R. I., including the Diamond Medal, highest awar for double cylinder machines in the 300 mile endurance contest, demonstrating the superiority over othe American and Foreign machines for reliability, hill climbing and economy; also winning speed trials fo both single and double cylinder classes, making new world's record on single cylinder machine of on mile in 56⅖ seconds. ¶ In addition to this the same single cylinder machine won hill climb event, an the double cylinder made fastest time in free-for-all.

Send for Catalog "A" which also describes light-weight air-cooled engines up to 40 H. P.

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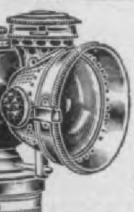

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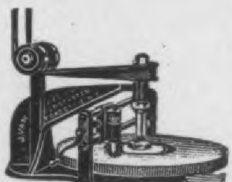

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Motor Boat Department

Marine Coming Events

September 1.—Contest of Motor Boats, Automobile Club of Sweden.

September 2.—Races of Baldwinsville, N. Y.

September 2-6.—Motor Boat Races, Jamestown Exposition.

September 23-28.—Motor Boat Club of America, Regatta Week.

October 1.—Illinois Valley Yacht Club Motor Boat Race.

October 5.—Motor Boat Club of America, Members' Race.

December 7-14.—Annual Motor Boat Show, Grand Central Palace, N. Y. National Association of Engine and Boat Manufacturers.

1908.

January 14-18.—Hartford Automobile Dealers' Show, Foot Guard Hall.

January 25-February 1.—Boston Motor Boat Show, Mechanics' Hall. New England Engine and Boat Manufacturers' Association. Chester E. Campbell, Mgr.

January 1-8.—Chicago Motor Boat Show, Coliseum, American Association of Engine and Boat Manufacturers. Chester E. Campbell, Mgr., 5 Park Square, Boston.

April 6-11.—Buffalo, Convention Hall, Motor Boat and Sportsman's Show. D. H. Lewis, Mgr.

Picaroon Wins Marblehead Race

The Marblehead race was run July 20 for the third time, and more successfully than any time before. Every boat finished practically without a mishap and in far better time than 1905 or 1906, despite the fact that all sorts of weather conditions were encountered, including fog, rain, strong winds and a heavy sea.

The course was from New Rochelle to Marblehead, a distance of 270 nautical miles.

The race was started at 10.15 o'clock and was won by Picaroon on time allowance. Her average speed was 8.19 nautical or 9.44 statute miles per hour.

Motor boat Hopalong, a scratch boat, made the fastest time, covering the course in 30h., 42m., 35s. She took the lead at the start and was never headed.

Summary follows:

	Rating	Corrected Time.	Cor. Fin.
Hopalong, Daniel E. Hallett, Boston Y. C.	39.32	30.42.35	4
Whew, Edw. S. Welch, Boston	38.06	30.49.16	5
Picaroon, T. B. Baylies, New Bedford Y. C.	31.63	28.46.24	1
Aldred, Chas. H. Voorhes, Riverside Y. C.	30.72	29.46.19	3
Irene, S. W. Granbery, Colonial Y. C.	29.56	28.50.42	2
Argo, John Armstrong, Bridgeport Y. C.	31.80	33.02.32	7
Susie, J. B. Schmelzel, Knickerbocker Y. C.	28.30	32.27.35	6

Frontenac Club Races

The Frontenac Yacht Club, of Frontenac, N. Y., held its first motorboat races of the season July 26 and 27, over the club's triangular course.

Owing to the rough weather, the list of entries was considerably reduced by the time the races were started.

The first event was a free-for-all for boats not over 35 feet water line, distance 14 miles, or twice around the course. The starters were Damphino, Pirate, Jr., and What Next. Damphino was the sole survivor, completed the course in fair shape considering the weather and was awarded the silver cup. Time 1h., 8min., 37s.

On the second day the wind had somewhat abated, but the water was rough.

The 14-mile handicap for boats not less than 30-foot water-line was run in one heat, and the starters were Damphino, Delawanna and Pirate, Jr. Delawanna soon came in, leaving Damphino in advance of Pirate, Jr. They finished in that order, and first two obtained handsome silver trophies. The winner's time for the course was 47m., 13s.

The free-for-all on the same afternoon resulted in the prettiest contest ever run on this river, when the speedy Simplex XI, owned by W. C. Whitehead and H. Broesel, of New York, defeated Pirate, last year's champion. The boats, however, finished only 68 seconds apart, and the victory was hard fought every foot of the way. The course was 21 miles, thrice around, and the victor's time only 47m., 42s.

"Chip II" Again Wins Gold Cup Race

The Chippewa Yacht Club has again won the Gold Challenge Cup of the American Power Boat Association, making this the fourth consecutive time that this club has won the cup.

The Chip II is owned by J. Wainwright, of Philadelphia, and is the product of Messrs. Levare and Leighton, the former being the well-known boat-builder of Ogdensburg, N. Y., and the latter the maker of the Leighton engine, of Brewerton, N. Y. The races were held on the Chippewa Bay, N. Y., on August 14 and 15, over a course of 30 nautical miles. The elapsed time for the Chip II for the first heat was 1:31:06, second heat 1:30:44 and for the final heat 1:26:43. The other boats entered in the race were the "Vingt-Trois," Frontenac club; "Delawanna," Clayton club; "Stranger," 1000 Island club, and the "Pirate," of the St. Lawrence River club.

Hudson River Carnival Sept. 23

One of the greatest events for this fall is the annual Motorboat Carnival which is to be held under the auspices of the Motor Boat Club of America, on the North River, at 108th street, starting Monday, September 23, and continuing thru the week.

The American motor boat Dixie, owned by Commodore E. J. Schroeder, of the Autoboat Club of America, won the race for the International Marine Cup in Southampton water, August 2, defeating its nearest English competitor the Daimler II, by three-quarters of a mile over a thirty-five mile course.

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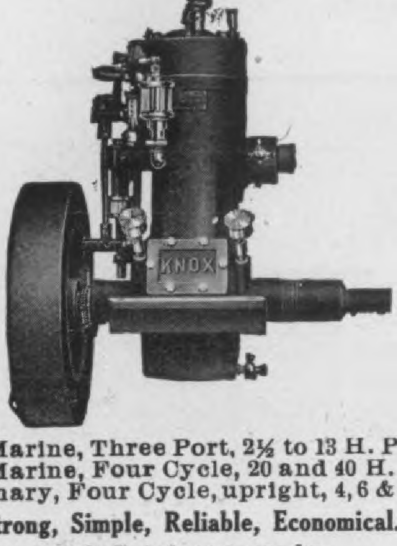
Knox Motors

Marine and Stationary.



Marine, Three Port, 2½ to 13 H. P.
Marine, Four Cycle, 20 and 40 H. P.
Stationary, Four Cycle, upright, 4, 6 & 9 H P

Strong, Simple, Reliable, Economical.

1907 Catalogue ready.

Camden Anchor-Rockland Machine Co.

CAMDEN, MAINE, U. S. A.

BRANCHES: Boston, 226 State St.
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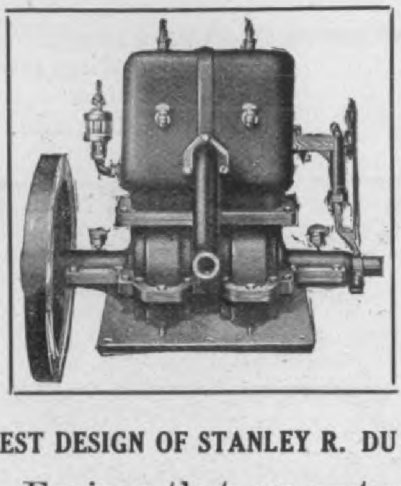

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Write for Descriptive Catalog.

THE PEERLESS MARINE ENGINE COMPA

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DuBrie
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And Others

If you have a small machine sho and want to fill in extra time build ing gasoline engine, either marin or stationary, two or four cycle, can make you the design, furnis you detail drawing and make yo the patterns for any size engine for one-half of the cost, if you wer to do it yourself.

I guarantee my drawings to b correct, and will give you an engin built on the most scientific princ ples. It will pay you to write t

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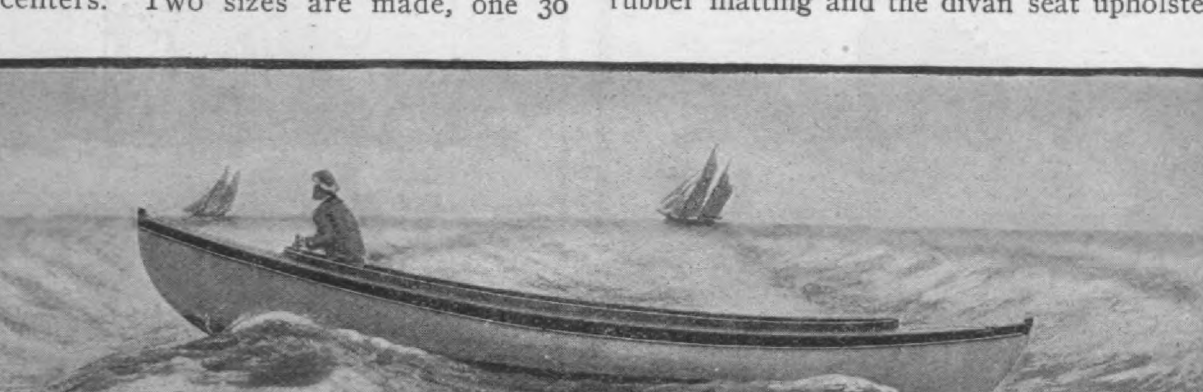
et, New York, puts out a motor launch hull of which is on pure whale boat lines. se Bonney seagoing launches have cedar ıking on steam-bent timbers, 10 inches centers. Two sizes are made, one 30 not in use, lays flat on the after deck. Th hood is provided with the regular side cu tains, offering complete protection from rai The flooring of the cockpit is covered wi rubber matting and the divan seat upholste



The Bonney Pure Whale Boat Type of Launch.

long by 7 feet beam, and the other 25 long by 6 feet beam. The 25-foot launch riven by a 5 H. P. motor and lists at . The 30-foot size has a 7 H. P. motor lists at $500. They are capable of ds up to 12 miles per hour. The hulls e list at $250 and $275, respectively. Mr. ney also puts out a $600, 30-foot hunt- cabin launch.

The "Flying Dragoon"

high-speed motor boat, combining speed a high degree of safety, stability and fortable seating appointments, is the ing Dragoon," manufactured by the tric Launch Co., of Bayonne, N. J. The ing Dragoon" makes a speed of 20 miles hour and is driven by a 50 H. P., 4-cy- r Elco Gasoline Motor placed forward protected by an aluminum hood resting he coaning and across the bulkhead aft he motor. All motor controls are in- ed on this bulkhead, while the steering el and reverse levers are conveniently ed in front of operator's cross seat. access to the motor is allowed for in- ion and oiling.

e hull is built with oak keel and tim- hackmatack stem, rock elm frames and r planking, copper riveted to frames; rstrake of oak with guard moulding ed on this strake. The decks, transom, ing and interior finish are of mahog- Seating capacity is provided for nine

ed in leather. The fuel tank is of copper an is placed in a copper-lined compartment ope to sea aft of operator's seat.

The general equipment of the boat in cludes all absolutely necessary deck fitting such as chocks, seats, hatch lifts, socket ventilator, flag poles, acetylene searchligh with Prest-O-Lite storage tank.

"Prest-O-Lite" Marine Lighting Outfit

The Prest-O-Lite Co., Indianapolis, Ind makers of the "Prest-O-Lite" acetylen tanks, which have become quite popular i the automobile field, are now furnishing va rious sizes for use on yachts and motor boats.

Cylinders of various capacities may be ob tained, from the small one that will ligh the cabin of a small boat to the large cy inders that will supply light for the ocean going yacht for the entire season. A sailin yacht of 45 to 50 feet waterline length re quires, approximately, 125 cubic feet o acetylene per month. A cylinder 12 inche in diameter and 36 inches in length charge with asbestos and acetone, would contain 22 cubic feet of acetylene; two such cylinder would supply such a boat the entire season

For larger yachts and boats the "doubl cylinder system" is often used. A full cyl inder can then always be kept in reserve and on long cruises it does away with th inconvenience of sending a cylinder back t be recharged.

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2-Cycle-Engine-Sensation of the Year. Entirely new and proved design introducing many exclusive features. Runs on Gasoline, Distillate, Kerosene or Alcohol.

2 H. P. ACTUAL Bare Engine $23

COMPLETE ENGINE with Fresh Water Boat Fittings, $39.90

Swiftest, most powerful, efficient and reliable engine of its size on earth. Drives Canoe, Row-boat or 14 to 20 ft. Launch, with load, 6 to 10 miles per hour. Reversible, easy to install and operate, unfailing endurance powers, economical and safe, cannot back-fire. **Sold under 5-yr. Guarantee.**

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elle Isle Motor Co., Dept. 49 DETROIT, MICH.

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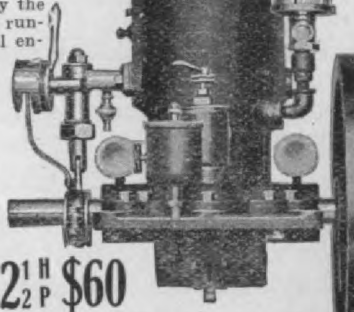
Write at once for new catalogue showing Ten sizes, 2½ to 27 H. P., at prices that will surely interest you.



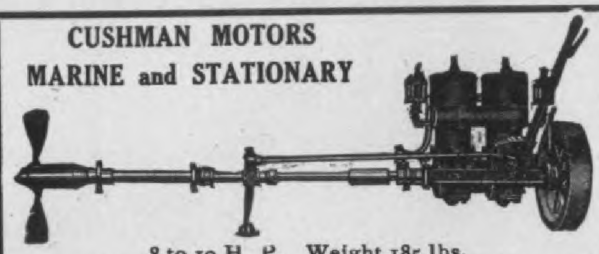
2½ H P $60

(With complete equipment.)

DU BRIE MOTOR CO., 432 GUOIN ST., DETROIT, MICH.

CUSHMAN MOTORS

MARINE and STATIONARY



8 to 10 H. P. Weight 185 lbs.

Designed for service. Material best obtainable, workmanship unsurpassed. Cylinder, Piston Rings and Crank Shaft ground. Bearings hardened. Write for catalogue.

CUSHMAN MOTOR CO., Main Office & Factory, Lincoln, Neb.

Eastern Branch, J. N. LIMEBURNER, 84 Chambers St., N. Y. City.
W. W. STEPHENS, Agent, 6 Reade St., Greater N. Y. City.
Western Branches: DENVER GAS ENGINE & APPLIANCE CO., Denver, Col.
SEATTLE HARDWARE CO., Seattle, Wash.

JOE'S REVERSING GEAR and ONE WA

Clutch

Send

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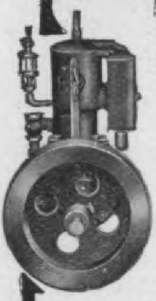
SNOW & PETRELLI MFG. CO., New Haven,

Perfection



MARINE MOTORS

Positively the simplest, quietest and most powerful two-cycle marine engine built. Better fitted and finer finished than any other at any price.

Reversible—No Cranking

2 H. P. $45 No valves nor cams. Highest grade material throughout. GUARANTEE covers replacement of any COMPLETE engine that does not give complete satisfaction and is backed by the largest and best equipped factory in the business. Can you afford to take chances, or buy on any other terms?

Handsome catalogue, FREE.

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1303 Second Avenue, Detroit, Mich.

PUTNAM MOTORS & CARBURETTORS

are giving satisfaction. For Kerosen or Gasoline. 2 H. P. and upwards.

PUTNAM MOTOR MFG. CO.,

57 Lebanon St., Springfield, Mass.

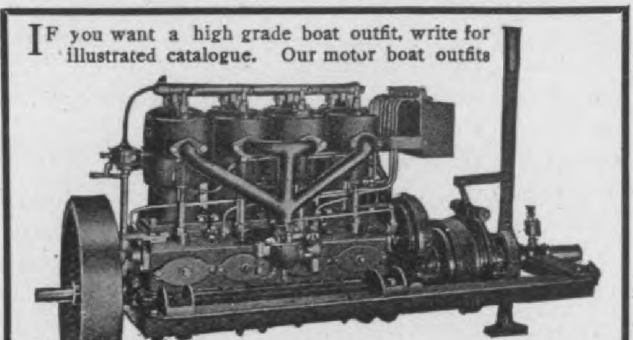
COMPLETE

ELECTRIC LIGHT PLANT

RICHARDSON ENGINEERING CO.

HARTFORD, CONN.

IF you want a high grade boat outfit, write for illustrated catalogue. Our motor boat outfits



S & B Marine Engin

Lead in Every Point of Excell

Great Efficie
Remarkable
trol, Smooth
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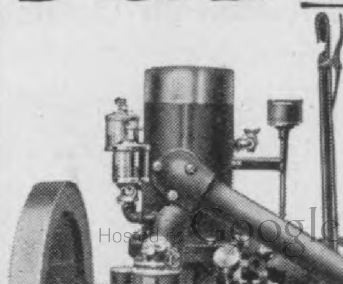
and finish. Ver
tractive, Simple
positive, Perfe
every detail.



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price
descr

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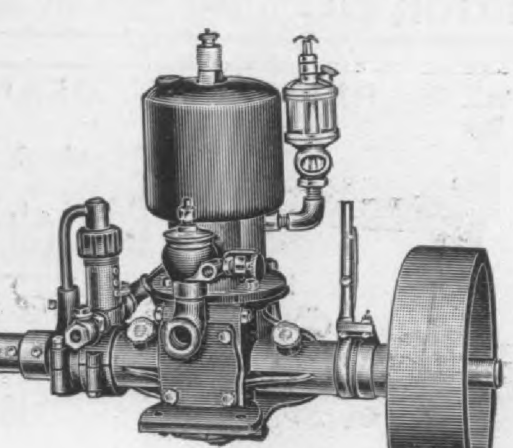
develops from 1½ to 2 H. P. The cyl- r bore and stroke are each 3 inches. crank shaft is a drop forging 1 1-6 inch iameter. The main bearings are 1 1-16 inches long and babbitted. The motor be run from 200 to 1200 R. P. M. with nal speed at 750 R. P. M. The con- ng rod is of bronze. The weight of motor is 75 lbs. The gasoline mixture n leaving the generator enters a trans- port and is drawn down the warm cyl-



The "Kneeland" Marine Motor.

r wall, becoming thoroly vaporized be- entering the base. The motor is re- ed by pressing a switch on the speed , and moving the latter to about the position in the opposite direction, as motor is fairly well slowed down. The r can be started with or without a ing crank. Three outfits are furnished the motor. Outfit E, includes motor commutator, pump, shaft coupling, ing crank and relief cock. It lists at 5. Outfit F, includes outfit E, with the ion of generator, lubricator, grease and muffler, and lists at $39.75. Outfit ncludes outfit F, with the addition of plug, wires, spark coil, batteries, h, solid iron propeller wheel, steel and stuffing box, and lists at $49.75.

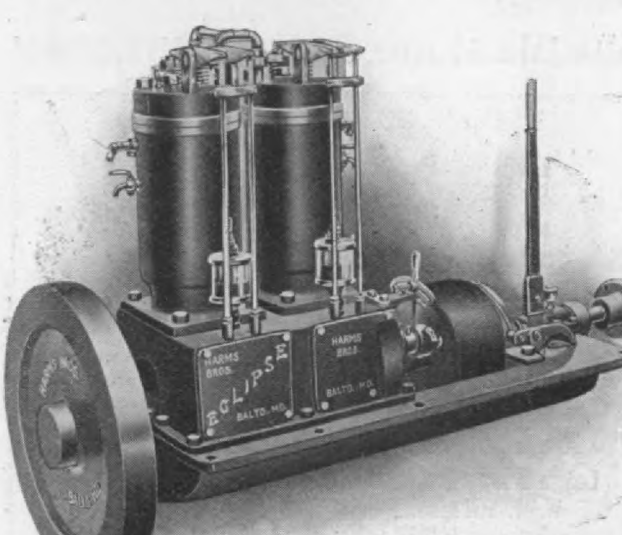
ynton's Oiled Automobile Clothing

ynton's Oiled Clothing Co., Gloucester, ., are manufacturing all kinds of auto- le garments made from oiled fabrics. of their latest creations is a reversible nobile coat.

e side of the coat is made up of a fine erized silk or kaki, in the natural state, il being used, making a garment suit-

"Eclipse" Gasoline Marine Motors

Harms Bros. Motor Co., Baltimore, Md manufacture a line of gasoline marine mo tors in single, double, triple and quadrupl cylinder forms. One of their 2-cylinder mo tors is here illustrated, and this shows th form of "Eclipse," 8, 12 and 25 H. P. motor The single cylinder motors are made in 4 and 6 H. P. sizes, while the 3-cylinde



The "Eclipse" 2-cylinder Marine Motor, made three sizes, developing 8, 12 and 25 H. P. respec tively.

models are made in 18 and 36 H. P. size and the 4-cylinder models in 25 and 50 H. P sizes. All are similar in design and work manship to the 2-cylinder model here show

"Eclipse" motors operate on the 4-cycl principle and are constructed with inde pendent cylinders and heads. The valve are contained in the head. A float feed car buretor is used, and either type of ignitio can be furnished. The gears are encased The engine base extension encloses a durabl friction reversing clutch. The makers clai that these engines only consume one pin of fuel per horsepower hour. The outfit furnished with these engines include Tobi bronze shaft, not over 7 feet long, propeller bronze stern bearing with stuffing box muffler, carburetor, wiring, six dry cells spark plugs, piping, tools and oil can.

Messrs. Sorge & Sabeck, with headquar ters at 86-88 Mauer street, Berlin, Germany who are dealing extensively in motor boa and automobile supplies, desire catalogs o marine motors and parts.

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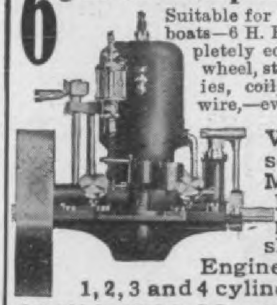
AND GREAT BRITAIN.
GAS ENGINE LUBRICANT
MANUFACTURED ONLY BY
E. H. KELLOGG & CO.
NOS. 241 & 243 SOUTH ST. NEW YORK, U.S.A.

IS THE BEST FOR
AUTOMOBILES AND MOTOR BOATS

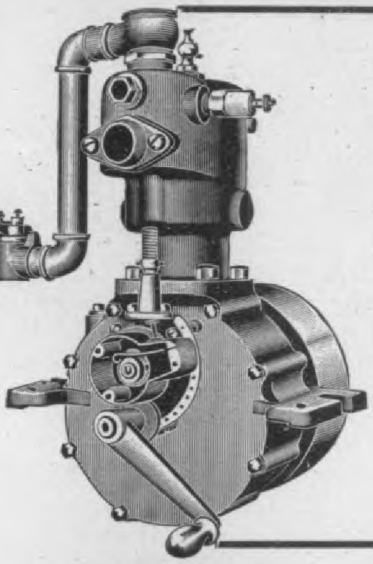
6-H. P. Complete Outfit $97.50



Suitable for 18 to 25 foot boats—6 H. P. Engine completely equipped shaft, wheel, stuffing box, batteries, coil, switch, muffler, wire,—everything but tank and piping.

Write for prices and description of our 2½ H. P. Motor, the lowest priced Boat Motor ever sold—power considered. Catalog showing all our Marine Engines from 2½ to 40 H. P. in 1, 2, 3 and 4 cylinders sent free.

GRAY MOTOR CO., 28 Leib St., Detroit, Mich.



The Most Power and Reliability ever given for the money

The "LITTLE GEM" Marine Motor

Price $100, including carburetor, spark coil and batteries. Bore 2 ⅞", stroke, 3¾", 2½ H. P.

It is the lightest and strongest motor on the market, weighing but 72 lbs. We stand back of every engine we sell.

It is impossible to get anywhere near this value elsewhere at double the price. Send for further particulars. A word to the wise is sufficient.

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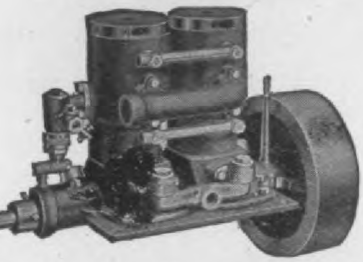
THE HARRIMAN MOTOR WORKS,
South Glastonbury, Conn., U. S. A.



There are years of experience behind "Watkins" Engines and years of service ahead.

"WATKINS" ENGINES

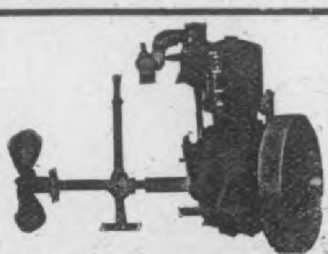
have kept pace with the march of motor boat progress. They are, and always have been practically perfect in durability, quality, design, material and workmanship. They are engines of unquestioned reliability. Our catalog is yours for the asking.

THE FRANK M. WATKINS MFG. CO.
528-538 BAYMILLER ST. CINCINNATI, OHIO

he Breeze Carburetor Co., Newark, N. s going to use a 28-foot, 40 H. P. motor t to demonstrate its carburetor and in citing trade among buyers that can be hed by water. Other manufacturers also placing their products in the boat demonstration.

he British Motor Boat Club race from vesend to Cowes, June 29, a distance of miles, which is the great British long-ance event of the year, was won by F. Edge's Napier Major, which covered course in 22 hours, 57 minutes, 25 sec-s actual running time.

he annual long distance motorboat race n Chicago to Mackinac Island, a dis-ce of 333 miles, under the auspices of the umbia Yacht Club, of Chicago, was held



High Grade Marine and Auto Engines, 2 and 4 Cycle, 2 to 20 H. P. Best material and FULLY GUARANTEED, also sell castings with drawings. State your want, and send for catalogue.

A. J. HOULE MOTOR WORKS
580 S. East St., Holyoke, Mass.

The Kneeland Mfg. Co., South Divisi and Short sts., Battle Creek, Mich., ma ufacturers of gasoline engines, are no located in their new factory. They have complete machine tool equipment, whi enables them to turn out 50 engines p week.

The Ferro Machine & Foundry Compan of Cleveland, Ohio, for seven weeks used Ferro three-cylinder, 25-horse power m

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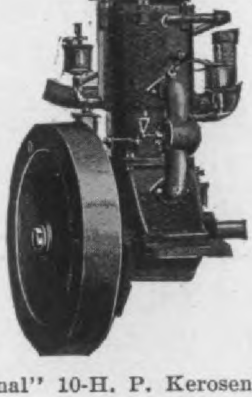
g. Co., 34-38 Murray street, New York
y, in all sizes from 1½ to 20 horse-pow-
The accompanying cut shows their 10
P. size.



e "International" 10-H. P. Kerosene Marine Motor.

This motor is of the 2-cycle type, and
es a mixture of kerosene oil and air for
el. The cylinders are made of gray iron,
ter-jacketed and accurately ground. The
tons are long and are fitted with specially
signed metallic packing rings. The pump,
inger, eccentric strap, etc., are of phos-
or bronze, which metal is used wherever
actical on all external fittings. All crank
afts are made from drop forged high
rbon steel. The crank boxes are of phos-
or bronze babbitted. All parts of the
otor are of standard size, thus making all
rts interchangeable. The fittings are all
r salt water.

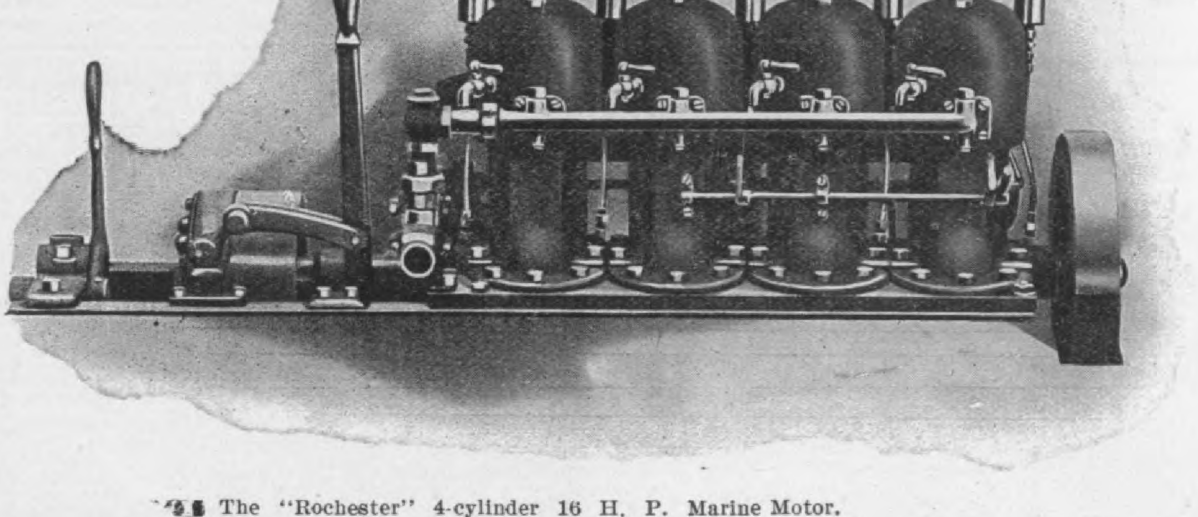
Marine Motor

Rochester Gas Engine Co., Driving P
avenue, Rochester, N. Y., recently placed
the market a new 25-ft. Semi Speed B
driven by one of their new 4-cylinder moto

The design of the hull shows easy li
with a nicely moulded stern, permitting
high speed. Its speed is rated at 18 mi
per hour. The hull is of high-grade co
struction, selected cedar 7-16 inch th
being used for planking, securely fastened
frames with copper rivets. The deck a
interior woodwork are handsomely finish
in mahogany and a steam bent oak coam
surrounds the cockpit. All hard woods
finished with three coats of best spar v
nish; the planking is painted white above
water line and copper or graphite bel
The main cockpit gives seating capacity
four to eight persons.

The steering wheel, which is of the a
type, is placed directly aft the engine a
all levers for controlling speed of eng
and reversing the propeller are placed n
the helmsman, permitting the boat to
operated by one man. The boats can
fitted with 8, 12 or 16 H. P. motors, list
at $850, $950 and $1050 respectively. T
equipment furnished includes willow cha
and cushions.

The Rochester Marine Motor is of the
cycle type. The piston is rough-machin
and then ground to fit the cylinder, pro
allowance being made for expansion fr



The "Rochester" 4-cylinder 16 H. P. Marine Motor.

The manufacturers claim that alcohol gives
per cent. higher efficiency over oil when
d in their engines. They also man-

the heat of explosions. It is fitted with
piston rings. All bearings are lined w
Special Anti-Friction Metal. The comp

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For Cleaning Auto Bodies

It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO

Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

National Supply Co.
13 S. 17th Street
Philadelphia, Pa.

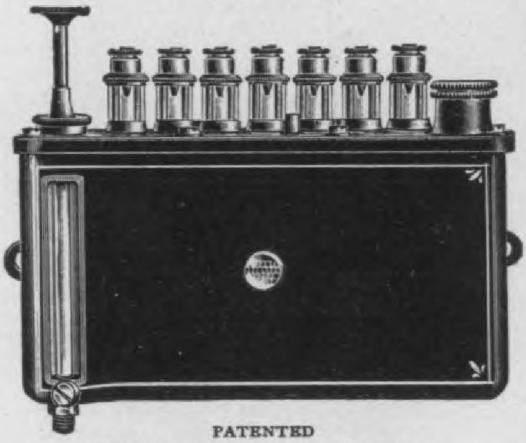
and at all good automobile supply stores in all leading cities.

Send for our Mobo booklet —"*How to Clean Well Varnish and Paint on an Automobile*" It's free.

THE PEDERSEN Mechanical Lubricator

Has earned the name of being "The Best Oiler on the Market"

Type X



PATENTED
Mechanical Lubricator

BECAUSE—

There are no Check Valves or Springs to get out of order.

It can not gum up. Works in cold or hot weather with same adjustment.

Has constant Sight Feed.

And many other valuable features.

Ask your dealer about it, or write

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reet, Boston, Mass., manufacture an auto-
atic folding propeller, a very real need for
ch a device having manifested itself es-
cially among users of auxiliary boats. As
rigid propeller is quite a drag on such
aft when the power is not being used, a
lding propeller is really necessary to allow
stallation of auxiliary power.

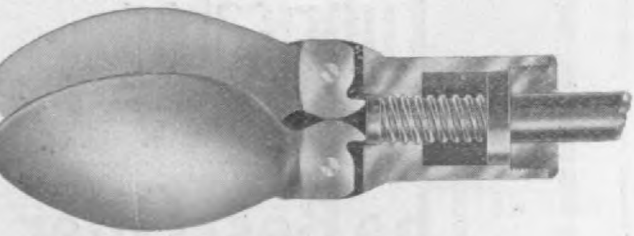

Fig. 1. Fuller Folding Propeller.

Fuller Automatic Folding Propellers have
oved practicable and durable on fishing
aft and pleasure boats for the last four
ars. They are made either with two or
ree blades and any pitch or diameter. The
ree-bladed wheels are folded in the same
ameter, of hub or boss, as the two and,
erefore, do not offer any more resistance
the water. These wheels are automatic

Fig. 2. Fuller Folding Propeller.

action, there being no levers, hollow
afts or complicated parts to get out of
der. They are made in two styles; one
r forward movement and the other for
rward and reverse movement. Where the
verse movement is used very little and
en only when maneuvering for moorings

stop on the shaft is at the forward
of the hub, as in Fig. 1. The hub revol
and the action of the screw blades op
them (the blades) immediately and they
main open as long as the propeller is
volved in that direction, communicating
ward motion to the boat.

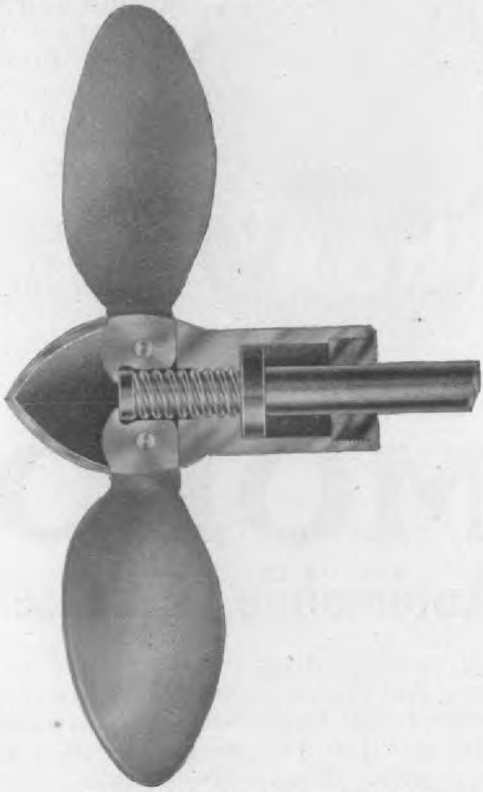

Fig 3. Fuller Folding Propeller.

If the engine is reversed, the resista
of the blades on the water (either i
closed or partially open position) prev
the hub from moving, the after end of
shaft meeting the shoulder on the lower
of the blades, pushing them outward
thereby opening them as in Fig. 3.

This, of course, is only relative to
shaft, as it is the hub that moves. If
engine continues to revolve in that direct
the blades will hold in that position an
the engine is then started for forward
tion the blades again prevent the hub f
turning around and it moves aft on
shaft until the stop on shaft engages
stop in the forward end of the hub, a
Fig. 1, when the entire propeller again
volves as in an ordinary solid propeller

When the engine is stopped, the mo
of the boat, thru the water causes the bl
to fold. It has been found that one to t
revolutions is all that is required to
for either forward or reverse motion. T
of course, is practically instantaneous
there is no shock because the water fo
a cushion

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 4. PHILADELPHIA AND NEW YORK OCT. 1, 1907

September Edition, 20,091

19,302 Copies mailed.
4,525 Copies Delivered to News Company.
1,205 Copies to Philadelphia and foreign, etc., under stamps.
100 Copies held in reserve.

25,132
5,041 Back numbers sent out.

20,091 Total copies September edition.
Of these
12,400 Were paid subscriptions.
4,525 Delivered to News Company.

16,925
1,822 Returned by News Company, to September 21, 1907.

15,103 Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the September issue was 20,091.

Of these, 20,221 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 18¼ ounces, representing 19,302 copies, and 5,041 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Mechanical Branch of A. L. A. M. Meet

At the meeting of the Mechanical Branch of the Association of Licensed Automobile Manufacturers, September 23, the subject of ballbearing motors was discussed. Mr. Frank Stearns, of F. B. Stearns Company read a very carefully prepared paper on the subject. At the afternoon session there was a report of the Tire Committee; the subject being a two part or detachable rim. There was also a report of the Test Committee on engine tests recently made at Hartford, which proved of great interest. The recommendation of the Test Committee, for a series of elaborate alcohol tests, was approved.

Coming Events

September 28-October 7.—International Automobile Show, Copenhagen, Denmark.

September 30-October 4.—Race meet and 24-hour contest; Interstate Fair; Grounds Track, Trenton, N. J.

September 30-October 5.—Daily Auto Races at Montana State Fair, Helena, Mont.

October 1-15.—Contest of Electric Vehicles, Automobile Club of France.

October 6.—Cup of L'Auto Maisons-Laffitte.

October 7-12.—German Vehicle Trials, Berlin.

October 13.—Kilometer Contest at Dourdan, under auspices of L'Auto.

October 20.—Gallion Hill Climb.

October 21.—St. Louis (Mo.), International Aerial Race for the Gordon-Bennett prize.

October 24-31.—Eighth Annual Automobile Show; A. C. A., Grand Central Palace, New York.

November 1-15.—Voiturette Contest near Paris, France.

November 2-9.—A. L. A. M. Show, Madison Square Garden, New York.

November 9-16.—Annual Show, Phila. Auto Trade Assoc.

November 11-23.—Olympia Motor Show, London.

November 12-December 1.—Paris Show, Grand Palais and Place Des Invalides, A. C. of F.

November 25-30.—Auto Show, Baltimore, Md., Auto Dealers' Assoc.

November 30-December 7.—Chicago National Automobile Show, S. A. Miles, Mgr., No. 7 E. 42d st., New York City.

December 5-22.—Touring Car Exhibition at Berlin, Germany, under direction of Kaiserlicher Automobile Club.

December 14-21.—Local Show, St. Louis, Mo., Auto Manufacturers' and Dealers' Association.

December 19-22.—Commercial Vehicle Exhibition at Berlin, Germany, under direction of Kaiserlicher Automobile Club.

December 26-28.—Reliability Trials of the South Indian Motor Union.

December 28-January 4.—Importers' Salon, Madison Square Garden, New York City. C. R. Mabley, Sec. and Mgr.

1908.

January 1.—Speed Trials of South Indian Motor Union.

January 18-February 2.—Fifth International Auto Exposition, Palace of Fine Arts, Valentino Park, Auto Club of Turin, Italy.

May 16.—Sicily Targa Florio, Automobile Club of Italy.

May 30.—Hill Climbing Contest at Sport Hill, Easton, Conn., under direction of the Automobile Club of Bridgeport.

July 14.—Paris to London, Aerial Race.

The American Motor League proposes to remit to its state and local organizations two-thirds of all the dues and fees received from the members—the remaining one-third to be devoted to the purposes of the national body. This arrangement will give to the clubs a substantial share of the funds with which to prosecute the work of the League in their several localities.

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Ban Placed on Racing Association

The Executive Committee of the Racing Board of the American Automobile Association adopted the following resolution, suspended the United States Motor Racing Association, and also defined the difference between a touring car, a touring runabout, and a runabout.

Resolution:

Any club of the American Automobile Association which associates itself in any way, wholly or partially, with the promotion of a race meet shall become responsible for the delivery of the prizes as stated on the entry blank, and also for the enforcement of the racing rules of the American Automobile Association.

Joseph M. Gaites, president; Fred T. Bailey, vice-president, and W. H. Pickens, general manager, all of the United States Motor Racing Association, were indefinitely suspended, together with the organization of that name, and all sanctions granted were cancelled, because of irregularities in the conduct of the race meet held at Brighton Beach, August 9 and 10.

To determine properly the exact division between touring cars, touring runabouts and runabouts, the Board announced the following definitions:

Touring Cars—A touring car shall be one provided with a tonneau and seats for at least five adults, two in front and three or more in the tonneau.

Touring Runabouts—A touring runabout shall be a car provided with two seats in front and a single permanent seat in the rear.

Runabouts—A runabout shall be a car provided with two seats side by side.

A. A. A. Officials Answer Criticisms

Officials of the American Automobile Association are coming forward in defense of the Association and its methods of management. Secretary Frederick H. Elliott, in reply to the numerous criticisms in regard to the management of 24-hour races, etc., which have been given publicity of late, said: "At the annual meeting of the Association, held in January last, the by-laws were amended and revised providing for the future management of the Association as desired by the clubs and State Associations which comprise the management. The clubs which are members of the sixteen State Associations affiliated with the A. A. A., nominate their representatives in the Board of Directors of their respective associations. The Board of Directors of the State Associations nominate one director for every five hundred members in the State body to represent the State organization in the National Board of Directors. The National Board of Directors are therefore representative of every State and elect the directors from the clubs which are unfederated or not in the State Associations. The directors of the National body elect the Executive Committee, and the Executive Committee elects the officers."

Mr. A. G. Batchelder, formerly secretary of the A. A. A., says: "I don't see how you can evolve any better form of government than to have every club represented in the meetings of the State Associations to which it belongs, and then have these State Associations elect the National Board of Directors, which then elect the National officers." . . . "A flash of criticism caused by a couple of mismanaged twenty-four-hour races is not sufficient in my mind to eclipse the real worth of the organization."

New York Motorists Organizing

About one hundred and forty-six members of the American Motor League have been appointed representatives to compose the New York State board of officers and to act as a special organization committee until the beginning of the next official year. Other appointments to complete this board will be announced later; a chief consul, vice-consul and secretary-treasurer will be named and the board will be called together at an early day to adopt a constitution and by-laws. In the meantime the chief consul will appoint standing committees and set the work of the Division in progress.

In organizing the state division, the 61 counties of New York have been divided into 10 districts, each of which will be entitled to a number of representatives proportionate to the number of League members enrolled within the district. State boards have been appointed in 36 other states, and over 1300 acceptances have been received from prominent motorists in all parts of the country who will become members of the state boards in their respective states. The membership has now been brought to a point which makes both possible and necessary the organization work, originally laid out. Each state division will have its own executive officers and state board thru which the affairs of the division will be directed. The state boards will elect delegates to the national assembly and the national assembly will elect officers of the national body and prescribe rules from time to time for its government.

To enlighten the automobile purchasing public on the mechanical construction of 1908 models and the principal changes from 1907 to 1908 cars, the American Motor Car Manufacturers' Association has engaged the services of Charles E. Duryea, recognized as one of America's leading mechanical experts, to write comprehensive mechanical data for the association's members.

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A. A. A. Directors Hold Quarterly Meeting

The quarterly meeting of the Board of Directors of the American Automobile Association was held at the association's offices, New York on Thursday, September 19th, with fifteen members present. This was a record attendance for a meeting of the directors.

This meeting was by far the most important ever held by the association considering the broad scope of the questions discussed, the very encouraging nature of the different reports submitted, and the optimistic outlook for automobiling in the future.

Secretary Elliott's report shows that the total membership of the association at the present time is 18,550—made up of sixteen State associations comprising 109 clubs, 15 clubs unfederated with State associa tions, and 550 individual members. During the present administration the membership of the association has more than doubled, and the number of affiliated State associations has been trebled, and applications are expected shortly from four recently organized State bodies in the South and West.

The report of President Hotchkiss was most complete and interesting, and covered the activities of the association since the meeting of the directors in March.

The President strongly recommended such changes in the organization of the association tending to increase its revenue from members, all of which were approved by the directors and are outlined in the following paragraphs:—

Provision was made for a Technical Board to which will be referred all matters of contests of a technical character, including contests between stript touring cars, which board shall have charge of all such contests with power to make rules and enforce fines and penalties subject however at all times to the control and veto of the Board of Directors or the Executive Committee.

A special committee representative of the various trade interests was appointed to consider the advisability of sanctioning track races. This committee after conferring with the representative national bodies of manufacturers and with the affiliated A. A. A. Clubs, will report at the directors' meeting in November.

The directors approved of the position taken by the donor of the Vanderbilt Cup and the Racing Board in deciding to hold no race this year for the cup over public highways unless the course could be properly guarded by troops.

The amendments to the by-laws were adopted providing for the annual meeting of the association to be held in November, instead of December. The fiscal year was also changed to begin November 1st, instead of February 1st. There will be quarterly meetings of the Board of Directors hereafter to be held in February, April, September and November.

The directors adopted a resolution which was recommended by the Executive Board of the Racing Board, providing that any club, a member of the A. A. A., which associates itself in any way, wholly or partially, with the promotion of a race meet shall become responsible for the delivery of the prizes as stated on the entry blank, and also for the enforcement of the rules of the Racing Board of the A. A. A.

It is proposed to hold a general convention of the A. A. A. at some central point during the touring season next year, with a programme including technical contests, etc. The matter was referred to the Executive Committee.

Engineers Meet in Hartford

The Test Committee of the Mechanical Branch of the Association of Licensed Automobile Manufacturers met in Hartford, Conn., Monday, September 9. Three very important subjects were under consideration, which will undoubtedly produce some very interesting results at the termination of the experiments under way.

The use of denatured alcohol, which for some time has occupied the attention of chemical experts has been given a thoro test by the mechanical branch. At the morning session, Irving Buck, the chemical expert of the United States Alcohol Company, delivered a lecture on the subject, and submitted to the committee a report of the results of his recent experiments, which prove that alcohol may shortly be a factor in the propulsion of horseless vehicles. The committee will install a plant for making more exhaustive experiments of alcohol. It is the purpose of the committee to conduct experiments with various carburetors now on the market to attempt to adapt the use of alcohol to the present day motors. The engineers have been endeavoring thru extensive experiments to obtain the maximum results in motor construction toward a reduction of the amount of fuel consumed, and some interesting efficiency tests were conducted, shown by brake tests, heat development and fuel consumption under various piston speeds.

Part of the afternoon session was devoted to the subject of tires, and an interesting demonstration was given of the new Dow tube—a non-deflative tube. This tube is of peculiar construction. A tube in the tire is filled with a self-healing plastic material which permanently seals up the tire when punctured. The night before the meeting a test run was made between New York and Hartford. On leaving New York six punctures were made in the tire, and six nails were also placed in the tire, and left until their arrival in Hartford, when they were withdrawn with practically no loss of air.

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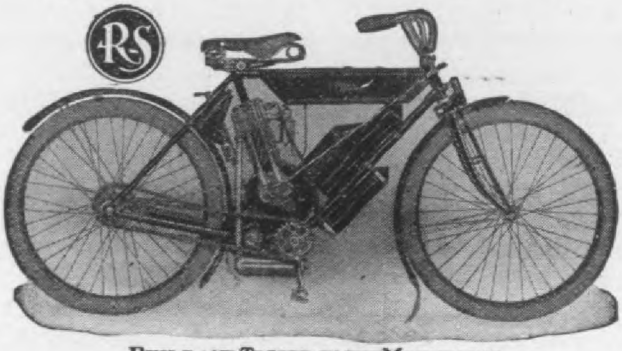

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Philadelphia, October 1st, 1907

The Working Man's Automobile

Doubtless some of those who have been following the development and trend of the automobile industry were somewhat surprised and somewhat amused at the early buggy type of machine which originated in the Middle West. These same individuals are probably even more surprised to-day to see the remarkable development of this class of motor cars. Yet this is exactly the kind of development that must be expected. These little cars, to which at first very little attention was paid, or if noticed at all, were ridiculed, have gradually but positively made their influence felt, particularly in the West, and are destined to bring about the long-looked-for, low-priced, but practical machine, which may be called the "working-man's automobile."

The ever increasing demand by thousands of people for a neat, simple, reliable car at a price ranging from $250 to $500 has been appreciated by machinery and farm implement manufacturers, and far-reaching preparations are now under way to supply this demand.

It has been said that a good car at such a price was impossible, and the makers of large luxuriously-appointed cars at once dismissed the idea of their manufacture. But the time will soon be here when they will be forced to pay attention to this type of vehicle. The best cars to-day are good for six or eight years of continued service, and as the models change so slightly from year to year, and will change less, those who already have serviceable machines will not change to a new car each year, thus the number of first car purchasers is rapidly diminishing, and it will soon be necessary to cater to a certain extent to those desiring a low-priced machine the field of buyers for which it is practically unlimited.

Automatic and special machinery for the construction of internal combustion engines have now been perfected, and such combinations as a two-cycle engine, friction change speed and solid tires can even now be serviceably built within the price limits set, and it will be but a short time before manufacturing conditions will be such as to make their construction possible at even a less cost. Of course, chrome nickel and vanadium steels, annular ball-bearings and many things which are used in high-priced cars will not enter into their construction. But these are not essential in small 8 to 12 H. P. cars not intended for speeds over 20 miles an hour. Plain felted oil pocketed bearings can be successfully employed on the wheels and air cooling also simplifies the construction. The bodies owing to well developed American machinery for this purpose can be cheaply but well built.

Already there are on the American market some twenty concerns manufacturing cars of this general type. These may be considered the forerunners of the "working man's automobile," for the time is surely coming, and is not far removed, when serviceable small cars can be had at prices which will bring them within the reach of many of the so-called working class.

Suitable Publicity Marks an Era of Progress

The progress that has been made in all the arts since the introduction of the printing press has made possible a rapid spread of knowledge, is a matter of record. The daily interchange of mechanical ideas connected with the proper kind of publicity is one of the basic and fundamental causes of the rapid growth of many of our industries. The thriving automobile industry of to-day is no exception to this general rule. The widespread publicity given the constructive features of the different makes and types of machines by the trade publications in the automobile field, is in a large degree responsible for the exceptionally rapid advancement made by our manufacturers.

In the early stages of almost every industry the narrow winded and selfish policy of endeavoring to keep secret every detail of the work, is usually followed, and as a result the progress of the industry as a whole is very slow, and necessarily remains so just as long as this selfish

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course is adhered to. Each worker guards jealously the small fund of information contained in his note book until some longer-headed and far-seeing manufacturer publishes his knowledge on the subject in connection with publicity given his product and reaps his reward, as he is inevitably credited with having superior information and methods of manufacture, and, therefore, better goods than his contemporaries. The cordon of secrecy thus broken, others follow suit and an era of rapid progress is the result.

The automobile industry past the secret stage some years ago, and to-day each manufacturer vies with the other in making public the particularly advantageous and clever constructions embodied in the design of his car. Of course, this is not done until such constructions as can be suitably protected, have been patented. Yet in spite of the lessons taught by the past of other industries, occasionally a manufacturer is still found who is so wrapt up and enclosed in the dense impenetrable shell of his own conceit, that he believes his creations to be far better than those of his fellow manufacturers and persists in the ridiculous endeavor of keeping secret his methods and constructions. Fortunately for the industry, however, these individuals are nearly always very small manufacturers whose peculiar ideas, when divulged, as sooner or later they must be, are found to be far behind the alert up-to-date manufacturer who is willing to talk and benefit by an interchange of ideas.

Uniform Horse-Power Ratings

There is probably no one feature in connection with the internal combustion motor more discussed than the question of the horse-power rating of the engines by different manufacturers, and the question is still being discussed in spite of the fact that the A. L. A. M. engineers have decided on an empirical formula, based on good American practice. This formula, which is only approximate, consists simply in squaring the diameter or bore and multiplying by the number of cylinders; this being divided by 2.5. This formula takes into consideration the length of stroke, the mechanical efficiency and many other conditions, as it is based upon the performance of a large number of typical engines of different bore and stroke. It is close enough for all ordinary purposes, but is apparently a little high when applied to single cylinder engines of small bore.

Why do we wish to know the horse-power of an automobile engine? Usually for a means of comparing one automobile with another. But does the horse-power of the engine give us this means of comparison when the method of transmitting the power and the amount which may be absorbed in this transmission is absolutely ignored? This method of comparing performances is about as reasonable as endeavoring to compare the work which might be accomplished by two electrical power plants by simply comparing the capacities of the generators and disregarding the different and various amounts of resistance to be met with in the two circuits.

What is really wanted as a means of comparison is the actual amount of power delivered at the driving wheels, taking into consideration all the losses due to the various methods of transmitting the power to the point where it can be effectively used. Several manufacturers realizing this fact are giving their cars a rear wheel rating, but this instead of lessening the difficulties, simply adds complication as such a rating is necessarily apparently much lower for the same size and type of engine than the rating of the other manufacturer who is speaking simply of the power of the engine.

What is needed is uniformity in this matter, and as it is impossible to actually compare one machine with another by simply knowing the horse-power of the engine, it would seem that before long some uniform method of rating automobiles by the power output at the rear wheels will be adopted. That a standard rating of this kind is possible is beyond doubt. Of course, in determining such a standard, difficulties would be met with in deciding upon one which would do full justice to both the single cylinder low horse-power runabout and the six-cylinder runabout of seven or eight times that power, but nevertheless such a rating is not only possible, but very necessary, and it is hoped steps will be taken in the immediate future to bring about such a result.

The Demoralizing Effects of Inter-City Record Attempts

Inter-city speed records are every day increasing in number. In each and every case it is well known that the driver must necessarily break the speed laws of the several States thru which he passes. Yet these record-breaking attempts between our large cities are being indulged in more and more by supposedly reputable firms and are not by any means confined to over-ambitious individual car owners.

Such attempts are entirely wrong in every respect. Even the advertising to be gained from them is of very little value, as no reputable paper can publish as facts the results of such unattested and unsanctioned attempts. During these trials it is well known that the drivers take grave risks, to say nothing of the danger to unsuspecting road users who are suddenly met by the speeding machine.

But this is only the material side of the

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question. There is also the moral aspect and its demoralizing effect to be considered. It is bad enough to have to use the highways for speed events even when the road users and public in general are warned and know what to expect, but indiscriminate and deliberate breaking of not only the speed laws but of all ordinary laws of consideration due other highway users, certainly ought not to be indulged in by automobile dealers and manufacturers.

A large part of the antagonistic feeling against the automobile is due to the reckless and inconsiderate use of the public highways by just such drivers, who have, or think they have, reason for great speed and have no time to be considerate of others. Every additional case only augments the adverse feeling and adds just so much to the clog of prejudice which interferes with the universal adoption of the automobile. To the same cause can be attributed the mass of unfavorable legislation which has been enacted. All such abuses of the highways cannot fail to re-act harmfully to the industry, the harm being many times in excess of any petty advertising advantages which might be gained. If a car really has the ability to make records, this ability can be far better shown by entering suitable contests sanctioned by the proper authorities, the results of which will be authentic.

We believe that the practice of attempting to establish inter-city records is bad from every point of view and that all the better class of dealers and manufacturers realizing the demoralizing effects of such runs will not only refrain from, but will endeavor to put a stop to, all such indiscriminate and deliberate breaking not only of the letter but the spirit of the laws.

New Alcohol Law

The Government method of handling the denatured alcohol industry will be much more liberal under the new regulations regarding it which went into effect September 1, 1907. In addition to the privilege of constructing warehouses on distillery premises, central denaturing warehouses may be constructed and operated at such points as in the opinion of the Commissioner of Internal Revenue the business interests of the country may require. Proprietors of central denaturing warehouses may transfer thereto for denaturization other alcohol produced at their own distilleries or alcohol purchased by them. Denatured alcohol may be transferred from denaturing warehouse by means of tanks or tank cars to consumers of, manufacturers using or dealers in denatured alcohol. Denatured alcohol transported in bulk thru pipes or in tanks or by tank cars will be gaged by weight. Dealers in denatured alcohol are not required to swear to an application for permit, and a permit when secured continues in force until revoked, and will not therefore have to be renewed annually as heretofore. Retail dealers in denatured alcohol are not required to keep a record of any kind. They may purchase alcohol in stamped packages of five gallons or more, or from tank wagons in quantities of five gallons or more, or they may purchase it in quantities of less than five gallons, provided it is taken from stamped packages or duly authorized tank wagons.

Trade Credit Association Secures Results

At the regular meeting of the Board of Directors of the Automobile Trade Credit Association, held September 17th at the office of the secretary, 80 Wall street, New York, a report was made that the membership had nearly doubled within the last six months. This association deserves the co-operation and active support of everyone in the industry. The regulating of credits and the collection of overdue accounts by a co-operative organization is indeed desirable in any industry, but especially so in a new one like the motor car business, where credits necessarily must be extended to firms not well established.

A report of the directors shows that a very large percentage of accounts referred to the association for collection are handled successfully, and that the members secure settlement from delinquent debtors who would not otherwise pay. The phenomenal work of this excellent association is due to the fact that it is a non-money-making organization. The directors are men who devote their time and attention to this work without remuneration, and in consequence the cost is nominal considering the services rendered. It is a self-supporting and purely co-operative association, and every manufacturer and jobber in the motor industry should be a member. The larger the membership the greater the results, and for this reason it is safe to state that the Association is just twice as strong to-day as it was six months ago, and that it is now an assured permanent factor in the motor business, and will do much to correct loose credit evils resulting from the quick growth of the automobile industry. Any manufacturer or jobber is privileged to join the association, and full particulars may be had by addressing the secretary, Mr. Franz Neilson, 80 Wall street, New York City.

An inspection of the announcements for 1908 of some of the leading American automobile manufacturers shows that prest steel will be used in many cases in place of armored wood for body building. It is understood to be lighter, stronger, and in every way an improvement.

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Considerations of Motor Car Elements

HUGH DOLNAR.

(The name of the writer of these considerations is well known to our readers as a describer of new cars, and his extended experience as a machine designer and constructor gives value to his deductions and suggestions. Should any of our readers dissent from the conclusions reached in these articles, the columns of the Journal are open to all, in the full belief that free discussion and interchange of opinion is the shortest road to perfection.—Editor.)

Springs

The one motor car element which nobody can make just exactly right is the springs.

Springs are now very much better than ever before, and a considerable number of the 1907 Glidden Tour contestants finished the 1570 miles of travel over American roads, which were in many places truly horrible for days together, with all their springs in as good condition as when they started, but many other contestants reached Jersey City July 24 with one or more springs out of work, blocked up, thus throwing all the load on the tires.

Some of the Glidden Tour cars, not very many, however, started out with various forms of spring checks or supplementary spring devices, some of which failed completely early in the Tour, and none of which, so far as continued observation thruout the tour could determine, did what was hoped for at the start.

Most of the Glidden cars were on half-elliptics, but some of them had full elliptics, and all of the full elliptics did very well indeed.

The half-elliptic spring gives advantages in the way of construction and car-body support which cause them to be preferred by a very large majority of car designers, but even the full elliptic spring, which is twice as quick in movement as a half-elliptic of the same length, is too slow to give ideal car-body support.

The ideal car spring would rise so rapidly that the dropping of a wheel into a road surface depression would not cause the car-body to drop at all until the depth of the road depression exceeded the range of the spring, and would also yield so promptly that no road obstruction not higher than the range of the spring, would lift the car-body. But no springmaker has yet shown springs that moved quickly enough to produce these ideal conditions. Since the full elliptic is twice as fast as the half-elliptic it is very clear that if rapidity of spring movement is what is needed, then the full elliptic is vastly preferable to the half-elliptic.

Another condition very greatly in favor of the full elliptic, is the fact that for a given range the full-elliptic springs have only half the spring-member travel, at the free ends, which the half-elliptics must make. If a half-elliptic spring has, say, 4 inches working range, then the top spring leaf must bend 4 inches to cover the range. But a full elliptic spring to give 4 inches' range, has to bend its long members only 2 inches each, to give a 4-inch total rise and fall, so that the full-elliptic spring is not only twice as quick as the half-elliptic spring, but has to bend only half as much to give equal range.

Now it is well known that any spring, even if made of soft iron, will bend a little way without hurting it at all. The most durable spring known to lockmakers is the old German coil of many turns of soft hammered iron, not steel at all, wound round the piece to be moved. Such lock springs would give, say, a quarter turn of a lock-handle and return it, forever, without change, if kept from rusting. Hence it appears that the length of spring travel has great influence on spring durability, as is, indeed, perfectly well known to be the fact, and this makes it possible for a full elliptic spring to give, say, 4 inches' range without harm, even tho made of very common material with little attention paid to tempering, while a half-elliptic to give 4 inches' range, and stand, would need to be made of costly special steel, and be tempered with the greatest care.

Many of the Glidden Tour half-elliptics were made of selected steel, and were carefully tempered, and went thru in good shape, ending in perfect condition.

But full elliptics, costing much less, did the same thing, and as the full-elliptic spring can be so applied to a car as to give satisfactory body support, as was shown in the Glidden Tour, it seems that the full-elliptic spring should have very careful and full consideration from motor car designers before the costly, special-steel, graded and tempered half-elliptic spring is accepted as the only first-class practice.

The 2-Cycle Car Motor

The story in a recent issue of the Journal concerning the performance of the Reliance four-cylinder, two-cycle motor proves beyond question that the two-cycle motor is in every way perfectly suitable for motor car driving. In this very hard run of 144 miles the motor was always powerful, had no "muffler explosions," that is to say, passed no unfired charges from the cylinder to the muffler, and was extremely flexible, varying the pace of the car by throttling from about seven miles on high gear, which is only 2 to 1, to 60 miles. The four two-cycle cylinders give the same number of impulses to the crank-shaft per revolution that would be given by an eight-cylinder four-cycle motor. The Reliance trucks are showing the best of work with two two-cycle cylinders, which give the same crank-shaft impulses as a four-cylinder four-cycle motor.

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The story given of the Adrian two-cycle air-cooled motors shows conclusively that the two-cycle motor is much more easily cooled than the four-cycle motor.

The Gulick two-cylinder two-cycle motor in the American Simplex car, Mishawaka, Indiana, also shows exceptional motor performance. In addition to these three stories of two-cycle motor work in car driving there is also the work of the Elmore cars, which have been in use for some years, and are well known to be economical of fuel.

In view of these successes it is somewhat surprising that more of the manufacturers have not yet taken up the development of suitable two-cycle engines for their cars. This may and doubtless is largely due to the fact that the buying public are not yet educated to the point of demanding two instead of four-cycle engines. However, when the time comes, doubtless the motor-car makers will give them what they want.

Meantime, the best that can be done is to fairly and fully record the successes of the two-cycle motor, both water and air-cooled.

The Multiple Stand Pipe Carburetor

No man can make a carburetor that is absolutely right, as is clearly proved by the constant changes in this wholly needless gas-engine despair. The only right thing to do, in the writer's opinion, is to throw away all the present vaporizing practice and use measuring pumps that will deal with the fluid fuel, measuring a variable quantity of the liquid to each cylinder for each cylinder charge. Some of the mechanical oilers will answer perfectly as fuel pumps, and one manufacturer told the writer he would soon apply his oiler to fuel feeding. As is clearly shown by the practice of some motor builders who employ flooded oiling systems, the precision oilers, with all their complications, are needless. "Ridiculous," to quote Mr. Ferguson, designer of the Pierce Great Arrow, but while they are not the thing for oilers, they have been developed to great certainty of action in measuring minute variable portions of fluid, and are all ready to apply to motors as fuel feeders. The fuel feed by pump is broadly covered by an expired English patent to Griffiths, who informed the writer that while the pump fuel feed worked all right the vaporizing carburetor was simple and cheap and he regarded the vaporizing system as the right thing. But it is now painfully evident that no one vaporizing carburetor is just right because every motor maker has one better than any other fellow's. There are too many variables in the vaporizing carburetor problem, and one of these variables, the condition of the atmosphere as to temperature and humidity, which makes a lot of difference in carburetor action, cannot be controlled by any man. The right thing to do is to suck air with the motor piston and inject fluid fuel into this air as the air goes into the cylinder. Then the air intake can be free for the maximum charge, instead of having to be always somewhat throttled, as it must be with the vaporizing carburetor.

But the vaporizing carburetor will be used for some time yet, and it is of interest to know its best form.

If the delivery nozzle of the carburetor stand pipe, and the area of the air-intake surrounding the gasoline delivery stand pipe nozzle could be regulated to suit the motor requirements of the instant, the action would be better. Several makers, as Menges and Matheson, use three stand pipes, each giving a different volume of fuel, and Schebler has just now put out a carburetor with two stand pipes. Various attempts have been made in the direction of needle-valve, stand-pipe delivery regulation and expanding and contracting air intake passages, but these variable elements involve delicate complications which have told against them, so that two or three different stand pipes, each with its own different diameter air intake appeals just now to a good many motor makers.

There is nothing complicated about the duplicate or triplicate stand pipe, and it is easy to make the motor use the most suitable one. The ground work of the multiple stand pipe carburetor is old, so that the field is broadly free, and only construction details can be covered by patent.

The triple stand pipe works to admiration with the Menges motor, which has a very flexible control, and the first and only 2-stand pipe Schebler carburetor is said to be showing very well indeed; perhaps there are now other American examples of the multiple carburetor stand pipe, originally a French conception, and this carburetor modification seems likely to be largely used, altho it is only a make-shift at best, and does not go to the root of the evil.

Undoubtedly the use of gasoline for motor car motor fuel will be abandoned in favor of heavier oil, which does not vaporize very easily, and this will require fuel feeding in liquid form, by pumps or by a variable admission of some sort.

It should be borne in mind that perfect combustion produces an odorless exhaust, and that the car which leaves an odor behind it is certainly wasting fuel, which makes it clear enough that there is yet some work to be done by car motor designers.

The suppression of the Stuttgart international race is regarded as the first step by the German government toward the complete prohibition of automobile racing on the highways of the empire, in accordance with the wishes of the Minister of the Interior.

Not the least of the good points gained by having the Automobile Shows come early is that the manufacturers have been forced to start in earlier on their 1908 models. Many prominent companies have already their 1908 models for sale.

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The Friction Drive

The friction drive is now a pronounced success, the Cartercar and the Lambert and Levigne's "Griswold" using aluminum discs and paper wheels with satisfaction, while the Rochester "Gearless" with fibre beveled pinions, and the Meiselbach trucks, with beveled pinions of tar-paper, drive perfectly. The Cartercar, Lambert, Gearless and Griswold are passenger vehicles, the Lambert and Cartercar both having offered trucks and delivery wagons, while Meiselbach is making commercial wagons only.

Lambert and the Cartercar and the Griswold use aluminum and straw-board coacting surfaces, and use driving discs and traversing pinions or "paper wheels," regular disc and pinion drive form, the novel features being found in the materials, aluminum alloy for the disc face and fibre in some form, vulcanized fibre, straw-board and tar-paper being used for the pinion face.

The Gearless and Meiselbach use beveled pinions coacting with beveled surfaces of grey iron. These beveled friction drives are generally of one speed only. The Gearless obtains two speeds by an epicyclic action, using the same bevel pinions and coacting beveled wheels for both high and low gear. Meiselbach, after many failures and spending much time and money, produced a two speeds forward and reverse drive with three sliding bevel pinions and a pair of opposed, grey iron, bevel friction wheels, having each a large and small beveled driving surface, and obtaining the low speed or the reverse by sliding a front or rear bevel pinion into contact with the larger diameter beveled driving surfaces, and the high forward speed by forcing an intermediate bevel pinion into surface engagement with the smaller diameter beveled faces of the two grey iron driven wheels. Meiselbach has now discarded the intermediate pinion and the smaller driven wheel surfaces, and has a one forward speed drive with one speed reverse, and is the only user of friction driving within the writer's knowledge to wholly omit the balance gear, and depend entirely upon the slipping of friction on the slow side on curves to equalize his driving wheel movement.

Brush, in his 1907 runabout, employs a form of friction drive, all steel surfaces, in which variable speeds forward are obtained with a direct drive on high speed with no use of friction adhesion, the driving shaft and driven shaft having the same axis on high gear. The Brush drive is so very different from the others named here as to be in a class by itself, but is like the Meiselbach drive in discarding the balance gear, tho unlike the Meiselbach, in that Brush disengages his slow wheel and drives with the outside wheel only on curves, while the Meiselbach truck drives both wheels on curves, slipping the friction engagement on the slow inside driving-wheel side.

Meiselbach boldly discards both the speed change gear and the balance, or "compensating," gear, and the writer is able to assert from his own observation that the fully loaded truck drives perfectly on short turns, with no hint whatever of any need for the omitted balance gear. The speed change gear omission is not noticed in the road work of the car, as the throttle gives a good range of speeds. The ordinary pace of the truck is about six miles an hour, much more than twice the walking speed of horse teams.

The writer fully believes that friction drive is in every way as effective and as suitable for motor cars of all kinds as any form of toothed gearing, and if a loaded truck having no balance gear makes short turns strongly on poor roads, it fully proves that the balance gear is not needed.

If the gas-engine car-motor has piston area enough to give a strong drive at slow speed, so as to take the car over muddy and sandy roads and up hills, then one forward speed is enough. Increase of piston area entails but little increase of gas-engine weight or cost.

The performance of these friction driven vehicles gives good support to the contention that the speed-change gears and balance gears are not needed for successful motor car driving, and if this is true motor-car builders cannot be made aware of the facts too soon.

Length of Wheel-Base

The large number of low priced "high-wheel" cars which are just now being brought out have very short wheel-bases. Is the short wheel-base right for any car, no matter what the price, or does it constitute a serious error in design?

The first cars had short wheel-bases, some as low as 58 inches, and the wheel-base was steadily increased, and is now from 100 to 128 inches for cars which claim good design.

It is perfectly well understood by car designers generally that the longer the wheel-base the better the car rides, and that 100 inches is as little wheel-base as a car should have if the comfort of passengers is to be considered; yet the designers and builders of the buggy type of cars are going back to the old figures of 68, 70 and 78 inches wheel-base, and are preparing to flood the market with low cost cars which are too short in the wheel-base to give the best results on the road.

It seems that the high-wheel designers have resolved to go back to horse-drawn "buggy" lengths, because horse drivers are accustomed to the short wheel-base, and are therefore more likely to buy cars

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which have the wheels closer together than those of 100 inches or so wheel-base. The designers are probably also influenced by the fact that a short-wheel base car costs a little less than a longer wheel-base, and the buggy-cars must be as low priced as possible.

The fact is that the horse-drawn buggy wheel-base, or length of road support, really includes the length of the horse as well as the distance between the buggy wheels, so far as stability is concerned, and that the horse-drawn buggy base is, in fact, more than 100 inches, which the majority of car designers consider a motor car must have to carry its passengers in comfort on rough roads.

The horse acts as a support so that a buggy cannot be overturned while the horse is on his feet unless something breaks. This makes the short wheel-base buggy pretty safe against overturning. But when the horse is taken away the short high-wheel car has no such support, and is more liable to capsize.

The buggy car builders want to make their cars turn in a small space, and so assume about 78 inches as the extreme limit of road base. A 100-inch wheel-base car is not so long or does not take up so much street room as a horse and buggy taken together, and can turn in almost as short a space.

As to cost the 100-inch wheel-base car costs very little more than the 78-inch wheel-base car. It is the two ends of a wheeled vehicle that cost, and the buggy car can be stretched in the middle for very little money.

When it comes to riding on a bumpy road, every added inch of wheel-base adds to the comfort and security of the passengers. The short wheel-base buggy-cars are very uneasy things when driven over ten miles an hour, which is about as fast as a horse and buggy can average. But even a farmer will not be contented with a ten-mile high-wheeled pace, which seems like crawling in a motor car.

Taken altogether it seems pretty certain that the short wheel-base is an even greater mistake in the high-wheel cars than in the 28 or 30 inch wheeled motor car, where the wheels are so low as to greatly reduce the chances of upsetting, and that the high-wheelers, should they come into vogue as expected, will have the wheel-base increased regularly as did the early motor cars, because the greater length increases the cost but very little, yet adds greatly to the comfort and safety of the passengers.

A cigarette dropt into a gasoline tank in the Howard Automobile Company's garage at 408 Golden Gate avenue, San Francisco, caused the burning of six buildings. The damage is estimated at $60,000. The other automobile places included in the fire are: Silent Automobile Company's garage, 404 Golden Gate avenue; Boyer's Automobile headquarters, and the automobile supply establishment belonging to Hughson & Merton.

President W. H. Hotchkiss and Charles T. Terry, chairman of the Legislative Board of the American Automobile Association, are both members of the Congress on Uniform Laws, composed of delegates appointed by the Governors of different States. This Congress will take up the subject of a uniform automobile law and present for adoption by the Legislatures of the different States a model bill drawn by Charles T. Terry.

One of the features of the Madison Square Garden show this year that will attract the attention of the followers of bicycles will be the first complete exhibition of motorcycles ever held in this country. Thirty-one manufacturers of motorcycles have been allotted space.

The annual automobile show luncheon of the American Motor Car Manufacturers' Association will be given at the Manhattan Hotel on Tuesday, October 29 of the week of the automobile show at the Grand Central Palace, New York.

Hill-climbing contests with cars especially geared for the purpose are of little practical value to the man who wants to know what the car that he buys will do on a hill. Every one who has had any experience knows that it is possible to gear a car up so that it especially suits some particular hill, and also that the same car on another hill where the grade varies may "fall down" badly.

The test of the all round utility of a car is to get it out on the country roads with its full complement of passengers.

A complete list of automobile licenses in the United States, compiled from official records to June 15, shows a total of 203,630. New York heads the list, with New Jersey, Massachusetts, Texas, Pennsylvania and Illinois following in that order.

The Government in India is considering the desirability of using motor-transport wagons for freight in moving produce of out-of-the-way districts to market. This is entirely practicable, considering the good roads to the plains in India, and it would solve a perplexing Government problem.

The Glide Automobile Club has been formed in Peoria, Ill., with a membership of twenty-seven. The club is composed entirely of owners and users of the Glide cars.

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The Ideal Carburetor

By E. W. Roberts, M. E.

As at present made the carburetor or mixing device for a gasoline engine, especially if employed for automobile purposes, must be so designed that it gives a practically constant mixture at all speeds of the engine. In order to draw the gasoline into the air passage while the engine is on the way, a vacuum must be produced around the nozzle leading to the float chamber in order to draw gasoline into the air stream. The amount of vacuum required to draw in the proper amount of gasoline depends on the size of the gasoline passage thru the nozzle and must be greater, as the size of the passage is smaller. With a given opening of the air passage around the gasoline nozzle, or, as is it is usually called, the "strangle tube," the vacuum increases with the speed of the air passage thru it. With a given size of gasoline passage, the quantity of gasoline drawn thru, increases faster than the volume of air going thru the strangle tube. Hence at high speeds and a consequently higher velocity of air current, the amount of gasoline is so much greater in proportion to the air that the mixture is increased in richness; that is, it has a greater proportion of gasoline. Hence with the average carburetor if the area of the strangle tube is constant at all speeds of the engine and no provision is made for compensation, the constant mixture cannot be obtained.

The greater number of carburetors compensate for this peculiarity by means of an auxiliary air passage admitting air into the mixture in such a way that it does not pass thru the strangle tube, in other carburetors, the area of the strangle tube, or what amounts to the same thing, the vacuum surrounding the gasoline nozzle, is so regulated that it is just sufficient to draw in the right amount of gasoline at all speeds. In both these types of carburetor this is accomplished by a spring-controlled valve, the valve being opened by the suction of the ingoing air current as the speed of the engine increases. In order to accomplish this, however, it is necessary to put a certain drag on the inlet air and consequently at high speeds the engine does not get so nearly a cylinder full of air as it does at lower speeds. It practically amounts to the same thing as a partial closure of the throttle.

It is an old trick among motor boat operators to hold this valve wide open when racing. To compensate for taking the drag off the air current, which would weaken the mixture, the needle valve is given a slightly increased opening. Another way in which this is accomplished is to use a manually-operated valve of the same size as the compensating valve which is opened when racing and when this is used the needle valve must be opened wider.

The ideal carburetor so far as compensation is concerned would be one in which there is no drag at any speed of the engine. This is accomplished in a way by certain types of carburetor in which the compensation is obtained thru the throttle valve. In other words, the compensation is manual rather than automatic. Carburetors of this kind, however, do not as a rule respond as promptly to the throttle and, in handling an engine with such a carburetor, the throttle must be opened gradually or the engine is very likely to stop when its power is most needed. Then there are troubles with the float valves, floats and all the mechanism of the float-chamber. These, however, have been to a great extent overcome in the latest improved carburetors, but they still remain to a greater or less extent.

The float that is quite universally used is cork, usually varnished with shellac because shellac is insoluble in gasoline. Corks that are not varnished are apt to gradually absorb gasoline into their pores. With the advent of alcohol shellac can no longer be used for this purpose, as alcohol is the solvent of shellac. Faults of float chamber mechanisms are principally floats with valves that stick, float valves that leak or are easily unseated by the jar of the automobile. It is most annoying to have a float valve that will act beautifully as long as the automobile is standing still, but just as soon as the machine is run, allows the carburetor to flood. Then again there is the float valve that will stick and yet when the automobile stands still will work perfectly, but a sudden jar on the road will make the valve jump off its seat and remain there, or will not leave its seat and allow the float chamber to become dry. But it is quite probable that with the advent of alcohol the cork float will have to be abandoned and the metal float used instead.

The great trouble with the metal float is its liability to leak and thereby lose its efficiency. This trouble is not lessened by the fact that a leak in a metal float is very difficult to find, especially if it is a very small leak. True, there are carburetors made without float chambers, but so far they have not proved popular, for, as a rule, the remedy is worse than the disease. The ideal float chamber mechanism is one that will shut the gasoline off under a wide variation of pressures, owing to the fact that quite a number of automobiles have their gasoline supplied to the carburetor by air pressure, and a valve that will open promptly with a very slight variation of the level. There are other faults in float chamber mechanism which are not worth mentioning, as they are practically all overcome in the modern carburetor.

Motor and Accessories Manufacturers held their semi-annual meeting at Atlantic City, N. J., August 8-10, in the Shelburne Hotel. No publicity has been given as to what transpired, but it is understood that much of the time was occupied in considering and adopting the new charter lately granted by the Connecticut legislature, and the new constitution made necessary by the revised charter. About 70 members were present.

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Fires, Judgements and Failures

Aerocar Company, of Detroit, Mich., in receivers' hands. Creditors met and appointed Detroit Trust Company trustee in bankruptcy. Receivers' inventory shows assets as $189,243. Liabilities amount to $300,000. Creditors appointed a committee to confer with trustee as to the advisability of continuing the business.

American Roller Bearing Company, South Framingham, Mass.; receiver Frederick B. Hill, of Framingham, Mass., was appointed upon a petition filed by Hyatt Roller Bearing Company, of Newark, N. J.

Boyd automobile store, 419 Massachusetts avenue, Indianapolis, Ind., was damaged by fire to the extent of $500, August 29.

Croft Brothers garage, 51-55 Evanston avenue, Chicago, Ill., damaged by fire to the extent of $100,000. Insured.

Cantono Electric Tractor Company, of New York, has been petitioned in bankruptcy.

Detroit Auto Vehicle Company, of Detroit, petitioned by creditors for the appointment of a receiver July 11, is not bankrupt, and the company's attorneys will contest the apppointment of a receiver before a jury.

Deere-Clark Motor Car Company, Moline, Ill., has been petitioned in bankruptcy by four creditors.

Eastern Battery Company, 42 Thurston street, Pawtucket, R. I., damaged slightly by fire.

Grout Brothers Automobile Company, Orange, Mass., plant is to be sold to satisfy the claim of W. L. Grout, who petitioned it into bankruptcy.

Holmes Motor Vehicle Company, East Boston, Mass., has been petitioned in bankruptcy; $571 aggregate claims of creditors.

Howard Automobile Company, 408 Golden Gate avenue, San Francisco, Cal., August 25, damaged by fire.

Hughson & Merton, located in Larkin street, San Francisco, Cal., auto supply business, destroyed by fire.

Huber Automobile Company, Detroit, Mich., has filed a petition in bankruptcy.

Knox Motor Truck Company, of Springfield, Mass., makers of the Atlas truck, has been enjoined by court from using the word Knox in connection with its business, and will change the style of the corporation to Atlas Motor Car Company.

Marvel Motor Car Company, of Detroit, has been petitioned by creditors, asking that the company be adjudged bankrupt.

Pope Manufacturing Company, of Hartford, Conn., hearing on the receivership which was set for September 16, was held before Judge Case, of the Superior Court in Hartford. A. L. Pope, the receiver, was present, as was also his attorney, Arthur L. Shipman. Several creditors were represented by their lawyers, but none of those who had attended the August hearing. An inventory was filed, and a more extended inventory will be filed October 16. No opposition developed to the appointment of A. L. Pope as permanent receiver.

Pennsylvania Rubber Company, of Jeannette, Pa., defendant in the suit of the G & J Tire Company, claiming infringement of patents, has been released. Judge Buffington, sitting in United States Circuit Court for Western District of Pennsylvania, handed down his decision, in which he claims that no infringements of any of the patents is shown; the bill will be dismissed on presentation of a decree.

Reliable Automobile Company, Tacoma, Wash., has made an assignment to George Wotten for the benefit of its creditors. Liabilities, $21 670; assets, $6,050.

Robinson, Birney A., Worcester, Mass., dealer, filed a voluntary petition in bankruptcy. Liabilities, $20,939; assets estimated at $9,300, of which $4,000 is represented by book accounts.

St. Clair Motor Company, Detroit, Mich., on August 22 was petitioned in bankruptcy by three creditors.

Snutsel, Inc., Paul N., wholesale dealer in auto supplies, 1535 Broadway, New York, has been petitioned in bankruptcy.

Silent Northern Automobile Company's headquarters, 404 Golden Gate avenue, San Francisco, Cal., damaged by fire August 25.

St. Louis Car Company, manufacturer of the American Mors, will reorganize, President Kobusch having succeeded, it is stated, in securing financial support from St. Louis residents. The automobile department will be separated from the street car end entirely, and the reorganization will be followed by additions to the equipment and enlargement of the plant. Notice of the increase of capital stock from $3,000,000 to $6,000,000 has been filed.

Trade Changes and Removals

Angier Auto Supply, 222 Park Square, Motor Mart, has been succeeded by the Butler Auto Supply Company, Mr. H. M. Butler having purchased the interest of O. M. Angier.

Boston Auto Gage Company has removed its headquarters from 614 Old South Building to 8 Waltham street, Boston, Mass.

Brooklyn Motor Car Company, of Brooklyn, has reincorporated as the R. E. P. Sporting Goods Company, and will be located as heretofore at 1384-1386 Bedford avenue.

Cleveland Motor Car Company, of Cleveland, inform us that after October 1 the headquarters will be in New York City, with offices at 1659 Broadway.

Dragon Automobile Company, of Philadelphia, recently reorganized with the following officers: President, John Kane Mills; vice-president and treasurer, Henry Rawle; second vice-president and sales manager, A. L. Kull; general manager, J. H. O'Brien; directors, J. F. Grimes, Pittsburg; John Kane Mills, New York; Henry Rawle, Philadelphia; A. L. Kull, New York.

Harrolds Motor Car Company, New York agent for the Pierce cars, has removed from its old location at Broadway and Fifty-ninth streets to 233 West Fifty-fourth street.

Hartford Automobile Parts Company, of Hartford, Conn., has filed a certificate of an increase of $6000 in its capital stock, making the total amount of capital stock $10,000.

Knox Motor Truck Company, of Springfield, Mass., enjoined from using the word Knox in connection with its business, will change to the Atlas Motor Car Company.

Manhattan Storage Company has changed its headquarters from 42 Cortlandt street, New York, to 1611 Broadway. The store at 42 Cortlandt street being discontinued.

Menges Motor Car Company has removed its plant from 14-18 Mill street, Grand Rapids, Mich., to Elkhart, Ind.

Reo Motor Car Company, of Lansing, Mich., has declared a stock dividend of 33 1-3 per cent., and its stockholders voted to increase the capital stock from $750,000 to $1,000,000.

Snow, C. D., informs us that he is no longer connected with the C. D. Snow Company, having formed the Snow Automobile Company with offices at 86 Dorrance street, Providence, R. I. They handle the Stevens-Duryea cars for Rhode Island and Attleboro.

Legislative and Legal

MASSACHUSETTS.

Pittsfield.—Ordinance regulating the speed of automobiles and motorcycles has been passed increasing speed to fifteen miles per hour.

NEW JERSEY.

East Orange.—A special ordinance for the guidance of public and private garage owners and operators was presented. The bill provides that in the future a license of $10 will be charged an owner of a public garage, and $1 for a private one. No gas or lamp lights are to be used; all lights on the autos are to be extinguished before entering the garage; no smoking is to be allowed, and signs are to be prominently posted to that effect. Sand is to be kept in buckets ready to be placed on oil that may drip on the floor. The penalty for violation of these rules will be $10.

A decision lately given for $101,789.10 against the New York Central Railroad in the Supreme Court before Justice O'Gormon for the death of Frank B. Read, in favor of his wife, for damages, failed to draw as much attention as it should have done. Mr. Read was killed at the railroad crossing at Van Cortland Park while traveling in an automobile. The automobile was struck by an engine concealed by the surroundings. Others in the accident were given big damages. A few more expensive accidents of the same nature might result in over or under crossings and save many a life.

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Aluminum Alloys

Rochester, N. Y., September 14, 1907.

We have noticed and read with interest the various articles which have been published in your last three or four issues on the subject of aluminum castings, in which is taken up a discussion as to the relative merits of alloys of zinc aluminum and alloys of copper aluminum. We have also been amused to see how sharply the lines are drawn between the two classes of alloys, and how strongly their respective champions stand for their own preference as the best metal for all purposes.

We have been 25 years at the brass foundry business, and years ago, when aluminum was first introduced, and before the automobile business came into existence as a commercial factor, did a great deal of experimenting with aluminum alloys. Our Mr. Clum, together with the manager of the Cowles Electric Smelting and Aluminum Co., made numerous experiments to determine the best alloys for various purposes, and some 15 years ago we were making in our own foundry aluminum castings for special work, which our Lockport friends had been unable to have made successfully elsewhere.

In connection with the Eastman Kodak Co., of this city, we have been called upon to do considerable experimental work in adapting aluminum alloys to their special machinery and chemical processes.

Going through all the ins and outs of the aluminum casting proposition, as practical founders, from its early history up to the present time, we have found not one or two, but many useful alloys. In our brass and bronze business we are accustomed, as are others, to a wide range of mixtures for as wide a range of uses. Users of steel are familiar with the fact that a steel suitable for one purpose may be totally unfit for another purpose, although it may be of as high a grade as the steel that is capable of doing the work. So in aluminum alloys the use to which the casting is to be put should determine the alloy. Zinc aluminum is superior to copper aluminum for some purposes, while for other castings the conditions may be such that the copper aluminum is so much better than a mixture with zinc in it that it is almost imperative that the copper alloy be used.

With one of our customers, the Mora Motor Car Co., of Newark, N. Y., we have recently been through a series of experiments for their 1908 car, and this company will use three separate and distinct mixtures of aluminum on their car.

We frequently see published reports of physical tests made of test bars showing wonderful, even impossible, combinations of good qualities. While scientific tests are necessary aids and are all right in their place, there are some things for the manufacturer to bear in mind as he reads them. Test bar records are like track or road records. A half dozen or more of well tuned cars may be entered, and if one makes a creditable performance, that is the one talked about. The same with test bars: "Many are called, but few are chosen." Moreover, every practical foundryman knows how to obtain quite a variety of high or low tensile strengths, elastic limits, and the rest at will, and all out of the same pot of metal, by a little manipulation in the making of the test bar. The making of the casting is a separate proposition, and the best test of the casting is the test of actual service.

With the introduction of the motor car industry, and the foundries that have sprung up in its wake, it is natural that aluminum alloys should again be put through the experimental stage, and while the subject is new in the minds of so many, that there should be a good deal of more or less heated discussion on it; yet we believe the manufacturers are inclined more and more to pay less attention to technical discussion and trust rather to their business ability in selecting a practical foundryman, and trusting to him to furnish castings suitable for the work to be required of them, and which will stand up under the test of actual service. CLUM & ATKINSON.

Albert L. Pope's Resignation Refused

At the monthly meeting of the executive committee of the National Association of Automobile Manufacturers, held September 4, in the association's New York offices, the only matter outside of the usual routine was the resignation of Albert L. Pope as president. The executive committee unanimously refused to accept his resignation, and the secretary was instructed to wire Mr. Pope of their decision.

Other business transacted was that of accepting the resignation of G. W. Bennett, caused by the change recently made by him from the Knox Company to the White, and the filling of that vacancy by M. L. Goss, Baker Motor Vehicle Co.

Doing the Right Thing by Autoists

The Middleboro, Mass., authorities, in conjunction with the Middleboro Automobile Club, have taken unique steps to warn automobilists of the speed laws in that town.

The club has placed large canvas banners across every street leading from the outskirts to the thickly settled districts, bearing the name of the town, speed limit and an appeal for a square deal. The banners read as follows: "Middleboro, 12 miles per hour thru town. We give you a square deal. Give us one. Middleboro Automobile Club."

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New's Gold Medal Awarded for Climb of Giants' Despair

The Wilkes-Barre Automobile Club members who acted as judges and referee of the last hill climbing contest up Giants' Despair, Wilkes-Barre, Pa., have announced the results of the competition for the "New's" Gold Medal, which was to be awarded to the car drawing the greatest weight per horse power per second. The Matheson car, driven by Ross Anderson, proved to be the winner.

The weight drawn by each contestant per horse power per second was arrived at as follows: The cars were weighed and their horse power determined by the formula recently adopted by the Association of Licensed Automobile Manufacturers. With these figures the weight drawn per horse power was determined. Then by taking the fastest time made by each contestant in the climb the weight drawn per horse power per second was obtained. The following table gives the results of the first six cars:

Car.	Driver.	H. P. lbs. per sec.
Matheson	Ross Anderson	.5535
Fiat	Kessler	.4984
Matheson	Charles Ward	.4118
Knox	Bourque	.4063
Thomas Flyer	M. Roberts	.3649
Maxwell	Price	.3268

Morris Park 24-Hour Race

At 11.55 P. M., Saturday, September 7, the 24-hour race at Morris Park, New York came to an end, with the 35-45 horse power Renault car as victor. The car was driven alternately by Maurice Bernin, and Carl La Trois, and covered 1,078 miles, beating the record of the Thomas car at Brighton Beach by 81 miles. Nine cars started in the event. The A-K car made an excellent showing for a new car, as this was its first actual appearance on either the track or road. During the intermission on Saturday another car backed into it, puncturing the radiator which caused a delay. This, however, was the subject of an allowance by the referee. Final score:

Renault	1,078
Lozier	972
Hotchkiss	892
Allen-Kingston	681

Only One Clean Score in Cleveland Run

The only contestant in the three days' sealed bonnet contest of the Cleveland Automobile Club, September 10, 11, 12, to survive with a perfect score was, a four-cylinder Gaeth car driven by Paul Gaeth. The Mora car made the next best showing, it being only penalized 25 points for the stopping of the motor. This was an accidental stop caused by a broken tire chain catching in the brake. A four-cylinder Buick was next, it being penalized 40 points for the taking on of water, which was necessitated by a leaky radiator caused by the carelessness of a driver at the garage. These three cars all finished with intact seals. The test was run over the roads around Cleveland, the most of the time in a downpour of rain. The distance traveled the first day was 138 miles, second day 152, and third day 156 miles. Daily penalizations:

Car.	Driver.	First Day.	Second Day.	Third Day.	Total.
Gaeth,	Paul Gaeth	0	0	0	0
Mora,	J. W. David	25	0	0	25
Buick,	H. J. Trumball	0	0	40	40
Cartercar,	B J. Carter	120	135	255	549
Cartercar,	A. W. Hall	562	134	75	771
Buick.	George Bettes	551	0	Broken chain.	
Jackson,	R. Burman	Tire trouble, abandoned.			
Jackson,	C. D. Paxon	Seized bearing, abandoned.			

Wildwood's Auto Carnival

On Monday, September 2nd, sixteen cars started from Gloucester on a regularity run to Wildwood, N. J., to take part in various events scheduled for the remainder of the week. Of the sixteen starters, eleven finished with scores next to perfect, altho not one absolutely perfect score was registered. The first prize awarded for this run was captured by Ira L. Brown, driving a Pullman. The six days sealed bonnet endurance run was called off on account of an insufficient number of entries. The most notable event of the week was a mile made in 43 seconds by Bert Holland in a Stanley steamer, on Thursday, thereby breaking the record by one second, made by Montague Robert on July 4th over the same course. Under the condition that no entrance fee was charged for any of the events, it was surprising to note the scarcity of cars. Besides the touring car records good showings were also made in the runabout class.

Early Date for Quaker City Show

Announcement has been made by the Philadelphia Automobile Trade Association that it will hold Philadelphia's annual automobile show this year November 9 to 16, following that of Madison Square Garden, New York. President Smith appointed the following: George H. Smith, White Steamer; Edward Leeds, of Titman, Leeds & Co., E. H. Fitch, of Diamond Rubber Co., and Fred Vanderhoff, of the Ford Co., as a show committee. J. H. Beck has been engaged as secretary. The place for holding the show has not been decided upon as yet.

The proposed hill climb of the Automobile Club of Bridgeport, Conn., scheduled for Labor Day, has been postponed until Decoration Day, May 30, 1908.

The consensus of opinion seems to be that the gradual increasing of wheel bases has reached its limit, and that 1908 will not see cars having a much longer wheel base than 1907. A few of the 6-cylinder cars may prove the exception.

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Proposed Stock Car Race For Long Island Discarded.

There will be no stock touring car race over the Vanderbilt Cup Course this season. The proposed plan of the Metropolitan Automobile Association to hold a stock touring car race on Long Island, October 16 and 17, came to a sad ending on September 9, when the formal application for the use of the highways was withdrawn. This decision was reached by the association on its appearance before the Board of Supervisors, on account of the hostile influences that had evidently been brought to bear on the authorities.

Recommendations for 24 Hour-Contests.

The following announcement was recently made by Secretary Elliott, of the American Automobile Association:

The racing board of the American Automobile Association has received from its technical advisers the following recommendations respecting the entries of cars in twenty-four-hour endurance contests or relay races, and requests that the promoters of such contests provide each entrant with a copy of these recommendations, believing that by complying with the same the safety of the contestants as well as the spectators will be better safeguarded, and accidents similar to those in former contests will be eliminated as far as possible:

First—That the tail lamps on each car shall be illuminated either by acetylene gas or electric lights supplied from accumulators, and that no car should be permitted to start which is equipt with tail lights using kerosene.

Second—That all entrants and drivers ascertain that their tire lugs are of the proper size for the tires, and it is not thought advisable that any car should start which does not use at least six lugs for each tire. This suggestion applies only to cars equipt with clincher tires.

Auto Parade Feature of Old Home Week.

As one of the many excellent features of Buffalo's Old Home Week celebrations, the Buffalo Automobile Club promoted an automobile parade on Tuesday evening, September 3, in which over two hundred and fifty gaily decorated cars participated. The Thomas car of E. R. Thomas won first prize. The design of decorations was an eagle's aerie. The machine was covered with an abundance of streamers and flowers, and resting above the tonneau was a large eagle with outstretched wings protecting the nest.

Date For St. Louis Balloon Race Changed.

The date for the Gordon-Bennett international balloon race set for Saturday, October 19, has been changed to Monday, October 21. This announcement was received by cable from Courtlandt F. Bishop, now in Paris.

Crude Para Rubber has been reduced by the United States Rubber Company and the independent dealers from $1.06 to $1.05 per pound, the lowest figure reached for three years.

Exports Still Increasing.

The exports for July show a growing increase. July, 1907, the exports reached a total of $796,325, a gain on June of 1907 of $64,271, and an increase of $283,146 over that of July, 1906.

Exported to	July 1906	1907
United Kingdom	187,909	301,126
France	71,046	121,627
Germany	26,392	47,720
Italy	9,991	14,161
Other Europe	27,535	21,992
British North America	85,704	183,503
Mexico	72,985	49,113
West Indies and Bermuda	12,361	10,023
South America	13.044	31,821
British East Indies	3,675	1,585
British Australasia	585	3,560
Other Asia and Oceania	1,847	5,731
Africa	105	3,735
Other countries	.....	618
Total auto and parts	$513,179	$796,325

The following communication was received by the "Cycle and Automobile Trade Journal," and is herewith published, as the individual referred to may endeavor to swindle other members of the trade.

Plainfield, N. J., September 17, 1907.

Cycle Automobile and Trade Journal,
Philadelphia, Pa.

Gentlemen:

We had a call the other day from a very slick individual with a strong English accent, who claimed to be H. G. Graham, son of the president of Argyll Motors, Ltd., Glasgow, Scotland. He claimed to have charge of the Argyll London branch, which is near our London office, seemed to be intimately acquainted with our London representatives, knew to a dollar the amount of goods we had sold in London this year, and knew that we had just received an order for a number of lights for the King's new car, and possessed a lot of other information which would make it seem certain that he was what he represented himself to be.

He stated that he had secured the contract for several thousand lights for the 1908 Argyll cars, and after showing to his own satisfaction that our success abroad was largely due to his unrewarded efforts, remembered that he was short of funds, and tried to secure a loan. Having become suspicious, we turned him over to the police, and found that he had nearly $1,000 in his pockets. As he had secured nothing from us, we let him go, but now regret this, as he appears to be a professional swindler, and he is such a slick article that we think the trade should be warned to look out for him.

He speaks very rapidly with a strong English accent, with a great deal of unnecessary profanity; is about 5 feet 5 inches, weighs about 150 pounds, has a smooth face with rather florid complexion, wears glasses, and has very poor teeth, many of them missing, as a result, he explains, of an accident when he was driving the Argyll car in the Isle of Man races last year. When he called on us he wore a blue suit and cheap plaid cap from Detroit. He showed a railway ticket on which he had just come from Pittsburg, and claimed to have just placed a $50,000 contract with the American Vanadium Co., who have just advised us that they never heard of the man.

Yours truly,
RUSHMORE DYNAMO WORKS.

At the recent outing of Massachusetts Automobile Association at Newcastle, N. H., a resolution was adopted recommending that a law be enacted to compel all vehicles to be provided with lights at night.

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A. C. A.'s Eighth Annual Show, October 24-31

As usual the demand for space at the A. C. A. annual show this year was greater than the available supply, so that a remodeling of the second gallery of the Grand Central Palace, where the show will be held, was necessary. This has been done by cutting a large aisle thru the first gallery to a central stairway leading to the second gallery, and by removing the partitions in the second gallery, so that a clear space the whole width of the building (200 feet) becomes available for exhibition. This space is easily accessible.

The change necessitated the placing in the second gallery of the restaurant and cafe, which, thus enlarged, tastefully decorated and properly equipt, will adequately meet the demands of visitors and exhibitors.

The Vitagraph Theatre, where will be exhibited interesting moving pictures of famous European and American automobile races, will also be on the second gallery, on the Forty-third street side, and the exhibit of airships and balloons of the Aero Club of America will be on the same floor, on the Forty-fourth street side. It is believed that this arrangement of the restaurant, cafe, theatre, and Aero Club Show on the second gallery will make it an attractive locality alike for visitors and accessory exhibitors, to whom more than 8000 square feet of space have been assigned.

Members of the A. M. C. M. A. have been allotted 23,641 square feet of space, and members of the Motor and Accessory Manufacturers, 16,087 square feet. For the exhibition of commercial cars 4,644 square feet have been apportioned, and for motor cycles, 636 square feet. On the main floor 7,777 square feet have been apportioned for general allotment regardless of membership in organizations; on the first gallery 2,494 square feet, and in the second gallery 10,000 square feet.

There will be sixty different makes of pleasure vehicles shown and ten types of commercial motor vehicles. The members of the American Motor Car Manufacturers' Association have taken most of the space on the main floor and in the center will be found the Ford, Reo, Mitchell, Maxwell, Premier, National, Stoddard-Dayton and Wayne cars. On the Lexington avenue side the Garford, Rainier, Cleveland, Blomstrom, Moore, Frayer-Miller, Lane, Kissel, Napier, Smith and Klink models will be seen, while on the Depew place side the Crawford, Acme, B. L. M., Marion, Welch, Imperial, Cartercar, Frontenac, Gaeth, Dragon, York and Dolson cars and the Knox motor truck will be displayed. The Forty-fourth street side will be occupied by the Dorris, Gearless, Chadwick, Moon, Lambert, Moline, Marmon, Mora and Jackson cars, while on the Forty-third street side will be the Overland, American, Allen-Kingston, Evansville, Simplex, De Luxe, Glide, Pennsylvania, American Mors and Austin cars.

Tho the first gallery is to be principally occupied by the 104 members of the Motor and Accessories Association there will be a number of other cars shown there, including the Colt, Jewell, Huntington, Holsman, Schacht, Cameron, Ellsworth, Buggyabout, Reliable-Dayton and Shawmut machines.

In addition there will be a number of motorcycle exhibits and a fine showing of commercial vehicles, including the Lansden, Logan, Miller, Reliance, Mitchell, Mack, Rapid, and Frayer-Miller.

In another part of this issue of the Cycle and Automobile Trade Journal will be found in compact arrangement a group of diagrams of the floors and the space allottments of all the exhibitors from which it will be easy to locate any exhibit.

Pittsburg's Race Meet

Pittsburg's fifty-mile endurance race at Brunot's Island track, September 12, was won by William McCulla, driving a Darracq strip touring car. Time 58.40 3-5. The Darracq car was also victor in the one-mile race. The other events included an exhibition race between Barney Oldfield and Ollie Savin, the former winning; a two-mile race won by Tom Dunn, Stevens Duryea; a three-mile handicap, James Kerr Stevens winner, and an open touring car race won by Eddie Bald, with a Columbia.

Cincinnati Enjoys Racing

Barney Oldfield, driving a two-mile exhibition in 1.58 and a fast 25-mile stock touring car race, were the most important events of the two days' meetings at Latonia track, across the river from Cincinnati, on September 14 and 15. The 25-mile race was won by J. R. Rainey, driving a Stearns car, covering the course in 29.30. In all there were 19 events, ten being run on first day. Allen Ross won both motorcycle events, first day, two miles, time 3.00 2-5, and second day he rode three miles in 4.18 3-5.

The new factory of the American Simplex Motor Car Company, of Mishawaka, Ind., is now completed. The plant covers about 35,000 square feet, and will be in full operation by October 1.

The headquarters of the F. N. Motor Club of America has been changed from 2208 Broadway, to 2234 Broadway, New York City.

Automobile Dealers' Association of Baltimore, announces its show dates as the week of November 25.

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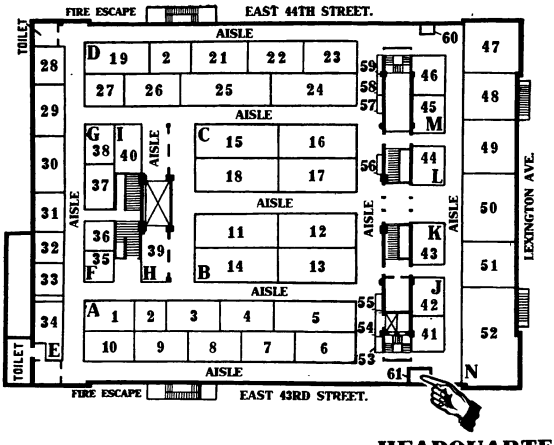
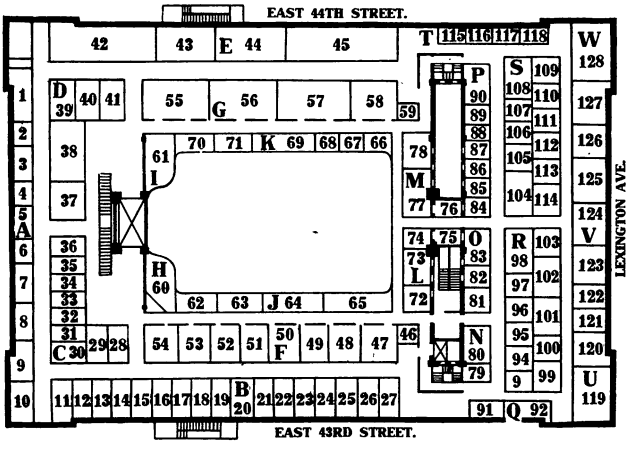
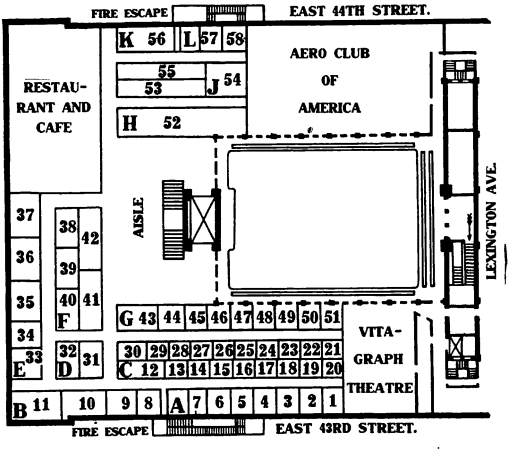


MAIN FLOOR

HEADQUARTERS OF THE CYCLE AND AUTOMOBILE TRADE JOURNAL



GALLERY FLOOR



THIRD FLOOR

These diagrams are not to scale, and the numbers are those of the list opposite, and are not those of the Show catalogue.

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Alphabetical List of Show Assignments

The numbers in the right hand column refer to the floor diagrams on the opposite page and are not those of the Show Catalog.

NAME.	FLOOR.	SEC.	NO.
Abendroth & Root Mfg. Co.	Main	E	33
Acetyvone Co.	Third	C	15
Acme Motor Car Co.	Main	I	40
Ajax-Grieb Rubber Co.	Gallery	V	127
Allen Auto Specialty Co.	Third	D	32
American & British Mfg. Co.	Gallery	F	52
The American Ball Bearing Co.	Gallery	O	82
American Elec. Nov. & Mfg. Co.	Gallery	B	11
American Motor Car Co.	Main	A	1
Ampere Mfg. Co.	Third	C	16
Atwater-Kent Mfg. Co.	Gallery	V	126
Aurora Automatic Mach. Co.	Gallery	S	110
Austin Automobile Co.	Main	A	6
Auto Accessories Mfg. Co.	Gallery	F	50
Auto Coil Co.	Gallery	R	103
Auto Appliance Co.	Third	G	46
Auto Blue Book	Main	Aisle	55
Auto Improvement Co.	Gallery	B	12
Auto. Supply Mfg. Co.	Third	C	26
Auto. Topics	Main	Aisle	56
Auto. Pump Co.	Gallery	T	115
B. L. M. Motor Car & Equip. Co.	Main	F	35
Badger Brass Mfg. Co.	Gallery	J	64
Baldwin Chain & Mfg. Co.	Gallery	M	84
Bartholomew Co.	Main	A	4
Blomstrom, C. H., Motor Co.	Main	N	49
Bowser, S. F. & Co., Inc.	Gallery	F	53
Breeze Carburetor Co.	Gallery	C	34
Bretz, J. S. Co.	Third	G	47
Briscoe Mfg. Co.	Gallery	P	86
Brownell-Trebert Co.	Third	E	33
Brown-Lipe Gear Co.	Gallery	I	66
Buckeye Mfg. Co.	Main	D	23
Byrne, Kingston Co.	Gallery	T	118
Cameron Car Co.	Gallery	A	4
Central Auto. Top Co.	Third	A	4
Chadwick Engineering Works	Main	D	21
Cleveland Motor Car Co.	Main	N	51
Clover Mfg. Co.	Third	C	20
Coes Wrench Co.	Gallery	C	35
Colt Runabout Co.	Gallery	A	10
Columbia Nut & Bolt Co.	Gallery	T	116
Commonwealth Rubber Co.	Third	C	29
Comptoir 'de Innovations Pour Auto.	Third	G	43
Comstock Shock-Absorber Co.	Third	B	9
Connecticut Tel. & Elec. Co.	Gallery	V	120
Continental Caoutchouc Co.	Third	F	42
Cowles, C. & Co.	Gallery	V	126
Cramp, Wm. & Sons, S. & E. B. Co.	Gallery	P	85
Crawford Automobile Co.	Main	H	39
Crown Battery Co.	Third	A	2
Cycle & Automobile Trade Journal.	Main	Aisle	61
Dayton Electrical Mfg. Co.	Gallery	N	80
Dayton Motor Car Co.	Main	B	12
De Luxe Motor Car Co.	Main	A	8
Diamond Chain & Mfg. Co.	Gallery	S	111
Diamond Rubber Co.	Gallery	K	69
Diezemann Shock-Absorber Co.	Gallery	B	17
Dixon, Joseph, Crucible Co.	Gallery	R	96
Dolson Automobile Co.	Main	E	28
Dorris Motor Car Co.	Main	D	19
Downing, C. J.	Third	B	11
Dragon Automobile Co.	Main	E	30
Duane, Wm. J. & Co.	Gallery	B	15
Eastern Carbon Works	Gallery	R	98
Edmunds & Jones Mfg. Co.	Gallery	R	100
Electric Storage Battery Co.	Gallery	B	22
Ellsworth, J. M.	Gallery	A	3
Empire Auto Tire Co.	Gallery	F	54
Evansville Automobile Co.	Main	A	2
F. R. V. Auto Parts Co.	Third	F	40
Firestone Tire & Rubber Co.	Gallery	P	89
Fisk Rubber Co.	Gallery	J	63
Ford Motor Car Co.	Main	C	18
Forest City Motor Car Co.	Gallery	A	9
G & J Tire Co.	Gallery	H	60
Gabriel Horn Mfg. Co.	Gallery	V	123
Gaeth Auto Works	Main	E	32
Garford Motor Car Co.	Main	N	52
Gearless Transmission Co.	Main	D	20
Gemmer Mfg. Co.	Gallery	S	109
Gilbert Mfg. Co.	Gallery	B	27
Goodrich, B. F. Co.	Gallery	J	65
Goodyear Tire & Rubber Co.	Gallery	M	78
Gray & Davis	Gallery	K	70
Gray-Hawley Mfg. Co.	Gallery	S	112
Hatfield Motor Vehicle Co.	Gallery	A	2
Ham, C. T. Mfg. Co.	Gallery	B	13
Harris, A. W., Oil Co.	Gallery	B	23
Hartford Auto. Parts Co.	Gallery	B	24
Hartford Rubber Works Co.	Gallery	I	61
Hartford Suspension Co.	Gallery	P	88
Hayes Mfg. Co.	Gallery	B	14
Heinze Elc. Co.	Gallery	B	18
Herz & Co.	Gallery	N	79
Hess-Bright Mfg. Co.	Gallery	R	94
Hicks Speed Indicator Co.	Third	F	39
Hill Mfg. Co.	Third	C	17
Holsman Automobile Co.	Gallery	A	7
Horseless Age	Main	Aisle	57
Hotchkin Mfg. Co.	Gallery	C	32
Howe, Mort	Third	L	58
Huntington Automobile Co.	Gallery	A	8
Hyatt Roller Bearing Co.	Gallery	I	75
Igniter Appliance Co.	Gallery	V	119
Imperial Motor Car Co.	Main	G	38
Jackson Automobile Co.	Main	D	24
Jeffery-DeWitt Co.	Third	G	48
Johnson, I. G. & Co.	Third	C	25
Jones Speedometer Co.	Gallery	V	124
K. W. Ignition Co.	Third	E	36
Kaltenbach, E. J.	Third	C	23
Kingston Motor Car Co.	Main	A	9
Kinsey Mfg. Co.	Gallery	V	121
Kissel Motor Car Co.	Main	J	42
Klauder, Chas. L.	Third	A	3
Klink Motor Car Mfg. Co.	Main	M	46
Kokomo Electric Co.	Gallery	T	117
Knox Motor Truck Co.	Main	E	31
Lane Motor Vehicle Co.	Main	J	41
Lansden Co.	Gallery	E	42
Lavalette & Co.	Third	F	41
Lear, Oscar Auto. Co.	Gallery	G	58
Lear, Oscar Auto. Co.	Main	N	47
Leather Tire Goods Co.	Gallery	C	30
Light Mfg. & Foundry Co.	Gallery	D	39
Light Mfg. & Foundry Co.	Gallery	S	104
Lipman Mfg. Co.	Gallery	V	120
Logan Construction Co.	Gallery	G	55
McCord & Co.	Gallery	R	99
Mack Bros. Motor Car Co.	Gallery	G	57
MacMullen, Roger B.	Third	F	38
Manhattan Electrical Supply Co.	Third	C	12
Manhattan Screw & Stamping Wks.	Gallery	B	25
Mann, Leon Co.	Third	G	45
Marion Motor Car Co.	Main	F	36
Martin-Evans Co.	Third	E	34
Maxwell-Briscoe Motor Co.	Main	B	13
Merchant & Evans Co.	Third	G	49
Michelin Tire Co.	Gallery	C	29
Midgley Mfg. Co.	Gallery	M	76
Miller, Chas. E.	Gallery	D	37
Miller Motor Car Co.	Gallery	E	43
Miller, W. P. Sons	Third	D	31
Mitchell Motor Co.	Main	B	11
Mitchell Motor Car Co.	Gallery	E	44
Moline Automobile Co.	Main	D	27
Moon Motor Car Co.	Main	D	22
Moore Automobile Co.	Main	N	48
Mora Motor Car Co.	Main	D	25
Morgan & Wright	Gallery	O	81
Mosler, A. R. & Co.	Gallery	R	101
Motor	Main	Aisle	60
Motor Age	Main	Aisle	53
Motor Car Co.	Main	E	34
Motor Car Specialty Co.	Gallery	F	46
Motor Print	Main	Aisle	59
Motor Vehicle Pub. Co.	Third	L	57
Motz Clincher Tire & Rubber Co.	Third	B	10
Muncie Auto Parts Co.	Gallery	B	21
Napier Motor Co. of America	Main	L	44
National Carbon Co.	Gallery	L	74
National Motor Vehicle Co.	Main	C	16
National Oil Pump & Tank Co.	Gallery	C	28
National Surety Co.	Main	Aisle	58
Nathan Novelty Co.	Third	C	28
New Departure Mfg. Co.	Third	J	55
Newmastic Tire Co.	Gallery	G	59
N. Y. & N. J. Lubricant Co.	Gallery	P	87
N. Y. School of Auto. Engineers	Third	A	5
N. Y. Sporting Goods Co.	Third	K	56
Nordyke & Marmon Co.	Main	D	26
Norton Co.	Third	C	30
Oliver Instrument Co.	Gallery	B	19
Oliver Mfg. Co.	Gallery	R	93
Overland Auto. Co.	Main	A	10
Ovington Motor Co.	Gallery	D	40
Pantasote Co.	Gallery	B	16
Patterson, Gottfried & Hunter	Third	C	27
Penna. Auto. Motor Co.	Main	A	7
Penna. Rubber Co.	Gallery	S	106
Perfection Spring Co.	Third	C	24
Phila. Forge Co.	Gallery	F	49
Pierson Motor Supply Co.	Third	C	13
Pneu'l Electric Co.	Third	B	8
Post & Lester Co.	Third	J	53
Premier Motor Mfg. Co.	Main	C	15
Presto Detachable Rim Co.	Third	C	22
Prest-O-Lite Co.	Gallery	Q	92
Prosser, Thos. & Son	Third	A	7
Quinby, J. M. & Co.	Main	A	43
Rainier Motor Car Co.	Main	N	50
Randall-Faichney Co.	Third	C	19
Rands Mfg. Co.	Gallery	B	26
Rapid Motor Vehicle Co.	Gallery	E	45
Reading Standard Co.	Gallery	D	41
Reliable Dayton Motor Car Co.	Gallery	A	1
Reliance Motor Car Co.	Gallery	G	56
Remy Elec. Co.	Gallery	P	90

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Reo Motor Car Co.	Main	C	17
Republic Rubber Co.	Gallery	F	51
Rose Mfg. Co.	Gallery	J	62
Sager, J. H. Co.	Gallery	B	20
Scandinavian Fur & Leather Co.	Third	H	52
Schacht Mfg. Co.	Gallery	A	6
Schwarz Wheel Co.	Gallery	S	108
Shaler, C. A. Co.	Third	C	18
Shawmut Motor Co.	Gallery	D	38
Shelby Steel Tube Co.	Gallery	L	73
Simplex Motor Car Co.	Main	A	3
Smith Auto. Co.	Main	M	45
Smith, R. H. Mfg. Co.	Gallery	Q	91
Spicer Universal Joint Mfg. Co.	Gallery	V	122
Splitdorf, C. F.	Gallery	K	67
Sprague Umbrella Co.	Gallery	V	119
Standard Brake Co.	Third	C	14
Standard Roller Bearing Co.	Gallery	V	125
Standard Welding Co.	Gallery	O	83
Stewart & Clark Mfg. Co.	Gallery	W	128
Swinehart Clincher Tire & Rub. Co.	Gallery	S	114
St. John Rubber Tire Co.	Third	G	44
St. Louis Car Co.	Main	A	5
Supplementary Spiral Spring Co.	Third	G	51
Timken Roller Bearing Axle Co.	Gallery	M	77
Travelers Ins. Co.	Main	Aisle	54
Traver Blowout Patch Co.	Third	A	1
Troy Carriage Sunshade Co.	Third	G	50
Turner Brass Works	Third	J	54
Twombly Goggle Co.	Third	C	21
Veeder Mfg. Co.	Gallery	L	72
Ventilated Cushion & Spring Co.	Third	A	6
Warner Gear Co.	Gallery	R	97
Warner Instrument Co.	Gallery	S	105
Wayne Automobile Co.	Main	B	14
Wayne Works	Gallery	A	5
Weed Chain Tire Grip Co.	Gallery	C	31
Welch Motor Car Co.	Main	G	37
Wheeler, F. H.	Gallery	R	95
Whitlock Coil Pipe Co.	Gallery	K	71
Whitney Mfg. Co.	Gallery	K	68
Winchester Speedometer Co.	Gallery	S	113
Witherbee Igniter Co.	Gallery	R	102
Wooster, William	Third	E	35
York Motor Car Co.	Main	E	29

Exhibitors by Floors

The space numbers refer only to the floor diagrams on the previous page and are not those of the show catalog.

MAIN FLOOR.

SECTION A.

Space No.
1. American Motor Car Co.
2. Evansville Automobile Co.
3. Simplex Motor Car Co.
4. Bartholomew Co.
5. St. Louis Car Co.
6. Austin Automobile Co.
7. Pennsylvania Auto Motor Co.
8. De Luxe Motor Car Co.
9. Kingston Motor Car Co.
10. Overland Auto Co.

SECTION B.

11. Mitchell Motor Co.
12. Dayton Motor Car Co.
13. Maxwell-Briscoe Motor Co.
14. Wayne Automobile Co.

SECTION C.

15. Premier Motor Mfg. Co.
16. National Motor Vehicle Co.
17. Reo Motor Car Co.
18. Ford Motor Car Co.

SECTION D.

19. Dorris Motor Car Co.
20. Gearless Transmission Co.
21. Chadwick Engineering Works.
22. Moon Motor Car Co.
23. Buckeye Mfg. Co.
24. Jackson Automobile Co.
25. Mora Motor Car Co.
26. Nordyke & Marmon Co.
27. Moline Automobile Co.

Space No.

SECTION E.

28. Dolson Automobile Co.
29. York Motor Car Co.
30. Dragon Automobile Co.
31. Knox Motor Truck Co.
32. Gaeth Auto Works.
33. Abendroth & Root Mfg. Co.
34. Motor Car Co.

SECTION F.

35. B. L. M. Motor Car & Equipment Co.
36. Marion Motor Car Co.

SECTION G.

37. Welch Motor Car Co.
38. Imperial Motor Car Co.

SECTION H.

39. Crawford Automobile Co.

SECTION I.

40. Acme Motor Car Co.

SECTION J.

41. Lane Motor Vehicle Co.
42. Kissel Motor Car Co.

SECTION K.

43. J. M. Quinby & Co.

SECTION L.

44. Napier Motor Co. of America.

SECTION M.

45. Smith Auto Co.
46. Klink Motor Car Mfg. Co

SECTION N.

47. Oscar Lear Auto Co.
48. Moore Automobile Co.
49. The C. H. Bloomstrom Motor Co.
50. Rainier Motor Car Co.
51. The Cleveland Motor Car Co.
52. Garford Motor Car Co. of N.Y.

AISLE—MAIN FLOOR.

53. Motor Age.
54. Travelers' Ins. Co.
55. Auto Blue Book.
56. Automobile Topics.
57. Horseless Age.
58. Nat. Surety Co.
59. Motor Print.
60. Motor.
61. Cycle & Automobile Trade Journal.

GALLERY FLOOR.

SECTION A.

1. Reliable Dayton Motor Car Co.
2. Hatfield Motor Vehicle Co.
3. J. M. Ellsworth.
4. The Cameron Car Co.
5. The Wayne Works.
6. The Schacht Mfg. Co.
7. Holsman Automobile Co.
8. Huntingdon Automobile Co
9. Forest City Motor Car Co.
10. Colt Runabout Co.

SECTION B.

11. American Elec. Nov. & Mfg. Co.
12. Auto Improvement Co.
13. C. T. Ham Mfg. Co.
14. Hayes Mfg. Co.
15. W. J. Duane & Co.
16. The Pantasote Co.
17. Diezemann Shock Absorber Co.
18. Heinze Elec. Co.
19. Oliver Instrument Co.
20. J. H. Sager Co.
21. Muncie Auto Parts Co.
22. Electric Storage Battery Co.
23. A. W. Harris Oil Co.
24. Hartford Auto Parts Co.
25. Manhattan Screw & Stamping Works.
26. Rands Mfg. Co.
27. Gilbert Mfg. Co.

SECTION C.

28. National Oil, Pump & Tank Co.
29. Michelin Tire Co.
30. Leather Tire Goods Co.
31. Weed Chain Tire Grip Co.
32. Hotchkin Mfg. Co.
33.
34. The Breeze Carburetor Co.
35. Coes Wrench Co.
36. Gilbert & Barker will not exhibit.

SECTION D.

37. Chas. E. Miller.
38. Shawmut Motor Co.
39. The Light Mfg. & Foundry Co.
40. Ovington Motor Co.
41. Reading Standard Co.

SECTION E.

42. The Lansden Co.
43. Miller Motor Car Co.
44. Mitchell Motor Car Co.
45. Rapid Motor Vehicle Co.

SECTION F.

46. Motor Car Specialty Co.
47. Headquarters M. & A. M.
49. Philadelphia Forge Co.
50. Auto Accessories Mfg. Co.
51. The Republic Rubber Co.
52. America & British Mfg. Co.
53. S. F. Bowser & Co., Inc.
54. Empire Auto Tire Co.

SECTION G.

55 The Logan Construction Co.
56. Reliance Motor Car Co.
57. Mack Bros. Motor Car Co.
58. Oscar Lear Auto Co.
59. Newmastic Tire Co.

SECTION H.

60. G. & J. Tire Co.

SECTION I.

61. Hartford Rubber Works Co.

SECTION J.

62. Rose Mfg. Co.
63. Fisk Rubber Co.
64. Badger Brass Mfg. Co.
65. B. F. Goodrich Co.

SECTION K.

66. Brown-Lipe Gear Co.
67. C. F. Splitdorf.
68. Whitney Mfg. Co.
69. Diamond Rubber Co.
70. Gray & Davis.
71. Whitlock Coil Pipe Co.

SECTION L.

72. Veeder Mfg. Co.
73. Shelby Steel Tube Co.
74. National Carbon Co.
75. Hyatt Roller Bearing Co.

SECTION M.

76. Midgely Mfg. Co.
77. Timken Roller Bearing Axle Co.
78. Goodyear Tire & Rubber Co.

SECTION N.

79. Herz & Co.
80. Dayton Elec. Mfg. Co.

SECTION O.

81. Morgan & Wright.
82. American Ball Bearing Co.
83. The Standard Welding Co.

SECTION P.

84. Baldwin Chain & Mfg. Co.
85. Wm. Cramp & Sons S. & E. B. Co.
86. Briscoe Mfg. Co.
87. New York & N. J. Lubricant Co.
88. Hartford Suspension Co.
89. Firestone Tire & Rubber Co.
90. Remy Electric Co.

SECTION Q.

91. R. H. Smith Mfg. Co.
92. Prest-O-Lite Co.

SECTION R.

93. Oliver Mfg. Co.
94. Hess-Bright Mfg. Co.
95. F. H. Wheeler.
96. Joseph Dixon Crucible Co.
97. Warner Gear Co.
98. Eastern Carbon Works.
99. McCord & Co.
100. Edmunds & Jones Mfg. Co.
101. A. R. Mosler & Co.
102. Witherbee Igniter Co.
103. Autocoil Co.

SECTION S.

104. Light Mfg. & Foundry Co.
105. Warner Instrument Co.
106. Pennsylvania Rubber Co.
107. Precision Appliance Co. will not exhibit.
108. Schwarz Wheel Co.
109. Gemmer Mfg. Co.

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110. Aurora Automatic Machine Co.
111. Diamond Chain & Mfg. Co.
112. Gray-Hawley Mfg. Co.
113. Winchester Speedometer Co.
114. Swinehart Clincher Tire & Rubber Co.

SECTION T.

115. The Auto Pump Co.
116. Columbia Nut & Bolt Co.
117. Kokomo Electric Co.
118. Byrne Kingston & Co.

SECTION U.

119. Igniter Appliance Co.

SECTION V.

120. Connecticut Telephone & Elec. Co. & Lipman Mfg. Co.
121. Kinsey Mfg. Co.
122. Spicer Universal Joint Mfg. Co.
123. Gabriel Horn Mfg. Co.
124. Jones Speedometer Co.
125. Standard Roller Bearing Co.
126. C. Cowles & Co. & Atwater-Kent Mfg. Co.
127. Ajax Grieb Rubber Co.

SECTION W.

128. Stewart & Clark Mfg. Co.

THIRD FLOOR.

SECTION A.

1. Traver Blowout Patch Co.
2. Crown Battery Co.
3. Chas. L. Klauder.
4. Central Auto Top Co.
5. N. Y. School of Automobile Engineers.
6. Ventilated Cushion & Spring Co.
7. Thos. Prosser & Son.

SECTION B.

8. Pneu 'L Electric Co.
9. The Comstock Shock-Absorber Co.
10. The Motz Clincher Tire & Rubber Tire Co.
11. C. J. Downing.

SECTION C.

12. Manhattan Electrical Supply Co.
13. Pierson Motor Supply Co.
14. Standard Brake Co.
15. Acetyvone Co.
16. Ampere Mfg. Co.
17. The Hill Mfg. Co.
18. C. A. Shaler Co.
19. The Randall-Faichney Co.
20. The Clover Mfg. Co.
21. Twombly Goggle Co.
22. Presto Detachable Rim.
23. F. J. Kaltenbach.
24. The Perfection Spring Co.
25. I. G. Johnson & Co
26. Automobile Supply Mfg. Co.
27. Patterson Gottfried & Hunter.
28. Nathan Novelty Mfg. Co.
29. Commonwealth Rubber Co.
30. Norton Co.

SECTION D.

31. W. P. Miller's Sons.
32. The Allen Auto Specialty Co.

SECTION E.

33. Brownell Trebert Co.
34. Martin-Evans Co.
35. William Wooster.
36. The K. W. Ignition Co.
37. Cycle & Automobile Trade Journal.

SECTION F.

38. Roger B. MacMullen.
39. Hicks Speed Indicator Co.
40. F. R. V. Auto Parts Co.
41. Lavalette & Co.
42. Continental Caoutchouc Co.

SECTION G.

43. Comptoir 'de Innovations Pour Automobiles.
44. St. John Rubber Tire Co.
45. Leon Mann Co.
46. Auto Appliance Co.
47. J. S. Bretz Co.
48. Jeffery-DeWitt Co.
49. Merchant & Evans Co.
50. The Troy Carriage Sunshade Co.
51. Supplementary Spiral Spring Co.

SECTION H.

52. Scandinavian Fur & Leather Co.

SECTION J.

53. The Post & Lest Co.
54. The Turner Brass Works.
55. New Departure Mfg. Co.

SECTION K.

56. N. Y. Sporting Goods Co.

SECTION L.

57. Motor Vehicle Publishing Co.
58. Mort Howe.

Farmers are buying automobiles. Factories all over the country have been invaded lately by representatives of the farming community who have purchased cars. One sales manager of a factory in Indiana has sold a number of cars to farmers who have come to the factory to look it over. Judging from the questions asked, it is clearly shown that they have been carefully studying the question during their leisure moments.

Western Motor Company, of Logansport, Indiana, manufacturers of motors and supplies, has taken over the Rutenber carburetor, which it will manufacture hereafter.

The plan followed at the two recent 24-hour automobile races in New York of stopping the contest during the afternoon of the second day for the purpose of running off short events and watering the track has occasioned considerable criticism in certain quarters. It is thought by many that a 24-hour race should be continuous without a single intermission. A 24-hour race is mis-named if it is stopt for even a few minutes, no matter what the cause is. The fact that contestants are not allowed to work on their cars during the intermission does not alter the case. Above all things these long distance contests furnish a severe test of motors and particularly of their cooling systems. A motor which has been running hot is afforded an opportunity to cool off by these intermissions. This is not fair to those cars whose cooling systems are equal to 24 hours of continuous hard service.

Plan Submitted by Knox Creditors

About 75 per cent. of the creditors of the Knox Automobile Company, Springfield, Mass., met September 4, to form plans for the reorganization of the company.

The plan submitted provides for the issuance by the Knox Company of preferred stock to an amount not exceeding $500 000, this stock to be preferred both as to assets and to dividends, to be subject to an 8 per cent. cumulative annual dividend, the claims of creditors to include interest thereon to January 1, 1908, and the preferred stock to be of that date, all claims of $100 or in excess thereof to be entitled to one share of the preferred stock for each $100, and for each fractional part above $100 and all claims less than $100 to be paid in cash.

A statement of the inventory at the time the assignee took possession showed assets as a going concern to the amount of $970,000, and liabilities of $566,000, of which about $70,000 is preferred—$35,000 being mortgage, $30,000 money loaned by pledge of machines and balance preferred claims consisting of labor, taxes and other claims such as are preferred by the United States bankruptcy act.

A creditors' committee submitted a plan that all the creditors of over $100 be given preferred stock to the par value of their claims—said stock to be preferred as to all the assets of the company, both as to principal and dividends, if earned, to be paid at the rate of 8 per cent. per annum payable 4 per cent. semi-annually. The plan was adopted by the creditors, only two persons dissenting."

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ch., U. S. A., E. R. Thomas, President, l its first car on the road in Septem-, 1906, and began operation in leased emises in Detroit in June, same year. of these cars, 300 touring cars and runabouts have been made and sold the time of this writing, September h, 1907, and this company expects to oduce 750 cars during the 1908 season.

Detroit cars has been pushed ever sin to the limits of the factory capacity, sho as was the time given in which to matu designs and produce the first model ca Really no "first model" was ever bui as the first car placed on the road w one of the 503 ordered by the Buffa Thomas Company.

The Detroit leased factory will be c

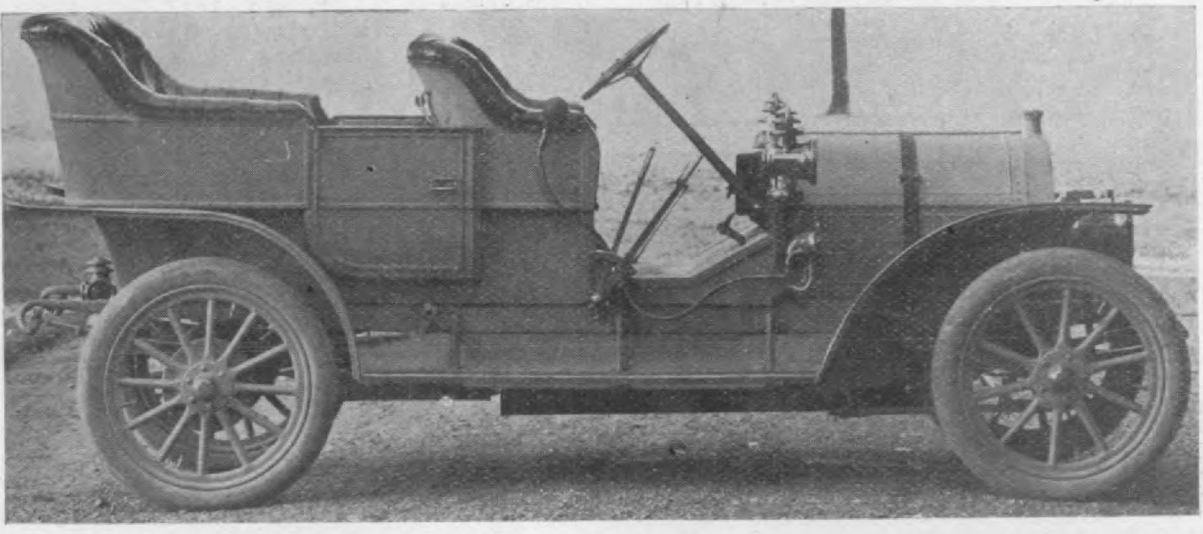

Fig. 1. The Thomas-Detroit 1908 five-passe ıger touring car; wheel base, 112½ inches ıge. 55 inches; tires, all 34x4 inches; motor, four, 4-cycle, water-cooled, 5x4¾ inches cylinders H. P., at 1000 R. P. M.; compression, 70 pounds. Tonneau body, side doors, swinging to rear eight, 2530 pounds. Price, $2750, including 5 lamps, generator, mats, horn and tools. Magnet nd cape top extra.

The Thomas Detroit Company was in-porated May 12th, 1906, and on that ne day accepted an order from the E. Thomas Buffalo Co. for 503 four cylin- cars, to sell at $2750 each.

changed October 1st, 1907, for a new f tory standing on this company's o ground, a 12-acre tract at Fairview, Jefferson avenue, Detroit, about five mi from Cadillac Square. The main bui

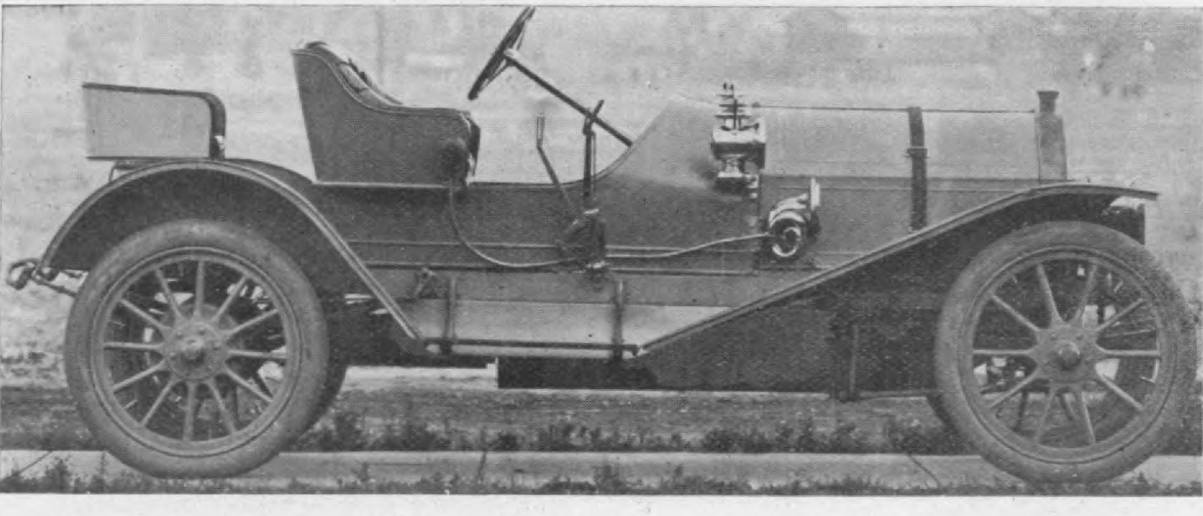

Fig. 2. Thomas-Detroit 1908 runabout with three seats. This runabout is also made wit our seats. Same chassis specifications as Fig. 1. Weight, about 2250 pounds. Price, $2750, i luding 5 lamps, generator, mat, horn and tools, ready for the road. Magneto and top extra.

A force of draftsmen was engaged and mediately began work on the drawings the new chassis. The first of a lot of

ing of this new Thomas-Detroit factory 60x400 feet, three floors, reinforced c

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rs to 5 ins. bore x 4¾ ins. stroke, in-
ead of 4¾ ins. bore and 5 ins. stroke.

112½ ins. for 1908. The 1908 weight
be the same, and the same price, $27

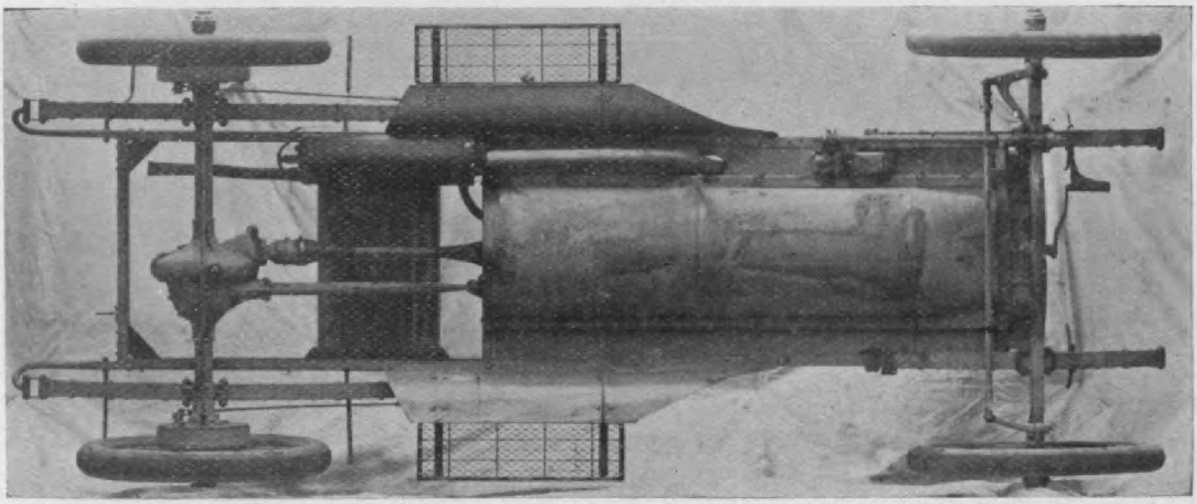


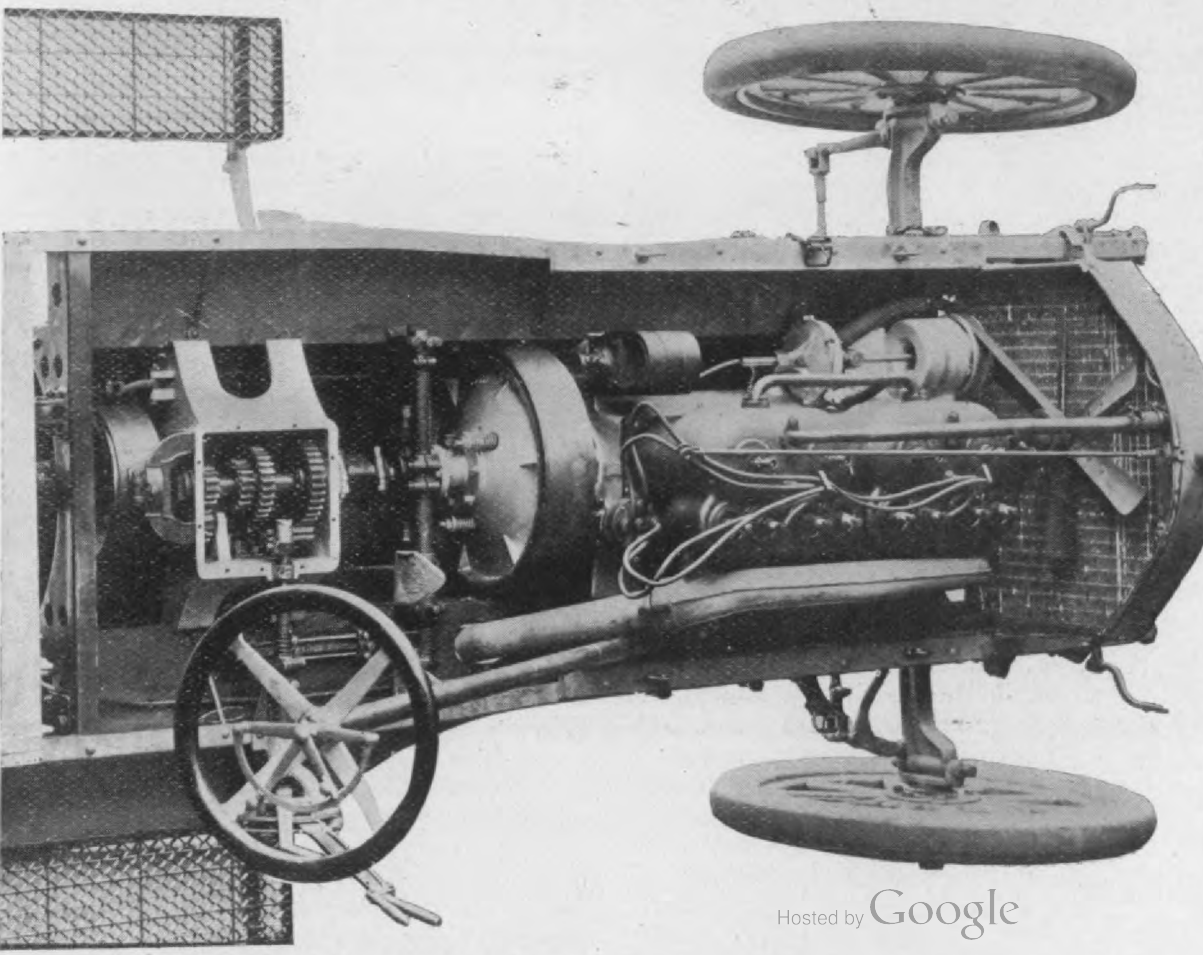
Fig. 3. Thomas-Detroit 1908 chassis, under side, showing dust-pan and fixt side plates b
ween the chassis frame sides and the sub-frame sides, which, together with the removable she
teel trough, fully protect the under side of the car.

e compression is about 70 lbs. and the
minal rating remains the same as be-
re, 40 H. P.

The Thomas-Detroit line of cars will be

will also be the same for each car.

While the general features of th
Thomas-Detroit cars will be but little
ferent for 1908, save in the specified a



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be as fully up-to-date, convenient, eedy and reliable as any cars in their ss.

The five-passenger touring car has a eel base of 112½ inches and 55-inch ge with 34 by 4 inch tires. The 4-inder 4-cycle 5x4¾ inch motor is rated 40 H. P. at 1000 r. p. m. The compres-n is 70 lbs. The tonneau doors swing the rear and the car weighs com-te 2530 lbs., and sells completely equipt dy for the road at $2750. Magneto and e top are charged for extra. The run-out seats three, but is also made to t four if desired. The chassis is the ne as that of the touring car. The weighs about 2250 lbs and completely ipt sells for $2750, the same as the ger model.

which can be squeezed together sidew so as to snap into full length chann formed in the insides of the sub-fram

It is a matter of some difficulty to vise a dust shield which will fully prot the machinery of the motor and will well retained and supported and at t same time easily removed and replac without adding more weight and c than is desirable. The method h shown, of placing fixt side-plates to co the spaces between the chassis fra and sub-frame sides, and then hangi the long trough of sheet steel by beaded edges in full length supporti channels in the insides of the sub-fra members, is very good indeed, and fu protects the under side of the Thom Detroit chassis while it is light, stro

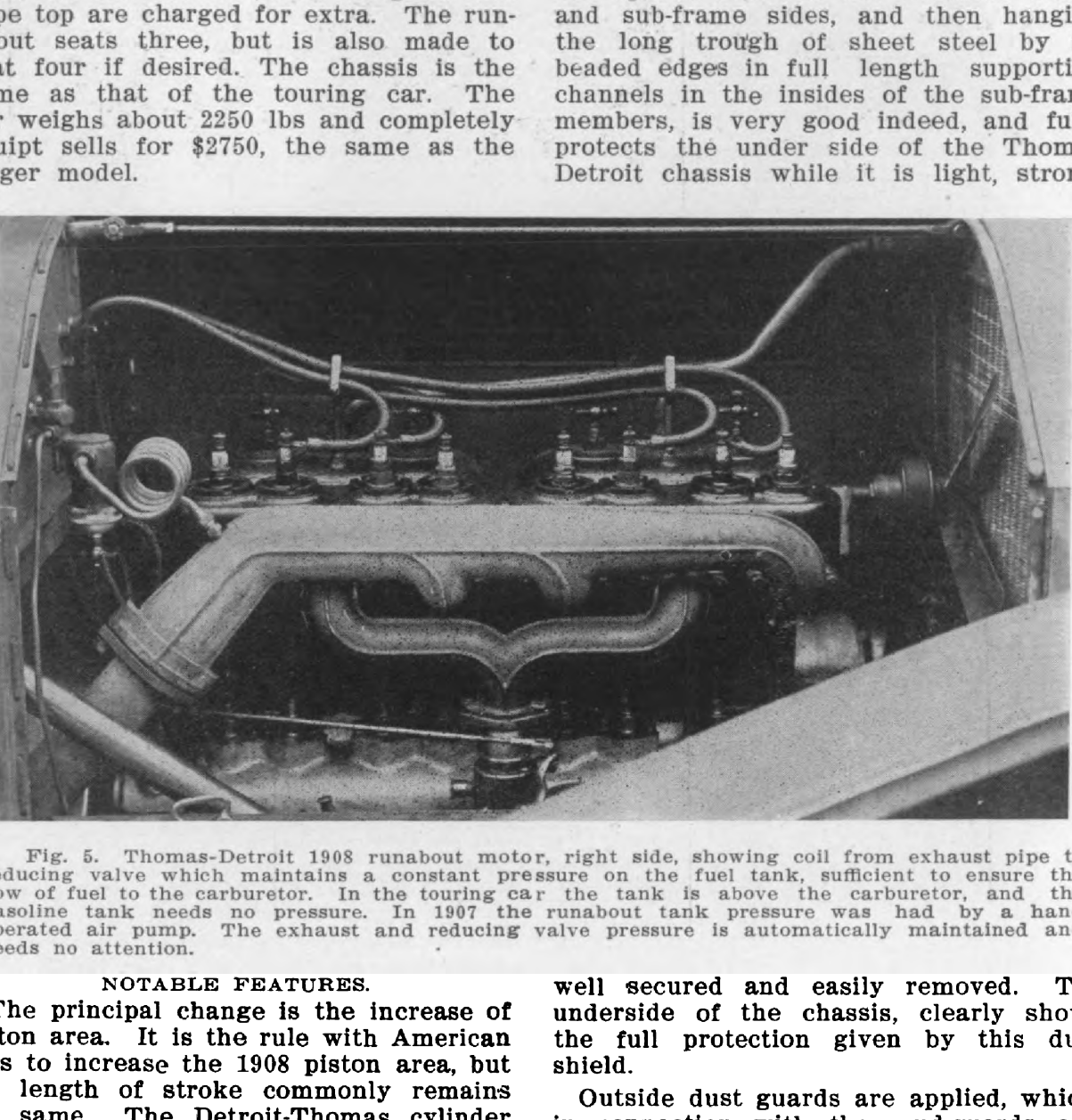

Fig. 5. Thomas-Detroit 1908 runabout motor, right side, showing coil from exhaust pipe t ducing valve which maintains a constant pressure on the fuel tank, sufficient to ensure th w of fuel to the carburetor. In the touring car the tank is above the carburetor, and th soline tank needs no pressure. In 1907 the runabout tank pressure was had by a han erated air pump. The exhaust and reducing valve pressure is automatically maintained an eds no attention.

NOTABLE FEATURES.

The principal change is the increase of ton area. It is the rule with American s to increase the 1908 piston area, but length of stroke commonly remains same. The Detroit-Thomas cylinder meter is increased from 4¾ to 5 ins., le the stroke is reduced from 5 to 4¾ . The added piston area is enough to ke the car pick up speed much more idly than with the smaller piston diam-r and this increase of power is of

well secured and easily removed. T underside of the chassis, clearly sho the full protection given by this du shield.

Outside dust guards are applied, whi in connection with the mud-guards a run-boards completely cover the und side of the car and keep mud, water a dust away from the passengers and t inside of the car, which is a decided a vantage, and one which is not yet to

at there is no shock in starting, and very slow pace can be had in crowded reets without changing from high gear. he Thomas-Detroit motors are by the merican and British Mfg. Co., Bridgeort, Conn., favorably known for excelnce of workmanship and rigid inspecon. These motors are extremely "flexle," giving a very large range of speeds ith a strong drive thruout.

Internal rear hub drum brakes only are ed, and a very large diameter line-shaft rake is placed at the rear of the gearox. This transmission brake-band is ned with camel's hair felt and is fully rotected by the dust pan, and so is uch less liable to wear than are exosed exterior rear hub-drum brake ands. This transmission brake drum is ins. diameter by 2½ ins. face, and as has the advantage of the gear ratio, nly a small band pressure is needed to ontrol the car, which is a point of great nportance. The rear springs all half liptic are on revoluble perches. They are ½ ins. long by 2¼ ins. wide in the front nd 53 ins. long by 2¼ ins. wide in the ear. The spring seating and retention has een worked out with great care. The orings have leather pads top and bottom. e U-shaped spring clips have 9-16 diamer screws and nuts and the top spring ates are of bronze, grooved cross-wise to ke the clips at each end, making a spring tention which is unusually well adapted resist spring displacement.

The front axle is an 1-section steel drop rging with no welds. No struts are ted. The torsion arm, a steel tube, has s globe front end between cup-washers ith coiled springs top and bottom, all nclosed in a casing. The chassis frame of a prest steel, 5-32 thick, frame de greatest depth 4 ins. It has two idths, 32½ ins. in rear and 31 ins. in ont. The front board is mahogany ⅞-s. thick, flat, for the touring car. For e runabout models, the front board is deep aluminum casting, no wood whatver. The lamps-brackets are all steel rop forgings. The gasoline tank, 18 galns capacity, is carried under the seat, nd is above the carbureter in the tourg car. In the runabouts the fuel tank under a small pressure which is obined from the exhaust through a cool-

The oil basin has two crank-pits, e fitted with an overflow stand-pipe lead to a well below, containing a two-pinion pump driven by the lower end of the c mutator shaft, that forces the oil upw thru a line of piping which has glass sight in the rear of the front bo and then goes down and delivers all oil to the crank shaft middle bear whence it goes to the two crank pits then through the overflow pipes to oil well and pump again. The oilin by splash, and more or less oil is gi to everything by varying the height of stand pipe.

Fig. 6. Thomas Detroit 1908 control; il tration from the runabout. The coil-box lubrication sight-stand under the cowl on shelf rear face of front board. The lubri tion sight does not appear in this illustrati

CONTROL.

The outside lever is latched, and w pulled backward first disengages clutch and then applies the emergency ternal rear hub-brakes. The inside l rocks side-wise in a straight slot an moved to affect the selective gear chan The steering is by a quadruple threa screw, trunion nut and bell crank slotted arms. The spark and throttle trol levers are ratchet retained on to the hand wheel. The left hand pedal leases the clutch only. The right h pedal applies the line shaft brake c and is not interlinked with the clu A plunger pedal governs the throttle sition.

Hiram Percy Maxim, formerly with the lectric Vehicle Co., and T. W. Goodridge,

A new system of power transmis will be used which they say is enti noiseless in operation, and larger batte

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ukee, Wis., which began operations out a year ago, has produced several dels of cars, and is now incorporated l is placing the first of its perfected structions, a three-seated Roadster, on market. The policy of the Hay-Berg mpany is to purchase components of best makers and assemble them in a rmonious design, carefully suited to the t service of the selected elements.

The parts and materials used are of the y best, and the mechanical experiences l successes of the Hay-Berg officers rantee the quality of the workmanship the cars produced under their manage-nt.

A 1908 20 H. P. four-cylinder air-cooled rrico engine is used. The compression only 55 pounds. A three-speed sliding nge speed gear is fitted with cardan ft to the bevel gear drive divided axle. e bodies are of wood, hand-made by the

frame members forward.

The Carrico air-cooled motor is al carried on 3 points only, one in front the front cross-member of the frame, a two at the rear of the motor on the chass frame sides. This gives a good distrib tion of the motor and gear box weight the chassis frame. A universal joint limited movement is placed between t crank-shaft and the line shaft. The clut is an exterior constricting band, co-acti with an exterior cylindrical extension tegral with the flywheel. This clutch pedal actuated in both directions wi one pedal only, and requires no sprin whatever.

A Hartford universal joint is used b tween the gear box and the rear ax Both front and rear axles are by the Ti ken Company, with exterior and interi brakes. No line-shaft brake and no stru are fitted. The change gear is slidin

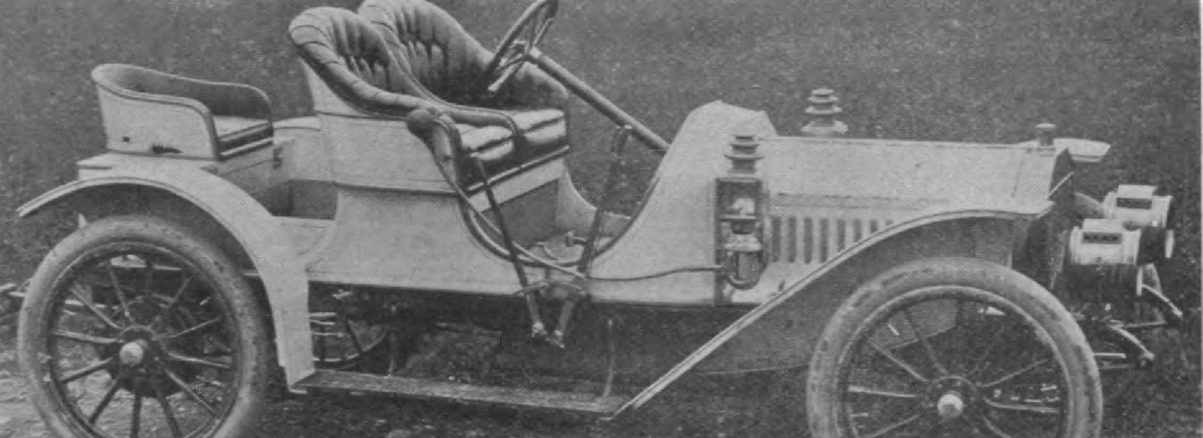

Fig. 1. The Hay-Berg 3-seat Roadster. Wh eel base 110 ins.; gage, 56 ins.; tires, 34x4 in r; 34x3 1-2 ins. front; motor, four, 4-cycle air -cooled cylinders, by Carrico, 1908 model, 55 lb npression, 20 horse power at 1200 R. P. M.; sliding gear, 3 forward speeds and a revers el gear drive to divided rear axles. Wooden bodies, hand-made by the Hay-Berg Company, t 3 passengers. Weight, 2000 lbs.; price, $2000, including 5 lamps, horn, mat and tool ready for the road.

y-Berg Company. The roadster seats ee people, has 110-inch wheel base, 56 e, and 34x4-inch rear and 34x3½-inch nt tires. The car weighs complete 2000 nds, and is listed fully equipt at $2000.

NOTABLE FEATURES.

he chassis frame is prest steel, A. O. ith Company, greatest depth of side-nes 4 inches, two widths, 34 inches r and 30 inches front. Oblique mem-s are introduced forward of the middle ss-girt, reaching to the offsets in the

selective type, by Brown-Lipe. The stee ing gear is a screw action, powerful a without lost motion.

AIR-COOLING.

Altho there is at this time a sentime in favor of water-cooling, the advantag of air-cooling are so obvious that no o would wish to add the radiator, water c culating pump and cylinder water-jacke to an air-cooled motor which gave no tro ble. As showing what the air-cool motor can do, the first Hay-Berg 5-passe

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-cooled motor, coupled with its great nplicity and the absence of water, fully termined the Hay-Berg management to opt air-cooling. The writer can add his n testimony as to the good work of an erloaded Carrico air-cooled motor during 375 mile run in dog days with the ther-ometer at 96 degrees and the fan-belt off, e car weighing about 3300 pounds un-aded and carrying three passengers. ese facts, not isolated but merely every-y occurrences which can be repeated at y time, amply justify the Hay-Berg Com-ny's decision to use air-cooled motors in of its cars.

and no aluminum are used for these tails. The inside front mud guards fu prevent splashing.

THE HAY-BERG ROADSTER BODY.

The lines adopted show for themsel in the illustrations given. The form is keeping with popular approval, and th seats are provided; the rear seat can removed, giving ample room to carry l gage or even a considerable quantity goods, and a double seat, accommodati two passengers, is fitted to order, maki a surrey body. As shown in these ill trations the rear seat has ample fo space, which greatly adds to the comf

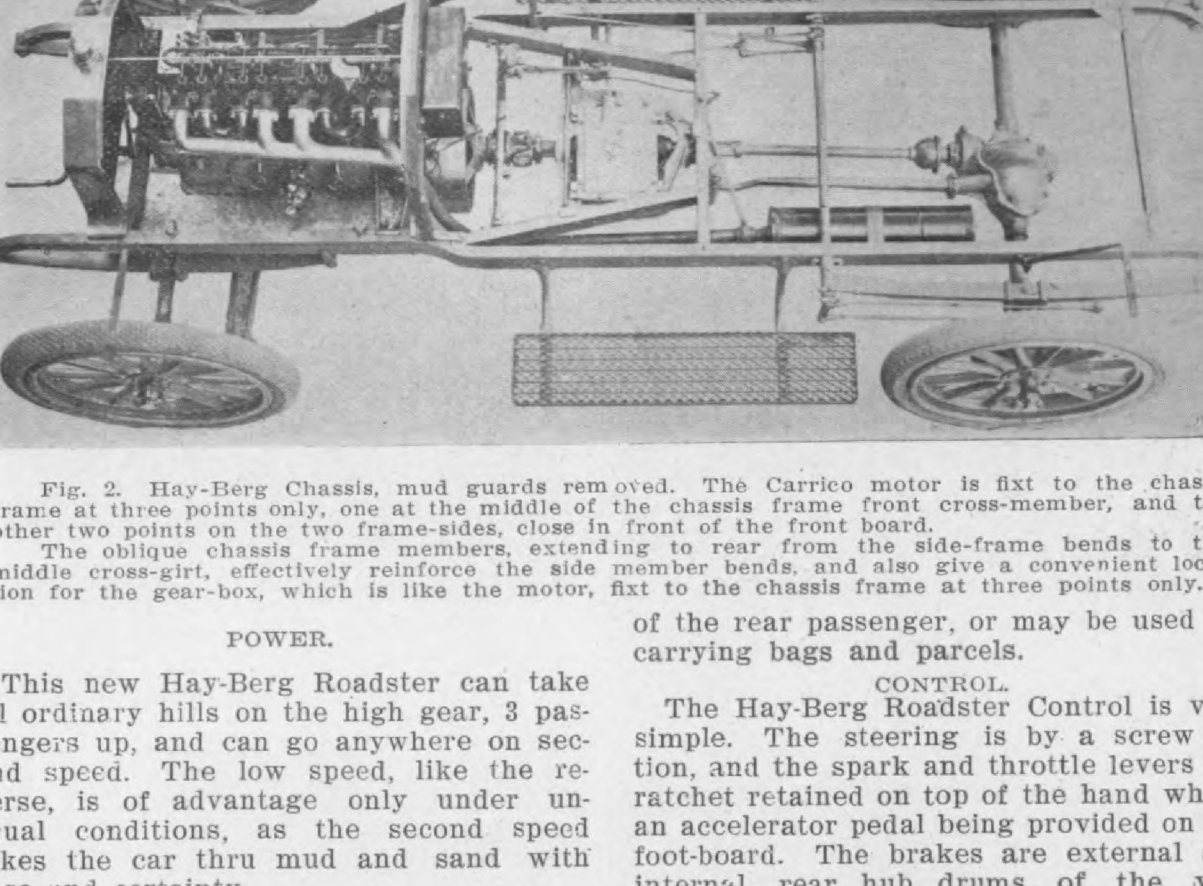

Fig. 2. Hay-Berg Chassis, mud guards removed. The Carrico motor is fixt to the chas rame at three points only, one at the middle of the chassis frame front cross-member, and t ther two points on the two frame-sides, close in front of the front board.

The oblique chassis frame members, extending to rear from the side-frame bends to t niddle cross-girt, effectively reinforce the side member bends, and also give a convenient loc ion for the gear-box, which is like the motor, fixt to the chassis frame at three points only.

POWER.

This new Hay-Berg Roadster can take l ordinary hills on the high gear, 3 pas-ngers up, and can go anywhere on sec-d speed. The low speed, like the re-rse, is of advantage only under un-ual conditions, as the second speed kes the car thru mud and sand with se and certainty.

The springs are all half-elliptics, 40 in-es by 2 inches, 5 leaves in front and 48 ches by 2 inches, 7 leaves, in the rear. o struts are fitted. The fuel tank, gal-nized iron, 24 gallons capacity, is located der the driver's seat, with the bottom anding six inches above the Schebler reburetor. The fuel tank has a hand

of the rear passenger, or may be used carrying bags and parcels.

CONTROL.

The Hay-Berg Roadster Control is v simple. The steering is by a screw tion, and the spark and throttle levers ratchet retained on top of the hand wh an accelerator pedal being provided on foot-board. The brakes are external internal, rear hub drums of the known Timken construction. There two hand-levers, the outside one shift the gear, while the inside hand le latched, applies the exterior, emerge brakes. The internal brakes are app by the right pedal, while the left pe works the clutch. The clean appeara of the foot-board is well shown in the

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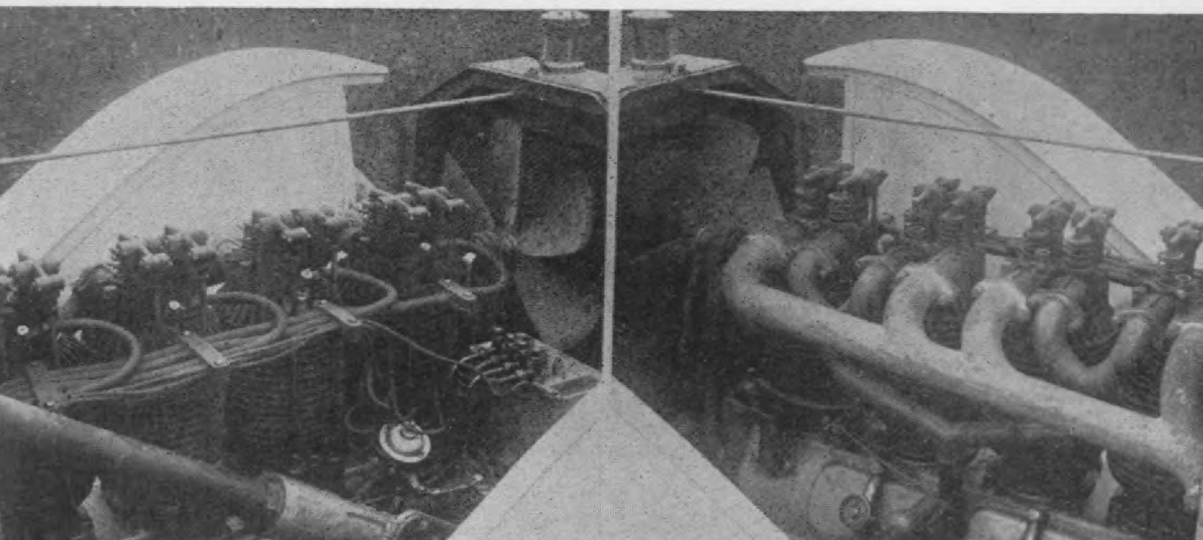

Fig. 3. The Hay-Berg Carrico motor, right and left sides. Both valves are in the head e cylinders are 4x4 ins. The piping, carbure tor and crank-box doors are all on one sid is motor air-cools perfectly, never giving the slightest trouble in this particular, as far as th perience of the writer has shown. It is promp t in starting and very strong on partial charges.

d, Wis., in good time, the motor work- to perfection, and showing plenty of eed and hill-climbing power. Within out 17 miles of Milwaukee, on the re- n run, the car was driven off the road

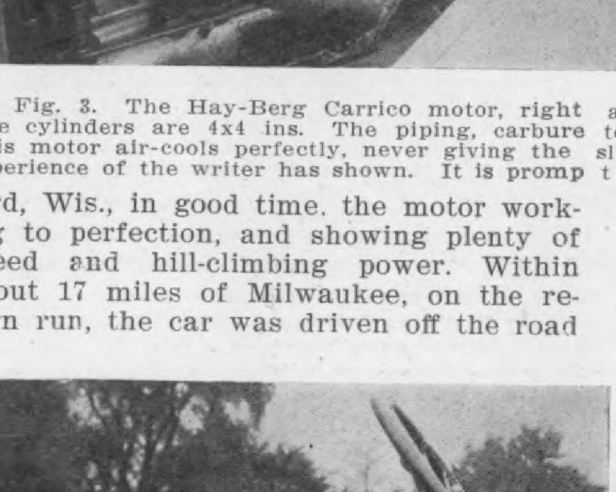

Fig. 4. Hay-Berg Control. The steering is a screw action, with spark and throtle con- l on top of the hand wheel and an accelera- pedal on the foot-board. The upright hand ers apply the emergency brake and shift the rs. The right pedal works the ordinary ke and the left of the clutch. The oil

tire was removed, and the car driven Menominee Falls on the wheel rim, wh wrecked the wheel, and caused a delay some hours before it could be replaced

In this first run the Hay-Berg roads showed well at every point except in springs, which are the first ones pla and are not what they will be. The ro was very hilly and the motor was push hard, and was always ready to meet demands. The car took hills, of wh there were many in the route, very w indeed, climbing almost everything high gear, but this otherwise most s cessful performance was made unsatisf tory by the accident at the end. The d tance covered was about 75 miles.

A second run was made Monday a Tuesday, September 2 and 3, Milwauk to Janesville, 71 miles and return, rou trip 142 miles, shortest road. The ro ster, supposed to have been thor repaired, left Milwaukee at 8.20 Mond Mr. Sternberg, one of the Hay-Berg ow ers, who has had only a limited expe ence, driving.

About 12 miles out, near Calhoun S tion, on a straight and pretty fair ro our left hand front wheel began to sh its spokes, and some 300 feet from whe it left the first one in the road the c stopt in the right, deeply gullied, d ditch, with the wheel-rim clear of the hu but the car right side up, all the passe gers in their places and nobody hurt. W were running about 20 miles an hour.

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Much of the road was very rough, towns were few and small, and we had ask our way, which delayed us.

On Tuesday morning we left for Milukee. Our same left hand front tire nt down 7 miles out, was patched, but ted only two miles. Then we put a 3½-h inner tube into the 4-inch shoe, lost road, and our storage battery ran vn while still 40 miles west of Milukee. We procured a battery of dry ls, and proceeded only to have our same hand front tire go flat from the leak- of a patched inner tube. To be safe had our spare tubes patched about 10 es from Milwaukee, which place we trouble was due to bad tube patchin The 3½-inch inner tubes in the 4-in shoe served perfectly well, save for t faulty patch on the first one put in. T 4x4 air-cooled motor was always read prompt starting, powerful and absolute perfect in action thruout. The whole d tance covered was well over 200 miles.

If the Hay-Berg roadster had not be very well put together it would nev have existed after its accident in the fir run. The motor performance was r markably good, and the car showed its to be silent, speedy, a strong hill-climb and of good appearance.

1908 Cleveland Car

The 1908 "Cleveland," made by Cleved Motor Car Company, is offered in models on the same chassis, one a ring car, and one a roadster, each list- at $3500.

The motor consists of 4 cylinders, verl, water-cooled, cast in pairs, with inral water jackets. The bore is 5-inch stroke 5-inch.

gnition is by jump spark, with an imted Bosch high tension magneto, and an auxiliary and independent coil and rage battery. Spark plugs for magneto cuit are over the inlet valves. The used is a single unit "Connecticut" h distributor.

postive feed mechanical oiler is selftained in the motor, and the oil reser- is carried as an integral part of lower f of motor crank case with capacity of ee gallons. Overflow holes in the oil of the crank case keep the oil at a stant level at all times.

Valves are mechanically operated; let and exhaust valves are both on t right hand side of the motor, and are terchangeable.

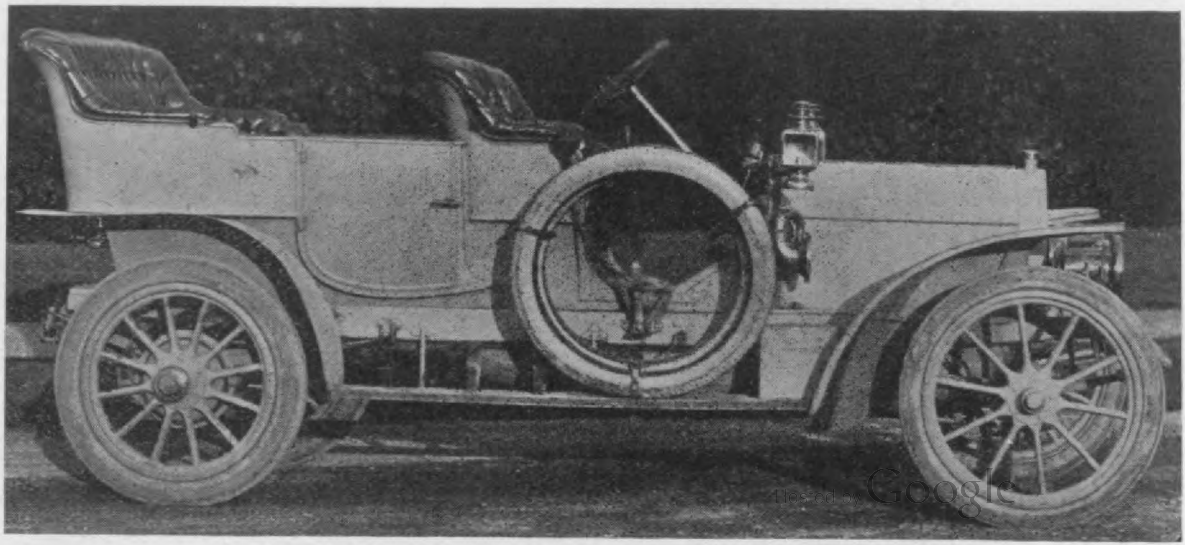
The cooling system comprises a Ma radiator of new Cleveland type and shap a large gear-driven pump and liberal siz drawn copper water tubes and conne tions.

The gasoline tank holds twenty gallon A large dirt trap is located between t tank and carburetor.

The transmission gear is of the selecti type, four speeds forward and one revers with direct drive on third speed. F and Annular Ball Bearings are used. T clutch is of the multiple disc type, ru ning in oil.

The rear axle is of the floating clut driven hub type, ball bearing thruout.

The front axle is a drop-forged I-bea section. The reach rod between the ste ing connections is located back of t front axle, which is placed flush with fro of radiator.



FORD "SOUND LOGIC" TALKS

WE HAVE BEEN CRITICISED because Ford agents receive about half the discounts for selling Fords that other makers find it necessary to pay in order to force the sale of their cars in competition with Fords.

SEEMS TO US as if that criticism is a boomerang. We fully admit that Ford agents have received less "rake-off" per car—but every one of them more than quadrupled the number of sales of his competitors.

YOU CAN'T POINT to a Ford agent who will handle any other line in 1908—if he can get the Ford. And he can get it if he has "made good" and treated his customers right.

HERE ARE THE FACTS: We believed that a thoroughly reliable, powerful, practical runabout could be built at a price within the reach of any man earning over $1800 a year. We believed $600 ought to buy such a car. And we did build and sell 2,500 at that price allowing usual agent's discounts

COMPETITORS AWAKENED to the fact that they were out-classed. Whether in sincerity or not we do not know, but several announced that they would "meet Ford on his own ground." They began to bid for supplies in the market. This resulted in inflating values—though it brought forth no real competition.

WE FOUND OURSELVES confronted by a severe problem and one which threatened for a while to defeat our plans. The advance in prices of material made it impossible to make cars at cost estimated.

ONE OF TWO WAYS WAS OPEN to us. First, to raise the price. This, our esteemed competitors hoped we would do—our well-meaning friends advised us to do, for Ford cars were commanding premiums as high as $250 and the output could all have been sold for $1,000 per car easily. The other alternative was to adhere to the price, even though, after deducting the regular 20 per cent. agent's discount, it cut our margin to nothing. The first was not to be thought of—principles—Ford principles—don't vary, even if prices do fluctuate. We were committed to a price, and had staked the reputation and all the resources of the concern on this runabout proposition. The price and quality must be maintained—that done, competition was helpless—the cars would sell themselves. This we could do if the agents were willing to divide their discount with the factory. We laid this proposition before our agents. Some assented readily; some reluctantly; a few refused, dropped the Ford line—and are sorry.

WE HAD AN ABIDING FAITH in the sound good sense of the average buyer; we were right; the customers saw where the value was; Ford cars sold themselves. Many Ford agents to-day admit they sold cars over their own half-hearted recommendations and even protests. No customer ever asked for a division of the discount—the news spread and they were getting "all automobile" for their money. No bad trades were made—all that was left to agents getting fancy commissions for selling inferior cars at higher prices.

AND THE NET RESULTS?—the most wonderful season's business ever recorded in the history of the industry.

SEVEN AND ONE-HALF MILLIONS of dollars' worth of automobiles made and sold, placing Ford in the first place among makers of the world.

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And Some PERTINENT FACTS

THE MOST WONDERFUL RECORD of performance, economy of operation and up-keep of pleased, delighted customers ever known to the trade.

DID FORD AGENTS MAKE MONEY?—ask 'em what line they will handle next year!

AND THE FUTURE?—Recent events have had a sobering influence on the market and especially on makers of parts and supplies. The price of copper has declined; other materials are seeking their natural level. Ford facilities now enable us to make every part of the car except tires, wheels, coils and the paint that goes on the body.

WE MAKE OUR OWN STEEL—Vanadium steel—and in this we stand alone among makers of the world. Thirty-five hundred tons of Ford Vanadium steel now under way.

FOR 1908 WE WILL BE ABLE to maintain the standard of quality to the customer and divide a more liberal margin with agents. Ford agents can continue to offer their patrons one hundred per cent. better values than any other—won't tell you what it is yet, but it's Ford and that's always two years ahead.

WE ARE NOW READY to establish an agency in every city, town and hamlet in the United States.

THERE ARE A FEW THINGS we'll insist on: In towns large enough to justify it the agent must maintain a repair shop, must carry a stock of small parts for replacements, must treat his customers liberally, fairly and courteously—we've had enough of those short-sighted "penny wise and pound foolish" fellows, who charge a good customer for adjusting his carburetor or cleaning a plug—they never get anywhere and they misrepresent Ford policy.

WE WANT MEN OF GOOD REPUTE IN THEIR HOME TOWNS—good, reliable hustlers—mechanics preferred—who will properly represent "Ford Courtesy" as well as Ford cars. We want men who will go into the automobile business in earnest, who will lay plans for the future—men who appreciate that the motor car is no longer a luxury, but an everyday necessity to every business man who isn't rooted to one spot all day. We'll treat you right—copy that in your dealings with customers and you'll win. Ford cars sell themselves, and you'll easily place five Fords while trying to force one of the others on an unwilling customer.

LARGE CAPITAL IS NOT NECESSARY to obtain the agency—we don't tie you up with a big contract for a large deposit or insist on your disposing of a definite number of cars—we know you will sell as many as we'll give you and we'll give you all you can sell, promptly. Good reputation and good intentions, backed by hustle and cash to pay for cars as you order them are the only requisites. The 1908 Ford line will be the most complete, the most comprehensive and the best value ever offered by any maker in the history of the industry.

WRITE TO-DAY for list of towns that are open in your state. Do it to-day—if you delay some more enterprising man or concern will have "sewed up" your territory.

FORD MOTOR CO., 254 Piquette Ave., DETROIT, MICH.

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protected. The brake shoes are double acting, holding either backward or forward in both the emergency or foot brakes; both brakes are bronze against steel. The emergency brake lever pulls toward the operator to set the brakes, and automatically releases the clutch. The foot brake does not release the clutch. A ratchet sprag is provided on the driving shaft drum. The pawl of this ratchet sprag has a unique spring cushion construction, which prevents shocks to transmission and rear axle when the sprag is applied.

The frame is cold rolled prest steel, channel section. The drop frame is arched over the rear axle. The front springs are semi-elliptic, and the rear are of the three point platform suspension type. The hood or bonnet is 16 gage aluminum. The radiator and dash hood flanges have raw hide lacings to prevent rattling.

CONTROL.

Spark and throttle levers of new and distinctive design are located on the steering wheel. The segment is stationary and independent of the steering wheel. Foot accelerator is independent of the hand throttle lever. The steering wheel rim is of mahogany, 18 inches in diameter, with an aluminum spider.

The wheels of the touring car are: Front, 36x4 inches; rear, 36x4½ inches. The roadster wheel equipment is: Front, 36x3½ inches; rear, 36x4 inches. The touring car wheel base is 122 inches; roadster, 110 inches; and tread, 54½ inches for both. The dash is mahogany bound with solid brass moulding. The body has metal panels, is a seven-passenger type, "straight line" pattern. The price of the touring car or roadster is the same, $3500.

The Albany Runabout

The Albany Automobile Co., Inc., of Albany, Ind., U. S. A., are marketing a line of high wheeled friction driven cars known as the "Busy Man's Car," There are four models, B, C, D and E, $375, $450, $500 and $650, respectively. The motors are a single cylinder vertical, 4-cycle, 4½ bore by 4-inch stroke, rated 6 to 7 H. P., and a twin cylinder, 10 to 12 H. P., 4-cycle motor of 4-inch bore and stroke. Both motors are air-cooled, having integral cast flanges and a belt driven fan. The inlets are automatic, both valves being in the head. Splash lubrication is used.

A description of Model C will sufficiently cover the other models. The wheel base is 90 inches. tread 56 inches; 32-inch artillery wood wheels with steel channel rims and solid 1¼-inch side wire tires are used. The road clearance is 12 inches. The frame is of angle steel, and is mounted upon four full elliptic springs. The front axle is heavy steel tubing, with drop-forged steel knuckles and yokes. The rear is tubing encasing a 1¼-inch live shaft, the drive from the countershaft being a single chain to a Warner differential on the rear axle. Roller bearings are used. The motor in each model is mounted at the front under a hood with the flywheel at the rear, and on an extension of the engine shaft a 20-inch friction disk drives an 18-inch friction wheel, which slides on the feathered countershaft. The disk is metal faced and the wheel is faced with a special tarred friction fibre. All speeds from 2 to 20 miles an hour are operated by one lever. The disks are engaged by a ratchet foot pedal. The disk is provided with a thrust ball bearing, and in the central position the friction wheel acts as a brake. The cars are fitted with a wheel steer, the connectink links having ball and socket ends. The knuckles and yokes are drop forged.

Ignition is by jump spark from a double coil and dry batteries. The engine is controlled by spark and throttle from the top of the steering wheel.

Model C is a two-passenger car, the space back of the seat being used for luggage. Model E is fitted as a surrey, and has running boards, and can also be fitted with a folding top if desired.

Ordinance to Create an Auto Commission

Milwaukee will probably be the first city in the United States to have an automobile commission.

An ordinance was introduced to create a commission, to be composed of three members, an electrical engineer, a practical machinist, and the secretary of the civil service board. All drivers will be compelled to secure licenses, and upon just cause the commission will have power to revoke such licenses. One provision of the ordinance is the right given the commission to revoke licenses of chauffeurs convicted in court of drunkenness.

Cars Insufficiently Marked by the Manufacturers

The manufacturers in this country are not over-careful in marking their cars. The maker's name and the serial number of the car are usually placed on a superficial plate attached to the body, while the engine change gear case, etc., bear no definite marks of the date of manufacture. Under these conditions it is easy for unscruplous dealers to make over and palm off on unsuspecting persons an old car for a comparatively recent model.

Mr. George K. Wheeler, of Columbus, O., sales manager of the Columbus Buggy Company of that city, died of heart failure at 2 P. M., Saturday, August 24.

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alo, New York, U. S. A., has a factory ntirely separate and distinct from that f the E. R. Thomas Detroit Company, akers of motor cars, although Mr. E. R. homas, of Buffalo, is president of both oncerns. The lines of production of hese two companies differ, in that the uffalo shops turn out larger and more ostly cars than are built at the Detroit actory, though in quality the cars are ntended to be the same.

This description is of the Buffalo prouct exclusively, that of the Detroit shops eing separately illustrated and described.

The E. R. Thomas 1908 Buffalo car nodels are four in number, a six-cylinder ouring car, two different models of fourylinder chassis, and a "Town Car," or notor cab, a closed car on a fourth hassis. This article will illustrate and escribe the two 4-cylinder touring cars

tails.

The outside appearance of the Thomas F and DX models is shown Figs, 1 and 2. Model F is a seven-pas ger touring car with 127 inches w base, 56 gauge and 36-inch wheels, 4-inch front and 5-inch rear tires. motor is 4 cylinders vertical water-coo four-cycle, 5½ inches square, rated a H. P.

The drive is a sliding gear, four ward speeds and a reverse, with side c driven rear wheels. The motor has a in front and the steel casting fly-whee provided with integral fan vanes. seven-passenger body is of sheet a inum on a substantial wood frame steel angles and braces. The tonn seat is unusually wide and two fol seats are placed on the tonneau f which has ample foot space, and the

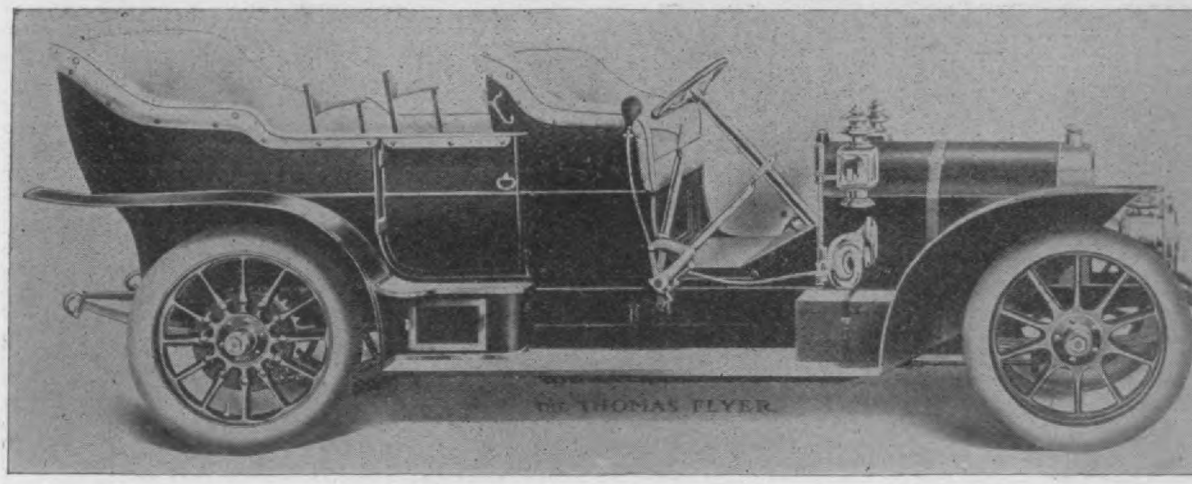

Fig. 1. The E. R. Thomas 1908 Model F seven-passenger touring car, wheel base 127 ches, gauge 56 inches, tires 36-4 inches front and 36x5 inches rear; motor, four, 4-cycle cylind water-cooled, 5½x5½ inches; nominal 60 H. P. The clutch is 3-discs, one of steel on each s of a bronze disc with cork inserts, double chain drive. Weight, 3000 pounds; price, $5000, w complete equipment.

nly, which have each four cylinders of he same bore and stroke, but have yet naterial differences in the engines, in the heel-bases and construction generally, hich make them two distinct and separate cars.

Of these two Thomas 4-cylinder 1908 ars. known as the "F" and the "DX," he Model F is the larger, 127 inches heel-base, and the DX is the smaller, 18 inches wheel-base. Both the DX and he F models retain the distinctive featres of former Thomas cars, including ymmetrical cylinders with two camhafts and directly operated valves, the hree-disc clutch, the three-point gear box upport, and the ratchet and pawl arngement which acts to prevent the cars

design has been changed to the "stra line" effect, all making this model one o largest, most powerful and most ele of motor cars. The car weighs pounds, and the price is $5000, inclu 5 lamps, mats, horn, complete set of t tire irons and acetylene gas tank, ready for extended touring. The cape is extra.

The model "DX" seven-passenger t ing car has 118 inches wheel-base, inches gauge, and the same sized wh and tires as the model F. The moto also the same size. The drive is a ing gear, four forward speeds and a verse, with side chains to the rear wh The body seats three passengers in rear, has two folding chairs in the

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NOTABLE FEATURES.

While the two Thomas 1908 models here strated and described show no radical nges, and, save in the carburetor, no olute novelties, they do show almost nplete re-designing of details through- . The carburetor shows new details ch are regarded as important. The ssis frame sides have been consider- y increased in greatest depth, from 4½ hes to 5½. The side frame width has n increased from 1½ to 1¾ inches, the ckness of stock remaining 5-32, as in 7. This very material increase in both depth and width of the chassis frame been accentuated by increasing the th of the lower member of the channel me sides where advantageous; the gely increased chassis frame strength stiffness thus obtained making it safe omit the ½-inch diameter turn-buckle ss rod, with two king-posts, which has n a distinctive feature of the Thomas ssis frames up to the present time.

The front axles have been re-designed, le the rear axle gearing has been ma- ally improved. All front wheels are Timken rollers, while the change gear, ss-shaft and rear wheels are on stand- ball bearings.

AXLES.

The front axle is the same in models F

The rear axle is the same for mode F and DX, and is an I-section steel dro forging, same as the front axle. Th beam section is 2¾ inches deep by 1 inches wide, web ¼ inch, ribs 5-16, wi large radius fillets. The largest diam ter of the tapered rear axle is 2 5-16 i ches. The rear wheels are on standa ball bearings, 9-16 balls inside and 7- balls outside. The inside ball race against a shoulder, and a tapered ste distance tube is placed between the ou side and inside ball races, so that one n and one washer retain both ball-races. N

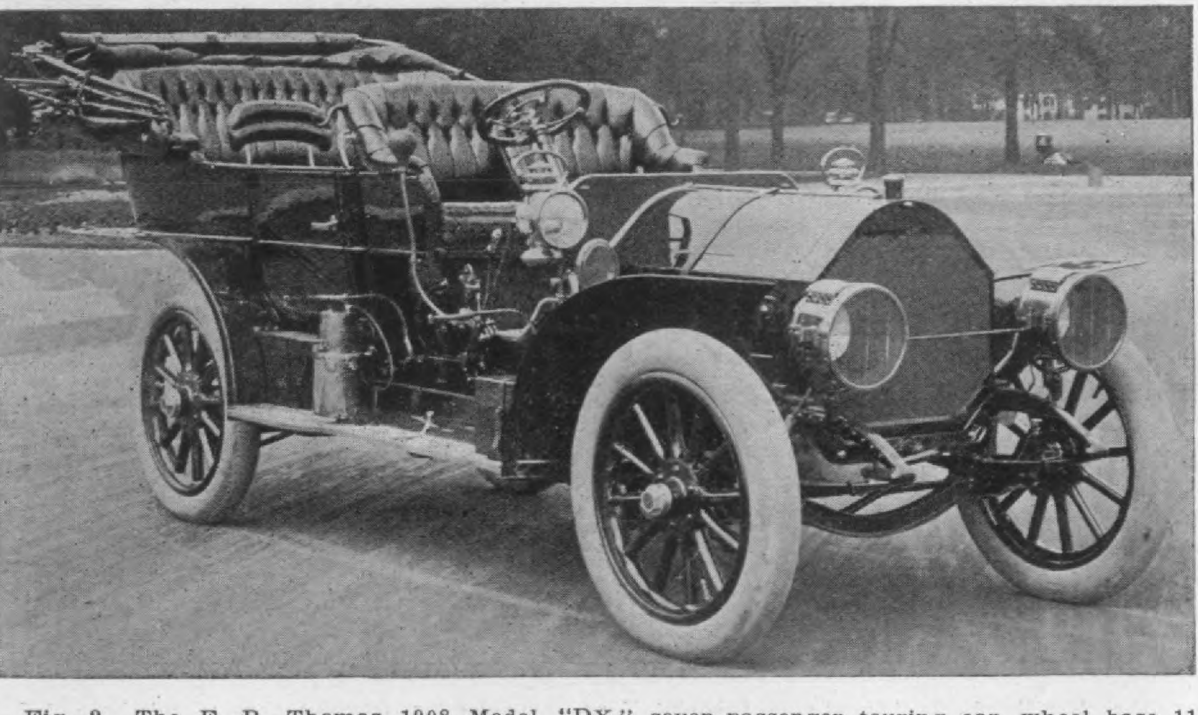

Fig. 2. The E. R. Thomas 1908 Model "DX," seven-passenger touring car, wheel base 11 ches, gauge 56 inches, front tires 36x4 inches, rear tires 36x5 inches; motor, four, 4-cycle, water- oled, 5½x5½ inch cylinders; nominal 60 H. P. The drive is by side chains. Weight, 300 unds; price, including five lamps, mats, horn, complete with equipment and gas generator 000.

thrust bearings are fitted. The rear h brake drum is 13½ inches, inside diam ter, internal shoes only are used. Th are fiber faced and cam-rocker expande

SPRINGS.

Models F and DX are equipt with ha elliptics. The front springs are 40 i ches long by 2¼ inches wide, tongue grooved and banded, have 7 leaves, a are jointed to the chassis frame in fro and linked in the rear. The rear sprin are 54 inches long by 2½ inches wi tongued, banded and grooved, have leaves, and are linked to the chassis fra at both ends.

Lubrication of the spring eyes a bolts is cared for by placing finished ste

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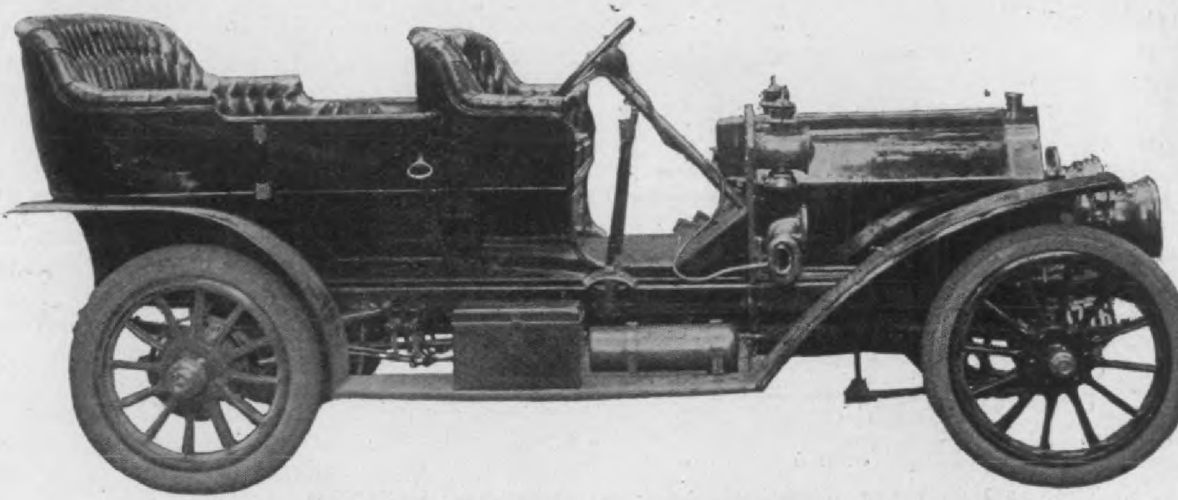

Embodying Chrome nickel steel, Annular Bearings, Aluminum Body.
Equal to the best. Impossible to get better.

THE POWER PLANT OF THE

PENNSYLVANIA

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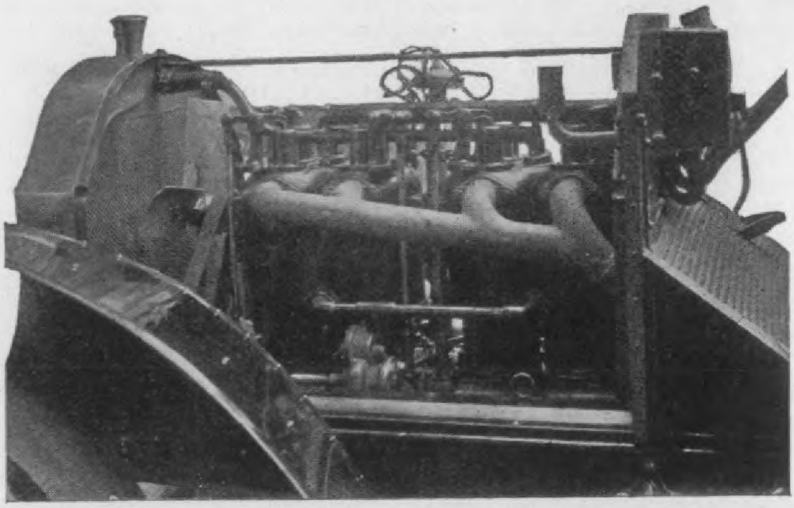

4¾ x 5¼ valve in head. Hollow Crank, Eccentric Ring Oiling, Large Bearings, Perfectly Balanced.

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$2800.00 50 H. P.

steel, 5-32 thick, 5½ inches greatest depth, 1¾ inches wide, while the lower channel member is increased in width at certain places. The one-half inch rod and turn-buckle bracing previously used has been omitted. The frame is 174 inches long, spring eye to spring eye, is in two widths, 31 inches front and 34 inches rear, and has five cross-members, with an angle steel sub-frame, 40¼ inches long by 20⅝ inches wide, on which the motor

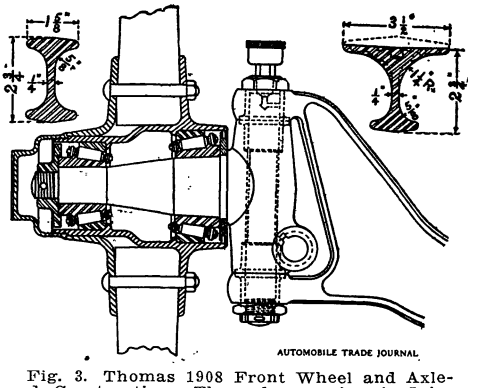

Fig. 3. Thomas 1908 Front Wheel and Axle-end Construction. The yoke opening is 5 inches. The stub axle pins are one inch diameter, and have hardened and ground ends in hardened and ground bushings. Note the large fillets shown in the I-beam axle section. The front axles are the same in Models "DX" and "F," and are steel drop forgings without a weld.

is placed. The top of the chassis frame is flat, and stands 5 inches above the top of the sub-frame.

The model DX chassis frame is 160-9-16 inches, spring eye to spring eye, is 30 inches wide in front, 34 inches wide in the rear and the frame sides are 4½ inches greatest depth, and made of 5-32 stock. This DX frame has four cross-members with no sub-frame, the motor being carried on four bronze brackets riveted to the insides of the frame sides.

THE MOTORS.

The DX model motor is not very much changed from that of 1907. The cylinders are the same dimension for the F and the DX, 5½x5½ inches, 60 H. P. nominal. The four cylyinders are individual units, with integral water jackets and heads, a plug in the top covers the large core-print opening. Abundant water circulation room is given everywhere, both intake and exhaust valves being jacketed. The water circulation is by a 2-pinion pump.

The cylinders are symmetrical, with valves on each side, all valves the same, directly actuated from two cam shafts. The cam rollers are in forked lifters, which have individual coiled springs in bronze lifter sleeves. The roller forks are threaded at the top end to take capped, threaded length-adjustment sleeves, which are check-nut retained. The valves are all integral head and stem steel drop-forgings, all ports 2 7-16 inches diameter. The crank-shaft journals are all the same diameter, 2 inches, the crank pins are 1⅞ diameter, and the shaft has five bearings in split babbitt boxes. The grey iron pistons are 6¼ inches long with four eccentric snap rings, cut 45 degrees, placed all above the piston pin, and pinned. The connecting rods are steel drop-forgings of grey-iron—bushed at the top end, full marine type with babbit half-boxes and two cap-screws on the crank-pins. The crank-shaft has an integral flange and projection at the rear end to take the steel casting, fan-vane fly-wheel, which is also the principal clutch member. The cams are applied to the cam-shafts and retained by riveted taper pins. The cams are drop-forgings of high carbon steel, case-hardened and ground. The cam-shaft is soft steel, ⅞ diameter. The cam-shaft gears are steel castings and fiber, and the crank-shaft pinion is steel, applied, keyed, and nut and shoulder retained. The cam-shaft gearing is 8 D. P. direct, no intermediates.

Two complete systems of ignition are furnished. the Atwater-Kent and Bosch magneto, with storage battery and jump spark plugs. The Atwater-Kent is held in high favor by the Thomas engineers, it having given excellent results in the past season.

THE NEW CARBURETOR.

In the sectional illustration given the auxiliary air intake assembly is revolved 90 degrees from its actual position to give an intelligible sectional diagram. This carburetor belongs to the float-feed, suction-operated, auxiliary air-intake class, and has a single nozzle. Referring to the cut at the right is shown a screened fuel-intake to the float chamber and a hand-adjusted, screw-threaded needle-valve in a stationary stand-pipe opening to an inserted throat. At the left side of the vertical charge-passage from the carburetor throat to the throttle a port is cut which opens to two vertical concentric cylinders of different sizes, the larger one above the smaller and having an applied cap fitted to the top end of the larger cylinder, and a small open-air hole drilled through the annular wall which unites the two cylinders. The lower cylinder is pierced by six air-ports, open to the atmosphere. The top larger cylinder is fitted with a cup air piston connected by a tubular piston rod to a sleeve valve, normally covering the six air ports in the lower smaller cylinder, all so that when the top air piston is lifted two separate effects take place; (a) the air above the air-piston in the top cylinder is compressed; (b) when the rise of the air-piston has reached a certain height the sleeve-valve in the lower cylinder begins to open the 6 air-ports of that cylinder so as to establish a communication between the passage from the carburetor throat and the throttle to the open air, reducing

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the richness of the mixture. The air-piston is lifted by the suction of the motor, but its motion is resisted (a) by gravity, (b) by the compression of the fixed volume of air above the air-piston, and (c) by the lack of air below the air-piston, which air to supply the space below the air-piston must enter at a rate determined by the diameter of the small air-hole in the bottom of the air-cylinder. These conditions cause a weakening of the mixture when the motor reaches a certain speed, and its continued weakening so long as the motor speed increases. The small area of the air-port admission under the air-piston and the trapped air above the air-piston combine to prevent fluttering and sudden fluctuations in the auxiliary air supply. The tubular air-

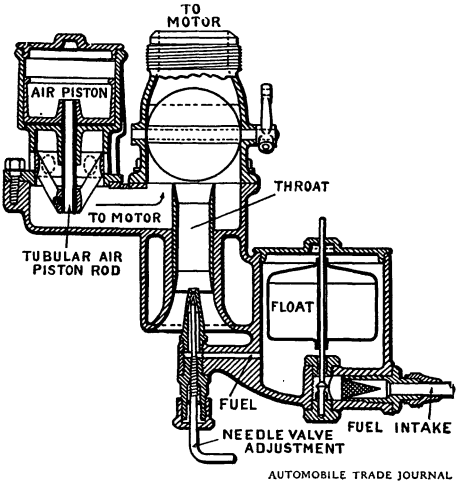

Fig. 4. The 1908 Thomas Carburetor. This is a new design, and has an auxiliary air valve of the piston type without any springs. For complete description see text.

piston rod opens the air-cylinder above the air-piston to the piston suction. The resultant action of the whole of this simple and positive carburetor auxiliary valve action, which has no springs whatever, is to make the mixture less rich when the motor runs fast than when it runs slow, and to vary the charge-richness gradually both ways, without sudden or fluttering fluctuations.

THE CLUTCH.

The Thomas fly-wheel is a steel casting, having integral exterior fan-vanes, and a friction surface which coacts which a bronze ring with cork inserts and a second steel ring, all prest together by four levers and the clutch spring, or relieved from friction by the action of the clutch disengaging pedal. The spring required is light, only about 350 pounds tension, and the clutch is very soft in engagement and gives a wholly satisfactory slipping drive.

THE CHANGE GEAR.

The selective change speed gear is four speeds forward and a reverse, direct on the high gear. The box is an aluminum casting, with applied annular ball-bearing seats of bronze, retained by pouring with fusible metal specified as "Babbit." The bronze ball-bearing seats are first machined inside, and then placed on jig-arbors and babbitted in place in the aluminum gear-box, making all the gear-box center distances alike and as nearly accurate as possible. The gears are all 6 D. P. high carbon steel, the idle gears being free on the high speed. The balance gears are bevels, and the counter-shaft members have universal joints of limited range, which engage the sprocket shafts carried in annular ball bearings in brackets fixt to the side-frames.

The steering gear is a carefully and substantially worked out worm and sector action. The sector is cut on two centers to make the middle tooth the highest. The rock-shaft is on Timken rollers and the worm thrusts are taken on ball bearings. A feature not usually seen in steering gears is the two temper-screws, check-nut retained, which limit the motion of the worm gear sector in both directions so that the steering wheels cannot be turned too far either way.

The turn-buckle length-adjustment is very largely used in the Thomas 1908 details, and all nuts have special retentions, principally castellation with split-pins, tho some check-nuts are fitted.

CONTROL.

The steering is by a worm and sector with spark and throttle levers on top of the hand wheel. There are two outside hand levers, both latched. The outside lever is pulled backward to first disengage the clutch, and then apply the internal rear hub drum brake. The inside hand lever shifts the gears. There are two large pedals, an accelerator pedal and a muffler cut-out plunger pedal. The right large pedal is pushed forward to apply the counter-shaft brakes, and the left large pedal to disengage the clutch. The accelerator pedal is horizontal, and located between the two large pedals. There are no outside rear hub drum brakes. The counter-shaft brakes, two in number, are fixt to the two counter-shaft members, and have fiber lined, constricting bands, applied by the right large pedal thru an evener, so as to give equal resistance to the turning of the two rear wheels.

Morgan & Wright, Detroit, Mich., have opened a branch at 118, 120, 122 East Tenth street, Los Angeles, Cal., for the accommodation of their Southern California trade.

Empire State Tire Company, 73-77 Erie County Bank Building, Buffalo, N. Y., has recently organized and secured the rights in New York State to manufacture the Greenwald tires, tire protectors, non-skid treads, and sectional vulcanizers.

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A Strong Statement—but a True One about the

The distinguished successes of the present automobile season, you can name on a very few fingers. And however you name them, the Elmore must come first.

First, we mean, in point of swift sales; the quick clean-up of the entire output; the call for more cars than our big plant could build; and the magnificent satisfaction which every Elmore in use is giving its owner.

Each Elmore season has surpassed the previous one---each year has seen its prestige grow greater and greater and greater.

In 1908, we promise you that the Elmore will be the most perfect car of its class in America.

THE ELMORE MFG. CO.

1004 AMANDA ST., CLYDE, OHIO,

MEMBERS A. L. A. M.

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MECHANICAL AND TECHNICAL Department

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

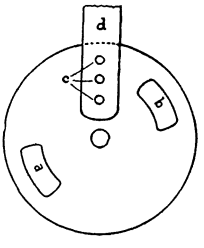
QUESTIONS ON THE DESIGN OF A VIBRATIONLESS MOTOR.

Indianapolis, Ind., July 13, 1907.

I am going to build a small double-cylinder opposed motor. I want to build it so as to eliminate all vibration, if possible. I intended to make the bores of cylinders 2 inches, and the stroke 3 inches. Now this 3-inch stroke is rather large for the bore, but I had an idea that the reason that most gasoline engines vibrated was because the exhaust valve was not opened soon enuf. Now I am going to open my valves about ¾-inch before the end of power stroke, so that when the crank gets to the bottom all the pressure will be released and the crank will pass easily around without any jerk at the bottom. Please tell me what you think of this theory. I don't care for very high speed, 900 is enuf, and a great amount of power is not essential, what I want is the least vibration possible. Will the engine be perfectly balanced if the cranks are set 180 degrees apart? If that stroke is too long what would you suggest? What size and weight fly-wheel would you suggest to make the motor run very evenly and steadily? Are ⅞-inch valves all right? Would a water space ¼-inch thick and 2 inches long around each cylinder be enuf to cool the motor? What kind of piston rings would you use and how many? If 3-inch stroke is all right how much clearance between the top of the piston and the cylinder head would you have, and if you suggest a different stroke what clearance then would you leave? Would you put a separate oiler for each cylinder or what method of lubrication would you use? What size shaft and crank pins would you use? If possible and if you have time would you please make diagram of ignition apparatus using one vibrating jump spark coil for both cylinders. Is this method as efficient as individual coils for each cylinder? I would be glad to get any other pointers about this engine that will make it smooth running. Also let me know what H. P. I may expect.

A. J. M.

A 2-cycle opposed motor if carefully balanced will eliminate most of the vibration. Better buy a couple of bicycle motor cylinders and save cost and experiments. You are wrong about the exhaust causing the vibration. The kick of the explosion is the cause and it pushes the motor as hard one way as it pushes the fly-wheel the other. Make the fly-wheel light and it will move instead of moving the motor and its frame. More cylinders to get a steady torque is the only sure way to kill the vibration. The long stroke will not help either. Your valves and water jacket are all right and you will get less vibration by using low compression. Make the compression space 1¼-in to 1½-in. long. A 12-lb., 12-in. fly-wheel should serve and lighter might serve better, particularly if you never want to run slowly. A separate oiler on each cylinder will serve nicely. You can get most sizes by looking at a good cycle motor at some repair shop or by reading descriptions in this journal. A single coil with a distributer to send the high tension spark first to one plug



A B—Metal segments on mica disk.
C C C—High tension wires, the middle one from the coil and the others to the plugs.
D—Insulated post to hold wires so their points terminate near the segments on the disk.
The spark will pass thru one segment to one wire one time and thru another to the opposite wire the next time.

and then to the other is a first-class arrangement. A simple form can often be rigged up by using a sheet of mica with two foil or brass segments on it and letting it revolve with the cam shaft (see sketch). Or coil makers can sell you a distributer. Two coils are no better and are harder to adjust alike. C. E. D.

A CASE OF POOR CONTACT.

New Knoxville, O., July 27, 1907.

I have a Kent volt and amperemeter on which I would like to have a little information. If I connect a new battery to the meter, that is, put the wire on the zinc side and the part marked carbon on the carbon it measures about 6 amperes, but as soon as I connect the carbon side on the brass binding post on the carbon it measures about 16-18 amperes. What causes this? L. H. MICKSHOTH.

When you put the "carbon" pole of the meter against the carbon of the battery you do not get a good contact and so do not get a full flow of current. The brass binding post is much larger and gets a better contact and more current flows thru it. Just imagine how a water pipe would behave if it was badly choked. This illustrates the necessity of having full size wires and good connections at every point if the best service is wanted. C. E. D.

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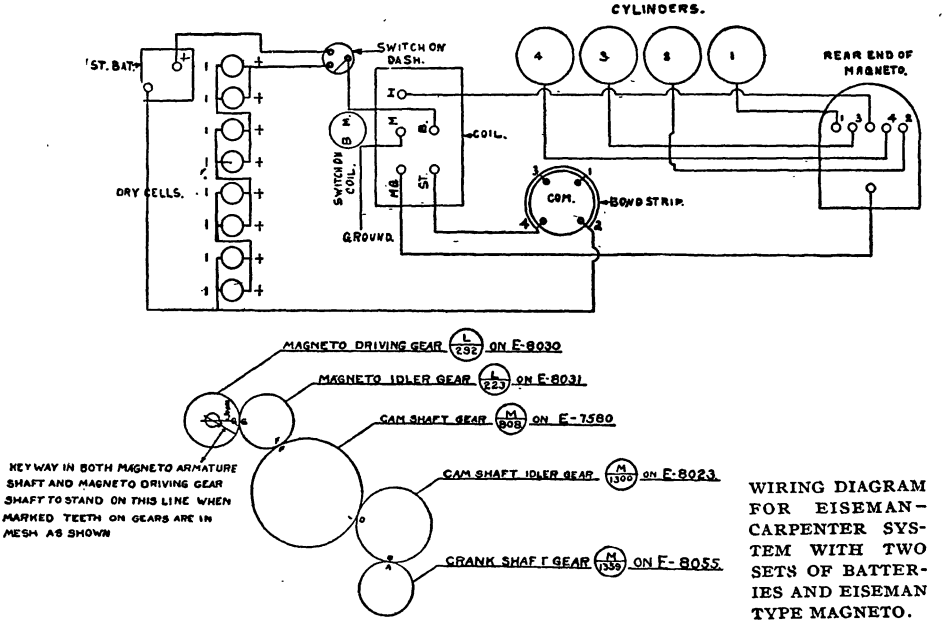
WIRING USED WITH EISEMANN MAGNETO

Pawtucket, R. I., April 12, 1907.

I beg to take advantage of my perquisite, as an old subscriber to the "Cycle and Automobile Trade Journal," to ask you if you will kindly give me the outline of the wiring, for dual ignition, as used on the Pope-Hartford machine this year, with the Eisemann magneto and the Eisemann-Carpentier coil? The car is also fitted with the usual timer which is of the Lacoste type. FRED G. PERRY.



WIRING DIAGRAM FOR EISEMAN-CARPENTER SYSTEM WITH TWO SETS OF BATTERIES AND EISEMAN TYPE MAGNETO.

The sketch herewith is a copy of that furnisht by the makers and I trust will meet your needs. C. E. D.

BEST DOCTOR'S CAR?

McKeesport, Pa.

What in your unbiased opinion is the best car on the market suitable for doctor's use in a very hilly country? What do you think of solid tires on a car weighing about 1400 lbs.? How about water against an air-cooled car for doctor's use? Will you kindly send me your opinion real soon, as I am thinking very seriously of buying, but thought I would consult some one that knew best just what was best for me. I am a subscriber to your Journal, altho I am not an owner of a car.—DR. W. C. BAIRD.

We cannot specify any particular vehicle as best, for this is but a matter of opinion. The writer's opinions are exprest by the vehicles he has been building. The better principles for your purpose can be exprest as follows:

A hilly country requires ample power. Remember, however, that 40 horse power on a 4000 lb. vehicle is not as good as 10 horse power on a 1000 lb. vehicle; so the mere amount of power itself is no guide whatever, but the amount of weight carried must also be considered. The heavy vehicle sinks into the soft road and is at a great disadvantage because of this fact. It therefore requires more power in proportion to its weight than does the light vehicle. Solid tires are not to be selected because of the weight of the vehicle but for other reasons. It is customary to equip light vehicles with pneumatics and heavy ones with solids. Pneumatics to-day will carry light loads nicely and those who have tried both have usually continued the use of the pneumatics, particularly if the roads are rough. On smooth roads, the solid tires run beautifully. For speed below 10 or 15 miles per hour the solid tires also serve, but at high speed the pneumatic is nicer.

There is much to be said in favor of the air-cooled, yet many air-cooled cars have been abandoned by their makers in favor of water-cooled. This does not say that they are not so good, but simply that the water-cooled is alright and buyers are a little doubtful about the air-cooled. Air-cooled cars can show performances equal to and in many respects superior to water-cooled, so there is no objection to a properly built air-cooled car. Unfortunately, makers have often assumed that air-cooling is not fit for anything but low power, and have not used the good judgment in connection therewith that has been expended on water-cooled vehicles. One reason often is that the buyer purchases an underpowered air-cooler, works it to death and then blames the air-cooling system. A good motor should be machined inside and out, so that its cylinders are known to be equally thick all around. If this is done, the air-cooled will expand equally and will give just as good satisfaction as the water-cooled. Further, it avoids complication, which is of advantage to a doctor. The best advise to a purchaser is to select the vehicle that most nearly seems to meet your needs and then get in touch with users who have been using this style of vehicle for more than a year. Their advice will generally be unprejudiced and reliable. If possible get the address of the users, from some source other than the manufacturers, so as to prevent the selection of successful users only. The Journal of the American Medical Association has published a Doctor's Number, as has also one of the weekly automobile magazines. These issues will assist you in your selection.—C. E. D.

COMPARATIVE HEAT VALUES OF FUELS.

Elizabeth, N. J., May 7.

I would like to know if you can supply me with the information in regard to the following subjects:

About how many heat units are there contained in each, a pound of anthracite coal and a pound of calcium carbide?

Also, which flame throws off the most heat units, all flames being the same size, an acetylene, gasoline, alcohol or an ordinary gas flame?

I take it for granted from what I have read about gasoline and acetylene when used in motors, that the acetylene generates the most heat, because it is difficult to keep a motor cool when using same.

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Chicago Cleveland

The Auto-Meter Won in the Glidden Tour

New York

Won in 1906 Won in 1907 in the Glidden Tour

Last year 38 out of 62 Cars entered in the Glidden Tour were equipped with Warner Auto-Meters, as compared with 55 out of 74 this year. At the finish last year 10 Cars out of 13 with perfect scores had Auto-Meters, and this year 36 out of 48 Cars that finished had Auto-Meters.

Won in the Sealed Bonnet Contest

Out of 68 Cars in the Chicago Sealed Bonnet Contest, 26 had Auto-Meters—the nearest competitor of the Auto-Meter had only 16 and the next 14, the next 7 and the rest —"nowhere" with 2 and 1 each.

Practically all Route Books Are Compiled by Auto-Meter

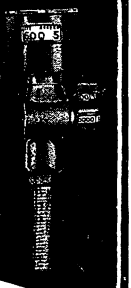
including *Motor Guide, The White Route Book,* Sidney J. King's Book, and the Routes issued by the *Automobile Club of America.*

From start to finish in the far-famed Glidden Tour this year the **Warner Auto-Meter** helped to win most of the perfect scores for the contesting cars. The **Auto-Meter** was installed

On 55 Out of 74 Cars AT THE START

in Cleveland. In this awful endurance test of keeping absolutely accurate figures on "How Fast" and "How Far" to Chicago, and then on to New York under some of the fiercest road conditions, there were **36 Auto-Meters on the 48 Cars that finished** at New York—**75 per cent** of the **Winners.**

Victory for The Warner Auto-Meter



On 36 Out of 48 Cars AT THE FINISH

That's going some. It's a victory for the **Auto-Meter** which might have been anticipated, because—

The magnetic principle which makes the **Auto-Meter** as reliable as a mariner's compass makes it unnecessary for the shaft to run at such a *wearing* high rate of speed, as on other speed instruments.

Consequently, experienced Motorists, like the Glidden Tourists, know that the **Auto-Meter** is the instrument that can be *depended* upon to stand hard endurance runs and *accurately tell* the *speed* and distance made by a car *from* start *to* finish without wearing out or being put out of commission like others.

That is also the practical reason why you'll see the **Auto Meter** on the *Cream of all Cars* on any road.

Watch any line of Motor Cars anywhere—you'll see the handsome little **Auto-Meter** on the dashboard of the best of them and the most of them—then you'll decide that

You ought to have an Auto-Meter on Your Car.

Agencies in All the Principal Cities

Won in Almost Every Contest

The Auto-Meter is so immensely popular with motorists everywhere, and it is so universally used and depended upon to tell speed and distance figures, that it is only natural that it should be used by experts in all great contests and win the most victories.

Won the Chicago Reliability Run and Boston Endurance Race

In both of these hard tests the **Auto-Meter** was used by the majority of the entrants, and proved absolutely dependable under all trying conditions.

The Warner Instrument Co., 721 Roosevelt St., Beloit, Wis.

Write Us the Model or Power of Your Car for Price Ready to Install.

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I would particularly like to have the information regarding the various flames.—W. W. HARRISON.

The heat values of the substances mentioned are about as follows: Anthracite coal 14500 B. T. U., petroleum 19260, gasoline, according to the density, varies slightly from this petroleum figure. Alcohol (denatured) 13150. Calcium carbide is not a fuel, but must be mixt with a little over half its weight of water, when it produces about 5¾ cu. ft. of acetylene C2 H2 gas. This gas has a heat value of 18260 B. T. U. per lb., but requires about 3 lbs. of carbide to make a pound, so it will be seen that 1 lb. of carbide plus ½ lb. of water contains 6085 B. T. U. It slacks easily when exposed to air and will not give its rated capacity of gas under ordinary conditions. 5 cu. ft. per lb. is usually figured.

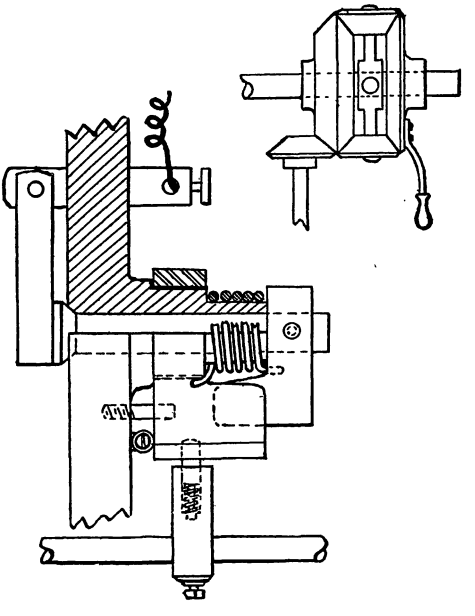
The acetylene flame is much hotter than the other flames mentioned. If acetylene gas and oxygen are properly combined in a blow pipe, the flame will cut steel like an electric arc. The acetylene light is very intense because the carbon particles are both plentiful and heated very hot. In some recent tests made in Paris the following heat efficiencies were found: Alcohol 24 to 28 per cent., gas 18 to 31 per cent., gasoline 14 to 18 per cent.—C. E. D.

A ROTATING MAKE AND BREAK MECHANISM.

Portland, Indiana, July 6, 1907.

We are very enthusiastic advocates of the make and break system of ignition for gas and gasoline engines, and highly value your views on the subject as given in the "Cycle and Automobile Trade Journal."

As a result of some five years of experience upon ignition systems, we present the design shown in the rough sketch, as the best in theory and practice known to us. We wish your expert opinion upon the merits of the system.



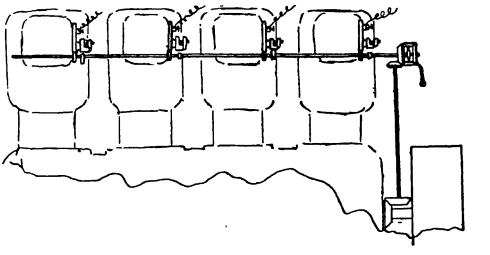
In this sparker the following advantages over others working on the same principle, can readily be seen:

Placing large jaw and spring connecting the jaws, upon a bushing or the like, in which the sparker shaft is inserted, instead of upon the sparker shaft itself.

Moreover, there is nothing to hinder the quick and lively action of the sparker shaft. Sparker shaft is well supported and is also very compact in design.

We have always been in favor of using rotary motion in the place of reciprocating motion, when possible. For this reason and because the timing of multiple cylinders can be accomplished by a single timer more easily and simply, we use the rotating actuating means rather than individual reciprocating rods, as is common practice at present.

This timer has been most successful and reliable. Main feature is, wide variation in the time possible. Thus one is enabled with an engine or four or more cylinders to start (if, of course, the cylinders have retained ignitable charge) by retarding and advancing, thus catching the cylinder on the down stroke which has



just past compression. Or one can manipulate the timer so as to catch the cylinder just coming up on compression. Thus making a back kick and compressing the cylinder which was on the down stroke, and then immediately firing the last mentioned cylinder so as to set the engine going in the proper direction.

We are very confident that this is a system well worth the introducing and would thank you very much for your opinion and any advice you may offer.—CHAS. C. COULSON, H. G. COULSON.

The make and break ignition system has a number of advantages not secured by the jump system. It is not so easy for the motor builder to apply as it is to buy jump spark parts in the open market, so it is not found in many of the cheaper motors. Your design seems to combine the usual hammer break in the cylinder with a rotary shaft for operating the several igniters. The rotary shaft idea is not new. It has been used on an auto engine made in Buffalo for several years and also on many boats for several years. Your method of varying the relation of the shafts to each other is new to me and quite likely patentable. A spiral collar of some sort is usually used for this purpose. There may be other features not clear in the small sketch, which you can patent. Possibly some manufacturer that sees this description will find it convenient to write you. The idea certainly looks practical and can be made to give satisfaction.—C. E. D.

AIR-COOLED ENGINE DIMENSIONS.

Evanston, Ill., July 1, 1907.

As I am about to build a 4-cylinder, 4-cycle, 3½-in. bore by 4-in. stroke, air-cooled auto engine, I would like a little information regarding same. I have a motor with valves placed in the head.

Are ⅞-in.x⅛-in. flanges 3-16 in. apart sufficient for cooling this cylinder?

Are 1⅛-in. valve openings with 1-in. exhaust and inlet pipes sufficient?

Is ¼-in. sufficient valve opening?

Are ¼-in. walls and head alright?

With ¾-in. compression space, should the motor develop 15 H. P. at 1000 R.P.M.?

Is a 50-lb., 20-in. flywheel large enough?

The valves are so arranged that in order to get the spark plug in the head it must enter on a slant about ¼-in. from the cylinder wall.

Would you prefer it on the side, as in the Franklin?—DE SILVA.

Your engine design is all right. The amount of cooling surface needed depends upon the amount of air reaching the cylinders. The more air the less surface needed. I would suggest a larger exhaust pipe, but if not convenient the 1-in. will probably serve. I do not think you will get over 12 horse power at 1000 R.P.M. The flywheel will be found amply large. I would prefer the spark plug on top, as you mention.—C. E. D.

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1908 MOLINE 1908

THE changes in the MOLINE line for the coming season are such as to make the Four Cylinder Cars very much more handsome in general design, more quiet running, and more powerful in action.

The same high standards of workmanship are maintained as to details of construction, upholstering, and painting so that MOLINE cars are second to none in the American market.

The Two Cylinder Car has given such unqualified satisfaction that it is being continued for 1908 in exactly the same style and at the same price. It is positively the best looking and easiest riding two cylinder in the market. On the question of speed and power you may judge for yourself, our catalogue gives the size of the cylinders and names the actual weight, and we stand ready to make demonstrations any time.

We are open for agencies in a few good cities.

Moline Automobile Company

EAST MOLINE, ILLINOIS

:: :: :: *Member American Motor Car Manufacturers' Association, N. Y.* :: :: ::

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A QUESTION OF MOTOR AND CLUTCHES FOR A TRACTION ENGINE.

Minneapolis, Minn., July 29, 1907.

Being a regular purchaser of the "C. & A. Trade Journal" I take the liberty to ask a few questions, also an answer by mail, as my questions are not of general interest. I am sending two sketches of gasoline engines that I wish you to pass your opinion upon. Not being a draughtsman, perhaps I have not made everything clear to you. No. 1 is a double-opposed motor with two fly-wheels and an extra long crank shaft extending to the right side. Upon this shaft and all inside of the bearings I wish to mount two friction clutches, both to be operated by one lever, thus doing away with the danger of some one trying to use both clutches at the same time. The gears attached to these two clutches will mesh with gears on a counter shaft placed below and attached to the frame of the truck and from this counter shaft power

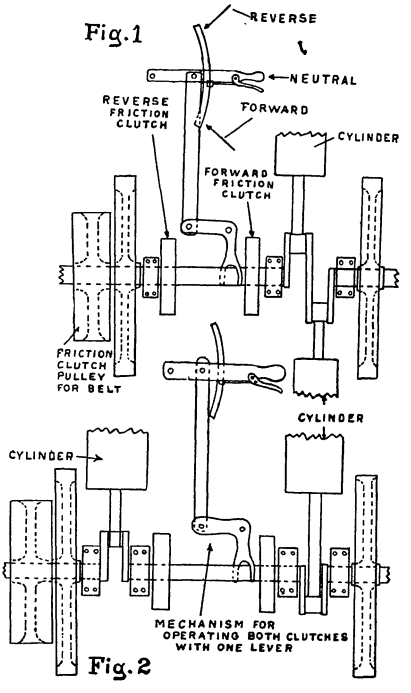


Fig. 1.—Double opposed motor 4-cycle, about 20-H. P., make and break spark throttle governed, speed from 150 to 500 R. P. M., mechanically operated valves, motor to be used for gasoline traction engine, weight no objection. Good transmission and a one-lever operated variable speed and a powerful engine is the object.

Fig. 2.—Twin cylinder motor, 4-cycle, 20-H. P., make and break spark, variable speed throttle governed, mechanically operated valves, speed from 150 to 500 R. P. M., weight no objection, motor to be used for a gasoline traction engine. will be transmitted to the driving wheels. The clutches and the pinions on the crank shaft to be so arranged as to remain stationary when the engine is standing still and delivering power with the belt. Fig. 2 is for the same purpose as Fig. 1, only the engine is a twin-cylinder with the cylinders placed a little distance apart, far enuf apart to allow the friction clutches and pinions to be placed on the shaft between the two cranks. Of course it will be harder to place the clutches and pinions on this shaft because it has one throw of the crank near each end. Cranks in both engines are 180 degrees apart. Engines to have a fly ball throttling governor, and so arranged that when the engine is throttled by hand the spark will be retarded or advanced as the case may be, and the speed to be varied from 150 to 500 R. P. M. At this speed do you think mechanically operated valves would give the best satisfaction? I have a small model of a traction truck that I think is almost perfect, and with your help hope to find a suitably designed engine. Any criticism will be cheerfully accepted, and all advice and suggestions from you will be greatly appreciated. Your articles in the "C. & A. Trade Journal" are very interesting and instructive.

W. I. BOWMAN.

Your device is not bad as far as it goes. The idea of a single lever for two speeds is not new, however. You will find it on most every auto to-day. For a traction engine better use a single cylinder light stationary engine without base. It is simpler and cheaper. If you think to save weight and vibration you must use two cylinders. Better buy a motor ready made and let it be of the opposed-cylinder type and you can get a better balance and use two fly-wheels with the clutches between the cranks and one of the wheels. Use suction operated inlets. They are simpler and will serve better at the speeds you expect to run. There are some advantages for high speed work in mechanically operated valves, but for the average man simplicity is worth more, and I believe future buyers will recognize this. C. E. D.

BEST FORM OF COMBUSTION CHAMBER AND ADVANTAGE OF OFFSET CYLINDERS.

Newark, N. J., June 30, 1907.

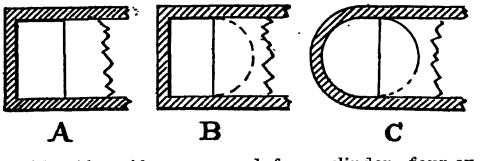
For the past year I have followed with interest, and to my great enlightment on various points, the numerous inquiries and answers found in your "Journal."

There are several points which I believe have not been taken up before in your columns that I wish you would make plain to me.

1st.—Which form of compression or combustion chamber is the most advantageous.:

A—The common oblong style; B—The semi-spherical; or C—The spherical?

2d.—Why do most engine builders off-set their crankshafts ⅜-inch or more from the centre line of the piston? It appears to me that they do this to give the engine a lead, if so. why not arrange the timing mechanism so the spark would be retarded. The results would be the same and the design more mechanically perfect.



3d.—Also, if an opposed four-cylinder, four-cycle motor could be arranged so that the opposite pistons could be directly connected and worked together with a common cross head, one connecting rod, and one crank-shaft-throw only, being necessary for every two cylinders, would the benefit of such an arrangement be enough to tempt one to make such a radical change from the standard style motor?

I know it would increase the life of the cylinders, pistons, and piston rings from 40 to 100 per cent., as it would do away with the rocking strain entirely, keep a more even strain on the piston, connecting rods and bearings and do away with considerable rack that most engines suffer from after running a while.—GEO. C. HOWARD.

The average theory deals with ideal conditions, and therefor does not fit working practice in many cases, and the theory is often very misleading, because actual conditions sometimes cannot even approximate theoretical conditions. The theory of the gas engine calls for the least possible cylinder wall in proportion to the quantity of explosive mixture. The theoretical best combustion chamber is the spherical one. It has been my practice to slightly concave both the cylinder and piston heads. These should not be hemi-spherical, however, for the movement of the piston prevents this shape being maintained. I prefer that they be cupt about equal to ¼ of a sphere and as the piston moves away the shape

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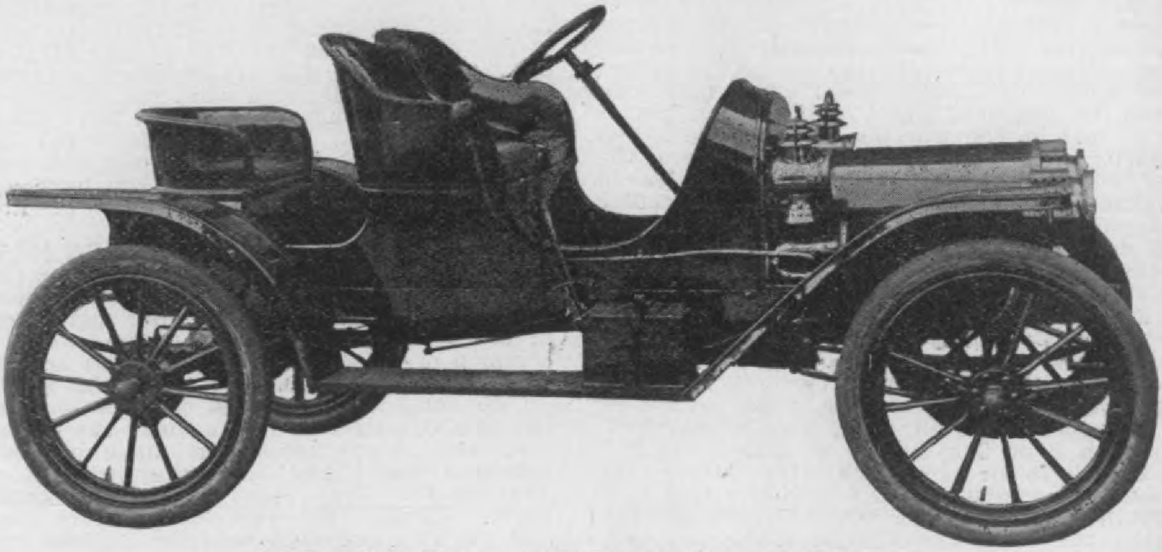
The Cameron

for 1908



TOURIST MODEL, $1050

Same car equipt with two rear seats making light, stylish, 4 passenger touring car, lists at $1100.

This car is equipt with our Standard 4 cylinder, 16 H. P. air-cooled engine and the CAMERON patented system of transmission, 3 forward speeds, direct drive on each speed, 32 x 3 in. tires and full set lamps.

We will also manufacture our Standard Model 6, 2 passenger car with a number of 1908 improvements, listing at $850; and, with our greatly increased manufacturing facilities will be in a position to quote prompt deliveries.

We would be pleased to hear from live agents, who want an up-to-date line for 1908.

We will Exhibit at New York, October Show.

CAMERON CAR CO.

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of the chamber becomes more nearly spheroidol during the early part of the stroke, but elongates beyond this in the latter part of the stroke. However, in vertical engines, concave pistons tend to gather oil which burns on and carbonizes.

Most engine builders do not offset their cylinders, but about two dozen prominent builders are using this improvement at present. It has been used on Duryea engines since 1897, and is correct practice and more mechanical than with the crank shaft on cylinder centers.

It should be evident that the working stroke needs all the advantage possible to get for it and that a slight angularity of the connecting rod, first one side and then the other, on the working stroke produces less friction than a large angularity on one side during the stroke. This lessened working angularity, is what saves power, permits a shorter connecting rod being used and therefor permits a lighter and more compact engine with consequently lighter weight and a lighter and a more comfortable vehicle. The off-setting has nothing to do with the valves or the spark, altho some slight effect may incidentally be produced by this off-setting, but is done so that on the working stroke there is less angularity of the connecting rod and more of the power is applied in turning the crank and less in side thrust against the piston wall. Of course the angularity of the connecting rod on the exhaust and compression strokes is much greater, but this is of little consequence, for the work done on these strokes is light.

In a horizontal or inclined motor a great angularity tends to lift the piston and overcome the effect of gravitation.

Your proposition to connect two cylinders to a single crank pin is a good one, altho not a new one. Engines are built using a 2-throw crankshaft with 2 or 3 cylinders to each crank-pin. This appeals to me as a much better design than the common system of 4 or 6 cylinders in a row. It permits a much more compact arrangement, shortens the crank-case, crank shaft and camshaft and lessens the total number of bearings. The only objection to such a design is, in my opinion, that the purchaser in his vulgar attempt to display the superiority of his pocketbook by the length of his motor bonnet, would be unable to do so if such a compact motor were used. I believe the future will see a much larger use of such motors, for the saving in weight, space and cost is considerable.—C. E. D.

THE HEDGELAND ANTI-SKID AXLE.

Webster Groves, Mo., July 28, 1907.

Will you please answer the following questions as I do not know where to get the information: How does Hedgeland's Anti-Skid Axle work? Does it drive by both wheels when turning a corner? Does it work by clutches, if so, what kind? What are its disadvantages? Any information you can give me will be gladly received. I am working on a differential myself.

W. F. SCHOENHARD, JR.

The Hedgeland Axle was a very ingenious device to drive the rear wheels without a balance gear. It served better than most devices of that kind which I have seen in the last 25 years, but we do not hear much of it now, and I fear it has gone to join its predecessors. It drove the inside wheel in turning a corner and this is its fault. It used screw actuated clutches and these gript the wheel hub when the axle was driven faster than the wheel. When the wheel ran faster than the axle it ran free of the clutch. You can find a copy of the patent in the Public Library at St. Louis and see its full construction and what the patent covers, and so learn what chance you have to make an improvement. If you can drive the outside wheel in turning and do it simpler and cheaper than the present balance gear you have a good thing. C. E. D.

FIRING ORDER OF SIX-CYLINDER MOTORS

Springfield, Mass., Aug. 6, 1907.

There seems to be a variety of orders in which the charges of six-cylinder motors can be fired. Will you kindly give some of the most common of these, and the particular advantage, if any, of each system? E. LOVELL SMITH.

I do not know how most makers do this, but the best arrangement is to make the six as tho they were two threes, but make one with a left-hand shaft and the other with a right-hand shaft. Then the two center pistons will move together, the two intermediate together and the two end ones together. Three opposed twos is also a good arrangement, but I do not think it balances quite so well. They can be fired in a variety of ways. Bend up a piece of wire and study it out for yourself. You will get both pleasure and profit thinking these things out for yourself. 1, 4, 2, 6, 3, 5 is a good order, but if you find a better one kindly send it to this department and give your reasons for thinking it so. C. E. D.

2 Cycle Engines

HUGH DOLNAR.

DALTON'S "FLYING PISTON" 2-CYCLE GAS ENGINE.

Will you kindly inform me if the enclosed sketch gives an idea that is practical? Also if the idea is new and of sufficient value to warrant a patent?

It contemplates the use of two pistons. A main or working piston and an auxiliary piston. To explain the action of engine, suppose both pistons to be at upper end of stroke, auxiliary piston seated against cylinder head, charge comprest by main piston.

When charge is ignited main piston makes the working stroke. At end of stroke piston uncovers exhaust ports. Auxiliary piston starts from head as soon as cylinder pressure falls below crank-box pressure, sweeping out burned gas and followed by fresh charge behind it.

On up stroke, just before completing compression, auxiliary piston passes cylinder recess allowing charge to pass below and piston to seat against head. Spark plug is placed in recess.

Auxiliary piston should not overheat. Only one side is exposed to flame. Other side is cooled by seating against water-cooled head, and by incoming charge.

A further consideration shows that this motor can draw in more charge than a four-cycle. In this engine charge is drawn into a space between cool side of piston and cold cylinder head. Charge is only slightly expanded by heat. Hence a greater volume of charge than with four-cycle where incoming charge is heated and expanded by contact with hot cylinder and piston heads and by mixture with burned gas in the clearance space.

The charge comes in one end and exhaust out the other, so that there is no change of direction of gas at induction. At high speed this is a pronounced advantage.

The cylinder head is not exposed to flame and therefore remains cold, permitting use of a stuffing box on auxiliary piston rod.

The spark-plug is placed in recess and is swept by fresh charge, preventing fouling. When engine is throttled down, the small charge is found in recess.

The mechanical construction is more complicated than the crank-case-compression two-cycle. Auxiliary piston can be very light and moved by as light mechanism as that required to lift an exhaust valve against cylinder pressure, for it only sweeps out exhaust. On compression stroke as both pistons (main and exhaust) move in same direction, the main piston crown will carry the auxiliary piston up, there will be no blow when they come in contact. DALTON.

The "flying piston" idea is old, and has been tried, and abandoned. The writer saw this en-

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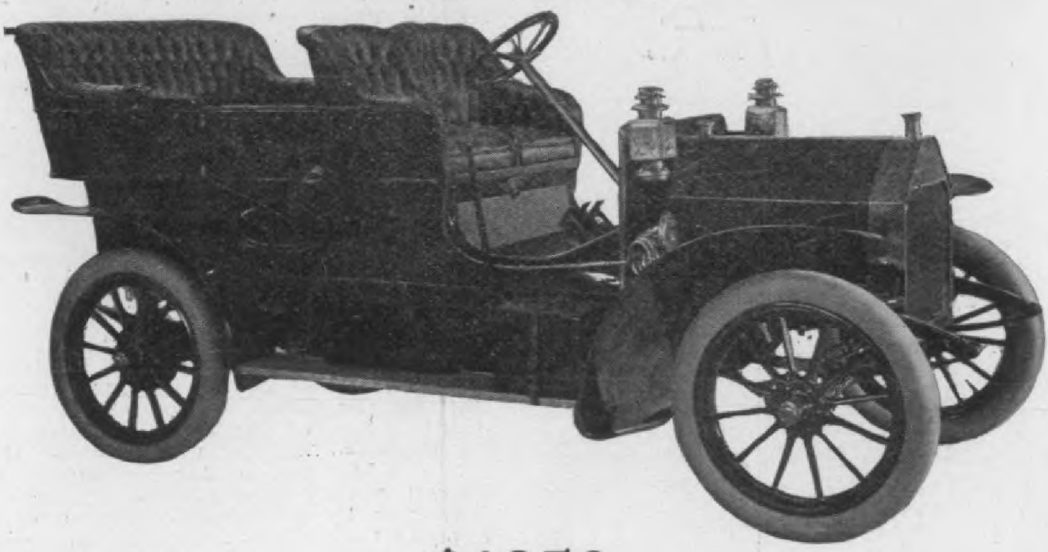
The Auburn

For 1908



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SPECIFICATIONS:—Double Opposed 5¼x5 Motor; Planetary Transmission, Chain Drive; Two Speeds Forward and One Reverse; Schebler Float Feed Carbureter; Splitdorf Coil; Standard Type Force Feed Oiler; Absolutely Irreversible Steering Device of the nut and screw type; Control on Top of Steering Post; Positive Gear Pump; Radiation 143 Feet; Pressed Steel Frame; Wheel Base, 100 Inches; Artillery Wheels; Goodrich Quick Detachable Tires, 32x3½.

THE MOST FOR THE MONEY

Some good territory still open for 1908

Correspondence solicited from wide awake dealers

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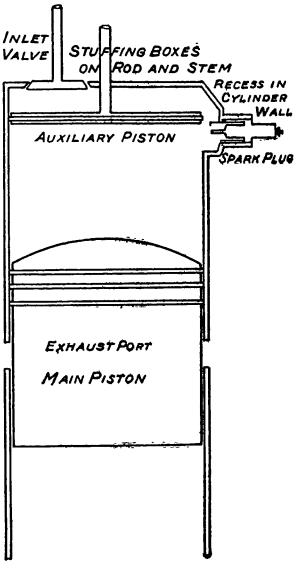
gine, constructed by a Mr. Joy, if memory serves, in Milwaukee, some four or five years since. The flying piston needs no mechanical action, as the crank-box pressure or other charge-pressure will force the flying piston down and the main piston lifts it up.

This scheme is bad, first, because it makes a motor which takes up too much room, and second, because of the great velocity of the flying piston in the scavenging and intake stroke.

There is no trouble with the burned residue in the 2-cycle working cylinder, and there is no need for any scavenging system, separate from the natural action of the 2-cycle motor.

The regular European practice for large 2-cycle motors, which are made double-acting



and as much as 8000 or 10,000 horse power each, is to use two supply cylinders, one for air and one for producer gas, with each working cylinder.

Extremely good results can, however, be obtained with crank-box pressure.

It is common to take the 2-cycle charge thru an automatic valve in the cylinder head. The "Wolverine" 2-cycle motors, Grand Rapids, Mich., use this plan.

A great number of "scavenging" 2-cycle motors have been designed, but the cylinder cleans itself so well as soon as the exhaust opens that none of the scavenging systems have come into much use for small 2-cycle motors.

Mr. Dalton's sketch is printed because it shows an idea which is now thought good by many persons not familiar with the history of the 2-cycle motor.—H. D.

INFORMATION ON TWO CYCLE ENGINES WANTED.

Boston, July 5, 1907.

Can you tell me of one or more books which will enable me to become conversant with the problems of successful gas engine construction and its theoretical and practical working out, especially with reference to the two-cycle type?

I would like to master the subject as completely as possible.

Can you tell me the name of the designer of the Elmore engine, or the name of some other expert on two-cycle auto engines whose experience would assure results as good as the Elmore gives?

If these questions come within the privilege of a subscriber to the C. & A. Trade Journal, I shall greatly appreciate your answers.

E. T. EASTON, M. D.

There is no book that will tell you what you want to know. Your only source of up-to-date information is the current Motor Press. The Journal is printing everything that offers, and gives more 2-cycle information than any other publication, at the present time.

The original Elmore motor was designed by Roberts, and gave not half the power now developed by the same sized Elmore engine. Roberts has published a book, "The Gas Engine Hand Book," which you can probably obtain of the Gas Engine Pub. Co., Goodall Building, Cincinnati, Ohio.

The large 2-cycle engine has been very thoroly worked out, but the final small 2-cycle motor has not yet been shown.

Harry Eason, 238th street and Matilda Ave., Bronx, New York City, has a 4-revolving-cylinder, 2-cycle motor which satisfies some of the conditions of the 2-cycle problem.

Perry Okey, Columbus, Ohio, has an excellent 3-stationary cylinder 2-cycle motor, which is the best 3-cylinder now built and at work, in the writer's opinion, and the "Atlas" auto motor, Springfield, Mass., is the best 2-cylinder, 2-cycle, small motor seen so far.

Note letter from N. C. Marks, in this issue. Detailed information as to the Marks motor will be printed in the Journal as soon as obtainable.

The basic principles of the gas engine are unchangeable, and have been formulated in many books. Perhaps as good a book as any for your purpose is "Gas Engine Design," by Charles Edward Lucke, D. Van Nostrand & Co., New York. The 2-cycle gas engine is apparently a bald impossibility from first to last. What man in his right mind would undertake to fill a cylinder with a combustible, light this combustible and do work with the heat generated, put the fire out and refill the cylinder with a fresh charge of highly combustible mixture without lighting the incoming charge, all in six one-hundredth parts of one second of time? Yet this is what a 2-cycle motor must do at 1000 R. P. M., and a 2-cycle motor has been shown which was strong at 2500 R. P. M. However, by continued experiments the writer expects to see this apparent impossibility, the 2-cycle engine, much simplified, greatly cheapened and improved. H. D.

A PERFECTED 2-CYCLE REVOLVING CYLINDER MOTOR.

San Diego, California.

In the June issue of the Automobile Trade Journal I noted the letter written to that paper by Mr. Harry Eason, in which he described a revolving cyclinder 2-cycle engine. I read your comments on Mr. Eason's rotating engine and was particularly interested in your description of what you consider will be the final car motor.

In the first place I am not a man of particular note, but I have followed the automobile and gas engine from the time of its first appearance in this part of the world. I am the designer and patentee of the California Motor Cycle, now being made in Toledo, Ohio, under the name of the Yale California. I had three years' experience manufacturing this motor cycle in San Francisco, and finally left that company to take a place as superintending engineer of the Howard Iron Works of this city, manufacturers of marine gas engines from 2 to 150 H. P. I am telling you this that you may judge of my experience and so you will not think that I have merely a fanciful idea of what I have done or can do in regard to the engine I am to speak of.

About a year ago I completed a revolving cylinder, air cooled 2-cycle engine: this machine is perfected and tested out thoroly in every respect. I do not use crank box pressure for supplying the cylinders, neither do I scavenge the cylinder, but I can use any charge volume desired as well as clear the cylinders of the burnt gas. This engine can be made with 1, 2, 3, 4 or 5 2-cycle cylinders, or as many as is possible to locate about a single crank shaft. By actual brake test I

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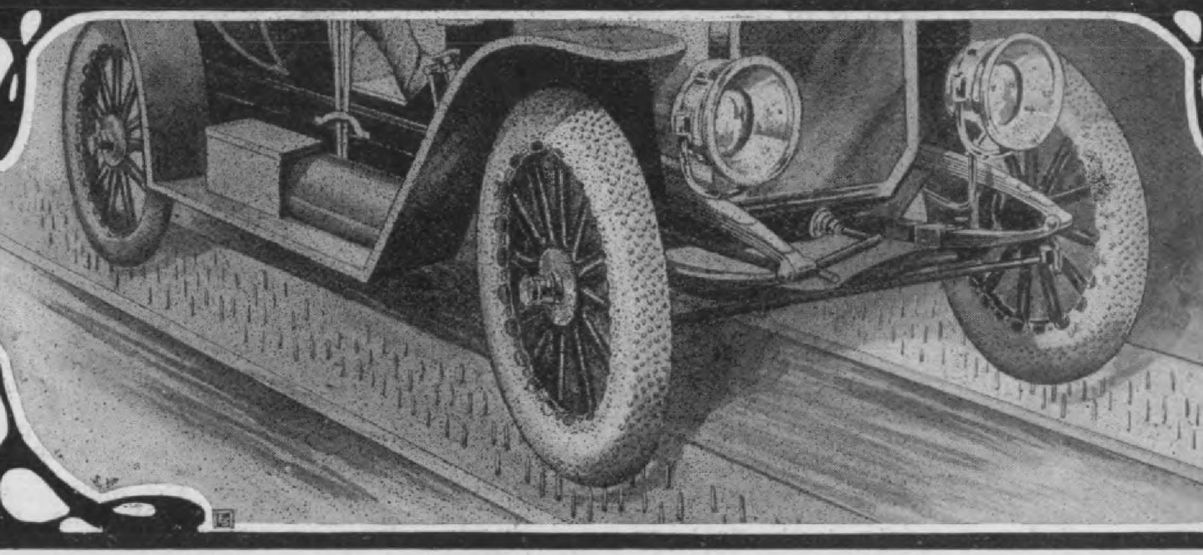
NAILS CANNOT PUNCTURE



WOODWORTH

ADJUSTABLE TREADS DETACHABLE

Tested with Six-Penny Nails

Woodworth Treads are all and more than you represent them to be. I would rather have my auto in the shape the tires are in now with Woodworth Treads on them than when new and without Woodworth Treads. The tires cannot now be punctured. I have tested them thoroughly by driving six-penny nails through boards and running the wheels over them back and forth. They stood the racket without a sign of a puncture. J. J. MICHLEY, Wilson, Kan.

Woodworth Tread for 1908: The above extraordinary testimonial refers to the Woodworth Tread as made heretofore. For 1908 the Woodworth Tread is made of three thicknesses of chrome leather full across through which closely set rivets with hat-shaped heads are carried, turned and clinched. The area of leather protected by these rivets is very much greater and the mileage of the Tread is increased at least 50 per cent. A more durable and convenient buckle and strap are used than formerly, and the whole construction is greatly improved to give to the tire far greater protection and to the Tread even more lasting qualities.

The Special Woodworth Tread: For Rutty Roads: This is made as above but with the addition of broad oval-headed steel rivets set close together along the sides to protect the leather from wear in ruts or on very rough roads.

Write today for booklet, "Safe and Sane Automobiling." Regular sizes and prices are as follows :

	Each		Each		Each		Each		Each
26x2 - -	$ 8.00	28x3½ - -	$14.00	32x2½ - -	$14 00	34x3 - -	$16.00	36x2½ - -	$16.00
26x2½ - -	10.00	30x2½ - -	12.00	32x3 - -	15.00	34x3½ - -	18.00	36x3 - -	18.00
26x3 - -	11.00	30x3 - -	13.00	32x3½ - -	16.00	34x4 - -	19.00	36x3½ - -	19.00
								36x4 - -	20.00

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get the same power out of my revolving cylinder 2-cycle engine at 500 revolutions as would be developed at 1500 revolutions by a 4-cycle engine same bore and stroke of the ordinary design. I claim by careful figuring that my rotating engine can be manufactured and placed in a rig for one-third the cost of any stationary cylinder engine on the market, and can be kept in repair and running order for one-fourth the price. I will close by saying that my greatest desire is to see my revolving cylinder motor on the market before long and that it may become of sufficient importance to repay me for my four years of study and patience to get it where it is. At present my whole attention is taken up with my patents, but I have every prospect of placing my machine before the public at an early date.

R. C. MARKS,
Supt. Howard Iron Works.

The Journal will be pleased to print a detailed description of the Marks motor as soon as it can be had for publication. Without question, a revolving cylinder 2-cycle motor can be built for one-fifth of the labor cost of a 4-cycle motor, ordinary form, to give same horse power, with a reduction in weight of from 40 to 60 per cent. as compared with the 4-cycle, and the 2-cycle repairs are confined to the piston rings and rod and crankshaft bearings.

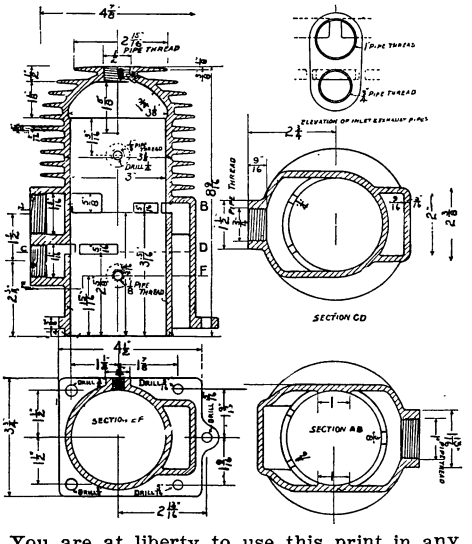
Mr. Marks asserts that he can now show what the writer is certain he himself will show, at some future time, that the 2-cycle revolving cylinder gas engine is the final car-motor.

H. D.

AN AIR-COOLED TWO-CYCLE ENGINE DESIGN.

I send you enclosed a blue print of the cylinder drawing for a two-cycle engine I have designed, and which is laid out, as near as possible, in accordance with suggestions by Mr. Malcolm and Mr. Dolnar.

I should be pleased to have Mr. Dolnar examine this print and make any criticisms he sees fit.



You are at liberty to use this print in any way that you desire, as I believe that an interchange of ideas will help solve the two-cycle question, in which many people, including myself, are deeply interested.

H. E. BURLINGAME.

While this cylinder shows nothing new, it is all good, and the drawings are well made and will interest many 2-cycle artists. The thing now wanted is the very best and lowest cost 3-cylinder 2-cycle motor, unlimited charge volume and compression, air-cooled.

Mr. Burlingame will confer a favor by reporting performance of this cylinder, together with fan particulars, if any fan is used for cooling. Would like to print H. P. developed, maximum R. P. M., and fuel consumption.

H. D.

MANVILLE'S 2-CYCLE DUAL-UNIT CYLINDER.

Carbondale, Penn.

Mr. Manville submits a well executed drawing of a dual unit 2-cycle cylinder, water-cooled, which is well proportioned save that the port-bridges are smaller section than seems wise. Mr. Manville says:

"I am enclosing to you, under separate cover, drawings of a cylinder casting and piston, for use in a motor of the two-cycle type having admission through a slotted disk in the crank-case. By examining and criticising the design of these parts and by acquainting me with the result, you will place me under great obligation to you."

K. R. MANVILLE.

The port-bridges, four of them on the intake side, are only ⅛-inch wide. The writer much prefers the exhaust and intake ports in different planes, as shown in the "Atlas" motor, with a central intake thru the piston head. In this "Atlas" form the ports are large, and have no bridges and the intake and exhaust are symmetrical.

The writer does not view the dual unit 2-cycle cylinder with favor, altho he does regard the triple-unit 2-cycle cylinder as the best form for the small 2-cycle crank and connecting rod gas engine, and believes that if a 2-cycle motor has more than one cylinder, it shall have three cylinders, and no more. The 3-cylinder, 2-cycle is the equivalent in effect on the crank-shaft of the 6-cylinder, 4-cycle motor, and turns its shaft well enough for car-driving in the crank and connecting rod form, or can be made to give six impulses per revolution to a straight shaft without cranks or connecting rods. In view of these facts the writer does not commend the dual unit 2-cycle cylinder casting.

A NOVEL 2-CYCLE DESIGN

Mr. W. G. Henderson, who gives 10723 Olivet avenue, Cleveland, as his address, will kindly pardon Hugh Dolnar for mislaying his interesting communication. Mr. Henderson writes as follows:

I have always been of the opinion that the main issue in the two-cycle motor was the simplicity and low cost of construction, and keeping these ideas in mind, I aimed to overcome some of the present troubles in the two-cycle motor, namely—premature ignition, low crank case compression, time lost in charging cylinder, and consequent poor results. In the design shown when the piston reaches the top of the stroke, a few small holes drilled near the top of the small cylinder, as shown, admit air to the piston inside and the crank box, and when the piston reaches the bottom of the stroke, this pure cold air is the first to come in contact with the burned gases, thus preventing back firing.

The crank case compression is also improved. The design of the piston admits placing the wrist pin near the head of the piston, and lengthens the rod, and keeps it cool. It will be readily seen that because of the small end of the piston passing into the cylinder, the piston displacement in the crank case is greater than that in the cylinder, which, while reducing the piston area somewhat, increases the relative volume of the mixture in the crank case. In regard to charging the cylinder the particular advantage gained here is that as the old charge is released at the bottom the new charge is already entering at the top and shoots directly downward. The exhaust port could be open at all sides of the cylinder if necesary. There appears to be less chance of the new charge mixing with the old charge in this design on account of the fresh gas closing down on all sides of the cylinder with the small piston in the center. Hoping to hear from you in

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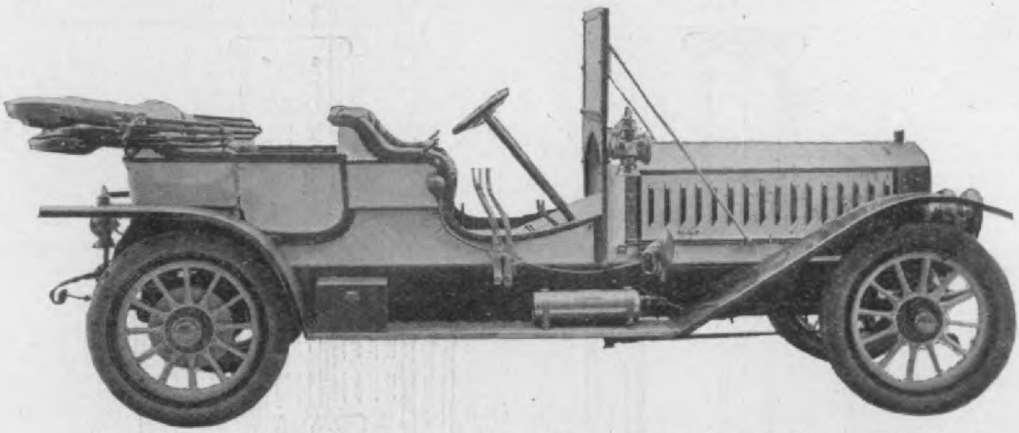
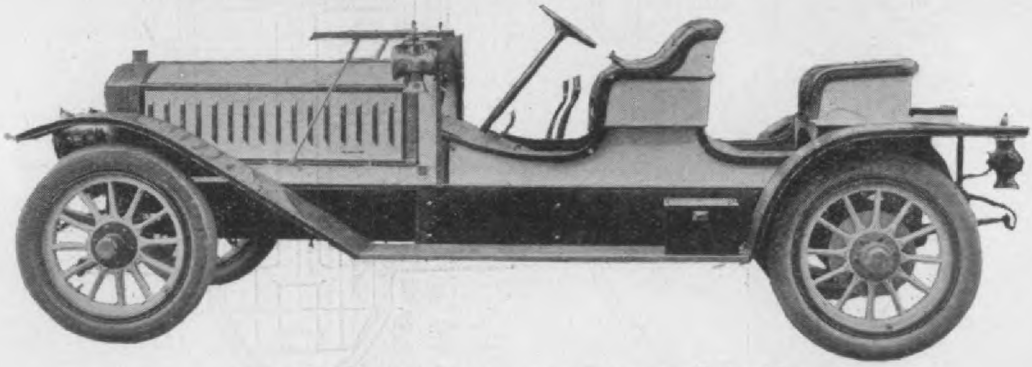
1908 Austin Models



6 Cylinder Austin, 90 H. P.



6 Cylinder Austin, 90 H. P.

The 1908 Austin Models are designed to exactly meet my own personal requirements after 6 years of building high grade cars, and to fulfill the ideas of that class of owners who want the "sportiest" kind of a car it is possible to get with *all* the power and speed they can possibly use—a car that is either a touring car or a runabout capable of making a 1000 mile trip any time, and will beat anything on the road.

Our 6 cylinder 90 h. p. model is my idea of such a car—and I believe it stands today without an equal in the Automobile world at any price.

Our new combination body as a touring car has an extra folding footboard chauffeur's seat. The tonneau seat can be replaced in 3 minutes by a rumble seat, thus converting the car into a runabout of the very latest design.

The equipment is complete in every respect, and includes both seats, and extension surrey top for the touring car, and single top for the runabout. We also furnish this new combination body on our regular 60 h. p. model in place of 7 passenger touring body. This regular standard body, either with or without detachable limousine top will be furnished on both 60 and 90 h. p. models.

All Austin cars have the celebrated Austin Motor and are built in our own shops under my personal supervision.

Send for Catalogue and detailed information about our new models.

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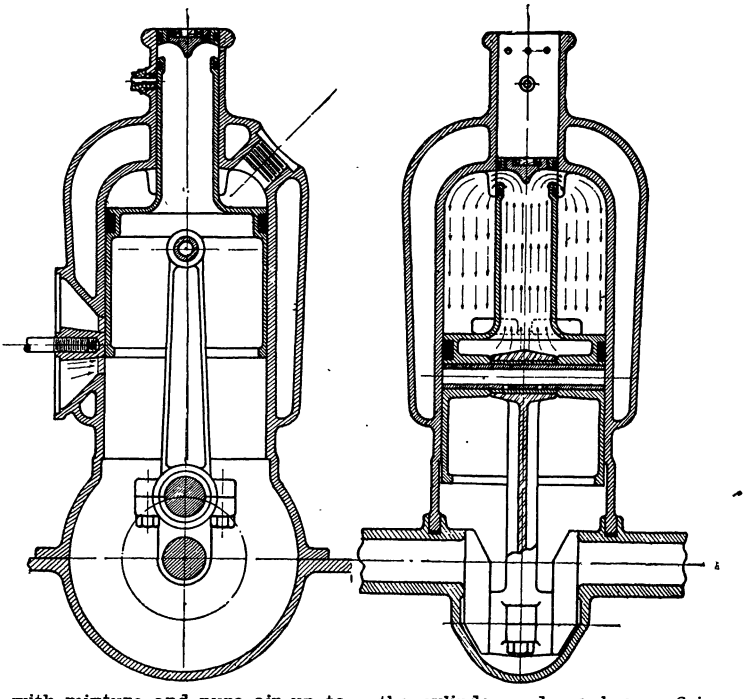
the questions and answers column, I am
W. G. HENDERSON.

ACTION OF HENDERSON'S 2-CYCLE MOTOR

The pure air ports at the top of the small cylinder should have as much area as may be. When these pure air ports open the crank-box intake port has been opened for a considerable time, and the mixture fills the crank-box at a little below atmosphere. As soon as the pure air ports open the crank-box is filled with mixture and pure air up to atmospheric pressure. The top, pure air, ports close before the crank-box intake port closes, so that the action of the motor in the working stroke is the same as if the top cylinder and the upward prolongation of the piston were not present, save for the reduction of the working piston area, which is but small. The exhaust port can well be very short up and down, as it can be carried all round the cylinder, with bridges enough for strength.

This Henderson design is the "Atlas" design carled to the limit, and has very decided advantages both in action and in durability, besides giving the longest possible connecting rod and the best possible piston and rod cooling. The cylinder charging is much improved, and the cylinder charge volume can be made as great as is desired. The only drawback is the increased motor height and the slightly added cost of the second piston finishing. This engine will probably give more power for the same piston diameter than the ordinary 2-cycle form, because of better charging and better charge placing in the cylinder and crank-case firing appears to be made impossible. Not only is the piston rod length increased, but the piston bearing in the cylinder is greatly extended, and this motor should be far more durable than the ordinary 2-cycle.



So far as the writer is aware this Henderson 2-cycle motor is new, and can be covered by a good patent; it certainly appears to be a better design than previously seen. It is possible, of course, that this design is not new; if old, probably some reader of the Journal can tell where it was previously shown. The design is certainly good.—H. D.

Makeshift Battery Repairs

In using dry batteries, the motorist as a rule has little or no trouble from the time they are installed until the time they are "run out," at which time there is a possibility of stimulating them for a short time by boring a hole in the wax and then putting in a little water, vinegar or muriatic acid.

Occasionally, however, it happens that one of the posts is broken off, so that there is nothing to which to attach the terminal wires.

In case the broken terminal is a negative one, it can be repaired by boring a small hole in the side of the zinc casing, inserting the wire and twisting it tightly so there is no chance for it to jar loose. When it happens that it is the positive terminal which goes wrong, it is generally possible to notch the carbon all around or bore a hole thru it. Should the pole be broken off too near the wax, a common wire nail may be driven thru the wax into the carbon, care being taken not to split the wax, nor break the carbon. The nail should just touch the carbon and be left protruding far enough so that the wire can be twisted securely about it and thus complete the connection.

A storage battery will lose its strength if left for any long period of time. If it is desired to put a battery away, and still retain the charge, the plates should be removed from the liquid and hung up in a cool, dry place. They will then suffer no deterioration, no matter how long they be left unused.

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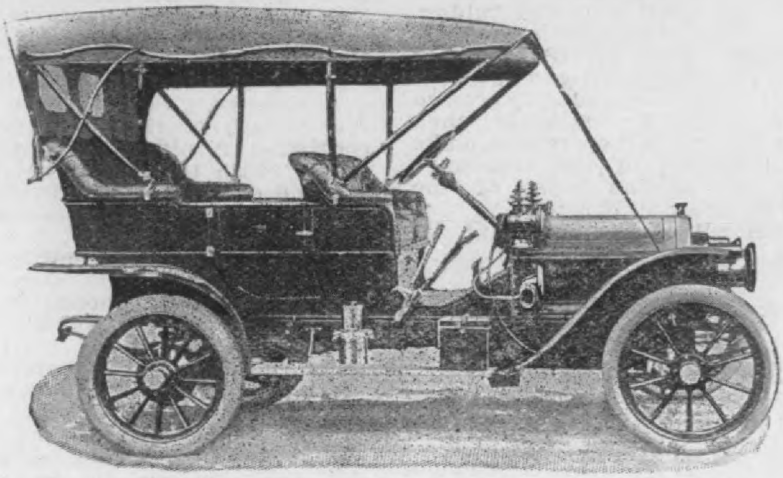
A Car Possessing all the Elements of True Greatness:—

Wayne

THIRTY FOR 1908



$2500.00 F. O. B. Factory—"Nothing to buy but the license."

WAYNE Thirty for 1908 will not ask your consideration—it will force its extraordinary excellence upon you. One or two of the foremost cars at an approximate or higher price will suggest themselves as worthy of comparison with the new Wayne at $2500—but none of them, in operation, can possibly give an equal demonstration of actual value.

All the facilities of the great new plant centred upon the perfection of one model—and that one model sold complete with top, storm front, side curtains and emergency seat in tonneau.

1908 Wayne Thirty Ready for Delivery.

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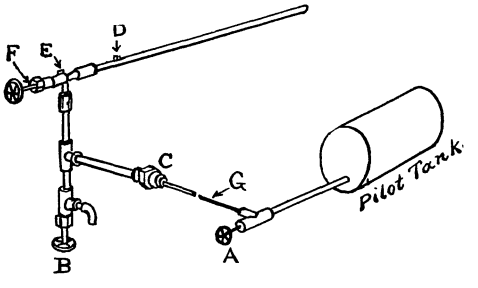
Difficulties Successfully Overcome by Users

Under the above heading we will be pleased to publish how *you* solved *your* automobile difficulties. Many troubles have been successfully overcome by means of the answers in these columns. We earnestly urge those who have been thus benefited or any who have overcome such difficulties to send a brief account of the same to the Editorial Department of the Cycle and Automobile Trade Journal.

TROUBLE WITH PILOT LIGHT.

Woonsocket, R. I.

E. P. R. desires to hear my experience with pilot light. I have not had much trouble with my pilot light, but more with the main fire. Before each run I take the cleaning stem out and smooth it with fine emery cloth, not overlooking the float sides at the end of the cleaning stem. I clean the pilot vaporizer with gasoline, putting in about a teaspoonful at a time, and blow it out with the breath, blowing in at the union end C and covering holes E and F. I then put in the cleaning stem, turning it around and sliding it in and out, to dislodge the carbon, then I blow the gasoline thru as before. Remove the cleaning stem, wrap the vaporizer and let the carbon out. Assemble and blow gasoline thru again, at the same time slide the cleaning stem back and forth until a straight stream of gasoline flows thru. Sometimes I connect the line at the union C with the pilot vaporizer out of the burner, then open valve A and let the kerosene on to show if it is all clear. The pipe from the union C to needle valve A is a small annealed tubing. The test D should be the proper distance from the end of the vaporizer. With my 16-in. burner it is 8⅞ ins. When I put the pilot light out with valve A I immediately close the needle drip valve B so the oil will not be in the vaporizer when it is cooling, as it is said to carbonize and make trouble later. For the most of two seasons I was troubled with the roaring noise of the burner, which could be heard half a mile. I was told to hit the bottom with a hammer; that did



not stop it but for a few minutes; they said it was the vibration of the bottom. I tried lower pressure on the oil, but after a while it stopt of its own accord. At the Boston Auto Show they claimed to have found a remedy: to drive pieces of sheet steel 3-16 wide into every other slot down flush with top of burner casting. I put in seven or eight pieces of galvanized iron in the place where the sound seemed to come from; It has seldom made any noise since, but I cannot say how much good the galvanized iron pieces did. It seems to me with a certain pressure on the oil, with a certain mixture of air and vapor, it will roar or whistle. I have 125 lbs. on the oil, and am going to try 150 lbs. I have been troubled considerably by the clogging of the main vaporizer pipes, first by a brown gummy substance, then by carbon, in my new vaporizer. I took the elbows off and once found the close nipple filled with this deposit; again found some in the elbow and in the pipe. After a run I took off the elbows again, ran a wire into the vaporizer pipes, pumped up the auxiliary tank to 125 lbs., then quickly opened the valve; the oil flowed from each line moderately, then the oil suddenly flew out 4 or 5 feet. When I first went out the pilot light did not work right, the flames shooting up 2 ins. or more. The flame should be blue, blending into a cherry red, with no light or yellowish flame. When I fired up the second time I had steam to spare. Have been thinking of putting tees in place of the elbows on the vaporizer, if I find they will not leak around the plugs, so by removing the plugs I can clear the line without taking the connections off.—C. S. LAWTON.

CURING AN ERRATIC MOTOR.

Upon one occasion the writer was called upon to drive a 4-cylinder air-cooled car several hundred miles just after it had been in rather inexperienced hands. The engine was cranked and ran idly throttled down and seemed to be all right, but as soon as the throttle was opened the engine would speed up for a short time and then gradually slow down and almost stop. After running very slowly for a short time it would speed up again, the throttle all the time remaining unchanged. This slowing down and speeding up again was almost periodic in its recurrence.

An investigation of the carburetor disclosed nothing out of the ordinary. Following the gasoline pipe line back, however, to the tank under the front seat it was discovered that just below the tank the small copper gasoline feed pipe had almost two full twists in it and looked like a corkscrew. Some novice in endeavoring to stop a leak at the connection of the tank had continued turning the connection after it had seated, with the result that the pipe was twisting and offering just sufficient resistance to give the impression that the connection was being tightened. The opening thru the pipe was thus restricted to such a small area that the gasoline flow was sufficient to keep the motor running slowly, but on an opened throttle the supply in the carburetor was quickly exhausted and the engine almost stopped until the gasoline level again raised in the carburetor.

After this discovery it was but a few minutes' work to cut off the pipe and solder on a connecting sleeve, as it was found impossible to sufficiently open up the pipe by untwisting it. After this was completed the engine ran perfectly and the start was made.—S. F.

NEVER SAY "GET A HORSE."

There are probably very few automobilists who have not at some time in their experience been accosted by the wayside urchin with "Get a horse." Unfortunately the writer found himself in this predicament one hot Sunday afternoon when an unusual feeling of the steering wheel indicated something wrong with the steering gear. Upon investigation it was found that the right front wheel was just ready to fall off, the peculiar feature being the fact that altho the outer cone, ball cup and all the balls were either ground to bits or lost, not the faintest squeak had given warning of the precarious state of affairs. This was probably due to the fact that the dust cap and bearing were packed solid with grease, which, melting from the heat, had thoroly lubricated the bearing while the grinding process had been going on.

A closer investigation showed that the threads were so mutilated that altho an extra cone and a few balls were found in the "scrap box," they could not be used—anyway, there were no traces for the balls to run in.

Fortunately we were only twelve miles from home, but a survey of the neighborhood showed nothing more hopeful than a drug store. Here we purchased a bottle of vaseline in lieu of grease. The end of the axle we then wrapt with all the available string, straps, cord and wire to be found, care being taken to wind it so the rotation of the wheel would keep it tight. This was then well covered with the vaseline, and thus a crude bearing was formed for the

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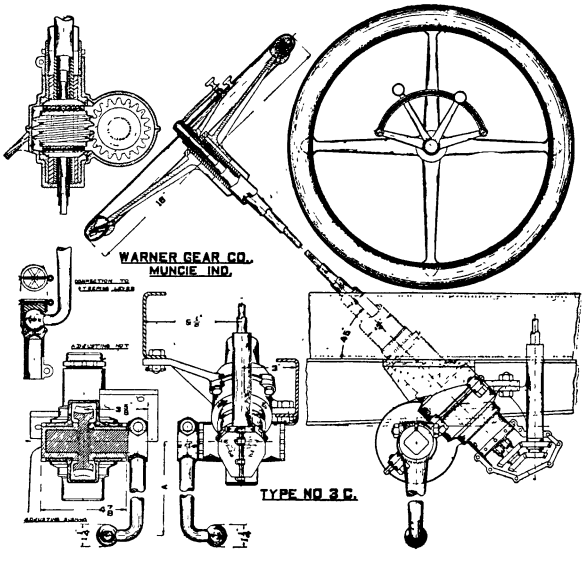
=1908 GEARS=



STEERING GEARS

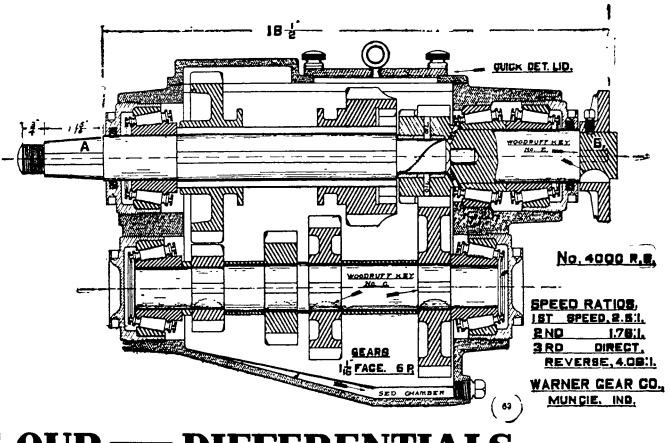
That are built **"To Stand Up."** Worm and sector adjustable, and are hardened and ground to size. Controll levers mounted on top of 16 inch wheel. Aluminum spider.

TRANSMISSIONS

OUR—SELECTIVE—SLIDING "Warner" 35 H. P. and 50 H. P. Built

For Timken Roller Bearings and Annular Ball Bearings.

Gears are made from **SPECIAL GEAR** forgings, hardened, ground and "treated." We also furnish Selective Control levers to go with these transmissions.



═══SEE OUR═══ DIFFERENTIALS═══

On 1908 Cars. **We build both Spur & Bevel types.**

WARNER GEAR CO., - Muncie, Ind.

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inner surface of the wheel hub to run upon. As it was impossible to screw a retaining nut onto the mutilated thread, and it was found that even if this could have been done, the wheel could come off, as without the ball cup the hole in the hub was larger than the diameter of the nut, other means of retaining the wheel in place had to be devised. A very large washer was found and placed over the axle end and against the string, wire, etc., to keep it in place. This washer bore against the wheel hub. In order to hold it in place a nut was slipt on the axle outside it, and the end of the axle riveted over the nut to hold it in place, so it was impossible for the wheel to come off.

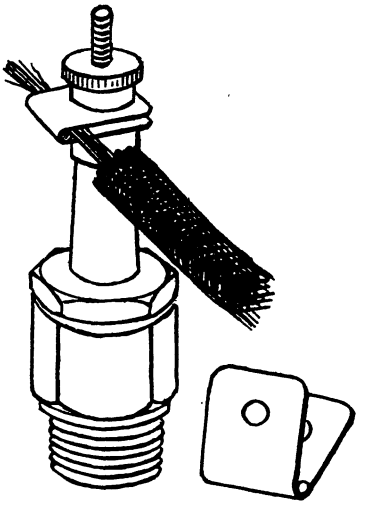
The return trip was made very slowly and altho the wheel wobbled badly we reached home without having to "get a horse."—F. S. E.

USEFUL KINKS.

Marshall, Minn.

My excuse for describing the two automobile conveniences in this article is that nothing can be purchased in the market in their line which will equal them in usefulness.

A common snap clip intended to hold the wire terminal to the spark plug in my runabout proved very annoying by frequently shaking loose. Securing a piece of spring brass about one-twentieth inch thick, five-eighths inch wide, and one and one-fourth inches long, I bent it in the middle until the ends came together. When released the ends sprang apart one-fourth inch, and in the angle of this "V" shaped piece I soldered a short piece of number sixteen copper wire to guard

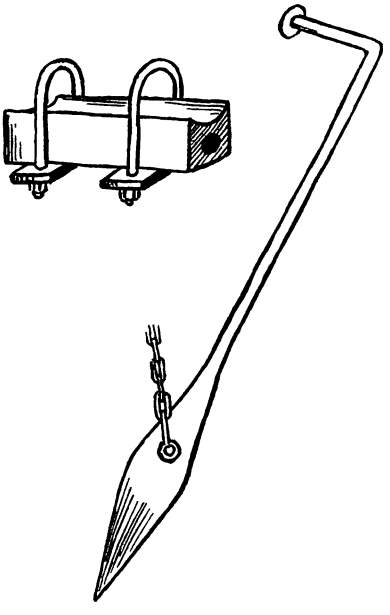


AUTOMOBILE TRADE JOURNAL

against it breaking at the bend when in use. I then drilled a three-sixteenth inch hole through the ends three-eighths inch back, and placed it on the spark plug pin, under the thumb screw. When the thumb nut was screwed down the plates came together, clamping the terminal wire firmly, as shown in the sketch, yet capable of instant release by simply turning the thumb nut back one or two turns. There is no possibility of shaking loose, or breaking, or necessity of turning an eye in the end of the wire, and it will clamp various sized wires or a group of small wires. It makes an equally good battery connection, requiring nothing but plain wire to connect the cells. The material of which it was made was thin "brass rule" obtained at a printing office.

A HOME MADE SPRAG.

On my way up a long hill on slow gear my chain broke, and if I had not been favored by a chance to let my car back against a convenient side bank, I should have been in a very dangerous situation, for the hub brakes could not be depended upon to hold the car. Upon ariving home I at once had made the following sprag brake, and its use has been the source of an agreeable safe feeling every time that I have climbd a hill since. A piece of half inch round steel rod thirty inches long was bent at one end at a right angle four inches long, and eight inches of the other end was bent back upon itself and welded there to give extra strength. This end was made pointed, and a five-sixteenth inch hole was punched through, four and one-half inches from the point. A piece of hickory, two inches square and three and three-fourths inches long, was bored through lengthwise with a nine-sixteenth inch bit. The four inch end of the sprag was placed in this hole and retained by riveting a washer over the end of the rod. The wood was hol-



AUTOMOBILE TRADE JOURNAL

lowed out a little on one side to make it fit, and then clamped tightly to the back side of the front axle by two ordinary carriage axle clips with cross ties as shown in the drawing. A piece of trace chain was fastened by a small clevis to the sprag in the hole near the point, and the other end was attached to a cross piece of the chassis frame, the length of the chain being arranged to allow the sprag to drop almost perpendicularly from its axle attachment. A half inch wide lace leather strap fastened to the third link of the chain from the sprag and long enough to permit the sprag dropping free, passed up through the car floor to a screw eye on the dash. A screw hook farther up on the dash served to hold the strap when the sprag was drawn up underneath the car. This sprag is conveniently located, easily put in action, will not permit the front wheels to skid around, and is entirely out of sight when not in use. In ascending a hill where there is any possibility of a backing accident I allow the sprag to drag as a precaution. This is not only the most effective sprag brake that I have ever seen, but it is inexpensive and easily applied.

A. D. HARD, M. D.

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The 1908 MITCHELL

at all agencies

September 1, 1907

The 1908 Mitchell, the finest touring car in the world for $2000 as well as the runabout and the NEW Mitchell Roadster shown at all agencies September 1, 1907. See them. Say to any Mitchell agent—"Show Me." He'll show you in a Mitchell for 5 miles or 50 whichever you say. Convince yourself that for power, control, silence, speed and sweet running there is nothing can equal the 1908 Mitchell at the price.

The 1907 Mitchell a Winner

At Hamline Track, St. Paul, Ed Zerbies in the 24 hour race, after wrecking two cars on the fence at the turns because of the dust—having no other car, borrowed a 20 h.p. Mitchell Runabout from a doctor in the crowd and drove it for nearly four hundred miles until another Mitchell 35 h. p. could be secured. In the face of this awful handicap Zerbies finished only 28 miles behind the winner who drove a 40 h. p. car, selling for over twice as much as the Mitchell, and in addition broke all previous world's records for 24 hours—183 miles.

The 1908 Mitchell chassis is a refinement of the 1907 with all the latter's good points and the same standard construction. You can't afford to overlook the 1908 Mitchell.

MITCHELL MOTOR CAR CO.

188 Mitchell St. RACINE, WIS.

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ring cars and Models 4-40 and 6-30 run-
outs. The statement is made that the
tory output will be double that of last
ar, and in addition to the other cars
0 H. P. car not yet ready for publicity
l be marketed. This company makes
the ordinary parts of the cars, except
mes and axles, in its factory at York,
As the chasses are very similar a de-
led description of that of Model I will
fice.

MODEL I PULLMAN.

The motor is four-cylinder vertical, de-
oping 40 H. P. at 1,000 revolutions per
nute. The cylinders are cast separate-
with integral water jackets having
le ports and flanges by which the cylin-
s are bolted together. This arrange-
nt not only insures perfect water cir-
ation, but also makes the four cylin-
s practically one unit, giving substan-
ly the same results that would be se-
ed by casting all four cylinders in one,
without the disadvantages of making

the radiator. All cylinders are ground
within 1-1000 of an inch on an improv
Heald Cylinder Grinder. The pistons a
ground on a machine especially design
for this purpose, and are tapered from t
lower ring to allow for expansion und
heat.

The connecting rod bearings are
Cramp's special bearing bronze. Ea
piston is fitted with three 5-16 inch rin
above the special steel wrist pin, and o
oil retaining ring below the wrist pin, a
with an oil groove which takes oil a
distributes it around the rings a
through the wrist pin, thus insuri
proper lubrication of the piston and t
wrist pin bearing. The valves are on o
posite sides, and are interchangeabl
made from nickel steel forged from sol
bars, turned, and the seat beveled to
degrees and ground to an accurate joi
The valve push rods are adjustable f
the proper timing by a cap and lock nu
The crank shaft with its flywheel flan

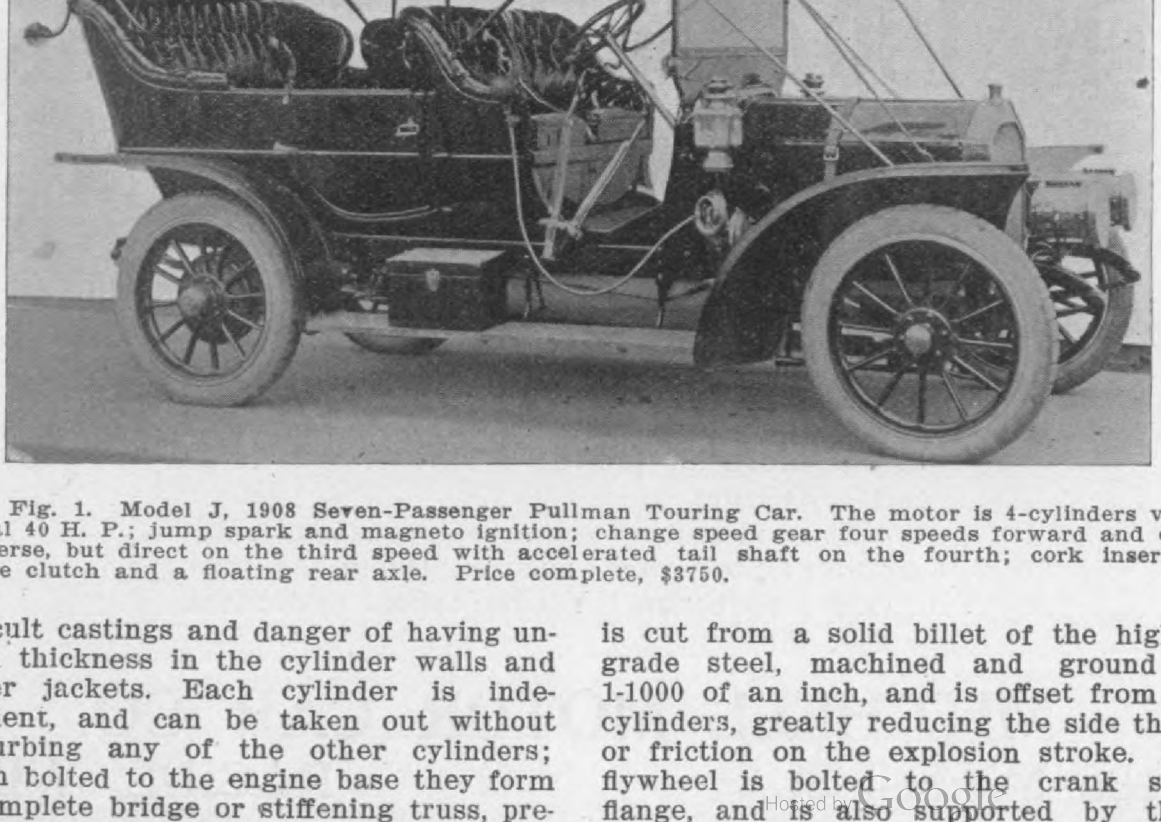

Fig. 1. Model J, 1908 Seven-Passenger Pullman Touring Car. The motor is 4-cylinders ver-
al 40 H. P.; jump spark and magneto ignition; change speed gear four speeds forward and one
verse, but direct on the third speed with accelerated tail shaft on the fourth; cork inserted
ne clutch and a floating rear axle. Price complete, $3750.

cult castings and danger of having un-
n thickness in the cylinder walls and
er jackets. Each cylinder is inde-
dent, and can be taken out without
urbing any of the other cylinders;
n bolted to the engine base they form
omplete bridge or stiffening truss, pre-
ting the possibility of twist or strain

is cut from a solid billet of the highe
grade steel, machined and ground
1-1000 of an inch, and is offset from t
cylinders, greatly reducing the side thru
or friction on the explosion stroke. T
flywheel is bolted to the crank sha
flange, and is also supported by thr
studs, which release the bolts from t

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The Jones on

Locomobile ·40·

On all the Best Cars you will find the

Jones Speedometer

And here's a reason or two:

The Jones is the *pioneer speed indicator.*

The Jones is the accepted *standard* speed indicator.

The Jones is used in this country and abroad by the police departments as a means for timing motor vehicles for reason of its accuracy.

The Jones won the Gold Medal *Reliability* award in the Royal Automobile Club's Contest. All American and Foreign manufactured speed indicators sufficiently practical to enter, were in this Contest.

S. F. Edge had the Jones on his Napier Cars when he made the World's most remarkable record, traveling 1,588 miles, 1,310 yards in 24 hours; averaging 66 miles per hour, on the Brooklands Track, London, England.

The Speedometer cable revolutions per hour at a 66 mile speed total 168,300 or 4,039,200 in 24 hours, demonstrating the Jones "*staying*" qualities.

Compare this to what other indicators have done—then you'll specify the JONES for your 1908 car.

Jones Speedometer

76th Street and Broadway

NEW YORK

We will send you upon request, without

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ngth; having cast integral with it five rings for the crank shaft, and four s of "I" beam section, which bolt it he side members of the frame. The t bearing is three inches in length, center ones two and three-fourths in-s, and the rear one four and a half es; this insures the crank shaft be-held in proper alignment under severe in. Four inspection plates, easily re-able, two on either side, are provided. casing for the half-time gears is cast arate and bolted to the engine base, entirely encloses the gears. The om pan is an aluminum casting, with oil compartments. A sight feed ge cast integral with the bottom pan ws at all times the level of the oil, pan being also provided with a drain in each compartment.

which will not absorb oil or swell.

The fly wheel is 18 inches in diamete 4-inch face, giving the proper rim weigl without an excessively heavy whee which gives a smooth running engine a low speed on high gear; it is fastened t the crank shaft which is flanged to r ceive it, by three studs, and is held i place by three extra bolts. The insid diameter is 15½ inches, with three inc face, turned to a 12 degree taper an fitted with cork inserts.

CLUTCH.

The leather faced aluminum cone cluto is 15½ inches in diameter, and is pr vented from rotating by two automat brakes, which allow changing the gea without clash.

WATER CIRCULATION.

A gear driven centrifugal pump with

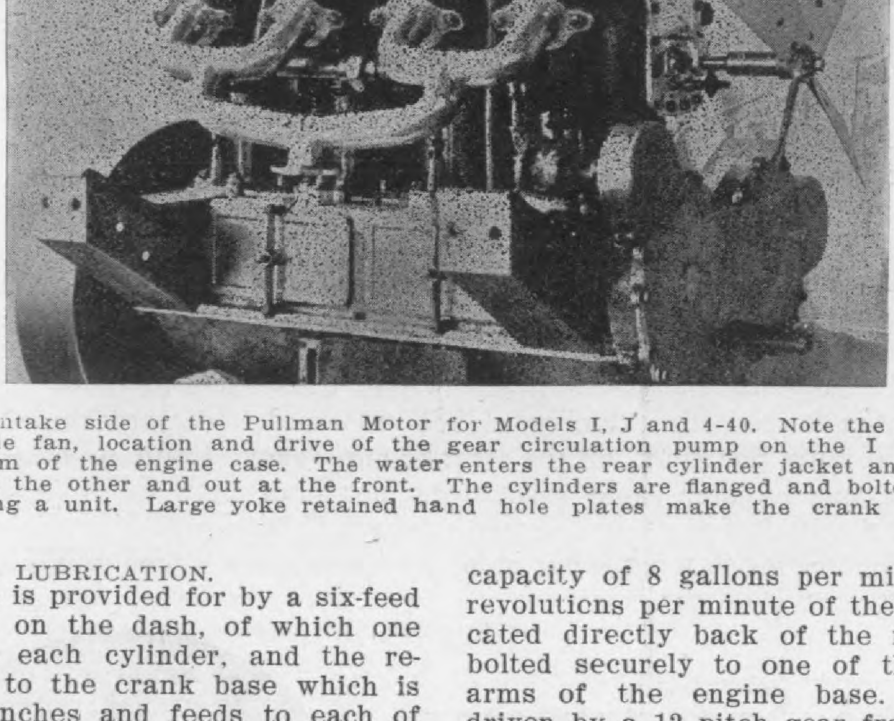

Fig. 2. Intake side of the Pullman Motor for Models I, J and 4-40. Note the encased gear-, adjustable fan, location and drive of the gear circulation pump on the I beam section porting arm of the engine case. The water enters the rear cylinder jacket and passes suc-sively thru the other and out at the front. The cylinders are flanged and bolted rigidly to-her, forming a unit. Large yoke retained hand hole plates make the crank case interior essible.

LUBRICATION.

ubrication is provided for by a six-feed , located on the dash, of which one goes to each cylinder, and the re-ning two to the crank base which is d by branches and feeds to each of five bearings. The surplus oil is col-ed by the bottom pan and serves as additional splash system.

CAM SHAFTS.

e cam shafts are on opposite sides of engine base and are fitted with three bearings. They are removable from front end by taking out two bolts, one

capacity of 8 gallons per minute at 1,00 revolutions per minute of the engine is lo cated directly back of the radiator, an bolted securely to one of the "I" bear arms of the engine base. It is gea driven by a 12 pitch gear from the cran shaft, and receives its water from th bottom of the radiator and delivers it t the rear cylinder, and then forces it for ward around all cylinders and valves, an enters the radiator from the front cylinde through a hose connection. The radiato is of the flat tubed vertical cellular type It is made entirely of copper and brass, an

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WHAT OTHERS SAY

CHAS. E. MILLER & BRO.
Ford and Reo Automobiles

Washington, D. C.
July 17, 1907.

Stewart & Clark,
Diversey Blvd., Chicago, Ill.

Gentlemen—We are delighted to report that we have used and sold 15 of your fine instruments, obtaining same through The Post & Lester Company, of Hartford, Conn. We are wedded to your instruments, being the finest we have handled, especially for the price asked. We hope to sell a large quantity, and are installing them on all of the cars we possibly can, as soon as sold. Very truly yours,

(Signed) CHAS. E. MILLER & BRO.

J. A. NEWBY

New Castle, Ind., July 24, 1907.

Stewart & Clark Mfg. Co., Chicago, Ill.

Gentlemen—Received your letter, and will say I have been selling your Speedometers exclusively this year. Have equipped Nationals, Stoddard-Daytons, St. Louis and Maxwell cars this season. Yours truly,

(Signed) J. A. NEWBY.

Stewart Speedometers are guaranteed for five years against everything but misuse

---

PRICES

No. 3.	**Combination**	**Speedometer-Odometer,**	**full**	**size**	**dial,**	**(4-inch)**	**50-Mile,**	**$**	**40.00.**
No. 4.	"	"	"	"	"	"	**60-Mile,**		**60.00.**
No. 5.	"	"	"	"	"	"	**90-Mile,**		**75.00.**
No. 6.	"	"	"	"	"	"	**120-Mile,**		**100.00.**

We can make immediate delivery on 50 and 60 mile instruments

We are told our new catalogue is the handsomest and most comprehensive book on speedometers yet published. Copy sent on request.

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Stewart & Clark Manufacturing Co.

adjustable on the steel hub, which kes the fan more or less efficient by usting closer or farther away from the iator. The blades are made of sheet minum riveted to the manganese cen-

IGNITION.

The high tension system of ignition is ployed, with distributor and single coil ed to the dash, which gives synchron- d firing. The distributor is located un- tne bonnet between the first and sec-

from forged bars of chrome nickel ste and machined on the pitch line to with 3-1000 of an inch, allowing easy slidi motion and freedom from noise. They a hardened and oil treated after finishi Shafts are chrome nickel steel, with fo integral keys to receive the sliding gea operated on them. All bearings and t transmission are fitted with annular i ported ball bearings, and all worki parts are completely enclosed and run oil. The transmission case is of ca

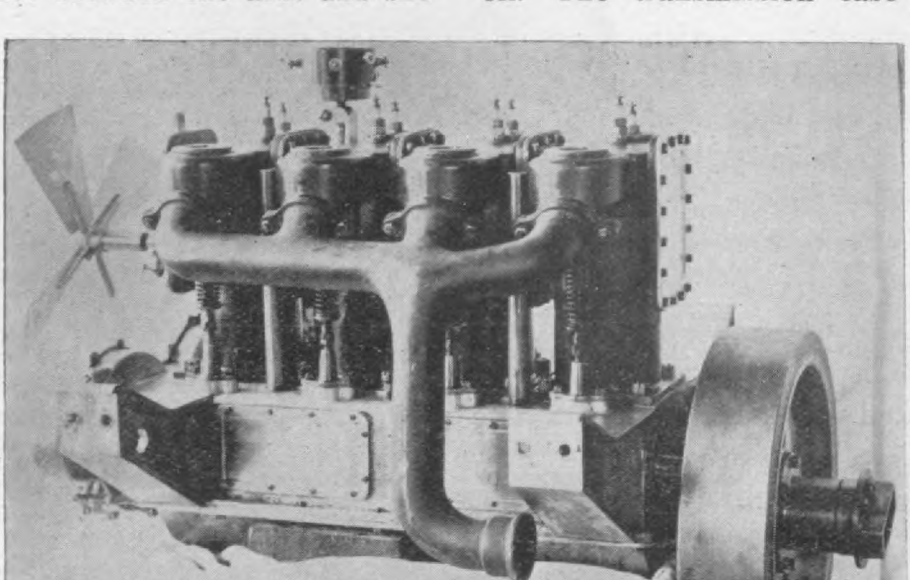

Fig. 3. Exhaust side of Pullman Motor, showing the accessible location of the combine ner and distributor, the one-piece exhaust manifold, double set of spark plugs and the metho bolting the cylinders together.

cylinder, with the bottom flush with top of the engine. The contact points of platinum and seldom need atten- n. The distributor runs in an oil bath, is enclosed by a glass cover, which kes it dust proof. It is driven by bevel rs from the time shaft, with a vertical ft running in bronze bearings and lu- cated from the splash in the engine e. In advancing or retarding the rk the central post only is moved. The side post does not move, which pre- ts the primary or secondary wires aking at the terminals. The current is plied from a six-volt 60-ampere-hour rage battery, and a set of six dry cells reserve carried in a waterproof box on running board on the left side of the

TRANSMISSION.

The transmission is of the selective e, four speed forward and one reverse, ving direct on third speed, the reverse rs being idle on all speeds forward

aluminum with four supporting arms c ried on a pressed steel sub-frame, and double universal joint is fitted between and the clutch. The transmission is c nected with the rear axle by a drive sh fitted with two universal joints, one each end, automatically lubricated a thoroly protected from water, dust a dirt.

AXLES.

The rear axle is of the floating or clut type, fitted with adjustable Timken roll bearings thruout. Owing to the pered construction of the roller bearin the side thrusts of gears are taken ca of, as well as the weight of the load. T shafts are 1½ inches in diameter, a squared in the equalizing gear, permitti their withdrawal and the removal of t equalizing gear without removing the a from the machine, making the gears a main bearings easily accessible. A shock or strain at one wheel is taken

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ents very simple. The pinion shaft is ted with two sets of Timken bearings, pering different ways. The spring seats e of the oscillating pattern, and cannot ove sideways, but permit of a slight ovement around the axle, which means at no strain is placed on the springs hen the power is applied, all the strain ing taken by the torsion rods. The rear le tubing is 2½ inches in diameter with inch wall, keyed and riveted into the using. A truss rod runs from the side ring blocks under the center of the differential housing.

The front axle is "I" beam section rged in one piece from chrome nickel eel. The steering knuckles are fitted th roller bearings.

WHEELS.

The wheels are 34 inches in diameter, ont and rear, have 1½-inch second owth hickory spokes, and are fitted with ick detachable rims to take any standd make of American tire. The front es are 34x4, and the rear tires 34x4½.

and also operates against metal.

FRAME AND SPRINGS.

The frame is made of nickel steel, ch nel section, with a sub-frame to carry t transmission. The front is narrowed t inches on each side, giving a large rad of action for the front wheels in turni The front springs are semi-elliptic, ribb and banded, 41 inches long by 2¼ incl wide, connected direct at the front a suspended by plates at the rear. The r springs are platform of the three-po suspension type, consisting of two se elliptic springs hung outside of the fra 43½ inches long, and a cross spri shackled at their forward ends and bol to a cross member of the frame.

The mud guards are of the flaring ty made from prest steel; the front o are fitted with mud shields on the ins next to the hood, connected to the m side member of the frame and fitted the running board at the rear. The r ones are of extra length, extending p the body, keeping the mud under all c

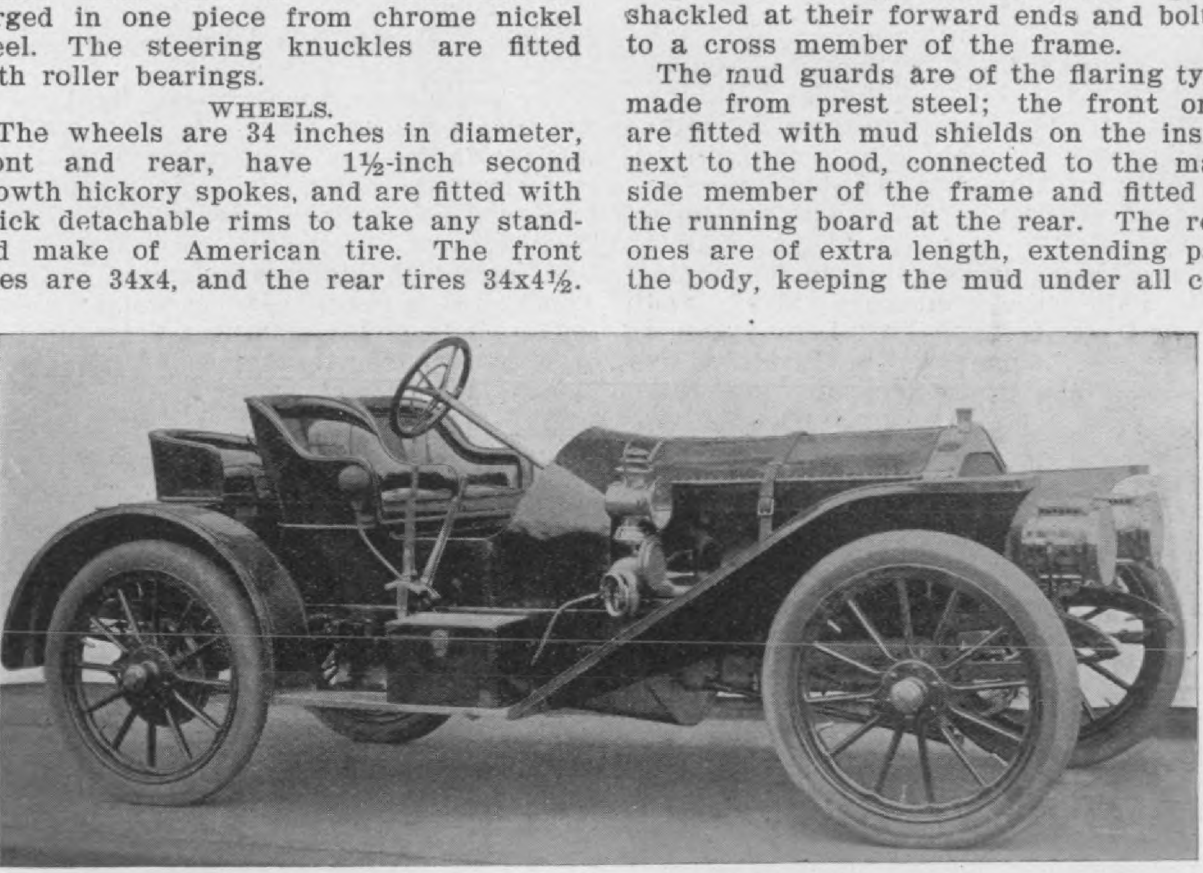

Fig. 4. 1908 Pullman Model 4-40 Runabout. Practically the same chassis as Models I a , except it has only a three speed selective sliding gear, 108-inch wheel base. The car weig bout 2400 pounds, and is claimed to do 60 miles per hour. Price complete, $3000.

STEERING GEAR AND CONTROL.

The steering gear is of the screw type ted with a ball bearing cone to take up y lost motion which may occur. It is ounted on the aluminum crank case, d is suspended by a bearing on the sh. The spark and throttle levers are rried on top of the steering wheel, but not move with it. They operate ru gears located at the bottom of e housing, and connected to the vertical aft to which are connected the levers

ditions from the back of the rear s and are connected at the front end to running board. The running boards of seasoned wood covered with linole with brass bindings, and fitted on right with a waterproof tool box, and the left with a waterproof battery b The dash is an aluminum casting cur on the top and sides, which gives pro tion to the coil and dash equipment. is made with a bracket which bolts di to the frame and supports it rigidly.

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copper, with compartments to prevent splashing, has a capacity of 18 gallons, and is located under the front seat.

BODIES.

The bodies are made in their own factory from the finest selected woods. The bendings are one piece. The tonneau seat is 55 inches wide, giving ample room for three to sit comfortably without crowding. The doors are 21 inches wide, and fitted with positive double-acting lock and double heavy one piece bronze hinges. The front seats are of the individual type, upholstered with the best grades of hand buffed, bright finished leather, upon a foundation of springs and curled hair. Each car is equipt with a full set of tools —jack, pump and repair kit—two gas lamps, two oil lamps, and one tail lamp. The price of Model I is $3250.

MODEL J.

Model J is a 40 H. P., seven-passenger car, the chassis being identical with the Model I, with the exception that the motor is equipt with a double system of ignition, consisting of the standard high tension system of storage batteries and dry cells, and in addition a magneto. A double set of plugs is employed, each located over the intake valve and port, and so arranged that both systems may be used separately or together, as described. The body has an unusually large tonneau with two comfortable extra folding and revolving seats, and the car has, in addition to its ordinary equipment, a lined cape top with side curtains and a folding glass front. The price complete is $3750. The colors of Models I and J are carmine body, light red gear, red leather, or dark blue trimming to order.

4-40 RUNABOUT.

The Model 4-40 Runabout is practically of the same specifications as the Models I and J, except that it is fitted with a three speed selective sliding gear transmission, 108 inch wheel base, and with a magneto as regular equipment. The motor, frame, axles, etc., being practically the same, only lighter. The weight is about 2400 pounds, and it is claimed the car will develop a speed of over 60 miles per hour. It sells for $3000.

6-30 RUNABOUT.

The Model 6-30 Runabout is a light roadster or speed car, with six cylinders of smaller dimensions, developing 30 H. P. at 1000 revolutions per minute. A magneto is furnished as regular equipment. The specifications are practically the same as the 4-40, except the parts are lighter and the wheel base is 104 inches. It weighs about 1900 pounds, and is said also to be capable of making a speed of over 60 miles per hour. The price is $2750.

Brush Patents on the Market

Several patent rights on the inventions of Alanson P. Brush, of Bates and Congress streets, Detroit, Mich., are now on the market, the licenses held under these patents by a prominent automobile manufacturer expiring October 1. These patents include those covering the planetary transmission, automatic carburetor, multicylinder oiling system, copper water jacketing, variable inlet control, bevel gear rear axle transmission, etc., used in a very successful make of car for several years, and the efficiency of these designs are beyond question.

Mr. Brush invites correspondence with automobile and parts manufacturers who might desire to manufacture under these valuable patents.

The Name "Knox" Belongs to Auto Company

Chief Justice John A. Aiken, of the Superior Court at Springfield, Mass., filed a decision in favor of the Knox Automobile Co. in the case of the Knox Automobile Company against the Knox Motor Truck Company, both of that city. The case arose over the use of the word "Knox," which was used by both firms, owing to the active connection of Harry A. Knox with each, and the decision just filed enjoins the motor company from further use of the name in its corporate name, in advertising its products or on its trucks. An injunction to this effect is granted but Mr. Knox, as a member of the truck company, personally is not forbidden to use his name so as to show that he is connected with the company, so long as this is done properly and in good faith. The case has been pending for a long time, the automobile company having brought its bill of equity two years ago.

Cheap Traveling

Those who labor under the impression that traveling by automobile is an expensive proposition will be interested in the list of expenditures compiled by D. E. Levy, the New York broker, which, he claims, cover his recent 3000-mile tour to Chicago and return. Mr. Levy drove his Matheson car and was accompanied by a party of five. The expenses for the 3000-mile trip were as follows:

Gasoline, $51.39; oil, $12.40: storage, $13; washing, $12; polishers, $4.25; kerosene, $0.75—total, $93.79.

The total of $93.79 figures out three cents a mile or five mills per mile for each passenger. In comparison railroad travel is not only very much more expensive, but lacks the advantage of complete independence enjoyed with automobile travel.

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e Payne-Modern is a new line of cars, ving a great number of novel and high-genious features, brought out by the ern Tool Company, of Erie, Pa., U. S. nanufacturers of screw machine equip-t, including chucks and self-opening for cutting threads.

is concern interested itself in the nanical problems of the motor car in placed its investigations and exper-ts in the hands of a well qualified and oly experienced automobile expert, has ever since pursued a costly course tudy and experiment, resulting in the uction of three different chassis models, ur cylinder, five passenger touring car, cylinder two, three or four passenger ster, and a six cylinder five passenger ing car.

ese Payne-Modern cars are here shown specifications, while the six cylinder ing car and its motor are now first n and described in some detail.

e Payne-Modern motor car study was expanding steel rings and steel balls which act as keys and when driven home hold the copper fins so firmly that they can be removed only by breaking up the cylin-der. The gear-shift is of equal originality and mechanical exactitude and is also patented, and also depends for its working on a novel use of steel balls. Both the designing and the construction are beyond criticism so far as form, perfection of work-manship and certainty of action are con-cerned.

The five passenger six cylinder touring car has a wheel base of 118 inches and 56 gage. The motor is air cooled, 4 cycle 4 by 4½ inches, with 80 lbs. compression which is extremely high for an air cooled motor. This motor develops 36 H. P. at 800 r. p. m. Completely equipt, tanks full, with some heavy robes in the seat and chains on the rear wheels, the scale weight of one of these cars was 2840 lbs. The price is $4000.00, including 5 lamps, mats, horn, tools, gas tank, cape top and

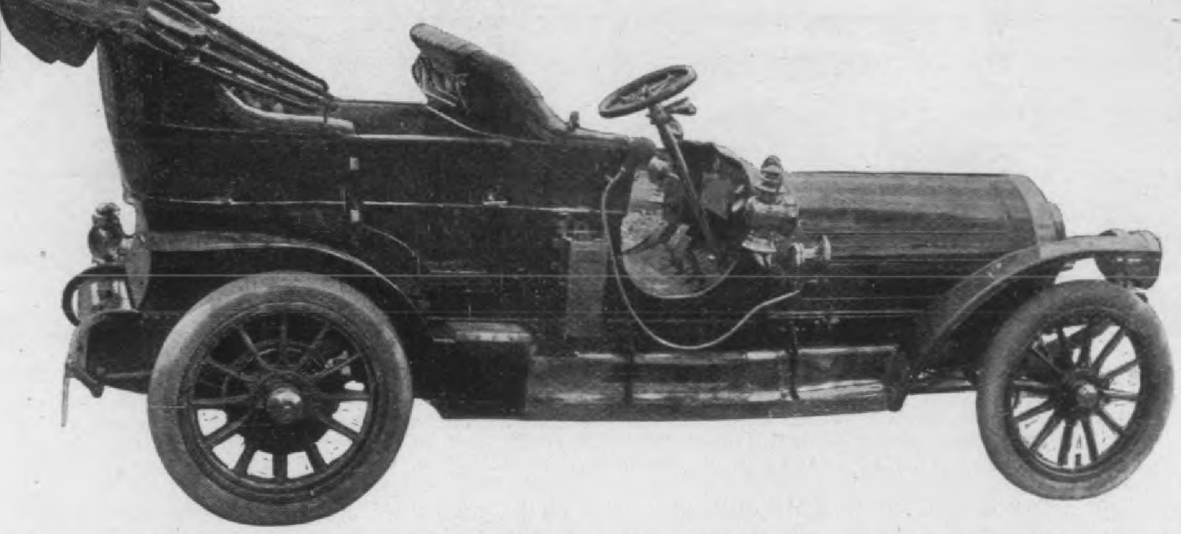

Fig. 1. The Payne-Modern 5-passenger, 6-cylinder, touring car. Wheel base, 118 inches; ge, 56 inches; all four tires, 34 inches by 4 inches; motor, six, air-cooled, 4 cycle, 4x4½-h cylinders, compression 80 pounds, showing 36 H. P. at 800 R. P. M., which drive the car miles per hour. This car, fully loaded, can easily make 65 miles per hour on a good road. nks full, completely equipt the car weighs 2840 pounds; price, including 5 lamps, mats, horn, ls, gas tank, cape top, and speedometer, $4000.

n with fixed convictions in favor of ooled motor cylinders, the use of a liar patented ball-clutch device for ge gears engagement selection and an nal analysis of vehicle spring action, h resulted in the diagonal placing of elliptic springs which is a unique lty that first challenges criticism in Payne-Modern motor models.

speedometer, completely equipt for ex-tended touring.

The five passenger four cylinder touring car has a wheel base of 100 inches, and 34 by 4 inch tires. The four cylinder motor shows 24 B. H. P. at 800 r. p. m., fully loaded. This car can make about 45 miles on a good road. The weight, with tanks full and complete equipment is 2100 lbs. The price $2800.00 includes the same con-

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bout 55 miles per hour at 1000 r. p. m. is expected to weigh about 2000 lbs., and make 75 miles an hour on good roads, nd will be fitted with a body to seat two, ree or four passengers. The price will e $3600.00, with complete equipment.

NOTABLE FEATURES.

The first thing noticed in looking at a ayne-Modern car is the oblique placing the half-elliptic springs, which are tilted in front by curving the frame-side neck ward instead of downward, while the ear spring-end is linked to a long down-anger fixt to the chassis frame. This stonishing variation from all previous ractise was made to take advantage of e following conditions, well known to be separable from wheel carriages of loads:

(a) A wheel pivoted on a pendulum can e pushed past a vertical road obstacle of ny height below that of the pendulum sus-ension point.

(b) A wheel pivoted to a horizontal ember in the line of the wheel axis and aving a vertical lift, can pass no vertical oad obstacle of more than one-half the heel diameter under any conditions, and nder the conditions of ordinary wheeled arriage practise the wheel, which must se in a perpendicular line against spring ction, can pass road vertical obstacles of nly a very limited height, considerably ess than one-fourth of the wheel diameter.

(c) A pendulum-carried wheel can sup-ort a vertical load on a spring equally as more than half the wheel diameter height, and cannot well be made to mount vertical obstructions of a hei greater than one-fourth of the wheel dia ter, and as it is desirable that motor wheels, pushed, pulled or turned by pow should pass the highest possible road stacles with the least possible power penditure and probability of damage, Payne-Modern car designers assumed t by giving the wheel-carrying spring so angle between the vertical, and the h zontal, advantages could be had.

Experiments were made by placing spring at different inclinations, alw with the front end of the spring eleva and the most favorable spring inclinat angle, all conditions considered, was fo to be about 15 degrees from the horizon

The resultant action is too complex be fully analyzed here, but the pract result obtained is that which would c from considerably increasing the w diameter and at the same time largely ducing the load. The wheel is given m more time in which to surmount a obstacle of given height and the sp also yields the more readily, this s spring inclination making the most prising difference in the riding of the

The peculiar features of the motor placing of the cylinders at a 60 deg. a to each other, the location of the shaft between the two banks of 3 cylin

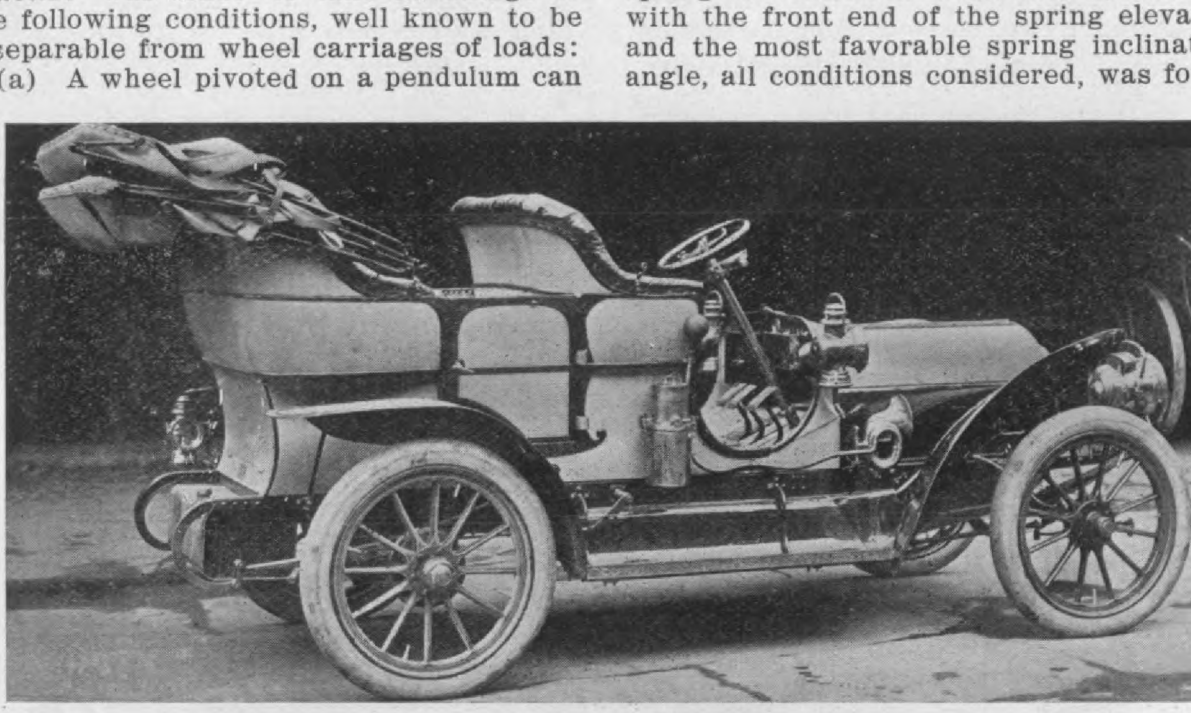

Fig. 2. The Payne-Modern 5-passenger, 4-cylinder touring car with tilted springs. Wh base, 100 inches; gage, 56 inches; tires, all 34 inches by 4 inches. Motor, four, of the sa 4-cycle, air-cooled, 4 inches by 4½ inches cylinders used in the 6-cylinder motor. The Payne- M ern Cars use only this one style and dimension of cylinder. The motor is rated as 24 H. P. at R. P. M. The weight with full tanks is 2100 pounds; price, $2800, with the same equipment as the cylinder.

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evious air-cooled multi-cylinder motors. is arrangement of the cylinders was for e purpose of total length saving, cylinder paration by spreading and staggering,

released by loosening one of the be screws, or both by releasing both screw while the beam can swing to one side

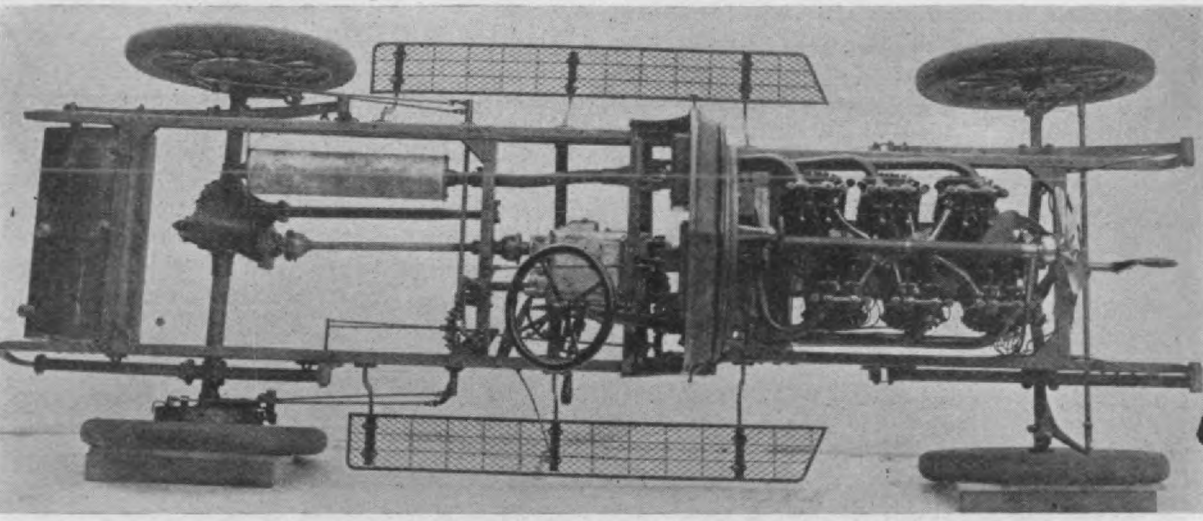

Fig. 3. Payne-Modern 6 chassis plan. Fuel tank in rear. Timken axles; 6-cylinder, ai cooled, 4-cycle motor. No outside hand levers.

give air circulation space, and be- ise it was believed that 60 degrees be- een the cylinder was more favorable to ration reduction than the 90 degrees of vious practise.

The cylinder angle makes the cranks

slacking its holding nuts on the pillar en as the beam-eye at one end is slotte Lastly, the exhaust and intake piping held by cam-ring fastenings, equivalent a mutilated, quick-pitch screw-thread, that one or both valves and valve actio

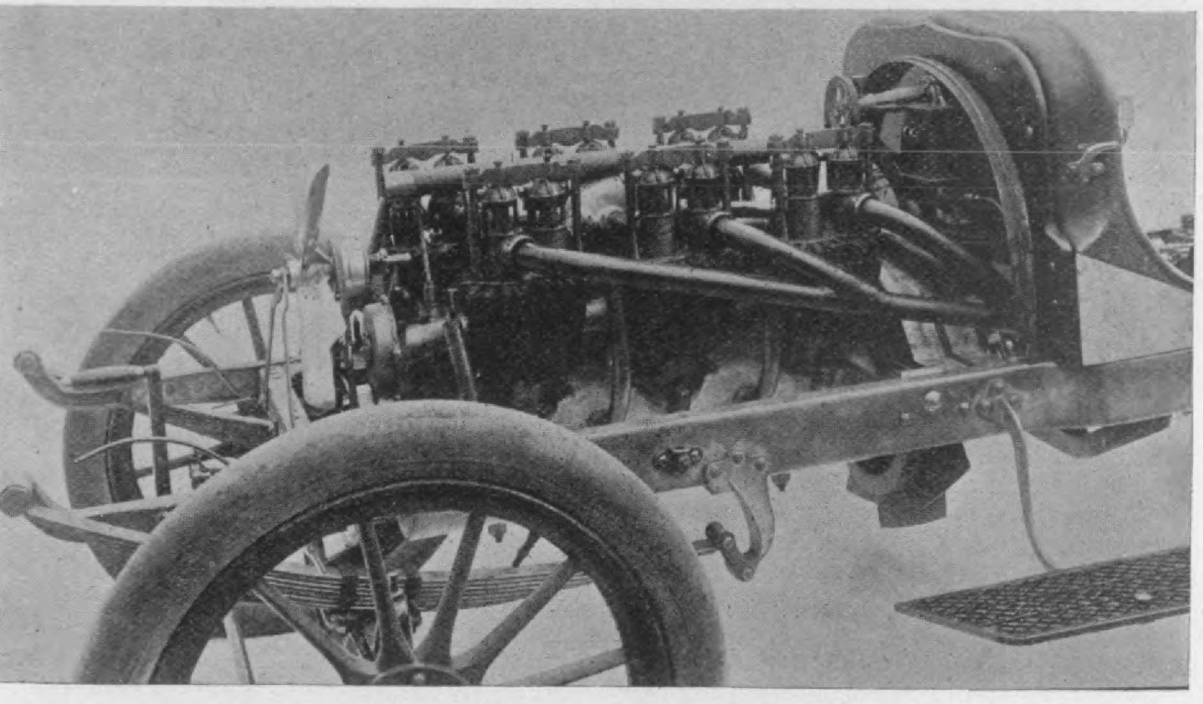

Fig. 4. Payne-Modern Six. Left hand side of motor, exhaust side of the 3 left hand cylin rs. Six of the cylinders have the intakes on the inside, between the two banks of 3-cylin rs each. This view also shows clearly the front inclined spring arrangement.

nd in three sets which are 30 deg. apart, adjacent cranks of each set being on

of a cylinder can be removed and replac in 10 or 15 seconds.

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t retained, so that the valve action ngths can be instantly adjusted to any sired clearance. The cams are machine eel, case-hardened and applied to a 7/8 dia. cam shaft with Woodruff key and n retention for each. The whole valve ge and valve action assembly is so de-gned and retained as to permit extremely ick and convenient assembling, dis-sembling and the most delicate adjust-ent. The intake and exhaust assemblies e the same, save for cooling fins on the haust valve cage.

Beginning in front, the order of cylinder ing is 1-3-2-4-5-6, adopted after many ials of other sequences.

throttle and air intake valves, butter type, linked together so as to incre the air supply as the throttle is ope and diminish the air supply as the thro is closed. The carburettor delivery p is horizontal from the carburettor pla high up in the rear of the motor, and bent upward into the distributing chamb located between the cylinders as sho in the plan view of the motor. As f applied the two forward cylinders rob the other four of fuel, but by exten experiments with the bent up carburet pipe admission to the distributing ch ber, shapes and dimensions were fo

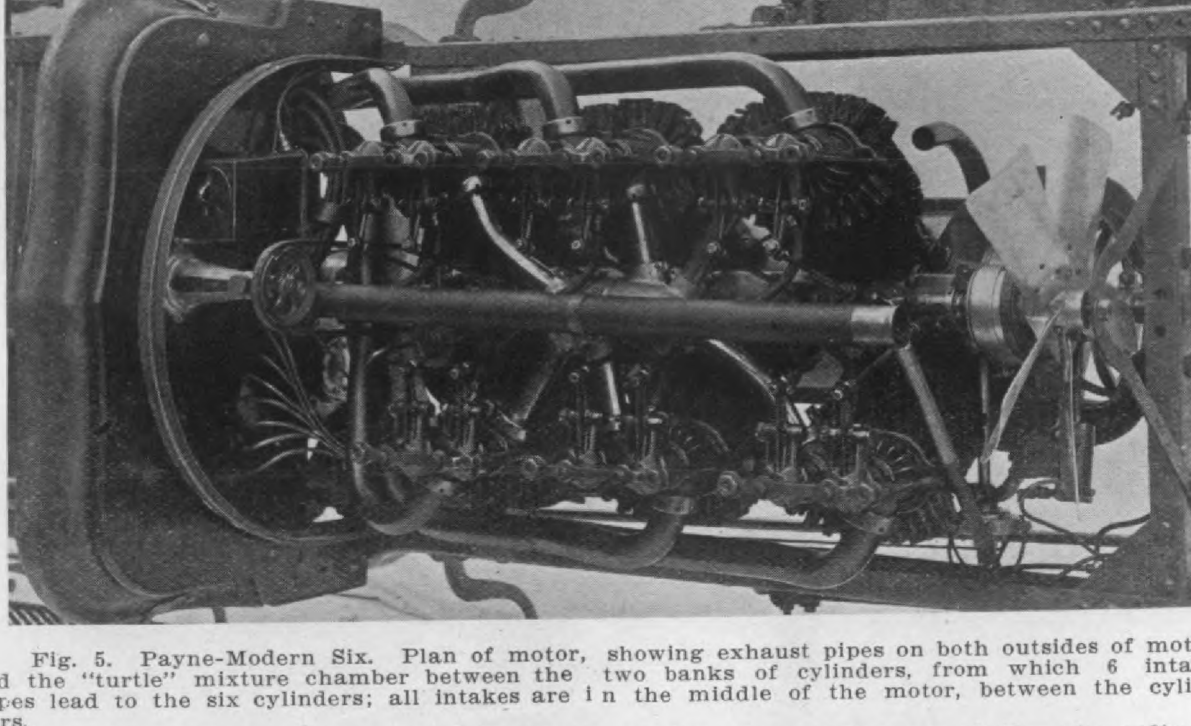

Fig. 5. Payne-Modern Six. Plan of motor, showing exhaust pipes on both outsides of mot nd the "turtle" mixture chamber between the two banks of cylinders, from which 6 inta ipes lead to the six cylinders; all intakes are in the middle of the motor, between the cyli ers.

The pistons, piston pins, rods and cylin-ers are ordinary construction; cylinders, istons, rings and crank-shaft all ground.

THE COOLING SYSTEM.

The applied copper fins now used, see lustrations, half-tone and construction rawing reproduction, consist of two, milar, sheet-copper, corrugated fin-halves, ipped into fin-seats ½-inch diam. by 3-16 ches deep, bored in the 3/8-thick cylinder alls, then split rings dropt in be-ween the fin-halves in their cylinder seats nd finally 5-16 steel balls are driven in e rings to expand them powerfully and retain this four-piece cooling fin assem-ly firmly in place. The cooling is efficient, ut the cylinders are costly, as each ylinder has 252 cooling-fin seats accurate-finished, 504 cooling-fin halves, copper,

which give each one of the six cylin so nearly the same fuel supply that exhaust rhythm is perfect.

The wheels and axles are Timk front and rear, regular forms, and no detailed description.

THE INCLINED SPRINGS.

The springs are placed at angles about 15 deg. to the horizon, and are elliptics. The spring eyes take plain b without special bushes and without sp oilers. The front springs are 40-in long by 1¾-inches wide, 7 leaves. rear springs are 42-inches long by inches wide, 7 leaves. All leaves tongued and grooved, and no bands used. The 15 deg. angle placing seem do away with nearly the whole of sp

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ked in the rear. The motor is supported so as to close to the center, concent

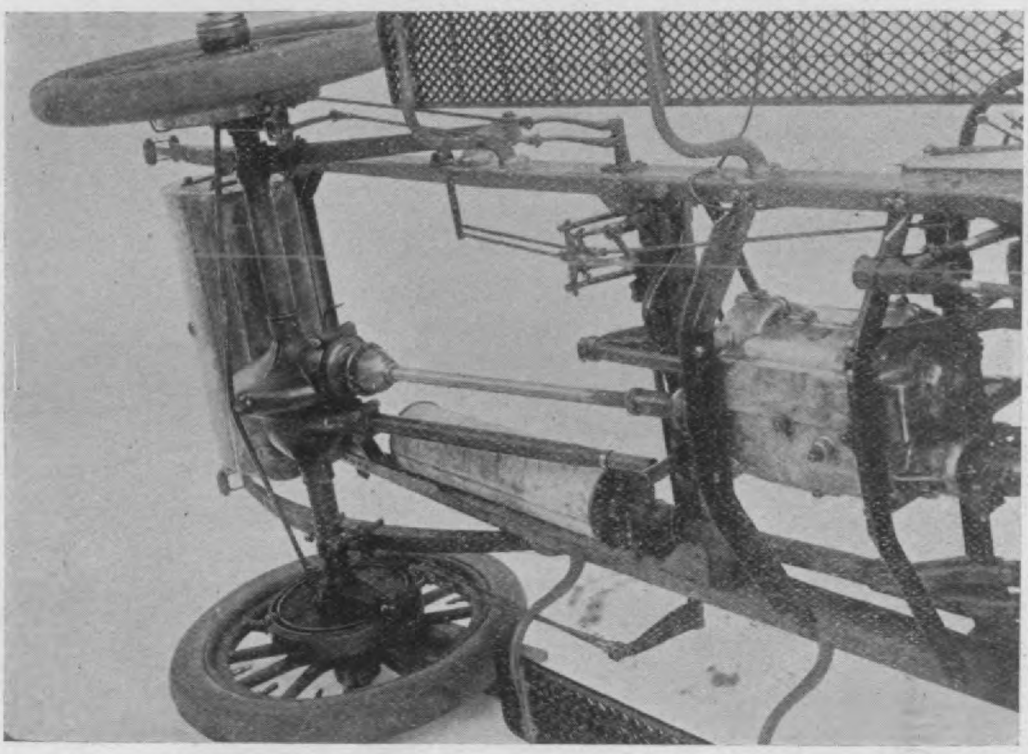

Fig. 6. Payne-Modern Six. Under side of rear part of chassis, showing the gear box sup rt, brake eveners and rear axle and torsion arm construction. No struts are fitted. Both fron d rear axles are by Timken Company. The copper gasoline tank is carried in the rear, is be w the carburetor, and is under air pressure supplied by the small air compressing cylinder ich is not very plainly shown at the right front corner of the motor in Fig. 8.

three points, one in front and two at rear of the crank-box, which has lugs ching across and hooking over the ssis frame sides. The chassis frame with the internal clutch drum surface a clear from it when the clutch is dise gaged, avoiding all closing springs and possibility of clutch-shoe drag on the dru

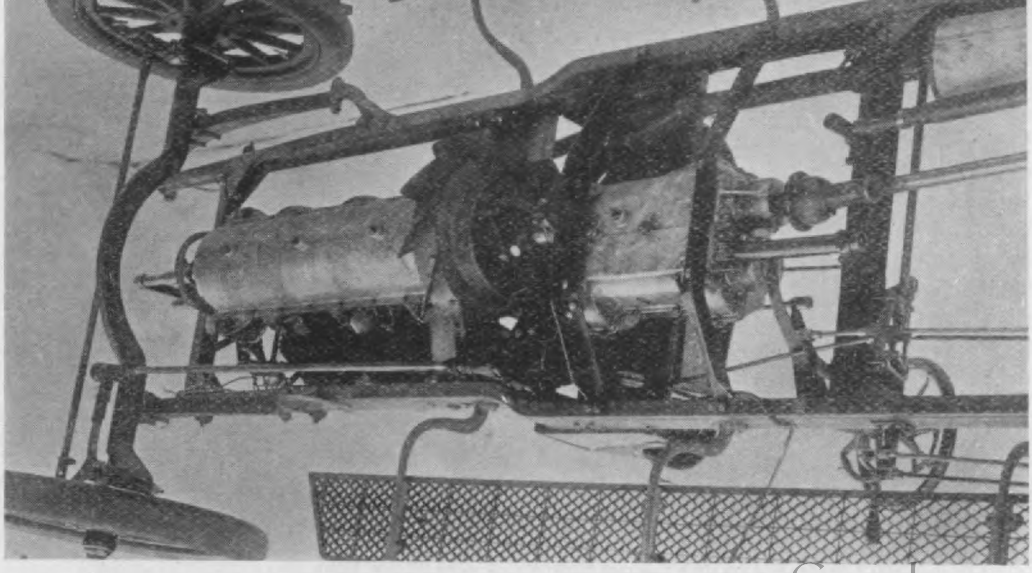

Fig. 7. Payne-Modern Six. Under side of front part of chassis, pan removed, showing l fan-vanes applied the flywheel and motor and front axle construction.

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ıd with no gears driven at any time save ıose in work to produce the desired

the tool chuck-shank has thus fully en the collet bore the collet sleeve, previ

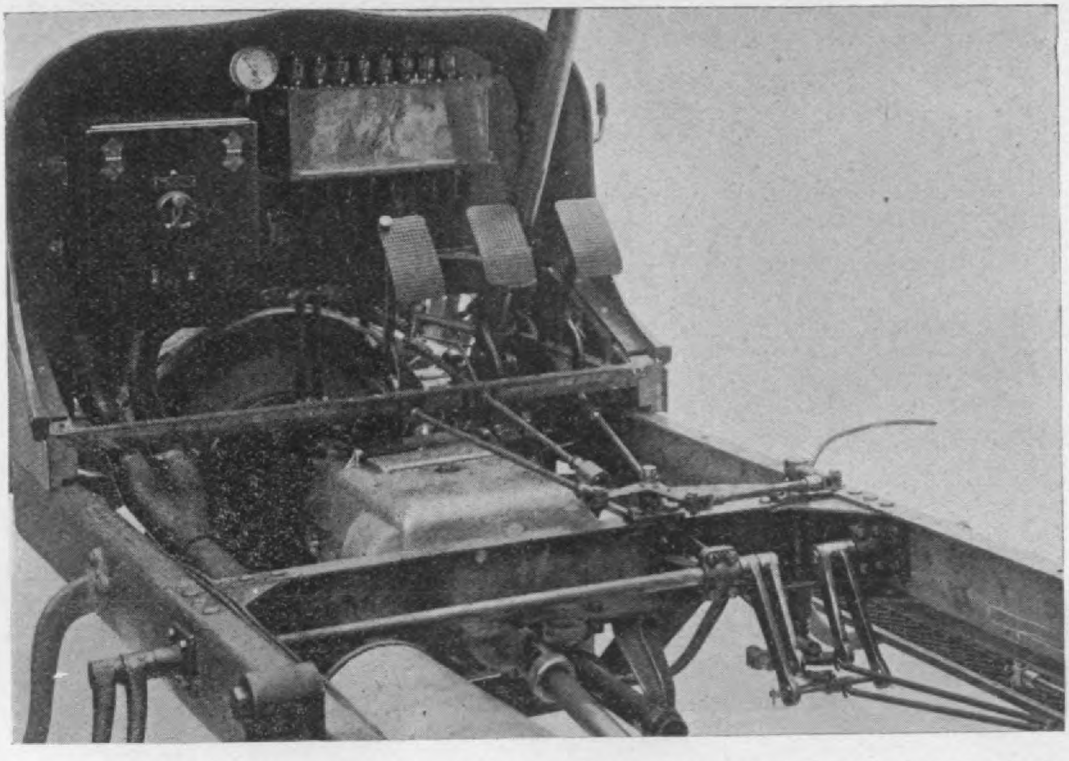

Fig. 8. Payne-Modern Rear of Dash. Note equalizers, the coil box and 8-lead oil feed c ried inside the cast aluminum front board.

peed. The gearing is all steel, 8 d. p. The peculiarity of this gear lies in the neans used for clutching the gears, all of vhich are normally loose on the line shaft nd side shaft, each pair in mesh and all tanding still no matter what the line and ide shafts are doing, this being direct lrive conditions.

The gear selection is made by moving steel balls, which normally engage the ide and line shafts only, but are free to nove in slots in the line and side shafts valls so as to engage both the side shaft or the line-shaft sections and one or more pairs of gears.

This is a patented clutch action, employed by the Modern Tool Company in their line of chucks, which permits the chuck to be slipt into a tool-spindle collet running at high speed, and firmly engaged therewith, or to be disengaged and removed, without stopping the tool live spindle in which the collet is fixt. This clutch action is herewith shown and gives a clear idea of the manner in which the engagement and disengagement are effected. The two balls are in slots in the walls of the hollow collet fixt by its taper shank in the tapered spindle seat, and the collet body is surrounded by a

ly held up by the workman's hand, i leased and drops down by gravity, fo the balls to enter the chuck-shank gro while yet retained by the collet slot that the tool chuck-shank is held either sliding or turning in the c cavity until the collet sleeve is again l by hand, when the tool chuck will down by its own weight.

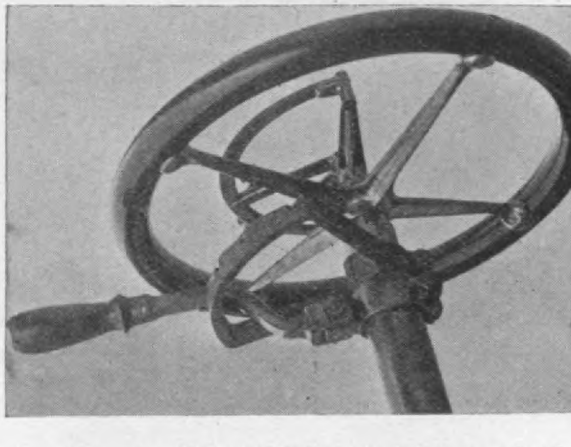

Fig. 9. Payne-Modern steering wheel gear shift lever. The Payne-Modern Six no outside hand levers. Description of shift action in text.

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In the change-gear the balls mov

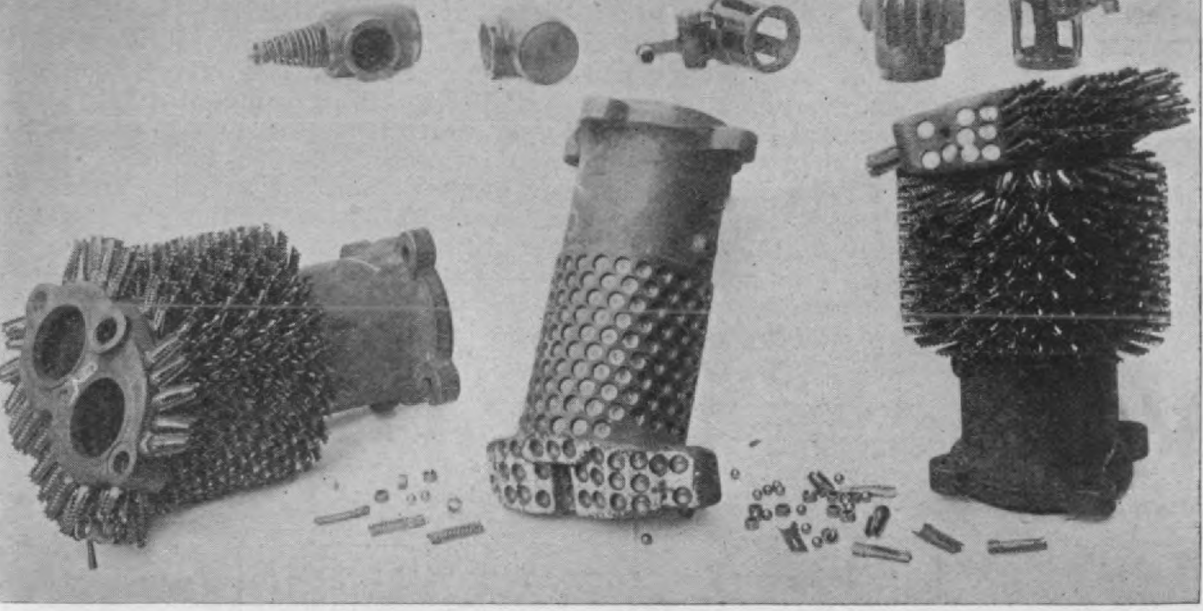

Fig 10 Payne-Modern Six. Air-cooled cylinder construction. The cylinder cooling fin assemblies, of which 252 a plied to each cylinder, each fin assembly consisting of two copper fin-halves, one fin-ring and one fin holding ball, mak g a total of 1261 separate pieces assembled and fixed together to form one single complete cylinder, or 7566 pieces total i e six cylinders of the motor. The valve cages and valve action parts are shown over the cylinders bodies in this illus ation. This fin is new, is patented, and is here fully shown and described for the first time. Cool successfully this en ne, with 80 pounds maximum charge compression. See Fig. 11 for details of cooling fin parts and method of retainin e cooling fins in their finished seats in the cylinders.

ed outward as selected by an internal ng member, while on the line shaft balls are forced inward to clutch, by rs sliding on the outside of the line t.

the plan view of the change-gear, the r shaft is the line-shaft, connected he clutch hub at the right end by a ersal joint. The line-shaft is in two s, that at the left being solid and then rged and chambered to take the left of the right hand line-shaft member.

e line-shaft carries five gears, the shaft driving pinion at the left, nted on the left-hand section of the shaft and four gears at the right all to one sleeve, normally free to re- e on the right hand member of the shaft. The following engagements of s may be made with the line-shaft: by moving the clutch, sleeve, 1, to the the pinion which drives the side-shaft be engaged with the left hand line- section so as to drive the side-shaft; by moving the clutch sleeve, 2, to the , the gear sleeve carrying the four s may be clutched to the line-shaft hand section; (c) by moving the h sleeve, 2, to the left, the sleeve, 3, ring the four gears is disengaged from right hand line-shaft section and the sections of the line-shaft are clutched these line-shaft engagements drives th side-shaft, one clutches the 4-gear carryin

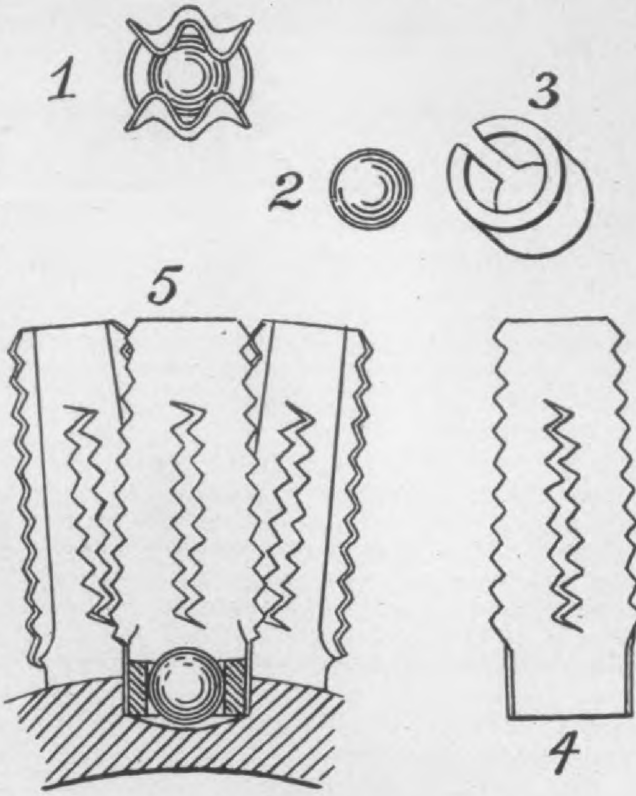

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Fig. 11. Payne-Modern air-cooling fin con-

sleeve to the right hand line shaft member by motion to the right, or releases the gear sleeve and clutches the right and left line-shaft sections together by movement of the clutch sleeve, 5, to the left.

The side-shaft is tubular so that the balls can be moved by an interior sliding member, 6, having a cylindrical body with portions of its surface cut away so that this mutilated cylinder may be moved to right or left without clutching any gears to the side-shaft, but when stopt at a proper position will engage one and only one of the gears carried on the side-shaft with the side-shaft, thus obtaining one of the three forward geared speeds or the reverse. The side-shaft carries 5-gears, the large one at the left being keyed to the side-shaft, while the four-gears at the right, which are in mesh with the four-gears fixt to the line-shaft sleeve, respectively, are free on the side-shaft, save as they may be separately and individually engaged with the side-shaft by the proper placing of the internally sliding member, 6, which selects the desired geared speed change.

The side-shaft internally-sliding gear-selecting member is moved by means not shown in the plan of the change-gear. The three-ball clutch engaging elements, the rockers 4 and 5, and the unshown slide which effects the side-shaft engagements, are all so interlinked that all speed change operations must be made in proper sequence and the whole change-gear control is interlinked with the clutch so that no gear change can be attempted while the clutch is engaged with the motor shaft.

THE CHANGE-GEAR LEVER.

The change-gear lever swings horizontally, is fixt to a sleeve which turns inside the steering column, and has the handle and retaining lug jointed to the lever body so that the lug can be lifted out of the retaining segment notches when a gear shift is to be made, and can be dropt into the selected notch. This arrangement avoids the costly outside vertical gear shift lever, and the need for reaching outside of the car body to grasp the lever, and is a decided improvement, tho the motoring public has become so wedded to certain control forms, among which two or three outside hand levers copied from foreign practice are included, that it is hard to convince a prospective buyer that he is not being defrauded by the person who offers a simpler and better arrangement.

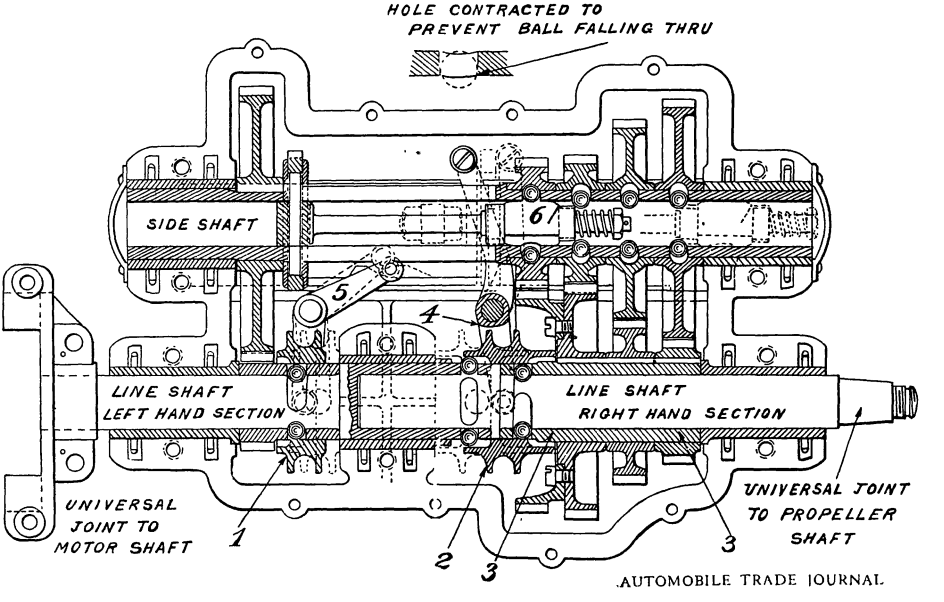

Fig. 12. Diagram showing the Payne-Modern motor car change-gear selection. The "Modern" change gear keeps all gears in constant mesh and makes the speed selections by clutching the requisite change gear assembly members together by the radial movement of steel balls, as determined by the moving of the change gear hand-lever. For complete details see text.

STEERING AND CONTROL.

The steering shaft has a quadruple threaded screw at its lower end, engaging a trunion nut in slots in the forked top member of the steering bell-crank. The hand wheel makes 1½ turns for the full sweep of the front wheels. The usual spark and throttle levers are on top of the hand wheel. There are no outside hand levers to block the car entrance. The foot board has three large pedals and a plunger pedal for opening the muffler, as shown in the rear view of the dash. Beginning at the left, this pedal, which is latched, when pushed forward first disengages the clutch and then applies the external brake bands to the rear wheel brake drums thru an evener, as shown

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clearly in the picture. The middle pedal, pushed forward, first disengages the clutch and next unlocks the gear-shift so that gear-changes can be made. The right hand pedal when pushed forward first disengages the clutch and then applies the emergency, internal, rear-hub drum brake shoes thru an interposed evener.

The dash is of wood, with an aluminum "cowl," and houses the "Pittsfield" coil-box, and the 8 lead mechanical oiler, piped to each cylinder and to the crank-box pits.

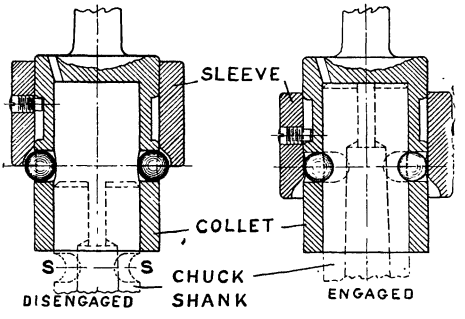

Fig 13.—Payne—Modern Car. Diagram illustrating the ball clutch arrangement used in the change speed gear. This is the device which has been successfully used for retaining the shanks of drills in chucks. The left hand figure shows a drill shank disengaged. At "S" are recesses for the steel balls, and when the shank is pushed upward into the collet (as shown in the right hand, engaged, view) and the movable sleeve dropt downward as shown, the balls are forced into the notches "S" thus locking or clutching the drill shank and causing it to move with the collet.

The cranks shaft journals and wrists and pistons are splash-oiled. The gear box has oil pools in the bottom member. The fan is cone-clutched to the triangular-leather-belt-driven-fan-sleeve, the clutch being under fan-governor control to avoid waste of power by a too rapid fan motion. The fan-cone is of fibre. The fan is considered needful for cooling this motor.

ON THE ROAD.

The only Payne-Modern 6-cylinder car available was new and had never even so much as made one turn of its crank-shaft. This new Payne-Modern six, with two passengers in the Tonneau, Gilbert Loomis, the designer, driver and the writer as observer, in the front-seat, left the Modern Shops in Erie at about 3.20 p. m., and was driven over the shore road to Dunkirk, N. Y., 50 miles and return. This round trip is about 101 miles over gravel roads, mostly of bumpy and uneven surface, tho some of it is very fair for short distances.

The route is thru little villages which have low-speed rules and are very prompt with fines for cars which fail to slow down. With these speed regulations no time could be made, and this 100 mile run was merely a spring-action demonstration. The front, right-hand cylinder constantly over-oiled itself from the crank-box; why, no one could tell. The same thing had been seen before with one of these Payne-Modern six-cylinder motors in which the left-hand rear cylinder behaved in the same manner. This over-oiling made the motor run on 5-cylinders a good part of the time, as the spark-plug of this one cylinder. fouled every 5-miles or so. When this spark-plug was clean, the car was very lively and could show 45-miles wherever the sign-boards permitted pace. We made 50-miles or more to Dunkirk, in about 140 minutes. We cleaned that one spark-plug every few miles in the run back from Dunkirk, reaching Erie at 9.20 p. m. Circumstances prevented another long run on this six-cylinder which had been planned with a view to measured fuel demonstration.

As to the springs, the writer had several short runs on the Payne-Modern half-elliptics before making this 100-mile trip, and had learned in the first half-mile that the 15 deg. angle of the half-elliptic spring placing, wholly changed the effect of road surface variations on the car body and passengers, making it very different from anything in previous experience. Not only can this car, be driven rapidly over a rough road without undue shaking of the passengers, but there is absolutely no tossing of the car body at any time, so that over a close succession of bumps and hollows, where a car body on horizontally placed half-elliptics would be bounced up and down with unendurable violence, tossing its passengers up off their seats and catching them with another bounce as they came down, in a manner all too well known to American motorists, the Payne-Modern merely indicated the road roughness by a rather lively movement of the car body, but did not toss things at all. In fact, in this Erie-Dunkirk 100 mile round trip over rather rough roads, made at from 25 to 45 miles an hour, in many places, the observer was not once tossed up clear from his seat, and after the first reassuring ten miles he ceased to "ride the road" at all, simply sitting back and trusting all to the inclined car-springs.

It does not seem possible that the mere tipping up of the front spring ends could possibly cause such surprising advantages, but this most agreeable change in the spring action is indisputable, and makes the cars extremely easy riding.

The new motor was very stiff in this run, but the exhaust was perfect, no "cadence" when the front right cylinder spark-plug was clean, showing that all six cylinders were equally charged by the "turtle" and the performance of the Payne-Modern six was perfect in every way save for the one over-lubricated cylinder and its foul spark-plug.

The air-cooling was satisfactory, polished spots on the cylinder heads showing pale straw-color on the front and rear cylinders, and dark straw-color on the middle cylinders, with no sign of over-heating at any time.

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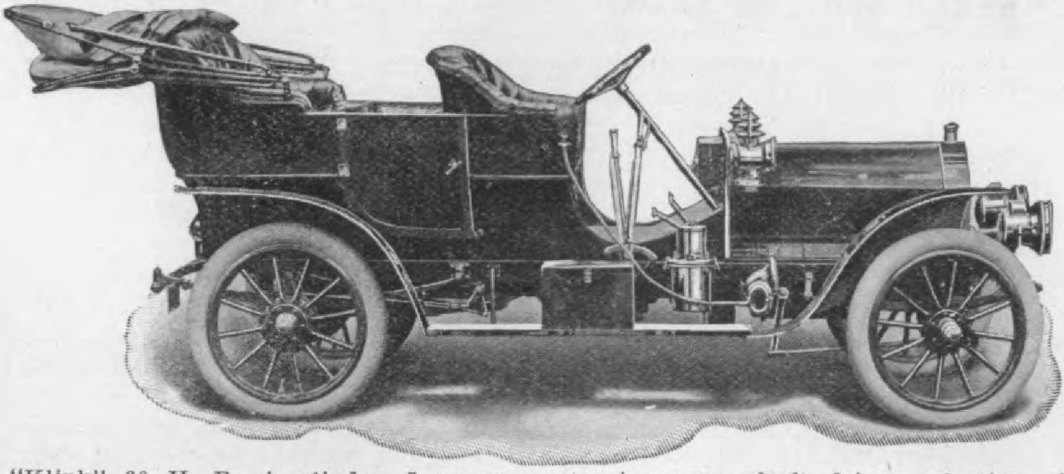
ouring and runabout bodies. As a run-
bout it has the radiator set back further

type, and runs on Timken roller beari
It gives three forward speeds and one



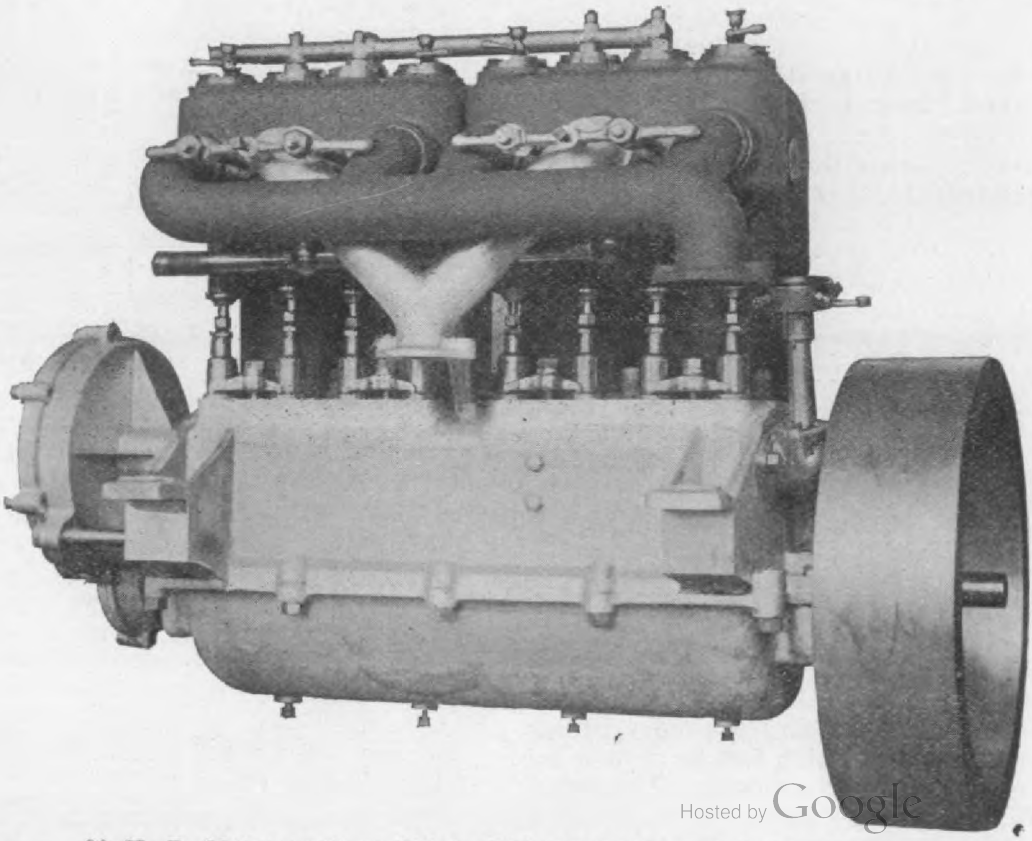
1908 "Klink" 30 H. P., 4-cylinder, 5-passenger touring car; shaft drive; selective, slidin
ear change speed; new type operating levers; adjustable ball bearing steering gear; self
ntained oiling system integral with crank case, eliminating exterior lubricating device; whee
ase, 110 inches; price, with oil and gas lamps, generator, horn, pump, repair outfit and set o
ols, $2000.

an on the touring car, and can be had
ith one or two tiger seats on the locker,
ese rear seats being removable.

A new feature of the 30 H. P. Klink is
e method of lubrication, this function
eing now performed by a two-pinion pump
hich floods the crank shaft journals, the
l dripping into the five oil pits which
ave constant level holes communicating

verse, drive being direct on the high sp
Gears and shaft are of nickel steel.
gear teeth are of large pitch and s
readily into mesh. The gear case is
uminum and has a cover which is rea
removable.

The brakes on the new model
worked thru eveners passing across
frame. Both internal and external bra



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30 H. P. Motor used on Klink 1908 runabout and touring car

REDUCTION

IN PRICE

Recent installments of special machinery together with the purchase of large quantities of material have cut our manufacturing costs 50 per cent. without lowering the quality of our goods.

That is why we are able to offer the Crouse-Hinds Double-Ball-Contact Commutator or Timer at an exceedingly low price. Write us your requirements and we will quote some prices that will astonish you. Our new catalogue M is just off the press.

Crouse-Hinds Company

341 Walton Street, Syracuse, N. Y., U. S. A.

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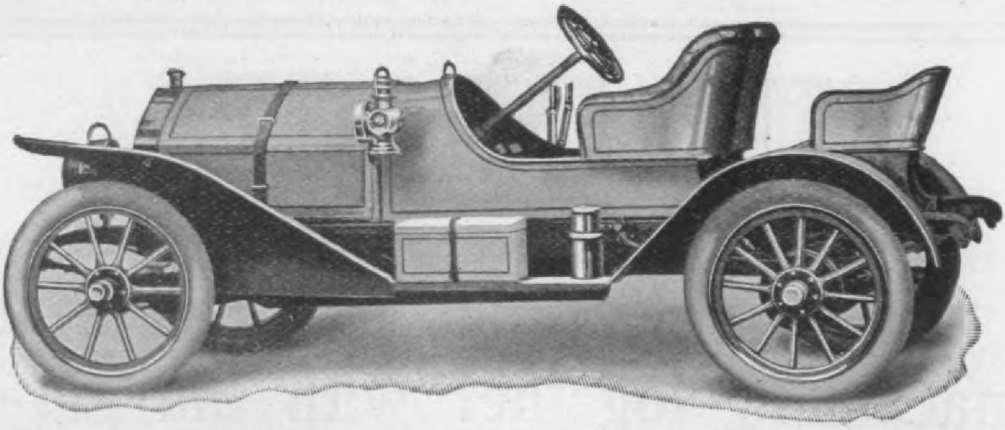
and by a lever on the steering column. other lever on the column adjusts the rk. The throttle and spark levers are

The touring car lists at $1800 and t runabout at $1700. The wheel base each is 108 inches, with 56-inch tread, t



1908 "Klink" 30 H. P. Runabout; same chassis as touring car; radiator set back further; car had with one or two removable tiger seats on locker.

ependent of the steering wheel, and do turn with it.

ll Klink cars are equipt with two gas dlights, generator, two oil side lamps, lamp, horn, tire pump, tire repair kit full set of tools. Price is $2000 for ier touring car or runabout.

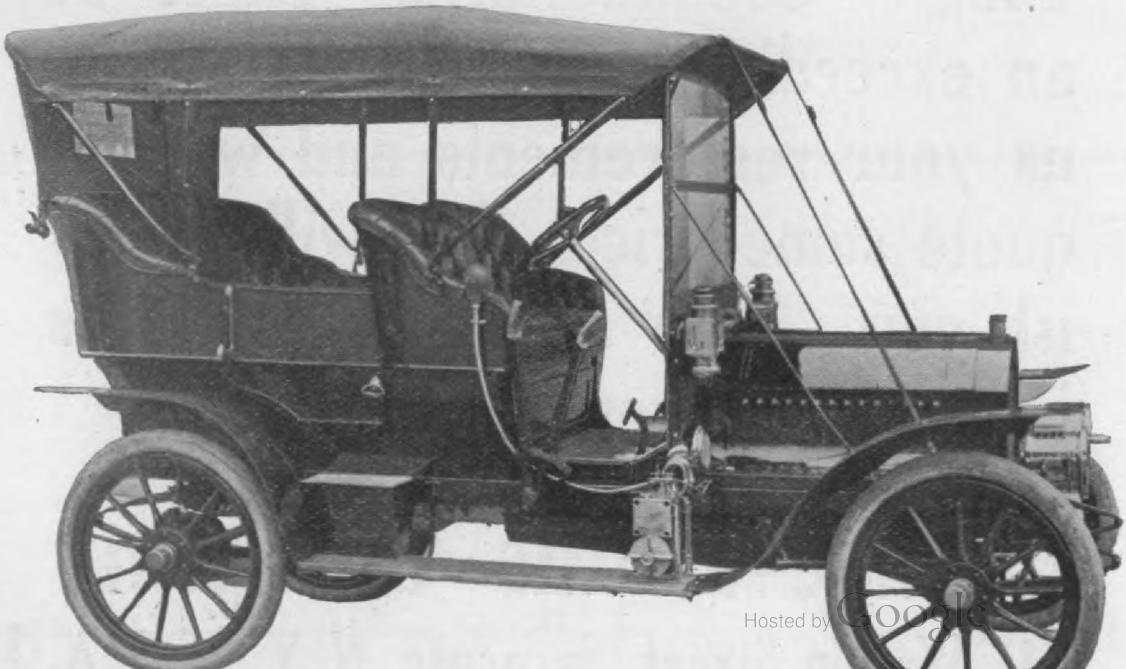
The 1908 Wolfe

he H. E. Wilcox Motor Car Company, Minneapolis, Minn., is manufacturing the lfe cars which are designed to suit the ditions on western roads, the clearance ng 16 inches, altho the wheels are only inches in diameter. This is accomhed by the use of a solid rear axle and

weight of the touring car complete bei 1950 pounds. The standard color is da green or dark green body with red ru ning gear.

Nothing new has been attempted, b such mechanical principles only as ha proven successful have been incorporat in the design. Each detail has been th oly tested, and has the seal of gener approval.

The cars are equipt with the well know Carrico air-cooled, 4-cylinder, 4-cycle m tors, mounted under the hood at the fro on a channel section prest steel sub-fram which is carried to the rear and also su ports the sliding change speed gear.



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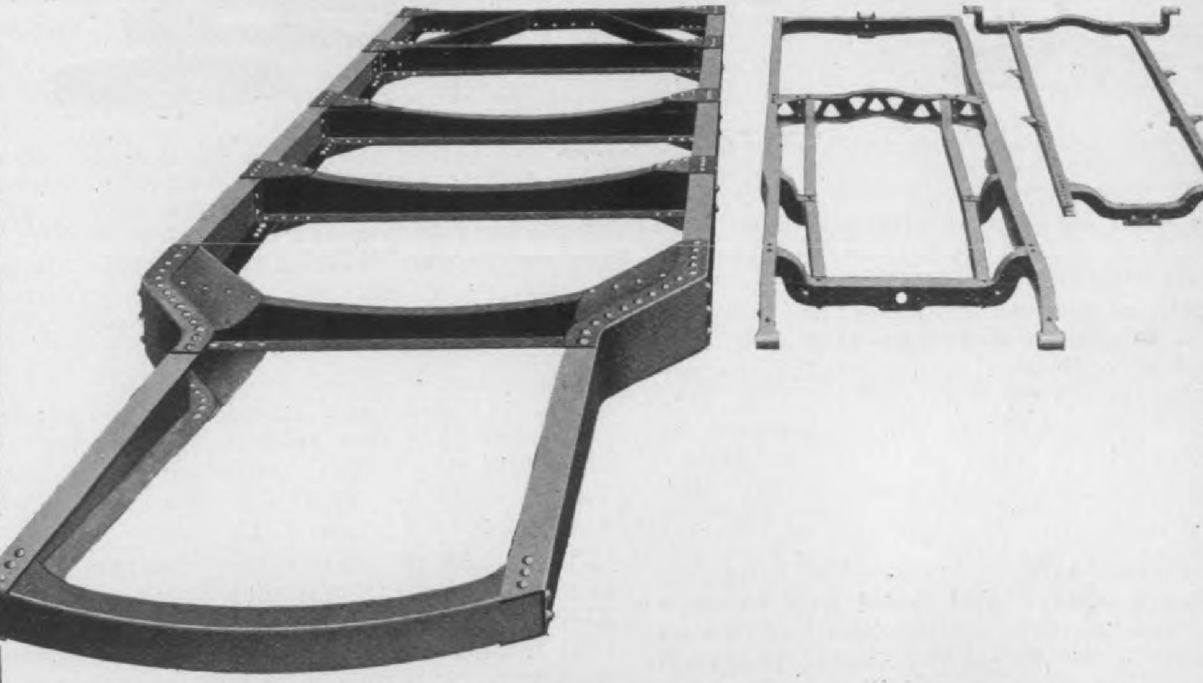

A. O. SMITH CO.

257 Clinton St., Milwaukee, Wis.

Largest Producers of Pressed Steel Automobile

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rt force feed oiler is placed under the d and supplies the engine. In addition this the forward end of the hood in-d of being a dummy, as in most air-ed cars, is made like a regular cooler appearance, but both sides in reality stitute a tank for oil and connect with force feed oiler. A filling cap of the al appearance is used for introducing oil. The change speed gear and differ-al run is an oil bath as usual, and the els are packed with hard oil and will care of themselves for a season.

tion prest steel with integral gusset plat The sub-frame is of similar constructio and extends to the rear of the chang speed gear case which is supported upo it by four integral arms of the aluminu case. Adjustable radius rods, ball an socket attached to the outboard jac shaft bearing brackets are used.

The body will carry five passenge comfortably. Solid seat bendings only a used and the upholstering is claimed t be of the best machine buffed leather ove curled hair. All the bodies are give twenty-two coats of paint and the finis

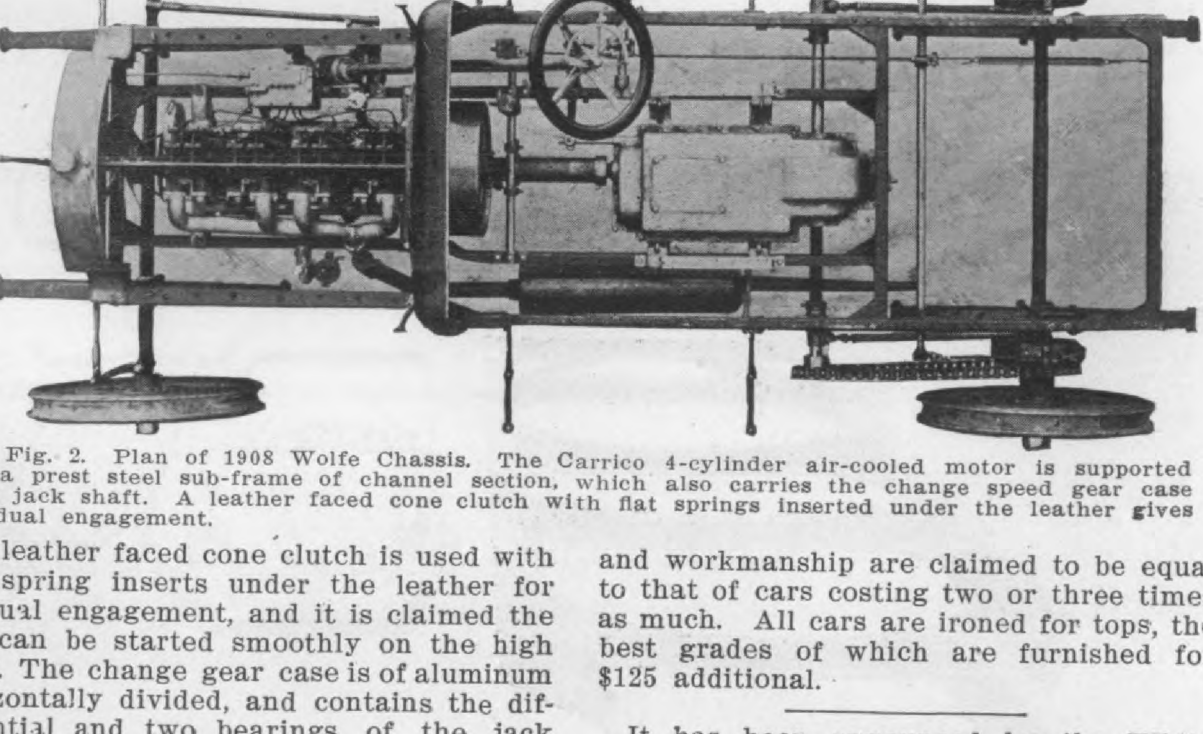

Fig. 2. Plan of 1908 Wolfe Chassis. The Carrico 4-cylinder air-cooled motor is supported a prest steel sub-frame of channel section, which also carries the change speed gear case jack shaft. A leather faced cone clutch with flat springs inserted under the leather gives dual engagement.

leather faced cone clutch is used with spring inserts under the leather for ual engagement, and it is claimed the can be started smoothly on the high . The change gear case is of aluminum zontally divided, and contains the dif-ntial and two bearings of the jack t, which shaft is also supported in ings at its outer ends on the frame. flexible joints are used in the jack t.

AXLES.

e front axle is made of a solid bar nches square, and is set well forward ere is no need of bending it down as ually done where the engine is placed ont. This gives a full 16-inch clear-The steering arm is in front of axle. The steering knuckles and s are drop forged, and Timken roller ngs are used in the wheels. The rear is made of a solid bar 1½ inches re, and the rear wheels turn on Tim-roller bearings. In this form of con-tion the axle has only the load to

and workmanship are claimed to be equa to that of cars costing two or three time as much. All cars are ironed for tops, th best grades of which are furnished fo $125 additional.

It has been announced by the Whit Company that this year it will exhibit it cars, which are independent of the Selde Patent situation, at the licensed show No vember 2 to 9, New York.

Theodore H. Bailey, for twenty year assistant general manager of the Genera Electric Company, has been appointed gen eral manager of the Kobusch Automobil Company, St. Louis, and has taken charge

The Reliable Dayton Motor Car Com pany, 375 West Lake street, Chicago, has leased the entire plant formerly occupied by Morgan & Wright, 15-21 North May street, Chicago, and will hereafter occupy the same as manufacturing quarters.

The Dragon Automobile Company in form us that word has been received from

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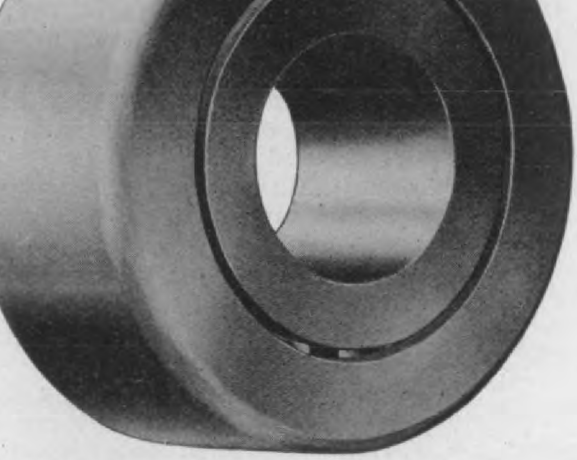
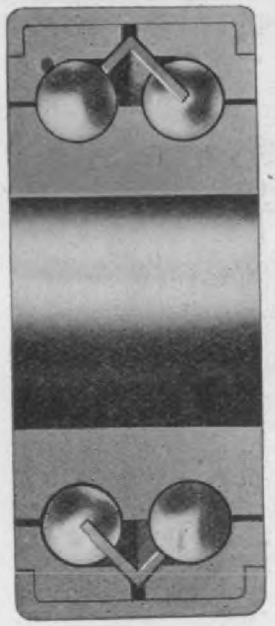


New Departur
Two in One
Annular
Ball Bearings



Complete, practical and proven substitute
the combined radial thrust and end thrust bearin
now used. Two rows of balls distribute the lo

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evenly and give twice the strength, efficiency a
capacity of the ordinary bearing.

Measurements are standard as regards b
and outside dimensions.

Price range is the same as standard lines of radial bearings,
he New Departure bearing is actually cheaper because it is pra
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High grade materials and wo
manship are employed in constr
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Advance Sheet to

NEW DEPARTURE
MFG. CO.

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y the International Harvester Company, f Chicago, Ill. This company was in a osition, owing to its extensive dealings n farming implements, to know that an normous field was open, particularly in ne West, for a high wheeled buggy type f machine. Experiments were begun by nem about three years ago which soon esulted in placing a practical, fool-proof nacnine on the market capable of nego-ating the so-called roads met with in ertain parts of the country, yet equally erviceable on the finest asphalt pave-nent.

Much thought has been given the design f this machine in order that all parts, es-ecially those which are liable to need ttention, are readily accessible in prac-ce as well as in name. As shown in

tremely heavy, pistons long, valve good size and located in the cyli heads. Cams, cam rollers and cam r guides have been made extremely h and material best adapted for each ticular place is used.

The transmission is of the posi clutch type, the clutch dogs being into engagement by springs and posi ly disengaged by a lever. The gears always in mesh and run in oil. The p is transmitted direct through a chai the counter-shaft on high gear.

The clutch is of the contracting b type, and has a very liberal wearing face. A spring has been interposed tween the lever and clutch band in s a way that the clutch may be engaged stantly, and at the same time the mac

Fig. 1. 1908 "Auto-Buggy" of the International Harvester Company, of Chicago. This m chine weighs complete with two seats and extension top 1750 pounds, and is capable of twen miles an hour. The rear seat is removable as shown. The motor is two cylinders opposed a cooled, and with the transmission and jack shaft is mounted on a steel sub-frame. The car h plenty of clearance, and is as near "fool proof" as it has been possible to make it.

e accompanying photos, the engine, ansmission, counter-shaft, levers, and in ct all devices which necessarily must main in proper relation are mounted on steel sub-frame composed of two cross-rs and two angle iron pieces which are gidly riveted together. The transmis-on and engine are attached to the cross embers of this sub-frame in such a way at they must always remain in align-ent, and at the same time, the trans-ission can be removed or replaced in lf an hour by anyone who can use a onkey wrench; the transmission always ing back to its proper place. A large

will start gradually. The counter-shaf extremely large, and its bearings are cated out near the sprockets. The di ential is of the spur gear type, located shown on the counter-shaft and the ge run in oil.

A good brake has been provided of expanding shoe type located on the r wheels. The brake drum is 14 inches diameter, and the shoes have 1¾-inch f Special Sarven No. 13 wheels are us and these are supplied with 1⅝-inch s wire tires. Timken type 1¼-inch ro bearings are used.

The axles are 1⅜-inch square, and

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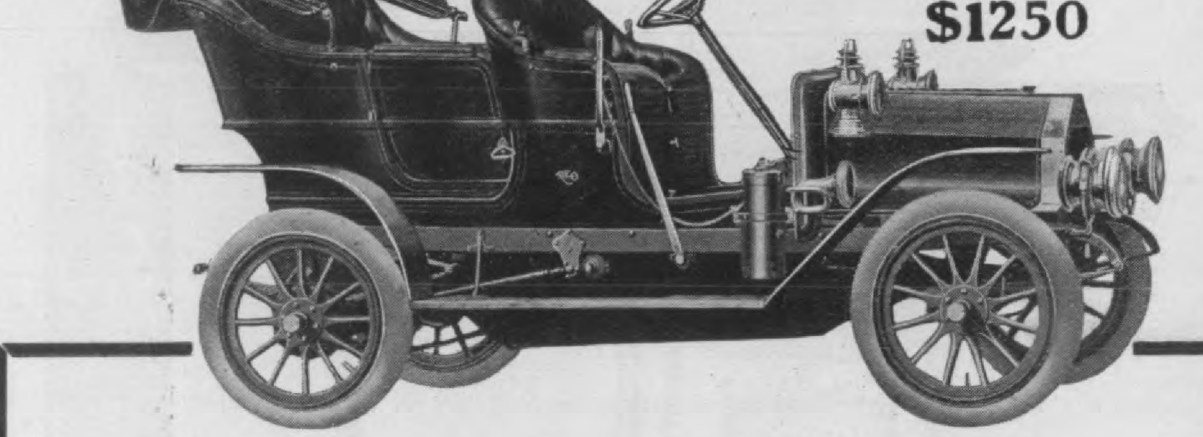

5 passenger touring-car, $1250.

Can you buy it?

The car that, in its first 3 years, ha beaten in a hundred contests of all kind against cars of double and triple its pric

The only car of anywhere near its pric that came through the last trying Glidde tour with a perfect score. And then capped the climax with a 500-mile non stop run to Jamestown.

A pretty good car, eh?

Do people know it?

Well rather!

Can you buy a 1907 model?

Perhaps. Just try it.

Write for "The Story of the Reo."

R. M. OWEN & CO., Lansing, Mich.

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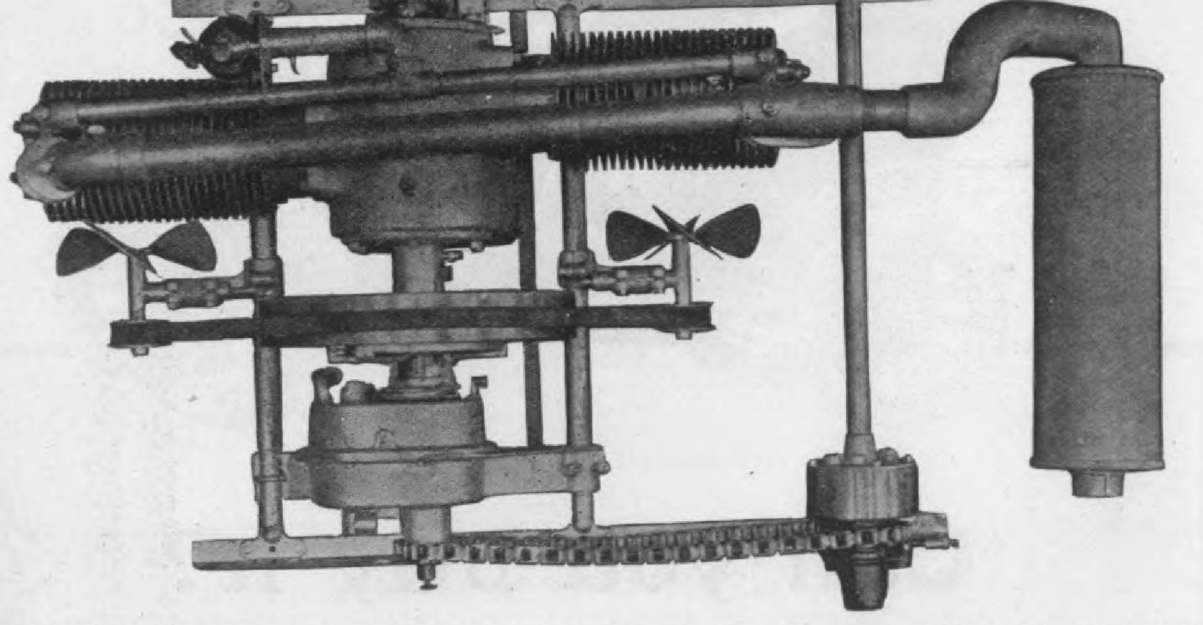

Fig. 2. Plan of the power plant of the Auto-Buggy, from the under side, showing the moto
d its cooling fans, the positive lug clutch transmission with friction band engagement, and th
ck shaft. This power plant is mounted on a sub-frame, as shown, of angle and tubular steel

ering axles are long and strong. Four elliptic springs are used, giving the y chance for free motion, and making easy riding car. The body is of piano type, and its sills are of heavy ash nforced by steel plates. The seats have h sides and backs, and are luxuriously olstered. The rear seat is removable, ing a carrying capacity in rear of the y of 800 pounds.

Spark and throttle control is employe the levers being on the steering colum The machine weighs complete with tw seats and extension top, 1750 pounds, a it is capable of twenty miles per hour. A average of sixteen miles per hour can maintained over ordinary country roa It has plenty of clearance, and the use solid tires eliminates a large part of t trouble and vexatious delays usually e

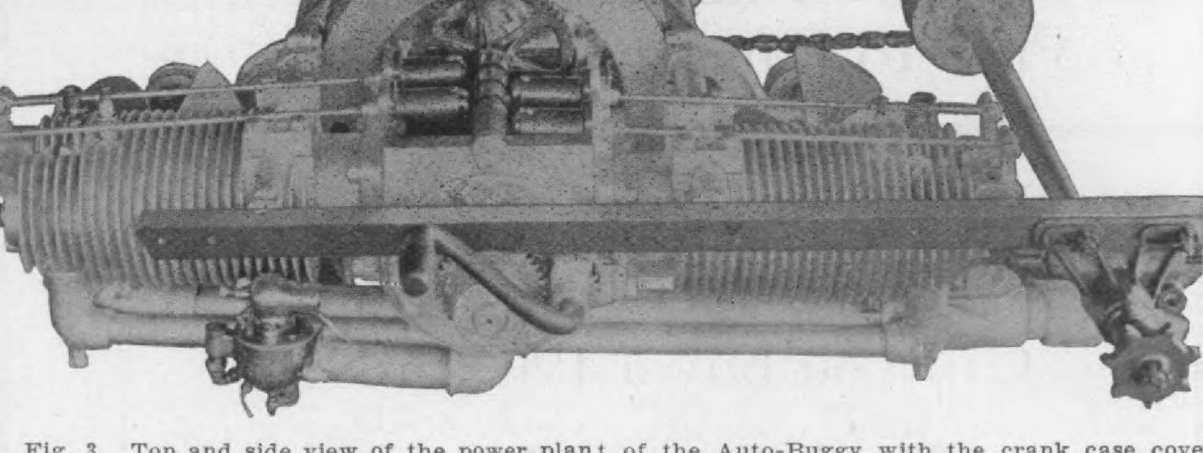

Fig. 3. Top and side view of the power plant of the Auto-Buggy with the crank case cove
moved, showing the cam shaft and push rods. All the valves are mechanically operated. Th
ck shaft is adjustably mounted on the frame for chain adjusting, as shown.

ten-feed mechanical oiler lubricates bearings except the counter shaft and eels which are provided with means using hard grease. Wheel steering is omplished by means of a pinion and

perienced by motorists. A very compr hensive and concise information bo which explains in detail the methods oiling and adjusting the various parts given each purchaser so that any m

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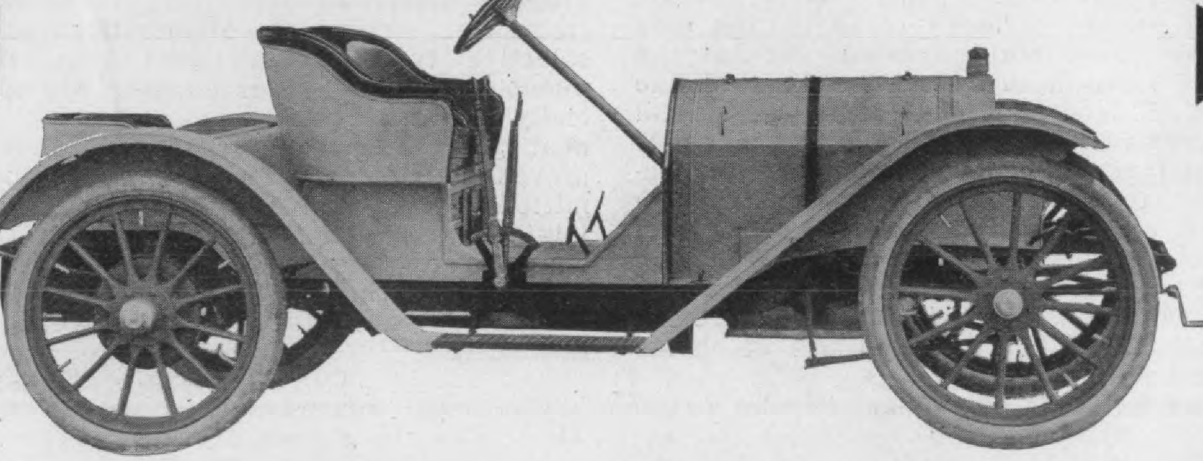

Imperial Roadster

The Car With

The Straight Line Drive

30-35 H. P.—36 in. Wheels, Selective Type Transmission—Eisemann Magneto.

Double drop frame. Price, including gas lamps and generator—horn—tools, etc., $2500.00.

Manufactured by the

IMPERIAL MOTOR CAR CO.

Williamsport, Pa., U. S. A.

Members A. M. C. M. A.

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Y., made some 40 or 50 touring cars ich were thoroly tested out on the y roads in their vicinity. In 1907 one H. P. model fitted with the Continental gine was marketed, and for the 1908 son several models, including a run-out, touring car and limousine, are of-ed, all having the same chassis specifi-ions. Very few changes have been de, these tending toward larger, room-more powerful cars, and added refine-nts and a more liberal use of chome kel steel.

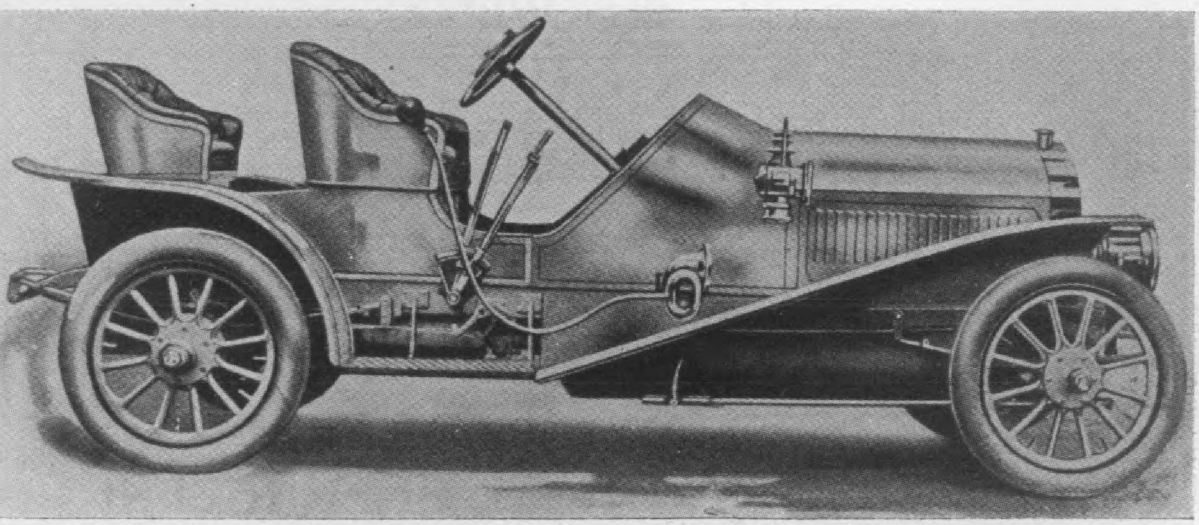
The motor is 4-cylinder, 4-cycle, water-led, 4¼-inch bore by 5-inch stroke, ed at 40-45 H. P., but it is claimed actual-develops 45 to 50 H. P. under test.

The three speed and one reverse slid-gear change speed is mounted on ball rings, and a multiple ring clutch is d, the rings being of steel and brass h cork inserts. The rear axle is of

frame also supports the aluminum encas selective type change speed gear, t members of which, it is claimed, are sp cially treated chrome nickel steel. neat gear interlocking device absolute prevents stripping. The power is tran mitted by shaft drive with two univers joints to a live floating rear axle of t clutch type. The front axle is an I-bea forging of carbon steel. Jump spark nition from a magneto and dry cells furnished.

CONTROL.

The usual control levers are on t wheel, and the speeds are operated by single selective lever with thumb relea latch on top. Two sets of brakes a supplied on the rear hubs, the fo brake being of the contracting, and t emergency hand lever operated brake of the expanding type and releases t clutch.



The 40-45 H. P. 1908 Frontenac Runabout with extra rear seat in place. Motor, 4-cycle, 4 linder, vertical, water-cooled, 4 3-4 by 5 inches. Chrome nickel steel springs, three speed and on verse selective type change gear and shaft drive are used. The rear axle is of the floatin pe. The wheel base is 124 inches, tread standard.

floating type on ball bearings. The ferential is of the spur gear type, and bevel gears are extra heavy, and are o mounted on ball bearings. The com-te chassis weighs 2600 pounds. The arance is 9 inches. The body dimen-ns are ample, and two folding seats of ge size are attached to the inside of tonneau, giving generous seating ca-city for seven persons. The type "D" ee-passenger runabout weighs 2900 nds. The type "C" seven-passenger weighs 3300 pounds. The type "E" ousine weighs 3600 pounds; price, 00. The price of the other two models $4000, including a full lamp equipment,

The new steering gear of the screw a nut type gives unusually long leverage a easy steering. The steering knuckles a mounted on ball bearings. The dash of cast aluminum with polished bra bead, that on the runabout being of d tinctive design. A 23-gallon gasoline ta is fitted under the front seat. The sprin all semi-elliptic are of chrome nickel ste and shock absorbers are furnished as pa of the equipment. The wheels are hea artillery pattern with 34 by 4 inch fro and 4½ inch rear tires.

A movement has been started to pla signboards on Wisconsin roads. Th

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Studebaker

Announcement

To our Model "H" Studebaker 30, the marketing of which we shall indefinitely continue, we have added a variation thereof known as Model "A". The only essential difference between them is that Model "H" has semi-elliptic rear springs and Model "A" half-platform rear springs. These cars are essentially five passenger cars. Between the two models all preferences and service conditions, affecting this power and size of car, are met.

The public is already familiar with the mechanical details of these two models.

Besides these models we are offering for the first time our Model "B" Studebaker 40, the design of which is practically an adaptation of the principles of the "H" and "A" Models to the requirements of a larger car, the mechanical specifications of which are briefly as follows:

ENGINE: 4¾x5½. Make-and-break low tension ignition.

WHEEL BASE: 114 inches.

CLUTCH: Conical.

CHANGE GEAR: Selective type; 4 speeds ahead with direct drive on third.

BRAKES: Operative and emergency brakes both on rear wheels.

CAPACITY: Seven passengers.

In body design and equipment we have been giving especial attention to comfort of driver and occupants and in order to reconcile these comforts with the best possible style, we have not hesitated to retain the best available experts to advise with our own well qualified and experienced staff.

We have taken a number of early contracts and retail orders for both closed and open vehicles of all three types, but can accept orders for Model "H" open cars about October 1st; for Model "H" closed cars during the month of October; for Model "A" open cars during the month of November; for Model "A" closed cars during the month of December; for Model "B" cars, both closed and open, during the month of December.

All of these models have been developed on the conviction that arbitrary changes of design, made at fixed calendar intervals, tend to throw the burden of experiment upon the user. We have had no occasion at any time to make any radical changes in our design, but improvements are introduced whenever practicable and with due reference to the active selling season. Our object is to absolutely eliminate the experimental. We are not "showing off,"—we are trying to satisfy our buyers.

STUDEBAKER AUTOMOBILE CO.

Member Association Licensed Automobile Manufacturers

SOUTH BEND, IND.

BRANCHES

New York City, Studebaker Bros. Co. of N.Y.
Chicago, Ill., Studebaker Bros. Mfg. Co.
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Portland, Ore., Studebaker Bros. Co., N'west.
Salt Lake City, Studebaker Bros. Co. of Utah
Denver, Colo., Studebaker Bros. Mfg. Co.
Dallas, Tex., Studebaker Bros. Mfg. Co.

See our exhibit at Madison Square Garden Show, space 31, or the combined show in the Coliseum, Chicago, space B-3.

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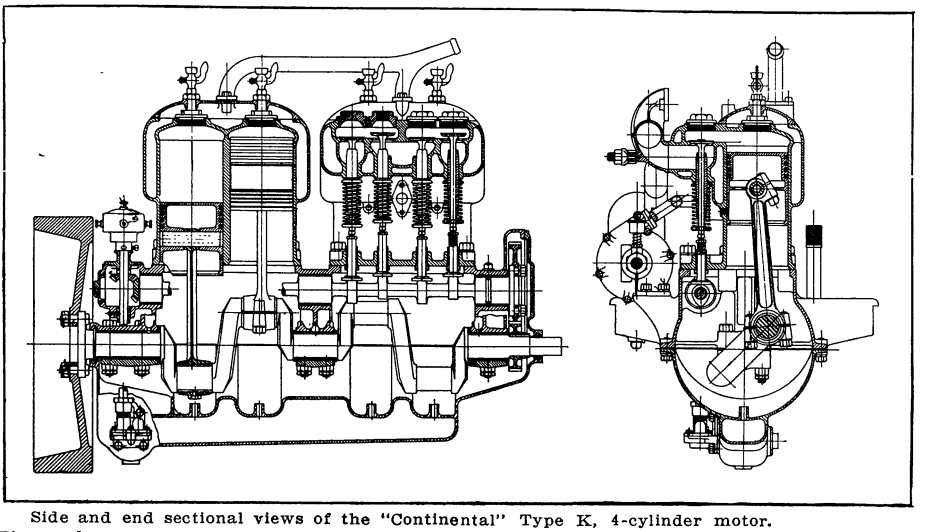
"Continental" Type K, 4-Cylinder Motor

The Continental Motor Manufacturing Co., of Muskegon, Mich., has added a new model 4-cylinder 4¼ inch bore by 4½ inch stroke, vertical self-oiling motor to its line. This new motor which is known as Type "K" retains all of the features of all previous models of Continental Motors, and is similar in general design to their types "H" and "HB" 4-cylinder, 40 and 45 H. P. vertical self-oiling motors. It is of a nominal 24 H. P., and is brought out in response to the demand for a light high grade motor, suitable for light weight touring cars and runabouts. The main features of this new motor are extreme simplicity in design and construction, due to the small number of parts. There are only three spur gears incorporated in the design, and these take care of the cam operating mechanism, water, pump, and also the magneto if used. The magneto and water pump are located at the side of the motor where they are very accessible.



Side and end sectional views of the "Continental" Type K, 4-cylinder motor.

The valve operating mechanism is extremely simple, the plungers being of the mushroom type, and the valve plungers as well as the cams which are integral with the cam shaft are all carefully hardened and ground to size. The valve timing is also accurately marked on the flywheel.

The crank shaft has extremely long bearings for this size of motor, and they as well as the connecting rods are provided with sheet metal liners so as to be easily taken up for wear.

Cylinders, pistons, rings, crank shaft, cam shaft, gudgeon pins, valve stems, and valve stem plungers, as well as every small part of the motor are accurately ground to size and positively guaranteed to be interchangeable.

The connecting rod is of drop forged steel, and the bushings of white bronze as are also the crank shaft bearings.

Attention is also called to the automatic oiling system contained in this motor. This is a development of the oiling system used on their larger motors, and is adapted especially for small motors. With the special construction of the oil pan adopted it is impossible to cause flooding or smoking on severe gradients or hills.

The water circulating pump used is of the centrifugal type. It is located on the side of the motor, and is of the double bearing style. The pump is provided with a drain cock, and fitted with an extension to drive magneto, and a bracket is also furnished with these motors on which any standard make of magneto may be mounted. The exhaust pipe can be furnished as shown in cut, bringing it on the left side of the motor, or can be brought down on the right side either at the front or rear.

Every part of these motors are built by the Continental people in their own shop, which is especially equipt with high grade machine tools and appliances for accurate workmanship.

The company has just completed a new testing house which enables them to operate and test forty finished motors at one time. These large testing facilities enable them to thoroly test each motor under full load for a sufficient period of time to detect any weaknesses that may develop. After testing, each motor is taken down and carefully examined, and all bearings are taken up, if necessary, and motor carefully cleaned up and all grit, etc., removed.

The Continental Company is now well established in its new factory at Muskegon to which an extensive addition has recently been made, and as motors only are being manufactured large quantities can be turned out.

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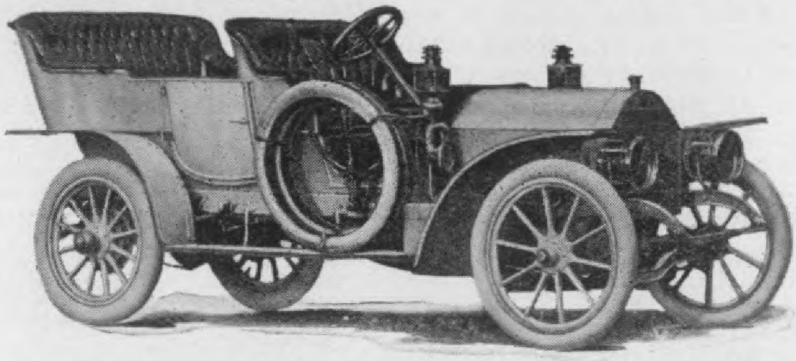
TION OF THE COMING SEASON WILL BE THE STARTLING 40-45 H. P.

Cleveland

1908 Model AT $3,500



This king of cars—the car that never has failed to *make good*—has more selling features of unapproache quality than any other car in America *absolutely without exception.*

Just read through these specifications. They do *more* than "speak for themselves"—they *shout* al to the dealer who wants a car that sells itself and to the man who knows a *perfect* and "up-to-the-minu machine when he sees it:—

MOTOR: 4-cylinder, vertical water cooled. Cylinders cast in pairs, with integral water jackets. Bore 5 inch, Stroke 5 inch.

IGNITION: Jump Spark. Imported Bosch high tension magneto, also auxiliary and independent coil and storage battery. Spark plugs for magneto circut over inlet valves; spark plugs for coil circuit over exhaust valves. Coil used is single unit Connecticut with distributor.

LUBRICATION: Positive Feed mechanical oiler self-contained in motor. Oil reservoir carried as an integral part of lower half of motor crank case with capacity of three gallons. Overflow holes in oil pan of crank case keeps oil at constant level at all times.

CARBURETOR: 1908 Schebler. 1½ inch size. Water Jacketed mixing chamber.

VALVES: Mechanically operated; inlet and exhaust valves on right hand side of motor. Valves interchangeable.

COOLING SYSTEM: Mayo Radiator, New Cleveland type and shape. Large gear driven pump, also liberal sized drawn copper water tubes and connections. Radiator fan, and also fan cast in fly wheel.

GASOLINE TANK: Twenty gallons. Large dirt trap between tank and carburetor.

CONTROL: Spark and throttle levers of new and distinctive design on steering wheel, segment stationary and independent of steering wheel, and foot accelerator independent of hand-throttle lever. Steering wheel, mahogany, 18 inch in diameter, with aluminum spider.

TRANSMISSION GEAR: Selective type, four speeds forward, and one reverse with direct drive on third speed. F. & S. Annular Ball Bearings.

CLUTCH: Multiple disc, running in oil.

REAR AXLE: Shaft drive, clutch-driven hub, ball bearings.

BRAKES: Emergency and foot brakes, large internal expan in rear hub drum, and dust-protected. Double-acting brake sh holding either backward or forward in both the emergency foot brakes; both brakes bronze against steel. Emergency b lever pulls toward operator to set brakes. Emergency brake a matically releases clutch. Foot brake does not release clutch

RATCHET-SPRAG: On transmission shaft drum. The pa this ratchet-sprag has a unique construction with spring cus preventing shocks to transmission and rear axle when spra applied.

FRONT AXLE: Drop-forged I-beam section with large ball ing steering knuckles; reach rod between steering connectio located back of front axle. Front axle is placed flush front of radiator.

FRAME: Cold rolled pressed steel channel section. Drop f with arch over rear axle.

HOOD OR BONNET; Aluminum 16 ga. Radiator and dash flanges have raw hide lacings to prevent rattling of hood.

SPRINGS: Semi-Eliptic front, semi-eliptic rear with plat (three-point) rear suspension.

WHEELS: Touring Car wheel equipment. Front 36 x 4; Re x 4½; Roaster Wheel equipment, Front 36 x 3½: Rear 36 x 4

WHEEL BASE: Touring Car 122 inch Roadster 110 Tread 54½.

DASH: Mahogany bound with solid brass molding.

BODY: Metal panels. seven passenger, "straight line" type

N. B.—Heretofore the Cleveland Chassis has been the same as the chassis used in two other well known c The 1908 Cleveland Chassis is distinctly our own product.

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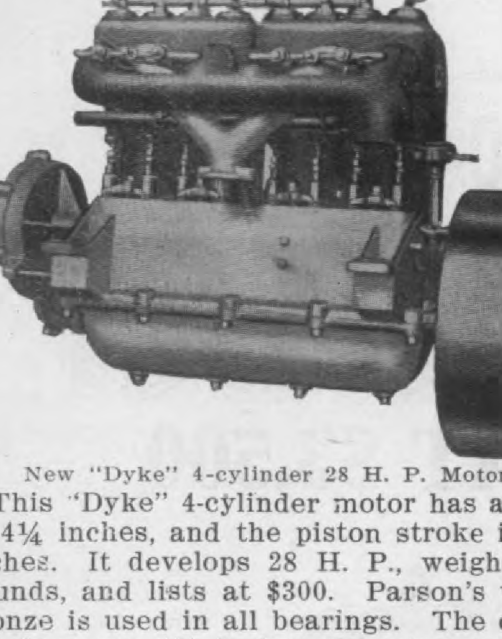
The 1908 Cleveland is the dealer's opportunity of a decade. GET BUSY—

own to the automobile trade as one of e pioneer distributors of automobile ma-ial.



New "Dyke" 4-cylinder 28 H. P. Motor.

This "Dyke" 4-cylinder motor has a bore 4¼ inches, and the piston stroke is 4¾ hes. It develops 28 H. P., weighs 350 unds, and lists at $300. Parson's white onze is used in all bearings. The crank arings are 1⅝ inches diameter, and the gth of the main bearings is 5 inches. lves are 1 13-16 inches diameter. The gth of the engine over all is 36¾ in-es.

Trade Printed Matter

among the de luxe catalogs of the 1908 son that of the Stevens-Duryea Co., of icopee Falls, Mass., occupies a leading ce. Three color half tone illustrations are d profusely thruout its pages and each ge is enclosed by a border in delicate green, king the book bright and attractive. Be-es being exceptionally handsome, this alog, like all Stevens-Duryea advertising rature, is full of commonsense arguments ich appeal to the practical minded man. th the catalog the Stevens-Duryea Co. t out another handsome publication—a k of illustrations of their limousines. In latter the half tone illustrations are pasted the pages being of antique stock which uld not take the half tones.

ne of the strongest pieces of advertising tter ever issued by an automobile manu-turer is a book lately published by the dillac Motor Car Co., of Detroit, Mich., con-ning statements from users, of the actual t of operating Cadillac motor cars. The ures have been sworn to and as they show ts, not estimates, they are not only of ue to a prospective user but excellent ertising for the Cadillac Co. The reports e not been selected but are all printed as eived and cover the records of 164 cars use an average length of time of 1 yr., 7 s., 20 da. The combined mileage of all s is 1,555,427, an average of 9,601.4 per car. e average mileage on each gallon of gaso-e was about 18¼; the average cost of airs per car, about 50 cents per week or cents per 100 miles; average cost of airs per passenger per 100 miles 12¼ cents; erage cost of repairs per car, $42.89

automobile clubs, garages and motor show rooms.

"The Dust Nuisance Can be Suppresse according to information contained in an tractive booklet just issued under that ti by the Barrett Manufacturing Co., Philad phia, advertising the merits of "Tarvia" dust layer. Aside from its practical va the chief feature of the booklet is the f page colored illustrations of streets a drives that have been treated with "Tarvi These lilustrations each occupy an entire pa no margin being allowed whatever, which ad much to the naturalness of the scene as eliminates the conventionality of the fra effect of a border.

For the purpose of acquainting automob makers and users with the principles of co struction as well as the actual methods e ployed in the manufacture of Timken rol bearings, etc., the Timken Roller Bear Axle Co., Canton, O., has issued a series folders containing concise descriptive data these subjects and several illustrations make the text more clear. Folder No. 1 de with the subjects of "Theory of Actio "Selection of Material" and "Carbonizing a Tempering;" No. 2 with "Grinding Roller "Grinding Cups and Cones" and "Gaug Rollers;" No. 3 with "Micrometer Gaugin "Cage-Ring Punching" and "Assembling a Rivetting."

The Empire Automobile Tire Company, Tr ton, N. J., has sent out a new booklet elegant appearance describing their line tires, mats and rubber sundries. The cover embellished with an embossed reproduction their trade mark in gold and red.

"The Piper's Percentage" is the title of latest booklet by the Diamond Rubber Co., Akron, Ohio. This booklet is written in pla cold, English without any trimmings, and t blunt style is appropriate to the subject m ter, for it deals with dollars and cents, and a clear and forcible manner tells how little cost users of Diamond Tires in the Glidd Tour.

The White Company has just issued Bulletin No. 13, which is devoted mainly t description of the new factory in which White Steamers are made. The pamphlet copiously illustrated with two-color engr ings, showing some of the notable features the plant. A few pages in the new bulle are devoted to an announcement of White 1908 models. The new machines sh but few radical changes and the prices unchanged. The entire front and back cov are taken up with a large factory view a a birds-eye view of the exterior occupies two middle pages.

THE MOTOR GUIDE.

The Motor Guide Co.,411 Unity Building,Chic Ill., has recently issued the Wisconsin edition The Motor Guide for 1907. It contains outli of the best automobile routes in Wisconsin Northern Illinois, cities, landmarks, etc., and gi information regarding hotel and garage acco modations. Eight double-page maps are cluded. The book contains 200 pages, is bou in flexible leather and sells at $2 per copy.

THE SOUTHERN ROAD BOOK.

A new edition of the Southern Road Book lately been published by The Automobile R ister Co., Baltimore, Md. Nearly all of the m ter is new and based on data gathered dur the past year. An index of routes appears

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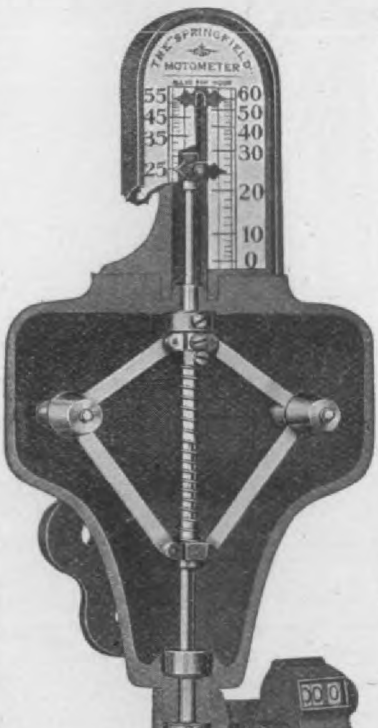
The Springfield Motometer



Now offers, covered by the same guarantee and backed by the same record of proven goodness as for the two seasons past,

These New and Valuable Features:

A Maximum Hand which is Perfection.

Travels up the scale with the regular pointer but remains at the highest speed reached until released by the pressure of a button when it instantly drops to the point where the regular pointer may be standing at the moment. It can be made inoperative in an instant, traveling with the regular pointer up and down and being invisible.

The Handsomest and Most Readable Dial Made.

Large, Symmetrical Figures in jet-black fired enamel, on a perfectly white enamel ground. Read with ease from the back seat of any tonneau. It will please all critics of the old one.

New Oil Tempered Spring Steel Reinforce,

at each end of the shaft. Prevents a short bend. Compels the easy curves necessary to smooth running and long life, which no make shift in the way of gears can replace.

The Non-Clogging Pinion.

Will not hold mud. A straight-forward and correct mechanical device of absolute efficiency.

These are additions, not changes. With them the Motometer is even more than before "The Speedometer For Service."

50-Mile Model, $45.00. **60-Mile Model, $50.00**

Either with Maximum Hand, $5.00 Extra.

THE R. H. SMITH MFG. CO.

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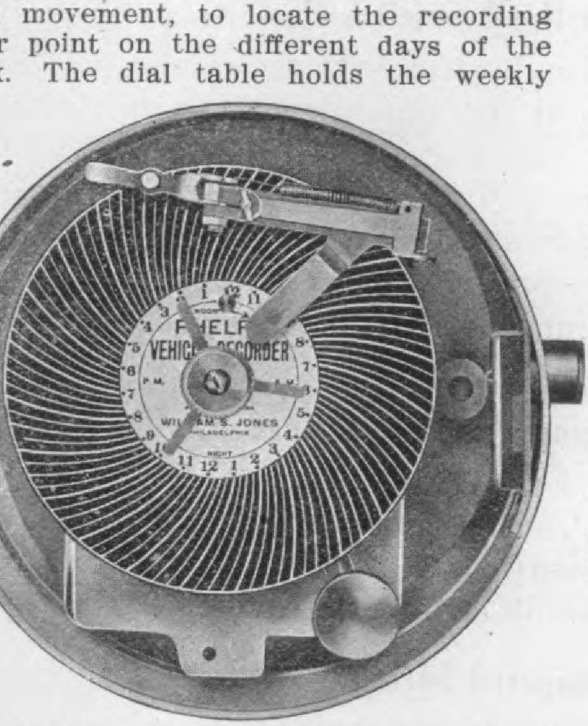
a device which keeps a record of the ements of a vehicle, and thus enables owner to discover at once if the cle is used without his authority. It enables him to know what the vehi- is accomplishing, and this knowledge aluable to the owner of a motor car, er of the pleasure or commercial type. e heart of this instrument is a Seth mas, 9-jeweled, 12-day clock movement h is fully isochronized and specially tructed to withstand rough usage and continued service. This clock move- drives a recording device, using a movement, to locate the recording r point on the different days of the . The dial table holds the weekly



rior View The Phelps Vehicle Recorder.

tized dial, revolving one turn in y-four hours, while the snail revolves nce in seven days, one-seventh turn e snail raising the recorder or her point up one-seventh of the space e edge of the dial. The inner line is nated as Sunday, the outer line or ne on the dial as Saturday, the timer being so controlled by a set spring it will remove the sensitizing from ilvered face of the paper as it is n under this scratcher. The dials are ated into hours, halves and quarters, istinctly marked A. M., P. M., noon ight. The printing of the numerals, is on silvered paper in special pro- ink that will not set to the paper, an be scratched off with the instru- point, leaving a white record on blue round. This scratcher or vibrator ling point is operated, while the re-

uniformly wide line, indicating the exac elapsed time of the vehicle's movement When the vehicle is stationary, the sens tized dial still traveling under the pointe which is steady, shows a perfectly straigh thread-like line.

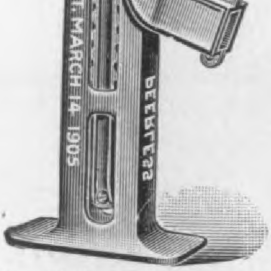
The clock movement and recordin mechanism are housed in an aluminun case with brass screw lid, and fitted wit a lock. The lid has on its inner side dog that records on the dial every tim the lid is unscrewed. As this dog canno pass in its arc without engaging th scratcher point lever, which raises th point up half way at each turn of the lid a record of each unscrewing of the lid i made on the dial at the exact day an time the device is opened or tampere with.

A very important feature of the device is the fact that it is self-contained, and no connected mechanically with any moving part of the vehicle.

The 1908 "Peerless" Jack

The Oliver Manufacturing Co., 203 South Desplaines street, Chicago, Ill.. ha just placed on the market their 1908 Peer less jack, shown herewith.

The leverage in this jack is claimed to be 50 per cent. easier than in their old style No. 15. The handle, of iron, is 15 inches long and weighs less than a pound.



The 1908 Peerless Jack.

The handle serves as a very efficient tire tool, and can also be used as a hammer. To raise the car, the handle is worked below the level, and to lower the car, above the level. The handle is long enough to work under any car. The weight and price of the new jack are the same as for their No. 15.

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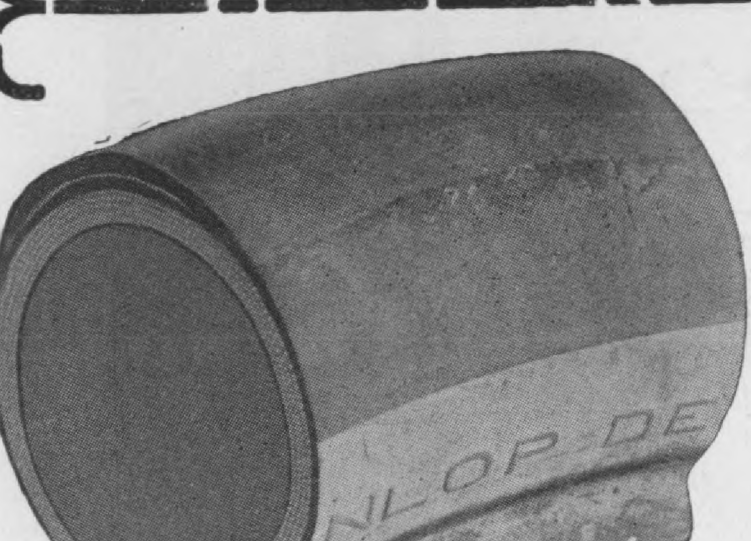
At the last meeting of the directors of

Seven Thousand Five Hundred Miles



Another Proof of Hartford Tire Quality

This cut is made from an actual photograph of a section of a

Hartford Tire

28x3 run by Dr. P. J. Ryan of Hartford, Conn., 7,509 miles by Odometer.

Note carefully that this tire is in practically perfect condition.

It pays to buy the best in tires.

You'll remember the quality a long time after you have forgotten the price

Most manufacturers equip their cars with good tires; some are not s particular.

Protect yourself by specifying and insisting on

Hartford Dunlop or Clincher Tires

There's no secret about the widespread popularity of Hartford Tires. They'r absolutely right, made of the best material by men of long experience with determination to excel.

FREE - A book that shows by pictures how to put on a Clincher or Dunlop Tire. Every Owner, every Driver, every Dealer should have it.

The Hartford Rubber Works Co. HARTFORD, CONNECTICU

NEW YORK, 88 Chambers St. and 1769 Broadway; CHICAGO, 83 Michigan Ave.; Boston, 404 Atlantic Ave. and 1020 Boylston S CLEVELAND, 1831 Euclid Ave.; DETROIT, 256 Jefferson Ave.; DENVER, 1564 Broadway.; PHILADELPHIA, 138 North 10th S BUFFALO, 725 Main St.; ATLANTA, GA., 55 Auburn Ave.; LOS ANGELES, 1505 South Main St.; SAN FRANCISCO, 423-

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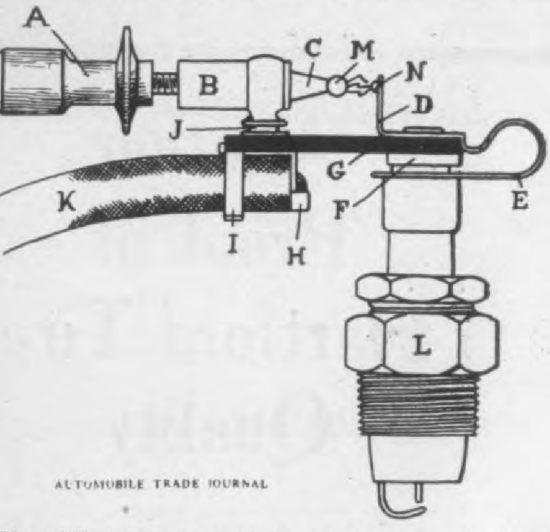
anow lock switch. This indicator is a spark gap, as might at first be supsed, but is kept closed except when used testing the spark. Ordinarily the mov-



The "Brandow" Spark Indicator. A, Manlating handle; B, Cylinder in which indica- point is operated; C, Indicator point; D, tionary electrode; E, Tension spring for aching to plug; F, Cup rivet or receptacle top of plug; G, Insulating base piece; H, re clip connection; I, Cable supporting clip; Slip connection; K, Cable; L, Plug; M, Adtable electrode or sparking point; N, Stanary sparking point. Except when testing ignition the sparking points M and N are close contact.

e electrode "M" and the stationary rking point "N" are in contact, the rent passing on without having to p any gap, but if a test is desired the vable sparking point "M" is moved y from "N" by turning the handle "M" and "N" being separated a ater or less distance according to the desired. For example: With the intors open about ¼ of an inch, if any le unit will not show a good spark he space, it is evidence of weakness or ty construction of the coil.

he necessity of carburetor adjustment ndicated when, with the indicators n ⅛ of an inch, the spark is regular, there is an occasional miss of ignition he engine. When all the indicators closed, by opening them one at a time, ul plug can be located.

magneto may be accurately tested opening the indicator about ¼ of an . Thus adjusted, if the spark misses sionally, it indicates either weak mag- or a leak in the circuit.

ne list price of the device is $1.25

The "X L C R" Ignition Battery

erewith we illustrate a new dry stor-

break these grids should be able to wi

The "X L C R" Dry Storage Ignition Batter

stand every strain to which they may subjected in automobile use.

For active material they use pure oxi of lead, and the solid electrolyte is o that has been selected after a great de of experimentation, and has been test out in actual use for a number of years.

Great care is exercised that the plat are never assembled green, time bei given to properly age and dry them b fore they are used. They refrain fro hurrying the manufacture of these batte ies at any stage, always planning the wo far enough in advance to allow time f properly performing each step in t process before the next operation is b gun.

They base their claims for superiori mainly on these two points—the use high grade materials and the careful a tention given to every detail of manufa ture. The price of the "X L C R" batte is $26, and a one-year guarantee goes wi each.

Pierson Motor Supply Company, Brooklyn, N. Y., has opened a New Yo City office at 43 Courtlandt street.

The F. R. V. Auto Parts Co. was recen ly incorporated with an authorized capit stock of $1,000,000, and has establishe offices at 116 Nassau street, New York. will manufacture shock absorbers, gea less differentials, mechanical oilers, spee change gears, and marine motors, and i factory is at Paterson, N. J. All its of cers are well known in the automobil trade, and are as follows: Presiden Henry L. Fridenberg, a consulting e

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DON'T FOOL YOURSELF

HAPHAZARD guessing is easy but it doesn't put any money down in your pants pocket. Don't guess. Don't experiment. Don't fuss. Get what you ***know*** is right—what you ***know*** you can depend on—what you ***know*** is the best that brains can make—

Get an XLCR Battery

Why Is It Best?

Because its grid (the backbone of any battery) is made of pure lead without alloy—because its grid is heavier and is made of more active material than any other—because no plates are assembled or used green—because all connections are burned lead to lead, and are therefore acid proof—because the jars are made of the best rubber that can be got—because ***everything*** about this battery is the best that skill and care and money can produce—that's why the XLCR Battery is best.

EVERYTHING

IN AUTOMOBILE SUPPLIES

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Excelsior Supply Company

$\frac{1}{10}$ H. P. or 150 H. P.

All the same to us.

On Speedometers a **Coates** Shaft insures a

DEAD BEAT.

Coates Electric Buffers, Grinder and Drills
are still Top-notchers.
Send for book 43.

Coates Clipper Mfg. Co.

Worcester, Mass., U.S.A.

The Greatest of All Show Numbers

The November Edition of the

CYCLE AND

AUTOMOBILE TRADE JOURNAL

Will Be a Record Breaker
Send in Your Copy Early

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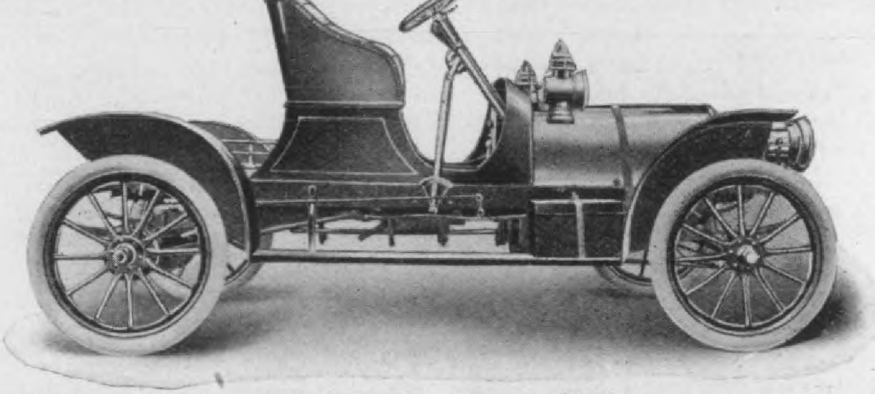

MODEL A. Price $900.

MOTOR—4-cylinder, aircooled, developing 12 H. P. and over.
CYLINDERS—3¼ in. bore x 3¼ in. stroke.
IGNITION—Jump spark, Pittsfield coil.
TRANSMISSION—Sliding gear,—three speeds forward and reverse, direct drive on high speed.
CLUTCH—Contracting band type, operated by foot lever.
LUBRICATION—Force-feed type, with sight feed on dash
STEERING GEAR—Irreversible type. Throttle and spark levers on steering column near driver's hand.
AXLES—Front,—tubular,—with ball bearings in wheels Rear,—divide, live axle running on ball bearings.
BRAKES—Two, of the contracting band type, operated by foot levers.
BODY—Of wood, with divided front seats; seating capacity, two.
COLOR—Dark Green.

The finish throughout is of the best, only first-class materials being used. Send for complete description of this most reliable and economical car, good for every day in the year.

U. S. MOTOR CAR CO., Upper Sandusky, Ohio

SPROCKETS

Bicycle & Motorcycle

7 to 40 Tooth in over 500 Models.

Flat, Pressed, Grooved and Offset

Teeth Punched and Pointed for $\frac{3}{16}''$ and $\frac{1}{4}''$ Chains, 1″ Pitch o
Blanks without teeth ready for milling any other pitch.

Increased Facilities—Prompt Deliveries Guaranteed

New Prices for Next Season's Orders.

THE PARISH & BINGHAM CO.

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e Kisselkar, built by the Kisselkar pany, Hartford, Wis., U. S, A., was rated and described in the Journal ctober 1906, and has not been ma- lly changed, though it has many im- nt improvements for the season of

as well as adding to the room of the body Both the body width and length have been increased, and two folding seats have been added in the tonneau, making the 1908 Kisselkar a seven-passenger model. The wheels have been enlarged from 32 to 34 inches, 4 inches diameter tires in the rear

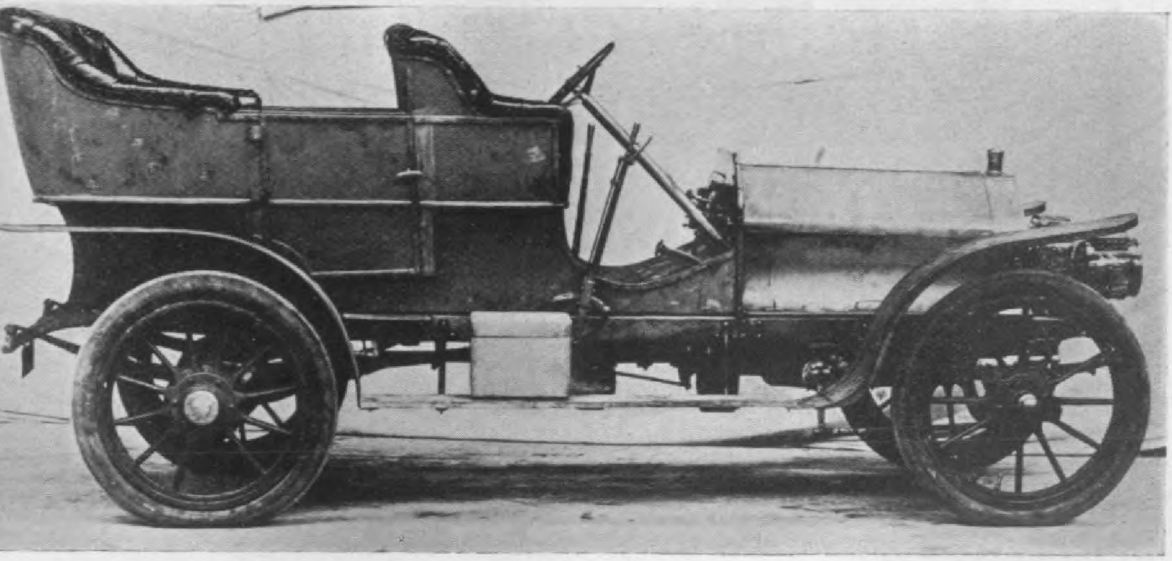

Fig. 1. The 1908 7-passenger Kisselkar, wheel base, 108 ins.; gage, 56 ins.; front tires, 34x -2; rear tires 34x4 inches; motor, four 4-cycle, water-cooled cylinders, 4 3-4x4 3-4 rated at 40 H. P. Straight line body, side doors swinging to rear, wide rear seat and two ng tonneau seats, making 7 seats in all. Weight 2400 lbs.; price, $2000, including 3 oil s, mats, horn and tools. Cape top extra.

e Kisselkar motor, 4 cylinders, 4 , water-cooled dual unit cylinders, ¾ inches, 1906 and 1907, has its di- ions increased to 4¾x4¾ inches for giving 45 H. P. at 1000 R. P. M., but

and 3½ inches front. The cone clutch is retained, and the Warner sliding gear, se- lective 3 forward speeds and a reverse, will continue to be fitted in 1908. A larger radiator, of different shape, will be used

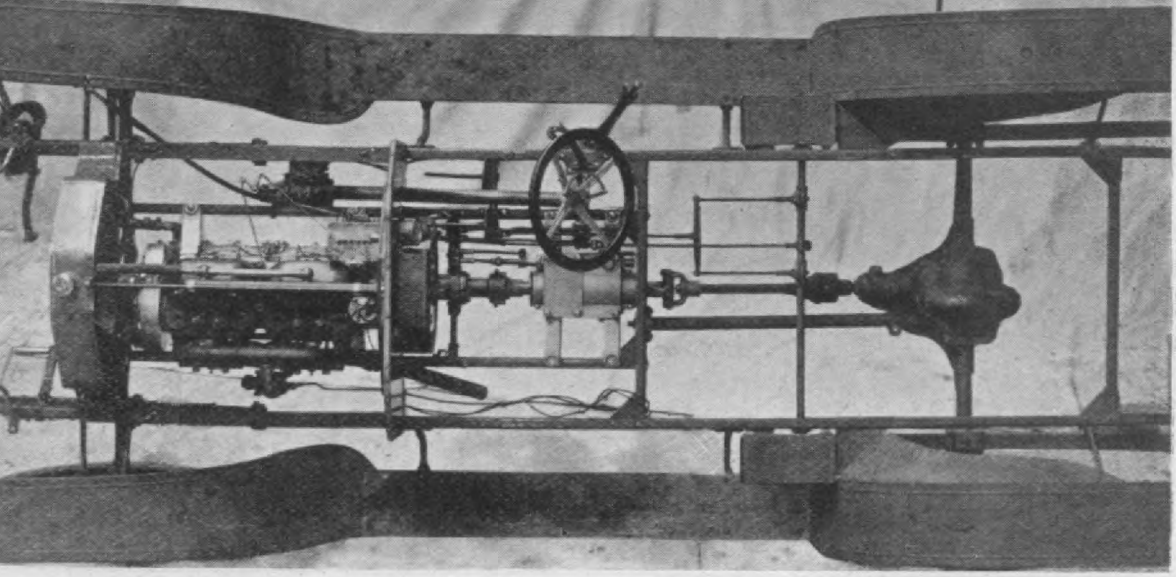

Fig. 2. 1908 Kisselkar chassis plan. This illustration is incomplete, as it does not show the nt leather side covers, leading down from the front fenders to the chassis frame sides. The r and change gear box are on a sub-frame, with a "cardan" joint between the crank-shaft line shaft, and two universal joints in the propeller shaft. The clutch is a plain cone, the

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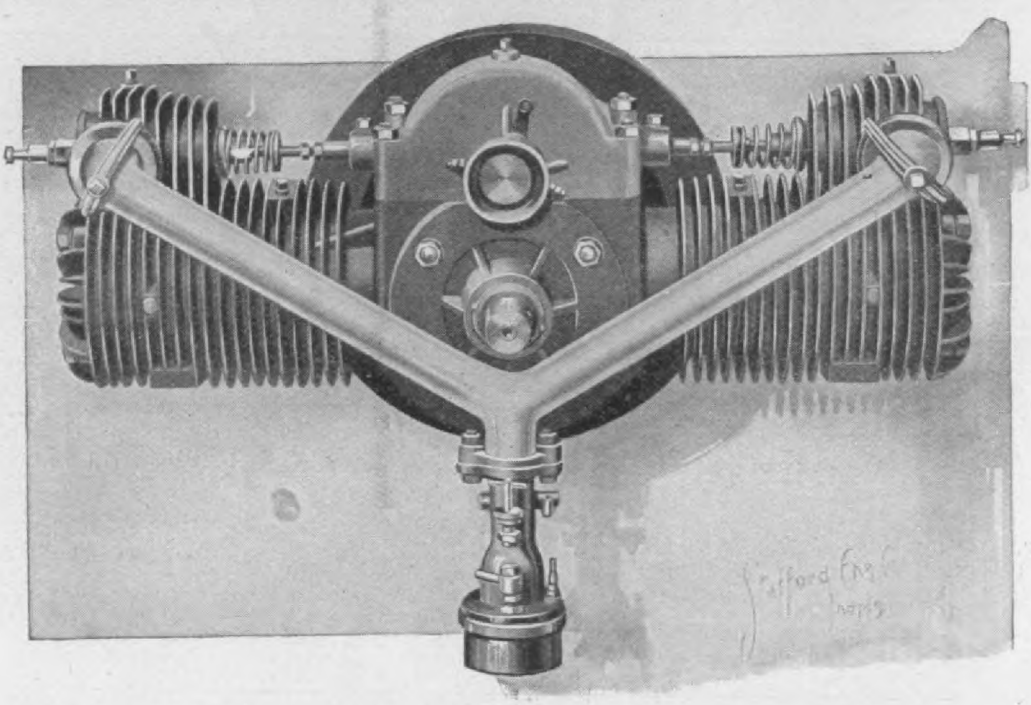
Universal Buggy Type Engine



The One Best Engine For Buggy-Type Automobiles

Suitable for any light runabout or light delivery wagons, but designed especially for buggy-type rigs.

Two cylinders, 4x4 double opposed.

Conservative power rating, 10-12 H. P.

Weight, including flywheel, 180 lbs.

Over all dimensions, including spark plugs: length, 30″; width, 16¾″; depth, 17″. Depth without flywheel, 11½″.

Perfectly balanced. Entirely free from vibration.

Air-cooled, and **cooled** beyond question. Has been run at full speed for six hours without a sign of distress. Big exhaust valves. Careful construction. Best materials.

Every engine fully guaranteed to deliver the rated power and keep cool.

Prompt delivery on any quantity to those who order promptly. Attractive prices in quantities.

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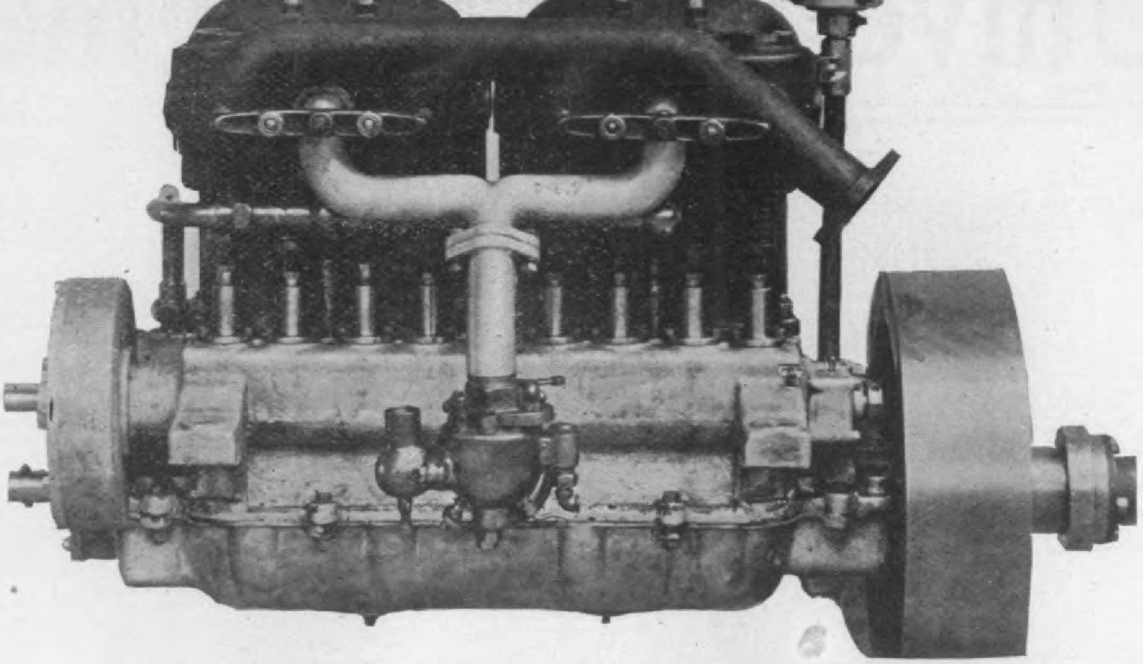


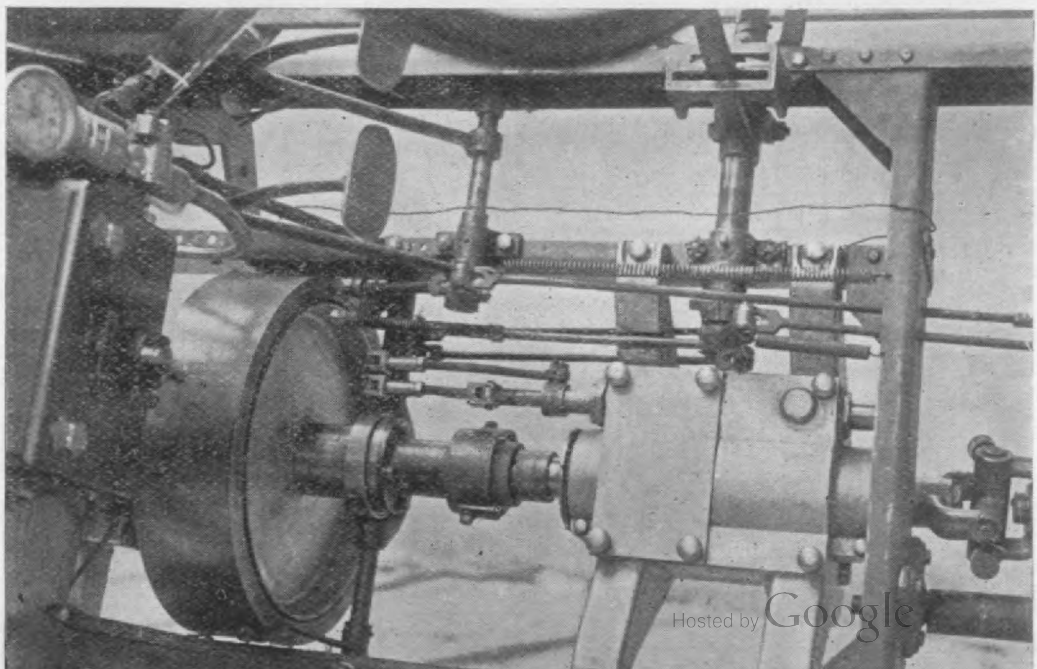
Fig. 3. 1908 Kisselkar motor. This motor is wholly a Kissel production, the Kissel facto including an excellent foundry, and furnishing its own dual unit cylinders, which cost about 6 cents a pound, manufacturing cost in the rough, as against about 12 cents a pound bought from another foundry. The Kissel cylinder bores are beautifully finished.

The motor valves are all on one side of the cylinders, and the base and oil pan are alu inum castings. Everything is well designed and the motor construction is high class thruou

ime. The weight of the new model Kis-elkar will be about 2400 pounds, and the rice has been increased from $1850 to 2200, including 3 oil lamps, mats, horn nd tools.

An improvement which adds much to he comfort of the front-seat passengers as been added in the form of patent eather, inside fender screens, from the front fenders to the chassis frame, w keep down the dust and prevent sp ing. It is claimed that a large par the 1908 production, which will total a 600 cars is already contracted for. A 200 of the cars will be marketed by company at Hartford, Wis.

The Kisselkar is not an assembled chine. Every part of the car, except



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Don't forget to take them with you

on your Touring Trip

WEED CHAIN TIRE GRIPS

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parate buildings, housing a Foundry, ithy, Grindery, Machine Shop, Wood-

in the Kissel shops at Hartford now cludes about 40 moulders, 25 men in t

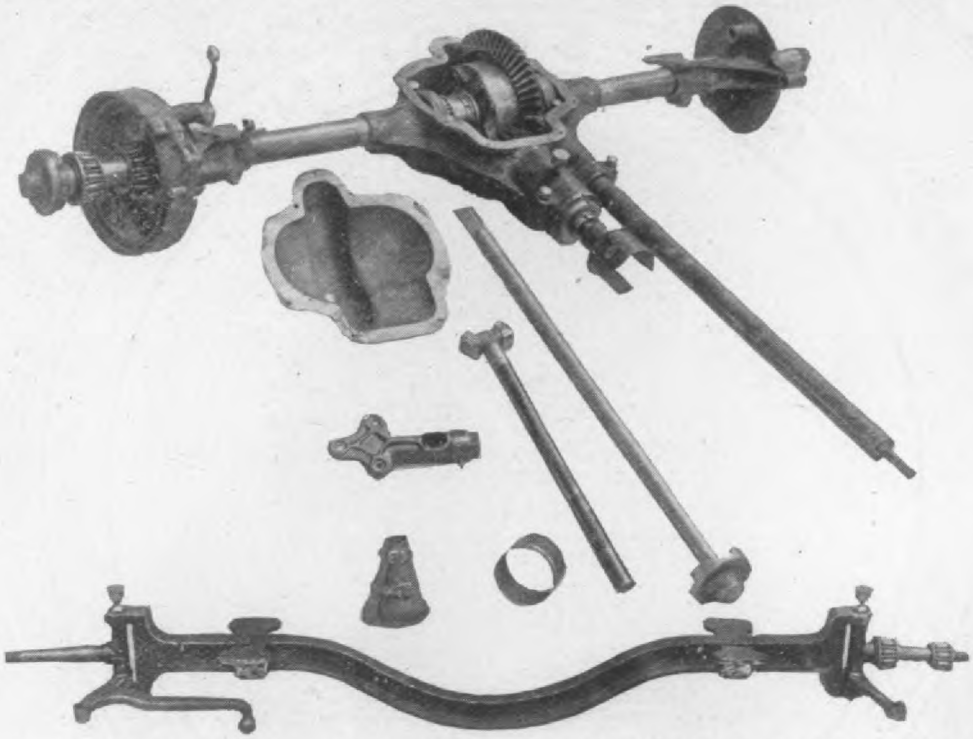

Fig. 5. 1908 Kisselkar front and rear axles. The front axle is a steel drop forging, ection, no welds, with Timken rollers for the front wheels. The rear axle is tubular, with arge bevel gear and pinion, all in the accepted form, as clearly shown by this illustration, f loating axles, gear box capt for ready access and easy disassembling; everything in unobje ionable form.

orking, Upholstering and Painting ops.

The Kissel Company built in 1907 a new, oncrete, well-skylighted machine shop, 0x165 feet, which has been equipt with l new tools, and have lately begun e erection of a new three-story, oncrete, body-shop, 60x120 feet. The

grindery, wood workers, including b makers, upholsterers and painters, ab 100, 30 smiths and some 200 machin and assemblers. Every part of the sel business is managed by the Kis themselves, who have ample capital are doing honest work, of which they justly proud.

1908 Type D Franklin

The principal changes of importance in e 1908 Type D Franklin car are as fol- ws: The engine has been increased om 20 to 28 H. P. New concentric valves hich make it possible to use larger alves directly in the cylinder head are sed. Larger tires and annular ball-bear- gs in the fan, differential, change speed ear and on each side of the driving bevel e used. The braking surface has also een increased. No change has been made the auxiliary valves. Other changes e: Shrunk on phosphor bronze cooling anges, a lighter brass tube intake pipe ith spun air-tight connections, the car- uretor now has a multiple jet in a Ven- ri tube shaped mixing chamber. The

The change speed gear of the selec type is operated by a new spring p into neutral position gear shift lever w out the usual H slot. The steering g is of the bevel gear type, with adjust ball-bearings on the steering knuckle

The Kingston Motor Car Company Kingston, N. Y., was recently admitte membership in the American Motor Manufacturers' Association.

The Rambler factory at Kenosha, W is now being added to, and also buildings of concrete and steel are b erected. These additions will aggre 50,000 square feet of floor space. A 1,500 foot artesian well will furnish water supply.

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The Cleveland Motor Car Company

THE WORLD'S BEST ALUMINUM CASTINGS

For general excellence Automobile Brand **ALUMINUM CASTINGS** cannot be surpassed. The leading and largest automobile manufacturers in America have testified to this fact by using **ALUMINUM CASTINGS** exclusively. You are privileged to ask any of them to tell you of their experience.

Automobile Brand **ALUMINUM CASTINGS** are a necessity for almost all parts of automobiles and motor boats. They are made expressly for the purposes and conditions under which they are to be used. If you are skeptical, write for proof, or, better still, send us your blue prints for a sample order, and let the **CASTINGS** speak for themselves.

LIGHT MFG. & FOUNDRY CO.

507 QUEEN STREET, POTTSTOWN, PA.

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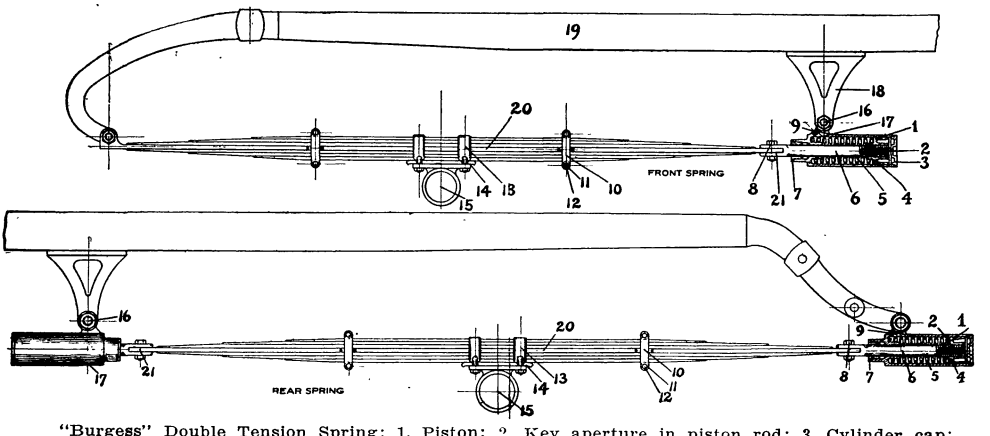
"Burgess" Double Tension Spring

In the accompanying cut is seen a new form of spring construction recently placed on the market by Charles H. Burgess, Jr., of Wenona, Ill. The advantages claimed for this spring are that there is no rebound of the car body, having the same elastic force above the horizontal line as below it; that there is no sidewise distortion of the body, and that the forward and back thrust of the body and twisting of the springs are eliminated.

Referring to the accompanying cut the axle (15), to which the wheels thereof are secured, is attached to the springs (20) by means of the plates (14) and clips (13), which is the common form of construction, the spring (20) consisting of a center leaf as shown, with laminations secured thereto on each side. The number of laminations that are employed depending entirely upon the strength of the spring required. The laminations being interposed on each side of the main or central spring (20) guards which are formed integral therewith and on each side thereof, are provided, thru which vertical guides are slidably mounted, having eyes (12) at each end thereof in which the roller bearings (11) are journaled and are normally in contact with the upper and lower leaves. When the spring is deflected there is a movement of the laminations, either forward or backward, longitudinally of the main spring and by the employment of the vertical guides (10), the laminations or leaves are kept in alignment during this movement, and are greatly assisted by the roller bearings which eliminate the friction between the leaves to a great extent. The depending hangers (18) are not preferably constructed, as the cylinders may be secured either above, below, in center or on ends of same. In the cut they are shown secured above, between the depending lugs, with bolts (16), which pass thru the eyes at the lower portion of the depending hanger (18), as well as thru the aperture formed integral with the cylinder casting. This construction gives the cylinder a free, vertical, rocking movement between the lower portion of the depending hanger (18), thus eliminating all friction of working parts of construction, the longitudinal axial line of springs and buffer springs being in the same horizontal plane. The cylinder (17), and its head are cast in one with the head aperture to receive a packing gland (7), thru which the piston rod (6) is adapted to slide. Adjustably mounted upon the piston rod (6) is the piston (1). The adjustable feature is accomplished by means of the piston rod being threaded as shown and adapted to cooperate with a bore provided with a female thread within the piston. The piston is provided with a cross sectional slot for the purpose of receiving the key which passes thru and within the apertures in the piston rod (2). Interposed between the piston and cylinder head of the cylinder is the buffer spring (5), the size of the buffer springs being governed entirely by the end tension sought to be given to the main spring (20). Each cylinder is provided with an oil plug (9) in order that oil may be inserted within said cylinder, the oil not only serving as a lubricant, but also acting as a fluid brake, inasmuch as each cylinder is completely filled with oil, and upon the forward or backward movement of the piston the oil is forced on either side thereof thru the longitudinal aperture (4), thus giving resistance to the piston according to the movement thereof, allowing the spring to move quickly when idle or worked on and slow when working, that is to say, absorbs the jars in the movement



"Burgess" Double Tension Spring; 1, Piston; 2, Key aperture in piston rod; 3, Cylinder cap; 4, Longitudinal aperture in piston; 5, Compression spring; 6, Piston rod; 7, Packing gland; 8, Spring bolt; 9, Oil plugs; 10, Vertical guides; 11, Roller bearings; 12, Eyes at each end of the vertical guides; 13, Clip; 14, Spring plate; 15, Axle; 16, Hanger bolt; 17, Cylinders; 18, Hangers; 19, Frame; 20, Main spring; 21, Slot in piston rod for main spring.

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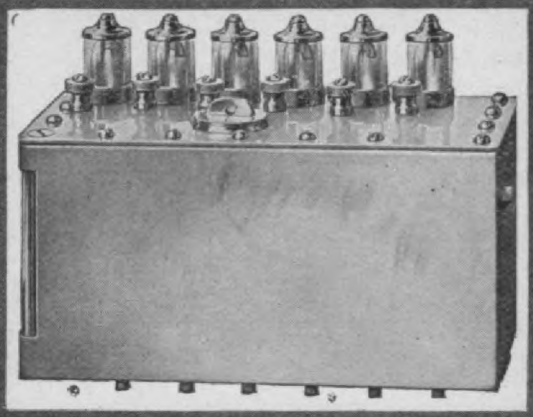
CHICAGO, U.S.A.

NEW YORK OFFICE, 24 BROAD ST.



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FORCE FEED LUBRICATORS

RADIATORS

CARBURETORS

WIRE BELTING

SPARK PLUGS

CIRCULATING PUMPS

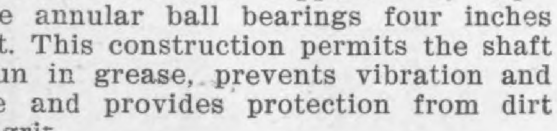
McKIM COPPER ASBESTOS GASKETS

is provided with a slot (21) adapted o-operate with the center leaf at each of the main spring, and is constructed the piston rod (6) and center leaf the mainspring solidly secured to-er by means of the bolts passing thru end of the center leaf of the main g. With this spring the general prac-is to provide 6 cylinders for each two on the rear ends of the forward gs and four on the rear springs, one ach end thereof.

Bearing Shaft on "Apple" Dynamo

e Dayton Electrical Manufacturing 89 St. Clair street, Dayton, O., are furnishing their "Apple" Dynamo a ball bearing flexible shaft drive desired. This ball bearing flexible is for use with their enclosed ad-ble governor. The governor is placed the flywheel end, and provides for sting the dynamos speed while engine is running, allowing very ac-te adjustment. The shaft transmits power from the governor to the dy-, and permits the placing of the mo at any convenient point at any nce from the flywheel.

e flexible shaft is encased in a flexi-metal tube and supported by high-e annular ball bearings four inches t. This construction permits the shaft un in grease, prevents vibration and e and provides protection from dirt grit.

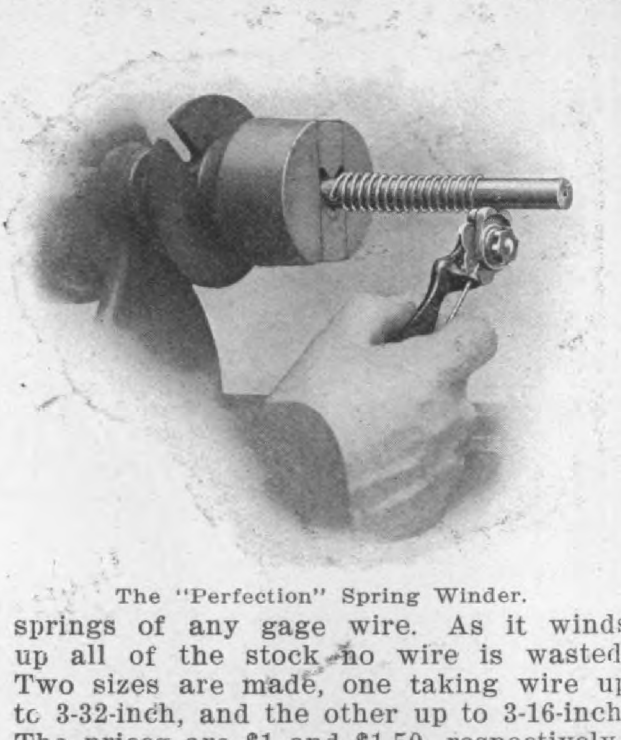


ctional view Ball Bearing Flexible Shaft on Latest Model "Apple" Dynamo. 1, t proper; 2, sheath; 3, flexible outer cover-

e governor is easily installed so as ake contact with the engine flywheel, the shaft being so constructed that ermits of a 90° turn, provides for in-ng the dynamo on any automobile, or stationary engine.

he "Perfection" Spring Winder

mington Machine & Tool Company,



The "Perfection" Spring Winder.

springs of any gage wire. As it winds up all of the stock no wire is wasted Two sizes are made, one taking wire up to 3-32-inch, and the other up to 3-16-inch The prices are $1 and $1.50, respectively.

"Jenkins" Slip Covers and Other Specialties

Jenkins Auto Specialty Co., Sumter, S C., are making slip covers, lamp covers top hoods, inside mud guard splashers and similar articles for the automobile trade and their aim is to produce these goods at prices that are attractive to the own ers of moderate priced cars. They are prepared to furnish these fittings for such cars as the Reo, Buick, Maxwell, Ford Cadillac, Stoddard-Dayton and Premier.

For these cars they have tailor-made slip covers made from the heaviest im ported linen, trimmed in best quality o braid, and attached with finest grade snap-on fasteners at $25.00 for touring cars, and $12.50 for runabouts. While making a specialty of the cars named they are prepared to furnish these special ties for any standard car.

All their goods are shrunk before ship ment and a perfect fit is guaranteed.

"Aluminite"

"Aluminite" is a new solder for solder ing aluminum to aluminum or to any other metal, and is made by Aluminum Solder Manufacturing Co., Oswego, N. Y., who state that the chief difficulty in soldering aluminum is to overcome the oxide which

EVER READY SPEEDOMETERS

1908 MODELS NOW READY

We are now closing contracts for next season and suggest that you investigate our liberal proposition.

They can also be had for immediate delivery.

Every instrument guaranteed to be absolutely accurate.

Without exception, the most reliable speedometers offered the public.

"Ever Ready" Tourometer,	$35.00
"Ever Ready" Roadster	50.00
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DEPARTMENT 5

AUTO IMPROVEMENT CO

Sales and Show Rooms, 2128 Broadway
Factory, 316 Hudson Street

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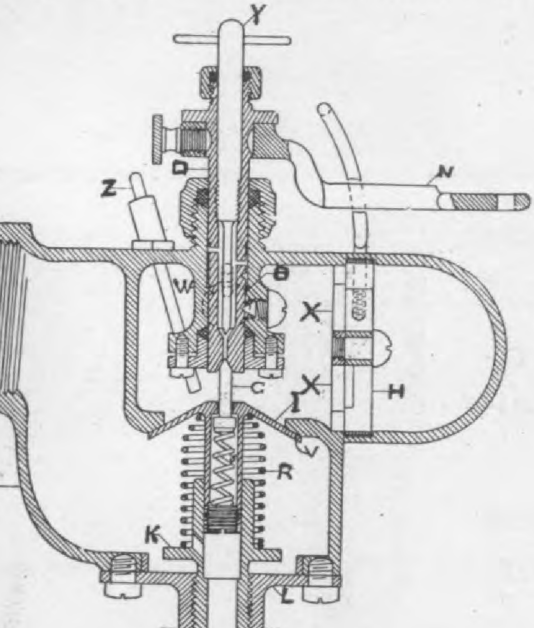
a uniform mixture at any motor speed adjustable to suit different grades of

eferring to the cross section illustration with it is found that this carburetor ists of a shell carrying a movable plug h is drilled to form the end of the fuel age. In this passage is placed an adng needle valve. There is only one that can be said to be a working part, that is the governing disc "I," which be used as a check valve if the device tached to a two-cycle two-port motor. e governing disc has a stem which is w and carries a small pin valve suped on a spring and engaging with the of the movable plug. It operates to shut the fuel supply between impulses and the motor is idle. There is no float ished, as none is necessary.

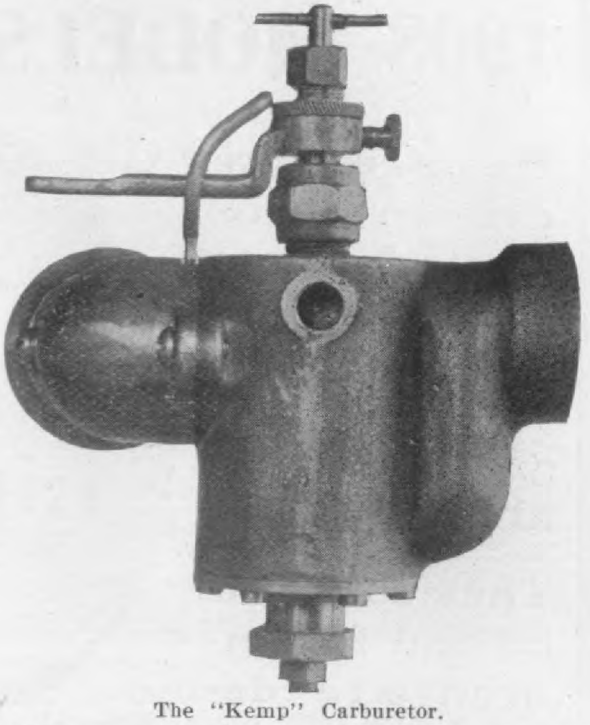
e operation is as follows: The air enat "X" thru the shutter valve "H" and es downward thru the opening occupied e governor disc "I," moving the gov-



Sectional View "Kemp" Carburetor.

disc downward, admitting the fuel at nd of the movable plug "D" and mixt as it passes the governor disc in its ge to the engine at "P." When the e of air and fuel has entered the encylinder the governor disc returns to at thus shutting off any further supply el. If, however, the speed of the en—which may be of several cylinders—is as to cause a continuous draught thru arburetor the size of the fuel passage enough to properly seat the pin valve "C so as to prevent leakage. The tension o the spring under the governing disc is chang able by means of the adjustable guide "K to suit any elevation of fuel tank.

All parts of the "Kemp Automatic" ar made of hard bronze and are almost inde structible.



The "Kemp" Carburetor.

The combination furnished in the car buretor admit of its use with all forms o internal combustion engines using liqui fuel. It is adjustable to the highest an lowest speeds, and the extremes can be ob tained in any one carburetor. It is mad very strong and is not affected by vibra tion.

The advantages of free, unobstructed pas sages are apparent in motors used on rac ing cars and speed-boats, where it is de sired to obtain all the power possible fron a given bore and stroke.

The makers are prepared to furnish thi carburetor in sizes ranging from 1-inch t 2-inch, inclusive, and in any quantity.

Two railroad show cars, one travelin East and one West from Cleveland, ar now on the road with an exhibition chassi and a complete 1908 Winton Six-Teen-Si in each. The cars will be on exhibitio from one to four days at Winton agencie in each of the large cities.

The Standard Welding Co., of Clevelan O., has in process of construction a ne plant which is situated on the Lake Shor

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GUARANTEED FOR 5000 MILES

DOESN'T it follow that the tire that carries the strongest guarantee MUST be the best?

Write for copy of guarantee, stating size tire you are using. Address Dept. A.

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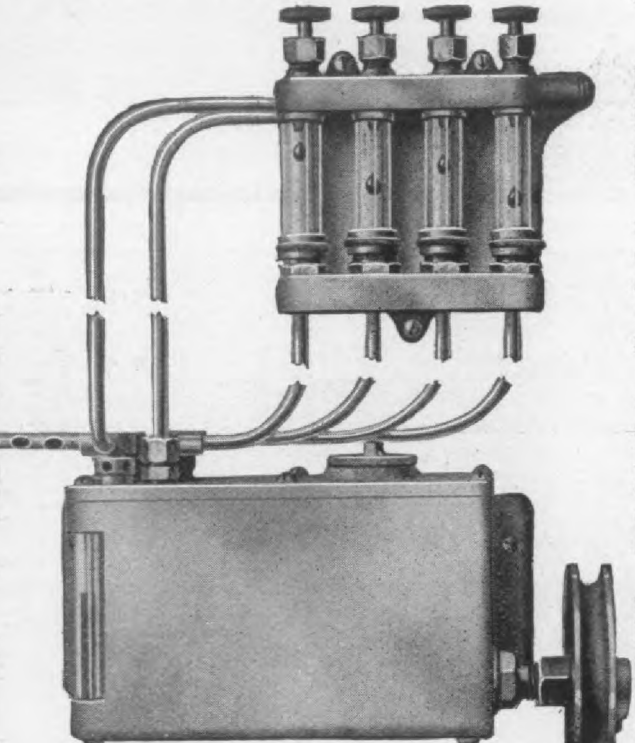
ve lately added to their line a force, sight-
d oiler of the mechanical type, with sight
ds and pump reservoir entirely separate,
that each can be located at the most con-
nient point. This oiler is especially de-
gned for use on automobiles and motor
ats and consists of an aluminum tank or
ervoir in which is located the mechani-
pumping device, which is belt-driven, the
lted power being taken from any con-
nient part of the engine. In the pumping
vice there is a separate forcing plunger
each of the sight feeds used.

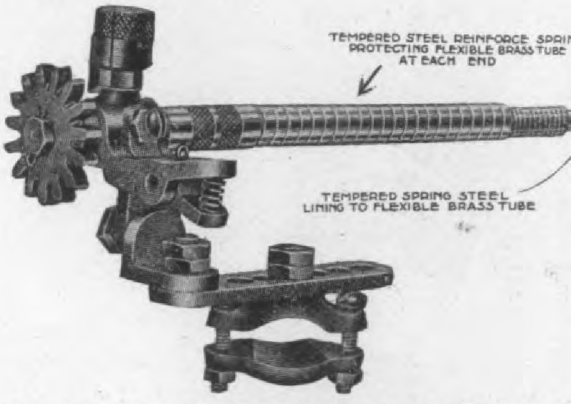
The tank or reservoir being made of alu-
num, is very light, and is fitted with at-
ching brackets. The tank is also fitted
th a good-sized oil indicator glass, so that
e oil in the tank can be easily seen at any
ne. It has a large filler hole and plug.
e set of sight feeds are made of cast
ass, finely finished and highly polished.
e sight feed glasses are of good size, so
at the feed of oil can be easily seen, and



The Sherwood Force Feed, Sight Feed Oiler.

e glasses are of sufficient length so that
ey will not cloud up. The oil is delivered
the set of sight feeds by the supply plung-
of the pumping device. The quantity
oil admitted thru each of the sight feeds
n be very finely and accurately regulated
meet the requirements of each separate
rt to be lubricated. The surplus is re-
rned thru a bypass and relief valve to the

While no changes have been found ne
sary in the fundamental design of
Springfield "Motometer," the speed in
cator made by R. H. Smith Mfg. C
Springfield, Mass., several detail impro
ments have been made for 1908 in the sh
of additional features, any of which m
be added to the 1907 or earlier models
the device.



Non-clogging driving pinion, shaft reinforcem
etc., of the 1908 Springfield "Motometer."

One new feature is a maximum sp
hand, which shows highest speed reac
and drops instantly when a button is pr
It can be rendered inoperative and inv
ble at the will of the user.

The dial used this season is an impro
ment over the old one in that it is m
easily read, having jet black figures fired
a white enameled ground, which is said
retain its pure whiteness and not to
nish.

The driving mechanism has not b
radically changed, but protection aga
a short bend or kink in the driving s
has been provided by the addition of
oil-tempered steel reinforcement at e
end of the shaft, which the makers
assures an easy curve of the shaft.

The shaft itself, and its immediate c
taining sheath have been changed, tho
less degree. The use of oil-tempered spr
stock in the sheath gives more room
the shaft and better action under flex
An improved construction of the sh
itself, which has given remarkable res
under endurance tests, is also in evide

Finally, there has been added a feat
at once novel and of an exceptionally pr
tical nature. This is the self-clearing,
rather, non-clogging pinion used in c
nection with the hub transmission, wh
they say will not clog with mud, etc., un
any conditions.

Mr. B. C. Swinehart, vice president of
Swinehart Clincher Tire & Rubber Co.
Akron, has returned from a three mon

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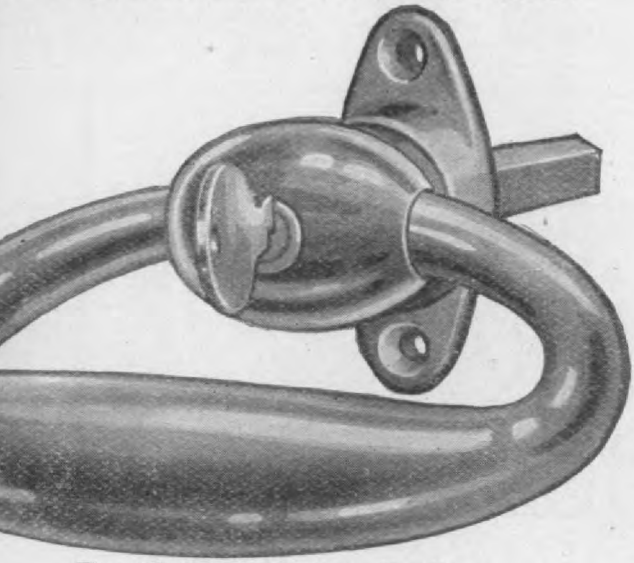
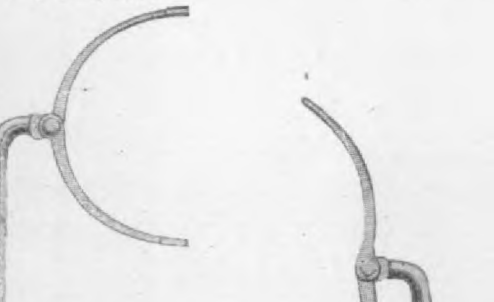
ıpted for use on the doors of limousines, daulettes and broughams. It insures the ety of articles left in the car and renders



The "Security" Locking Handle.

mpossible for chauffeurs to soil the olstery by lounging in the car while it the garage.

his lock is attached to the door in the e manner as an ordinary handle, and is rchangeable with the same. Two styles made, No. 105, with drop handle, and 106, with bar handle, each style listing 16 per pair.



"Cowles" Tire Holder.

s company has also brought out a new older made of solid brass and consist- f three parts, one to be bolted to the ng board with its base parallel to the of the board, one to the underside of part of the front seat which extends d the body and one to the dash. The

The Venus plugs have sold be

The New "Sta-Rite" Spark Plugs, No. 48

made from Bessemer steel rod, which doe not stretch and hence the mica does no loosen. There is no shellac or other simila substance on the inner core. The mic washers are comprest under great pressur and machine-turned to a finely glazed sur face. No. 32A is standard half-inch size an No. 48 has metric threads. Both are separ able. Price of either is $1.50.

"Richmond" Forgings

Richmond Drop Forging Corporatio (Belle Isle), Richmond, Va., are producing forgings of all kinds for the automobil trade. Their equipment consists of steam an board drop hammers, varying from 400 to 2000 lbs. and capable of making every de scription of automobile forgings excep heavy axles and the larger crank shafts They are particularly well equipt for making heavy hubs, steering knuckles, axle spindles, connecting rods, double and single throw crank shafts, etc., and as their shop is run by electric power generated by a water wheel, they are enabled to manufacture at low cost.

They have railway tracks into their yards and six trunk lines with several steamboat lines give them excellent shipping facilities.

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E. H. Broadwell, well-known tire man

Does Not Forget

"WITHERBEE"

An "Absent minded" Ignition system causes more trouble to the automobilist than four flat tires. The Witherbee battery on your car means PERFECT ignition—means new life to your car—means less cost of up-keep.

4,300 MILES ON TWO WITHERBEE "66"

As a remarkable demonstration of battery dependability C. W. Price has driven his Maxwell Sealed Bonnet Car over 4,300 miles on two Witherbee 66 Batteries without recharging What other battery could have stood this test without forgetting itself?

Learn more of the Battery that does not forget; write for a copy of our Ignition Booklet No. 23.

WITHERBEE IGNITER CO.

541 West 43rd Street, NEW YORK

CHICAGO
1429 Michigan Avenue.

DETROIT
220 Jefferson Avenue.

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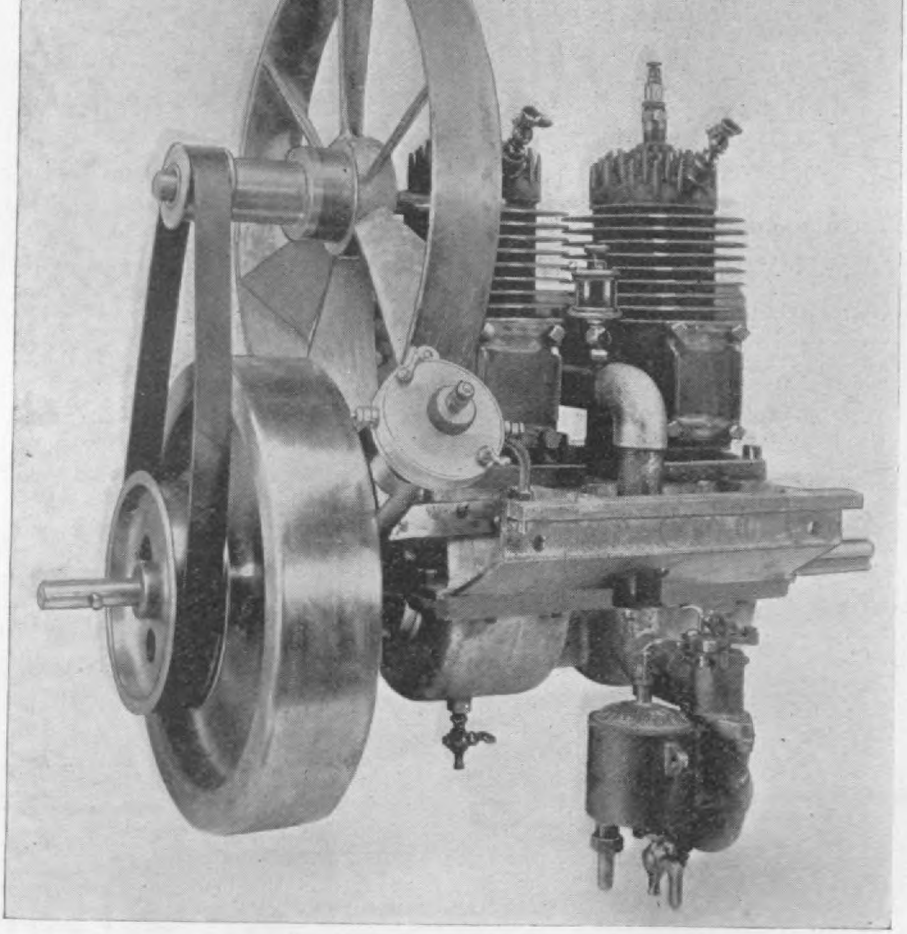
he market with a two-cycle air-cooled notor. Several models ranging from 10 to o H. P. are offered by this company. These engines are sold either for trucks or leasure vehicles. The smallest engine is ated as 10 H. P., the next two-cylinder at o H. P., a three-cylinder at 30 H. P. and he four-cylinder at 40 H. P.

GENERAL CONSTRUCTION.

The cylinders are made of a special rade of cast iron and so cast that there s no porous iron in the heads, which have

ing the shaft or its bearings. Long ings are used, insuring continued c case compression. These bearings p erly oiled the company guarantee to 10,000 miles without any appreciable w The large sizes are 4½ inches long the smaller engines are fitted with 3½- bearings. The crank shafts have co turned on them which prevent blo thru from one chamber to the next. T shafts are of high carbon steel cut f the slab and not drop forged and are



The 10 H. P. Air-Cooled 2-Cycle Speedwell Motor. A feature of the Speedwell Motor is completeness of the air-cooling system, the inside of the piston heads carrying cooling pins a the cylinder being incased in a jacket not shown on this small engine. The fly wheel in t engine is in front for light cars and high-wheeld machines, but in the large 3- and 4-cylin models the fly wheel is at the rear. The fan is ball-bearing and the timer can be had directly the crank shaft or on a special shaft, as shown. Details and prices will be found in the text.

tegral cast cooling pins, while the trunk the cylinder carries integral flanges. All linders are annealed and seasoned before e finishing cut, insuring permanency of rm. The crank cases are special alumi- m alloy, giving maximum strength and nimum weight. All the supporting arms e cast integral with the upper half of

ished by grinding.

The pistons are of light construction specially tough close grained cast iron are fitted with five eccentric, diagon cut ¼-inch rings. These are ground t perfect circle after being split, and pistons are also finished by grinding. Co ing pins are also cast on the under s

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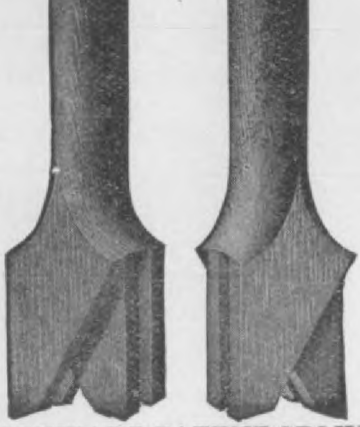

SCHWARZ PATENT SPOKE

SCHWARZ WHEEL

FINISHED WOOD WHE

The tenons of the spoke are grooved and mortised for interlocking.

They are put together at one time, under pressure.

WHEEL COMPLETE

The whe can be mad complete an shipped witho the hub.

For Automobiles and Heav Vehicles. The best and strong est artillery wheel made. Spoke can never loosen. Wheel wi stand where every other fails.

APPROVED AND ADOPTED BY LEADING AUTOMOBILE MANUFACTURERS

Send for illustrated booklet.

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THE SCHWARZ WHEEL COMPANY

the heat and not be lost in cooling the hood or other parts. Upon the effectiveness of the air-cooling system the results obtained with these motors are based. The claim is made that with the same amount of lubricating oil as used on a water-cooled motor the same work is done without premature firing.

FLEXIBILITY.

As it is often claimed that the two-cycle motor is not flexible, the company states that its demonstrating car with 34-inch wheels and geared 3 to 1 can be driven on the high gear from 5 to 50 miles an hour which is as good as obtained with 4-cycle motors. The motors are also light for their power, as will be seen from the following: Four-cylinder, 300 pounds, 40 H. P., $350; 3-cylinder, 250 pounds, 30 H. P., $275; 2-cylinder, 200 pounds, 20 H. P., $200; and the small 2-cylinder, 130 pounds, 10 H. P., $135. The equipment includes spark plugs, carburetor, piping, ball bearing fan and air casing. A small marine motor of the same general design and workmanship, but of 3 H. P., is marketed for $45. All motors are guaranteed.

The Iversen Rear-Axle Transmission

A novel construction of bevel gear drive rear-axle in combination with the transmission and equalizing gears, is offered the trade for the coming season by The Iversen Mfg. Co., Pittsburg, Pa.

The transmission is of the planetary type, differing from the ordinary gears of this type, in that it gives three speeds ahead and one reverse; and also that almost any practical speed ratios can be obtained. The standard model 2 for up to 60 H. P. has a bevel gear reduction of 3.2 to 1, which is equal to about 40 miles an hour with 36-

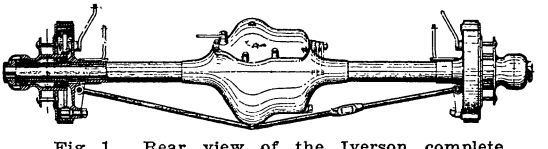

Fig 1. Rear view of the Iverson complete floating type axle, with hubs carried on annular ball bearings, internal and external hub brakes and gear casing in the center.

inch driving wheels, when engine is running at 1200 R.P.M. The second speed is 23; the third speed 11 and the reverse 8½ miles an hour. The bevel gear reduction can be changed at customer's option. This will change the other speeds in proportion.

By referring to Figure 3, it will be seen that the main bevel gear is mounted free to rotate on the axle on a very long bearing. The bevel gear rim which also has an internal gear, is bolted to the main spider. The latter has also a pinion at the hub which is not in the same plane with the internal gear. The spider is also provided with four clutch shoes and operating means as shown. The equalizing gear is of the ordinary spur gear type. A circular drum-like extension is cast integral with the equalizing gear casing, and extends thru the planes of the pinion and internal gear above described.

An exterior flange is provided at the outer end of this drum, to which the journals for three pinions are securely fastened. These pinions mesh with the internal gear of the bevel-gear, and also with a gear which is carried, free to rotate, on the extension drum. This gear has an extension suitably arranged for receiving a brake, which if applied gives the second speed forward. It will further be seen from the cut that the pin which carries the pinion in the equalizing gear extends thru the casing and carries journaled on it a pinion which meshes with the pinion of the main spider and also extends thru a suitable opening in the extension of the equalizing gear casing, and meshes with the internal gear. This internal gear is fastened to a brake drum, to which the second brake is applied when the third or low speed ahead is wanted. Of course, three pinions are provided, one each, on three of the six pins in the equalizing gear.

The above-mentioned brake drum incloses the equalizing gear casing, extending with a flange down over the end of same. This flange has an exterior gear wheel as shown in the cut. To the hub of the equalizing gear casing is also fastened, by means of a screw thread, a flange which carries three pinions. These pinions mesh with the gear on the prior mentioned brake drum

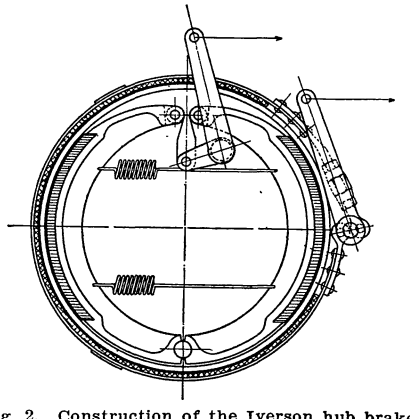

Fig. 2. Construction of the Iverson hub brakes. This axle makes the drive complete, and nothing need be placed under the machine except the driving shaft from the motor, the torsion rod and connections for the operating levers.

and also with an internal gear. If the third brake is applied to the exterior of this internal gear, a reverse motion is obtained. To obtain the high speed all brakes are released and held by means of springs so that they do not touch their respective brake drums. The clutch shoes in the main spider are then engaged; they grip the interior surface of the extension of the equalizing gear casing, thus locking same to the spider. The whole system of gearing then revolves with the main bevel gear, and all

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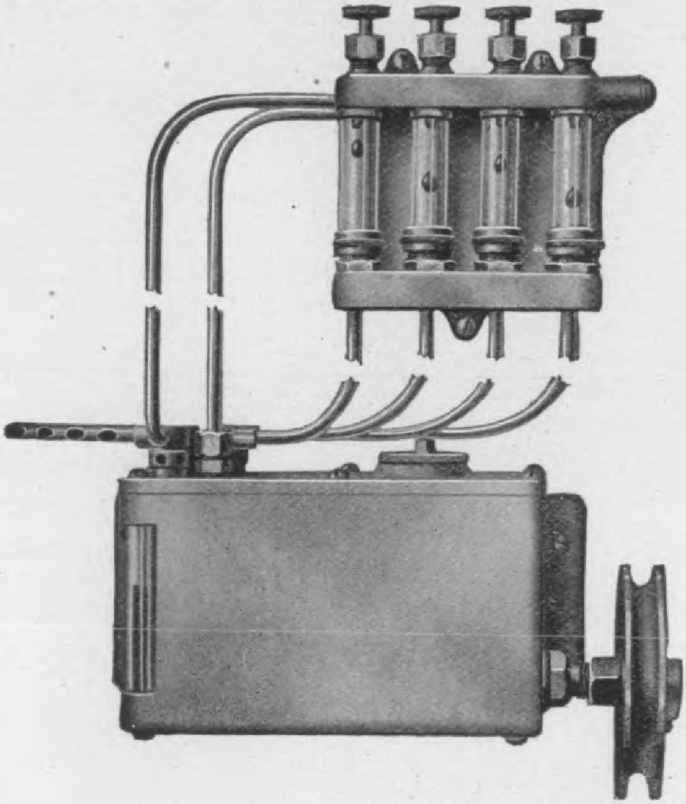
Force Sight Feed Mechanical Oiler

The correct and most satisfactory method of lubricating

For All Style Gasoline Engines



Set of Sight Feeds and Pump Reservoir separate so that each can be located at most convenient point. Can be furnished with any number of feeds required.

Simple in construction—Feed Positive, Uniform and Reliable.

In All Respects the Best

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THE SHERWOOD MANUFACTURING CO., Buffalo, N.Y.

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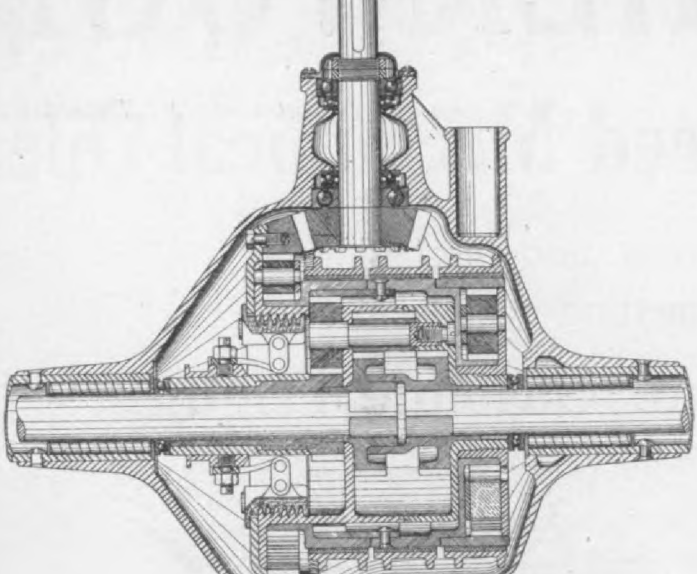

Fig. 3. Sectional view of the Iversen rear le transmission thru the gear casing.

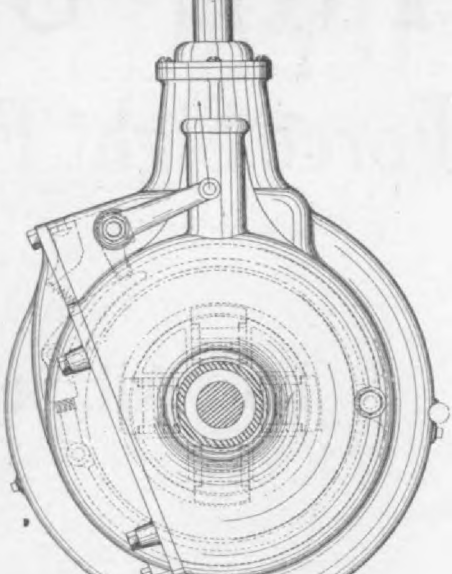

Fig. 4. End elevation of the Iversen re axle transmission.

us the car can be started on high gear hout a jerk, it is claimed. When the tch and all brakes are released, the whole aring runs idle.

The axles are shown carried on roller arings, this can be supplied, altho stand- l models are made with annular ball bear- gs same as shown on pinion shaft. All ner pins and journals are steel hardened d ground. All parts are inclosed in an tight and dust proof casing with cover, an incline as shown in Figure 4. By re- oving the cover, the complete gear can taken out from the rear by pulling out e axles or brakes and clutch shoes can be justed or removed without dismantling ything.

The novel arrangement of the brakes can seen from the end elevation.

Two models will be placed on the market r the coming season. Model 1 will trans- t up to 24 H. P. Model 2 up to 60 H. P. ne total weight for transmission with itch and brakes in addition to the weight the ordinary bevel gear drive axle of me construction is only 40 pounds for odel 1 and 70 pounds for Model 2.

The "Waterweb"

R. H. Wallace Co., 497 Washington reet, Boston, Mass., is marketing a pro-

dust. It is very light and thin and wh not in use can be tuckt inside the lad waist or placed in her wrist bag. Two si are made, one for street wear, listing $1, and one for automobile wear, listing $1.25.

The Springfield 1908 Ratchet Screw Jack

The latest product of the Shawver C Springfield, O., is a powerful ratchet scr jack for cars weighing from 1000 to 4000

The base is made of malleable iron, he ily ribbed and dust-proof. The screw is the regular type, four pitch, square thr steel. Height of jack over all is 12 i extreme rise of screw 7 ins.

The New "Springfield" Ratchet Screw Jac

The ratchet works in a grease tight, r leable casing from which both screw ratchet are lubricated, one filling of gre being sufficient for a whole season's The ratchet pawl is made of steel and h

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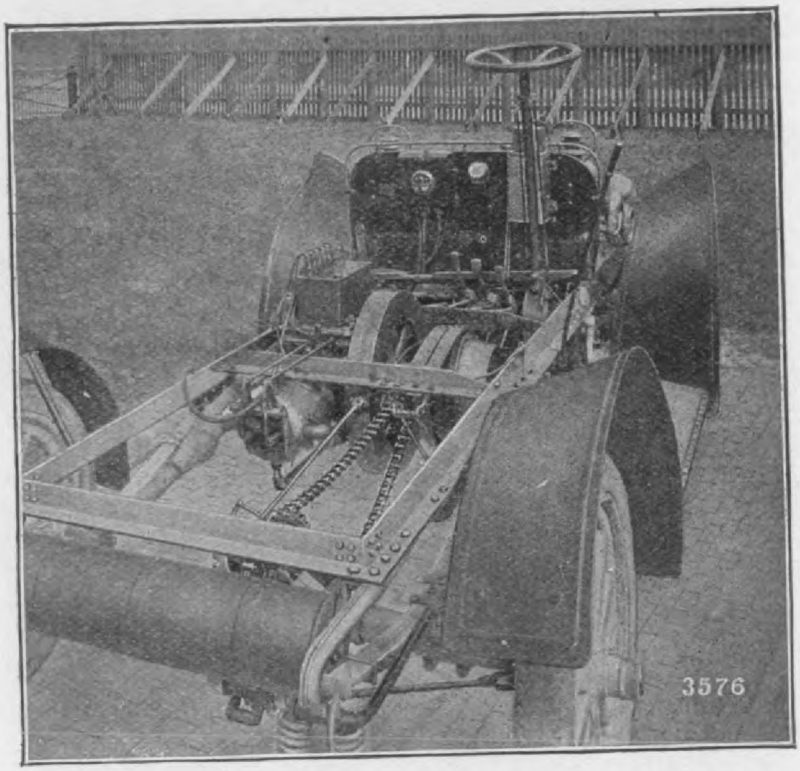
THE RECORD OF ENDURANCE

"40,000 Miles—3 Years'
Constant, Efficient Service"



Chassis of American-Made Car—Renold Chain Transmission.

Renold Roller Chain

supreme abroad—where it originated—popular here—where it duplicates the service given to thousands of foreign cars.

"If your car has a Renold it wins."

LINK BELT COMPANY

Exclusive Sales Agents

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latest addition to the numerous speed cators on the market, but possesses eral distinctive features, and an ex- nation of its design shows that its de- er had in mind the accomplishment of vell-defined object, the production of instrument for a certain, single pur- . It is a speed indicator and nothing , and by trying to do one thing only makers feel that they are able to pro- a simple and reliable instrument, and he same time keep the the manufac- ng cost at a minimum while using the highest grade materials and xmanship.

The "Velocimeter."

e Velocimeter operates by centrifugal , and the mechanism is driven by s of a "Coates" flexible shaft which its motion thru a system of hard ze gears with cut teeth. The shaft the unit link style, and is specially for this purpose. The gears are in place by a specially designed p fixture which will fit any standard rican car. The fixture, like the gears, bronze, and will not rust. It can tted to either front wheel. Special bearings are used wherever neces- and provision is made for permanent cation.

e dial is of circular form, and is of silvered aluminum with scale and es clearly engraved in black. An heavy bevel edged glass protects the The scale is graduated in 5-mile di- s, and the makers state that this gement has been found perfectly sat- ory in actual use. The exact speed e car can be judged by the relative on of the indicator hand.

e case is highly finished, and is dust-

Folding Tonneau for Ford Runabout

The Dayton Folding Tonneau Company, 1143 North Main street, Dayton, O has added to its folding tonneau line size suitable for the Ford runabout. This new size is the smallest tonneau the make, but is large enough for two grown persons and a child. It adds only about 40 pounds to the weight of the car, but is strongly made. It is meeting with great favor among Ford dealers, as many of their customers while wanting a car of that price desire one to carry more than two persons. The Dayton Ford tonneau is designed to harmonize completely with the car, and can be fitted in a few hours No touching up or painting is required.

The "Moss" Sand Tractor

Augustus S. Moss Company, Sandusky O., has placed on the market a sanding device for automobiles. This device is called the Moss Sand Tractor, and is said to be very useful on wet asphalt or other slippery surfaces. It consists of a box of sand in some convenient part of the car, a comprest air system and suitable piping and valves. A gage on the dash shows what air pressure there is in the air tank. The valve is pedal operated When the pedal is deprest air is released and carries the sand thru pipes to the rear wheels where the sand is scattered on the ground.

Stevens-Duryea cars will now be handled in Philadelphia thru a branch which has been established, and is in charge of Mr. F. Windsor.

The Ajax Grieb Rubber Company's plans for new additions call for three buildings of brick with a total floor space of 75,000 square feet on the west side of Olden street in Trenton, where about six acres of ground are owned by the company. New officers for the year were elected as follows: President, Horace De Lisser; vice-president Wm. G. Grieb; secretary and treasurer, Harry Grieb.

With the recent reorganization of the Dragon Automobile Company, John Kane Mills returns to active work from which he resigned last spring on account of ill-health. While there has been no radical change in the interests involved in the company's work, there has been a re-adjustment, which, it is believed, will in-

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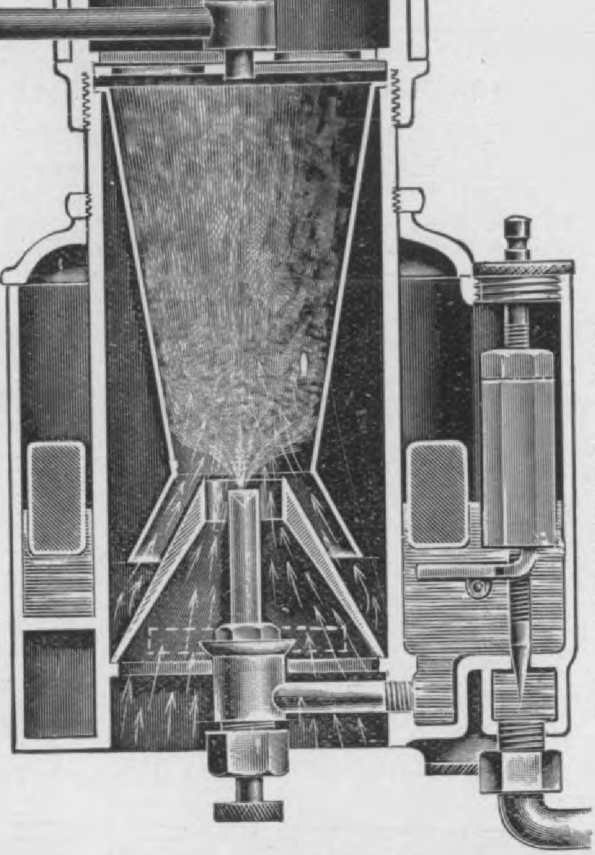

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THIS INSTRUMENT PRODUCES THE

MAXIMUM EFFICIENCY

FROM INTERNAL COMBUSTION MOTORS

INCREASING THE

POWER, SPEED,

AND FLEXIBILITY ON A MINIMUM FUEL CONSUMPTION

It functions on correct scientific princi pals and is greatly superior in its method o gas formation, workmanship and finish, t any carburetor ever brought out.

Our modern new factory, allows us t make prompt deliveries. We will be please to forward sample instruments to manufac turers who are interested for this season's an next requirements, and believe you ca hardly over-look this opportunity of increas ing the popularity of your cars, by securin absolute perfection in carburation.

Owners of cars, who have ideas of large motors are advised to try a Bowers Carbu retor first, it makes giants of the weaklings

CATALOG FOR THE ASKING

The F. E. BOWERS COMPANY

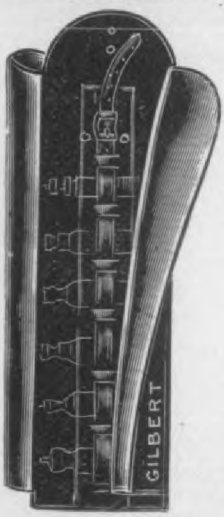
New Haven, Conn.

GILBERT AUTOMOBILE

THE ONLY ONES WORTH YOUR MONEY

FABRIC SUPPLIE

QUALITY .... SUPERIORIT



TIRE CASE

STORM HELMET

WE MAKE EVERYTHING IN RUBBER FABRIC

Sold

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ust hood which we illustrate herewith. our sizes are furnished, each size being djustable several inches by means of an astic cord encased in the hood. Nos. 002 and 1003 are made of artificial leath- and melodian cloth, respectively, and st at $10 and $7.50. They fit tops 75 to inches wide. The next size, for tops to 74 inches, lists at $9.50 in artificial

"Gordon" Adjustable Dust Hood.

ather and $6.75 in rubber. The small uring car size, fitting tops 64 to 68 in- es wide, is furnished in artificial leather $8, and in rubber at $6. There is also runabout size for tops 54 to 58 inches ide, listing at $7.50 in artificial leather d $5.50 in rubber. This dust hood has extension that covers the back of the ar seat and prevents the dust from ming up back of the machine into the r, so that the occupants of the rear seat e always free from dust when the dust od is used.

The Nathan Tire Trunk

The Nathan Novelty Manufacturing Co., -90 Reade street, New York, has added its line of automobile specialties a unk shaped to fit inside the spare tire ually carried on the side of the car. It made of the same material as automo- le trunks, and is handsomely bound in

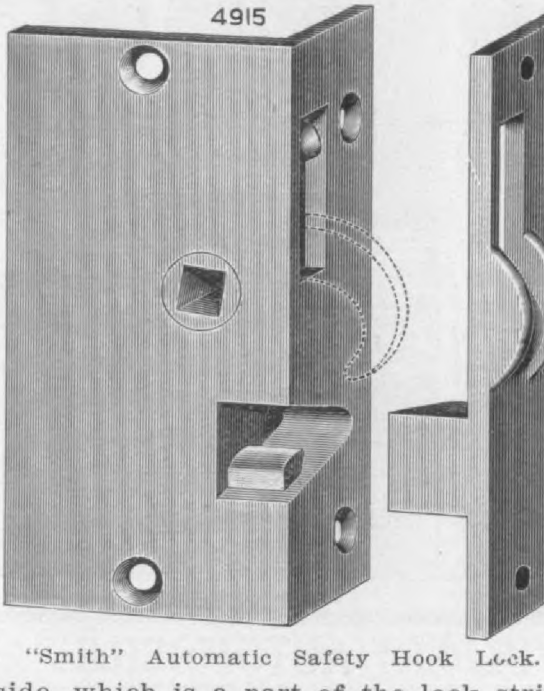
The "Nathan" Tire Trunk.

ther. Two sizes are made, one for 30- 32-inch tires, and one for 34- to 36-inch

deep, $10.00; nine inches deep, $12.00.

New "Smith" Safety Door Lock

Joseph N. Smith & Co., Detroit, Mi have lately added to their line of auto bile hardware, etc., a new form of sa lock for tonneau doors. In this lock combined a guide for the door to prev its sagging. The engaging part of



"Smith" Automatic Safety Hook Lock.

guide, which is a part of the lock stri and is fastened to the door strip, co in contact with the working part of lock when the door is closing; but it o operates the lock when the door is clos at which time it instantly releases mechanism and a hook is thrown out i the slot in the lock striker, this hook only locking the door, but having a t dency to draw the door and the door p together. When the door is open the gaging hook is held within the lock, that there is no projection.

Billings & Spencer Company, of Ha ford, Conn., have contracted for a la addition to their already enormous pla The addition consists of a two-story br building on the east side of Broad stre 85 feet long and 40 feet deep, and e mated to cost in the neighborhood $23,000.

Upon the resignation of Mr. B. W. T man as buyer and sales manager of Logan Construction Company, of Ch cothe, O., the following changes ha taken place: B. A. Gramm becomes g

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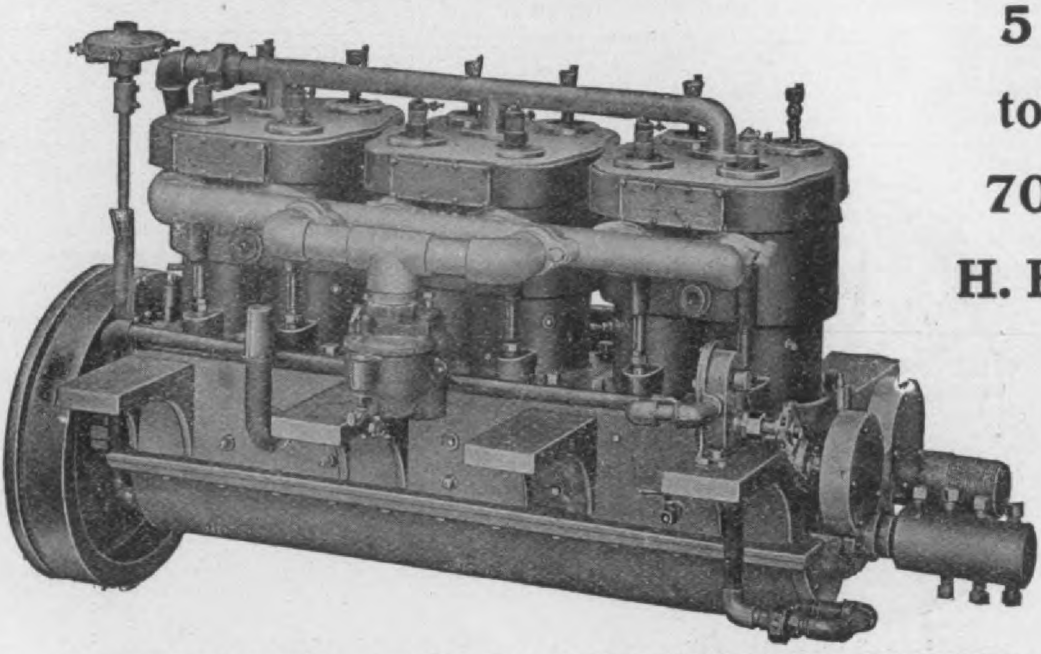
TRANSMISSIONS and CLUTCHES for AUTOMOBILES and MOTOR BOATS

Motors

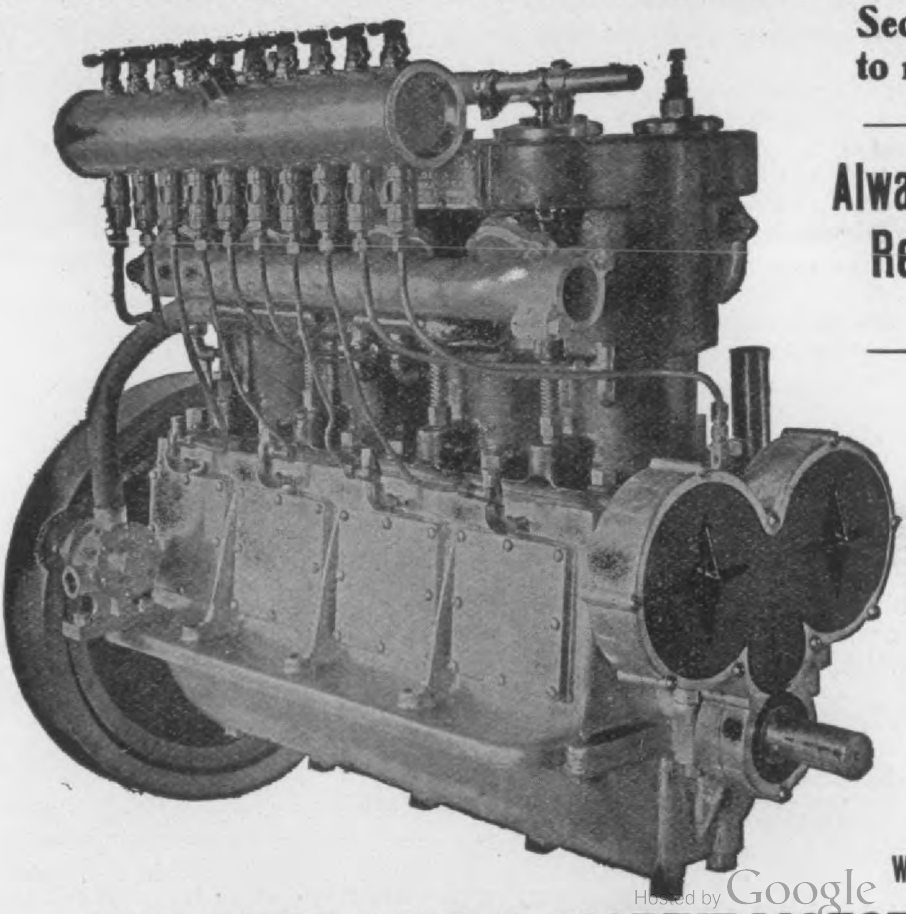
5 to 70 H. P.



6 CYLINDER, 45 H. P. AUTOMOBILE MOTOR.

Second to none.

Always Reliable



Write for Catalog and Prices.

Air and Water Cooled.

4 CYLINDER, 35 H. P. MARINE MOTOR.

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ajestic Building, Detroit, Mich. The Vilderspin" tire is very simple in con-ruction, and does not materially differ appearance from the usual pneumatic re, while the wheel to which it is fitted not altered to receive it. It can be aced on any artillery type wheel, and removed leaves the wheel unchanged d ready to receive the ordinary type of e if so desired.

The Wilderspin "No Puncture" Tire.

The foundation of the tire is a steel annel the width of the felloe, and on is channel are placed spiral springs of eat strength and resiliency. The tops the springs are fastened together with ring steel. A cushion of canvas belting placed on top of the springs and secure-fastened. Over this is a cover of spe-lly prepared waterproof leather, and ally a 2-inch leather tread, steel riv-ed, is placed on the top of the leather ver.

The manufacturers furnish wheels and es complete, less hubs, at prices rang-g from $45 to $70 per wheel, but can rnish the tires separately if desired at out 75 per cent. of the price of the eel and tire. These tires can be placed any make of car.

New "Onward" Wrench Set

The Onward Company, 531-545 West teenth street, Chicago, maker of enches, etc., has just added to its line

The wrenches are made of a selec material skillfully tempered to prod both hardness and toughness, and they guaranteed proof against springing wearing at the jaws.

The "Standard" Tire Protector

Norris-Eddy Auto Company, Sagin Mich., has placed on the market a t protector which is easily applied and p sents a smooth surface to the tire. consists of a tread strip held to the t solely by a clamping effect produced the peculiar bead construction employ There are no mechanical fastenings wh ever. The beads are made up of f layers of fabric in pyramid shape, a built into the protector proper surroun by the harder bead gum and the extend layers of body fabric before mention This construction of the beads has gr

The "Standard" Tire Protector on Tire, Cross Sectional View.

strength-giving qualities as well as fle bility.

Nothing but the very best long cu tread gum is used, and it is said that haustive tests have proved these trea are fully able to withstand the hard usage and contact with road surface th a tire can be subjected to. The p tectors are easily applied—by simp deflating the tire and slipping the p tectors on with ordinary tire tools. F instructions are furnished with every s

These protectors are built in many d ferent sizes to fit every make of tire, s for size, including flat tread racing tir if such is desired. They are built building forms very much on the sa lines that tires are constructed, and no ing is used but the best grade of S Island cotton fabric, five layers on t body or carcass of the protector, two l

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NOTICE

IT HAS BEEN BROUGHT TO OUR ATTENTION

That certain unscrupulous dealers and top makers have been offering to the trade and public Automobile tops made of cheap inferior leather substitutes, representing them as

Pantasote

The name PANTASOTE represents a particular composition, which is, and for years has been, manufactured exclusively by us. It is thoroughly protected by copyright. We do not desire to create trouble, but for the protection of our own business, as well as that of our customers, we are forced to give notice that we will follow up and

Prosecute to the full extent of the law

all such cases as come to our notice.
If your are in doubt as to the genuineness of the PANTASOTE, request your dealer to affix one of our trade mark labels to the top or send us a small sample or one of the side curtains.

TO DEALERS

We are prepared to furnish upon application, free of charge, small celluloid trade mark labels, one of which affixed to a Pantasote top stamps its genuineness.

THE PANTASOTE CO.

NEW YORK, 11 Broadway

CHICAGO, 707 Fisher Building

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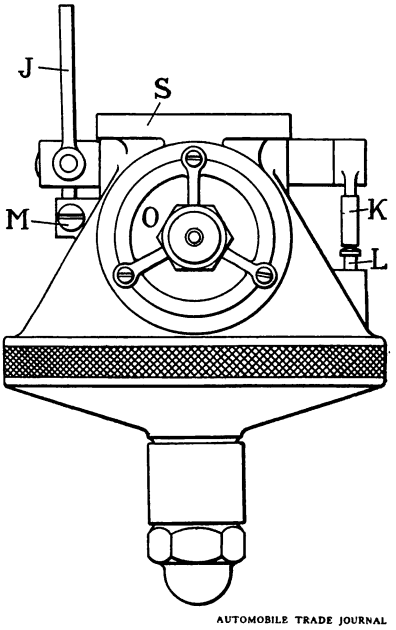
The 1908 "Newcomb" Diaphragm Carburetor

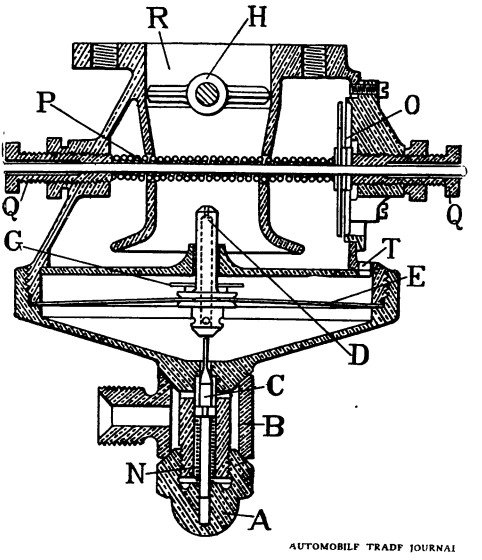
The Newcomb Carburetor Co., 1900 Broadway, corner Sixty-third street, New York City, have recently placed on the market the Newcomb Diaphragm Carburetor, which is claimed to be absolutely automatic, in that it consists of an extremely sensitive, ingenuously-constructed atmospheric regulating valve, which supplies the gasoline exactly as needed, and follows instantly every movement of the throttle.

The operation of the carburetor is as follows: When the engine is cranked and started a partial vacuum is produced in the carburetor proper. This vacuum is communicated thru the gasoline jet to the space below the diaphragm (E), which is normally filled with gasoline. The



The "Newcomb" Carburetor; Perspective view; J, Throttle lever; K, Tickler cam; L, Tickler pin; M, Tickler screw; O, Air inlet valve; S, Outlet flange.

space above the diaphragm is always at atmospheric pressure due to the air vent (T). The difference in pressure on the two sides of said diaphragm causes it to move downward, opening the gasoline valve (C). This action continues until the flow past the gasoline valve equals the flow thru the nozzle. The pressures on the two sides of the diaphragm are then equal, and it remains in a fixt position until the demand for gasoline is changed. If the demand is reduced the gasoline pressure raises the diaphragm, allowing the spring (N) to close the valve slightly, reducing the supply. When there is an increase in demand for gasoline, the pressure is reduced on the lower side of the diaphragm. The atmospheric pressure on the upper side of the diaphragm instantly forces it down, opening the gasoline valve to such a position that the flow of gasoline thru the jet equals the flow thru the nozzle, and a balance is again established.



The "Newcomb" Carburetor; Sectional view; A, Universal union nut; B, Universal union; C, Gasoline valve; D, Gasoline nozzle in jet; E, Diaphragm; G, Tickler; H, Throttle valve; N, Gasoline valve spring; O, Air inlet valve; P, Air inlet valve spring; Q, Nuts for adjusting P; R, Outlet to engine; T, Air vent.

The only adjustment necessary is that of the tension of the inlet air valve spring (P). The tension of this spring is changed by means of the nut (Q). This air valve (O) tends to hold up the vacuum when the air flow thru the carburetor is slow and unsteady as it is under conditions of light load or low speed, and makes a mixture of sufficient richness for these conditions.

When the engine is running at a fair speed or moderate load this air valve sets back out of action, and a constant mixture is maintained. This constant mixture is due to the shape and position of the modified Venturi tube which allows the air to flow in such a way that the gasoline flow is not affected by it. Therefore both the gasoline flow and air flow follow the same law, and the mixture must be correct if the gasoline and air openings have the correct relations.

W. A. Woods, formerly with the Oldsmobile Company, of New York, is now connected with the Cleveland Motor Car Company, as sales manager.

Harold J. Elsworth, previously connected with the sales department of the Maxwell-Briscoe Company, has taken the position of sales manager for the Colt Runabout Company, and C. B. Craske will be purchasing agent for the Colt company.

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ANNOUNCEMENT
TO SPARK PLUG USERS

A Money-Back Guarantee
WITH EVERY
DIAMOND SPARK PLUG

The ONLY Plug which you can LOOK THROUGH and SEE THE SPARK in the cylinder

¶ Believing that proof is better than argument and that practical demonstration is the ***best*** proof, we make the following unexampled offer to Spark Plug users:

Send us $1.50 (Marine Engines $1.75) for each Spark Plug desired, in check, money order, stamps or cash, together with name of your car or engine, and we will send you, PREPAID, Diamond Spark Plugs to the amount of your order and under the following absolute

GUARANTEE

If within six months of date of purchase you are not entirely satisfied with the Diamond Spark Plug in every particular, write us to that effect, and the purchase price will be returned without question or quibble.

¶ Diamond Spark Plugs are made from the highest grade material throughout. The porcelain used is unbreakable, all metal parts nickeled and polished and cannot rust.

¶ There is no short circuiting. No packing to blow out. No cement or shellac used. The sparking points are non-corrosive throughout.

¶ These and other features make the Diamond Spark Plug a ***serviceable certainty.***

¶ Send to-day, while the offer is fresh in your mind, for your first perfect Spark Plug and end your sparking troubles.

ADDRESS

WILLYOUNG APPLIANCE CO.
Yonkers (LUDLOW STATION) New York

SELLING AGENTS:

MOTOR PARTS CO., No. 25 West 42d St., New York City

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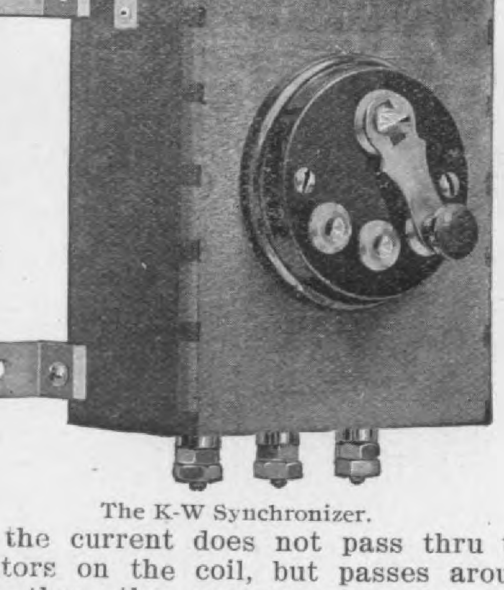
ver avenue, Cleveland, O. It com-
es a well-made and rapid vibrator and
owerful condenser enclosed within a
d mahogany box, and equipt with a
tch for using two sets of batteries al-
ately, or one set of batteries on one
and a K-W Magneto on the other
. It is intended to be fastened on the
n, alongside of the coil, and is wired
n the diagram shown herewith.

rom this diagram it will be noted that
battery wires are transferred from the
to the Master Vibrator or Synchron-
, and there is a wire which runs from
center binding post on the Synchron-
to one of the battery binding posts
he coil. This places the Synchronizer
eries with the battery and coil, or with
Magneto and coil, so that no matter
ch unit in the coil the timer closes
circuit on, this Master Vibrator vi-
es, and shoots or sparks that particu-
coil. Each vibrator on the coil is
t-circuited, as per small diagram, so

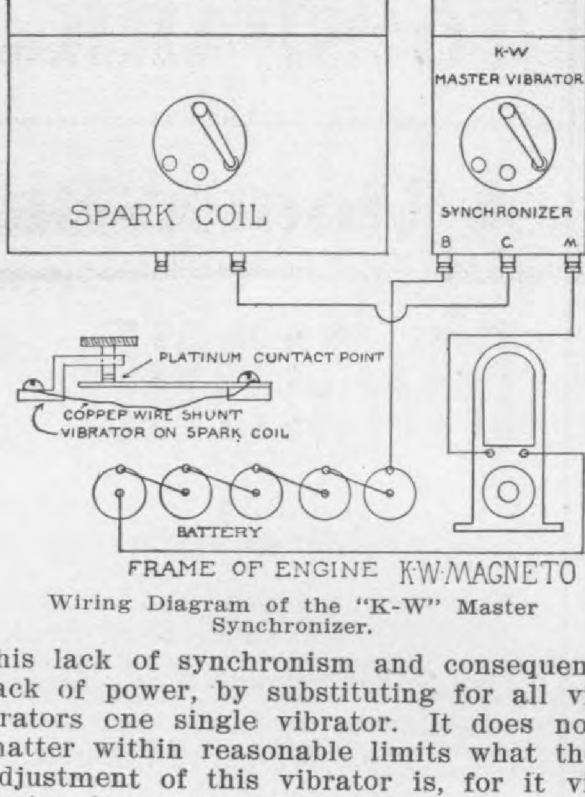


The K-W Synchronizer.

the current does not pass thru the
tors on the coil, but passes around
thru the copper wire shunt as
n.

is device is intended to eliminate the
ence in adjustment and difference in
element of the various vibrators on
spark coil. It is a well known fact
t is an impossibility to so adjust sev-
vibrators that they will act in exact-
e same interval of time after the
closes the circuit, and unless they

operating largely against each other. Th
K-W Master Vibrator entirely obviate



Wiring Diagram of the "K-W" Master Synchronizer.

this lack of synchronism and consequen
lack of power, by substituting for all vi
brators one single vibrator. It does no
matter within reasonable limits what th
adjustment of this vibrator is, for it vi
brates for every cylinder, and no matte
what its time lag is, it has to be the sam
for every cylinder, thus giving exact syn
chronism and placing the sparks in every
cylinder at exactly the same position o
piston and the same angle of crank shaft
just as would a high tension distributo
and a single coil. It is claimed to posses
a great advantage, however, over the high
tension distributor system, for it does the
synchronizing on the low tension side o
the circuit.

The following men interested in the
Pontiac Buggy Company, of Pontiac
Mich,. have formed the Oakland Motor
Car Company: E. M. Murphy, president
and general manager; A. P. Brush, vice
president and consulting engineer; M. L
Pulcher, secretary and treasurer. The
Board of Directors consists of James
Dempsey, Manistee, Mich.; R. F. Monroe
and G. J. Cram, of that city, and A. P
Brush, of Detroit, and E. M. Murphy.

At the annual meeting of the Firestone
Tire & Rubber Company at Akron, O.
August 21, plans were submitted for still
another addition to the plant, which will
increase the capacity 40 to 50 per cent
The entire board of directors was re-

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Eighth Annual Automobile Show

of the Automobile Club of America

Participated in by the American Motor Car Manufacturers' Association and the Motor and Accessory Manufacturers, Inc.

NEW YORK CITY

October 24th to 31st, 1907

Grand Central Palace

Lexington Ave. & 43rd St.

OPEN TO ALL AMERICAN AND FOREIGN MANUFACTURERS

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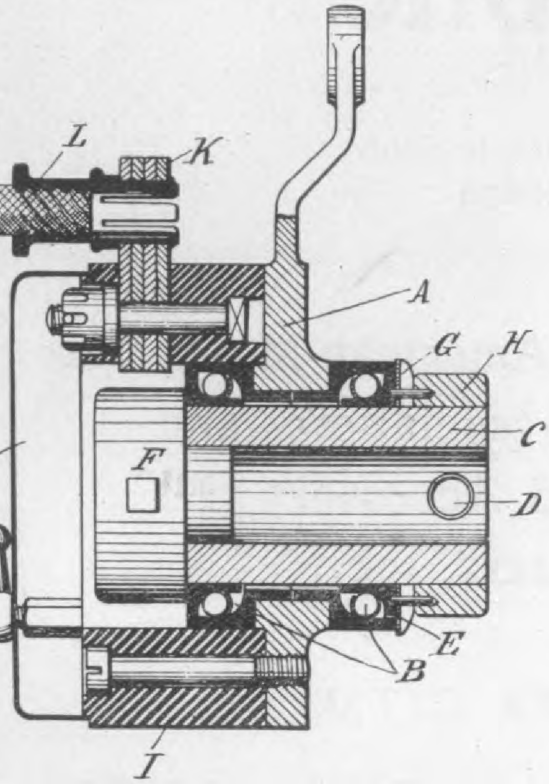
improved ball-bearing timer has placed on the market for 1908 by & Company, of New York. The ball-ngs are self-adjusting by means of a al spring G (see illustration), which s the cone E, which is an accurate g fit, in against the balls, taking up motion sidewise as well as endwise, hus preventing wabbling. All parts

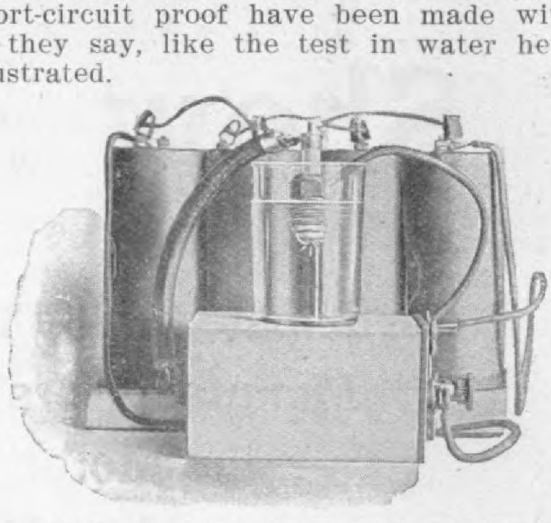


he "1908" Excellent Standard Timer.
steel base and integral advance lever ing hardened cups for ball-bearings B; tating center sleeve with contact plunger , set screw for retaining sleeve C to half-shaft; E, adjustable cone, an accurate g fit for the sleeve; F, contact plunger; ecial spring, constantly forcing cone E to up lost motion; H, collar for holding g G in place; I, hard rubber insulating carrying laminated hardened tool steel cts K; L, metal terminal; M wire; N, inum dust cap, and O, its retaining hand

nterchangeable and of best material vorkmanship. The steel base A with ral advance lever carries hardened for the ball-bearings, B; C is a rotat-leeve held to the half-time shaft e set screw D, and carries the con-plunger F, which rubs the laminated ened tool steel contacts K, which are d by the hard rubber insulating I. The flanges of the cones are close to exclude dirt, and a neat num dust cover N, held by hand O, protects the outer end. The ated contacts are firmly held by

The "Reliance" Spark Plug

The Jeffery-Dewitt Company, of Newark, N. J., is placing on the market the Reliance Spark Plug, which, while resembling in appearance many other plugs, is said to refute many commonly accepted theories. Apparently impossible demonstrations supporting the claims of the manufacturers that their plug is short-circuit proof have been made with it, they say, like the test in water here illustrated.



The "Reliance" Spark Plug Sparking in Water.

The distinctive feature of the plug is the insulated sparking point which is a hair-like platinum wire entirely protected from corrosive action in the cylinder by being baked in and brought flush with the end surface of the porcelain. The spark in leaving this minute point is concentrated and intensified to such a degree that it is said to instantly remove by the intense heat and scouring action produced by striking the surface of the insulator any matter depositing on or near the point. Absence of short-circuiting matter makes it possible to utilize the entire energy of the battery and coil to produce maximum heat in a spark, thereby insuring regular and perfect ignition. The plugs retail for $2.50 each, and are put up in metal receptacles. For the trade these are packed in neat display boxes containing a dozen each.

Mr. G. G. Westerfield, secretary of the Westerfield Motor Company, Anderson, Ind., manufacturer of gasoline engines, has been engaged by the Staver Carriage Company of Chicago, as superintendent of their automobile department.

As a convenience to their numerous clients who now tour Europe in Pierce machines, the George N. Pierce Company

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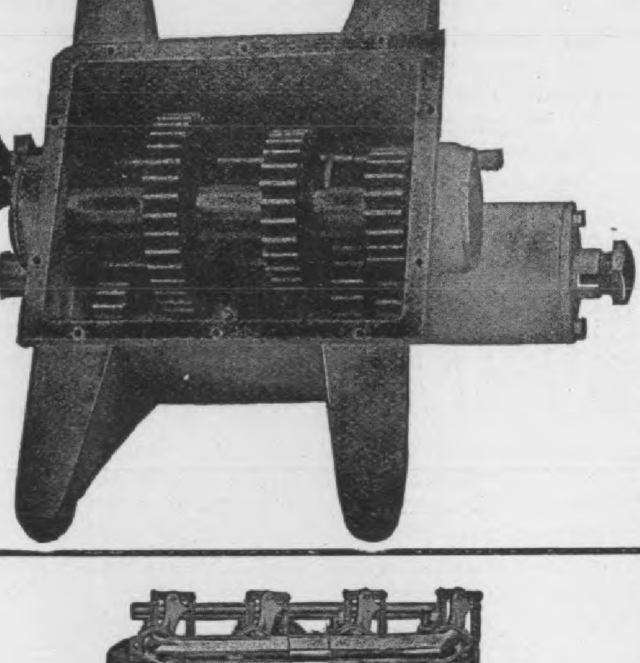
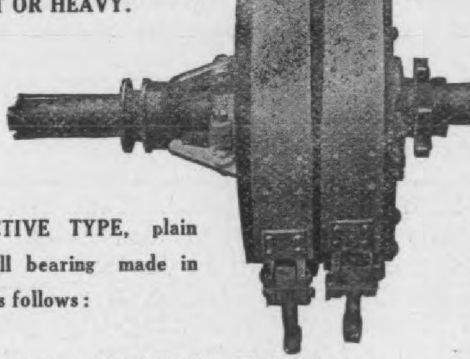


LIGHT OR HEAVY.



SELECTIVE TYPE, plain or ball bearing made in sizes as follows:

No. 3 for cars up to 2,000 lbs. Shaft Drive.
No. 3½ for any size motor up to and including fo cylinder 5x5.
No. 4 shaft drive and double chain drive, built for t largest types of pleasure and commercial cars and trucks.
PLANETARY GEARS. Made in two sizes: No. 3, for c up to 1850 lbs. No. 4, for the heaviest types of pleasure a commercial cars. Let us quote you prices.

SYRACUSE GEAR CO., - Syracuse, N.

Brennan Standard Motor

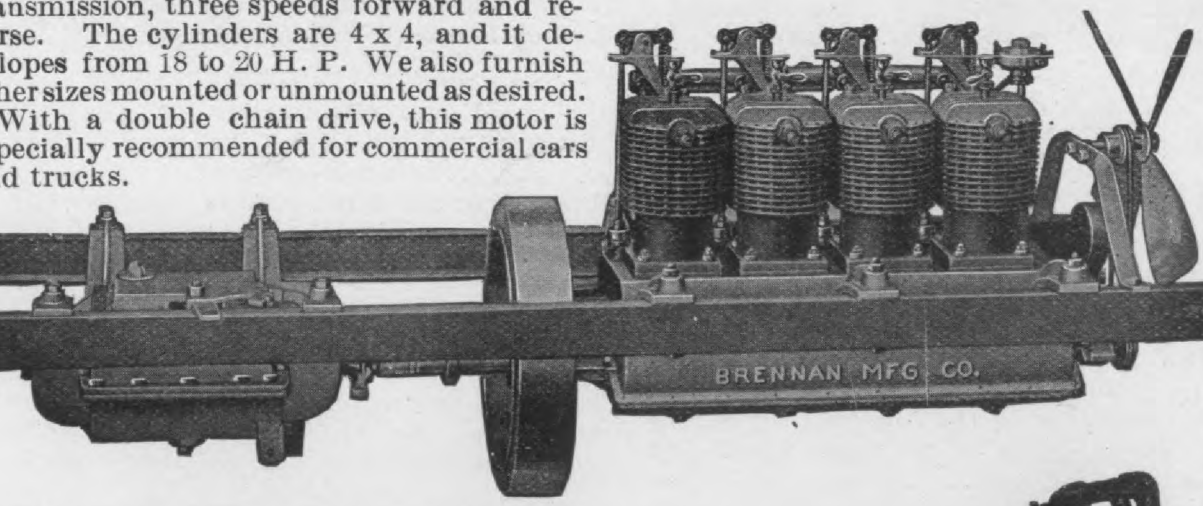
will make your new cars 50% more efficie
They have stood the test of time.

Built in the following six sizes:

4 x 4, 20 H. P.
5 x 5, 32-38 H. P.
6 x 6, 60 H. P.
$4\frac{9}{16}$ x 5, 28 H.
5½ x 6, 45 to H.
7 x 6, 90 H.

These motors are also furnished with tra mission gears,—the motors being moun on sub-frame.

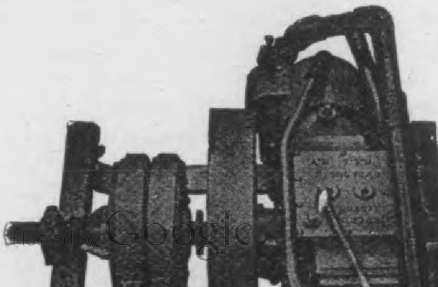
OUR CYLINDER AIR-COOLED MOTOR
Mounted on sub-frame, with sliding gear ansmission, three speeds forward and re-rse. The cylinders are 4 x 4, and it de-lopes from 18 to 20 H. P. We also furnish her sizes mounted or unmounted as desired. With a double chain drive, this motor is pecially recommended for commercial cars d trucks.



Two-Cylinder Horizontal Motors

with transmission gear, for either chain or shaft drive.

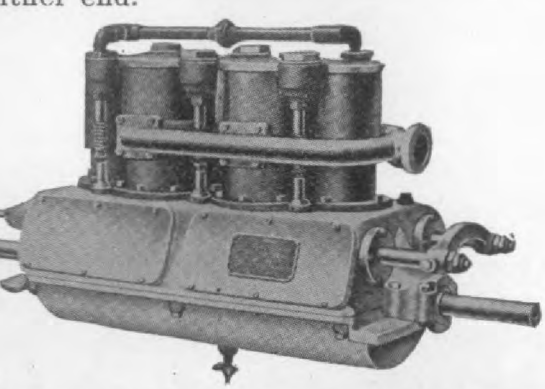
For All Standard Makes of Cars



poppet valves has been placed on
market by the Detroit Steam Engine
15 Gilman street, Detroit, Mich., and
nade in three forms. Model "C" is a
linder, 3&6x3½-inch, 20 H. P. motor;
el F a 6-cylinder, 3&6x3½-inch motor
0 H. P., and Model L a 6-cylinder 4&8
-inch 60 H. P. motor. List prices are
pectively $400, $600 and $800.

hese engines can be instantly changed
n compound to simple, a slight move-
t of the lever admitting high pressure
m to all cylinders. The same lever
rols the cut-off and reverses the en-
, which can also be used as a brake
closing the poppet valves, and thus
g the compression on the pistons.
s, it is said, is not detrimental to the
ne.

he cams are so constructed that the
m may be cut off at any point of the
ke down to three-fourths, making the
ne very economical. The engine can
installed with either end forward, as
steam can be admitted and exhausted
ither end.



cLachlin Model C, 4-cylinder, poppet valve steam engine,
3 and 6 inches; stroke, 3½ inches; develops 20 H. P.
$400.

he engine has no receiving chamber,
s, or any other spaces between the
nders to absorb the heat from the
m, which is working from the moment
nters the inlet valve of the high pres-
cylinder until it is entirely absorbed
the low pressure cylinder, if so de-
d.

he cylinders of the MacLachlin engine
cast in pairs with valve seats and
m ports integral. They are lagged
asbestos and cased with Russia iron.
lagging on the heads is covered with
vy, polished aluminum.

he aluminum crank case is in two
s with the center bearing bracket cast
he upper half, allowing the removal
he lower part without disturbing the
ings, etc. Large, removable plates
also provided on the sides.

The connecting rods are of cast ste
this model being used to prevent heat b
ing carried from the pistons to the cran
pins. They are fastened to the piston
by yokes which are screwed thru the pi
ton head and locked with a nut. Th
crank shafts are hammer forged fro
steel, and made to fit either way in th
engine. The main bearings are 3½ inche
by 1⅝ inches, and run in nickel babbi
bushings. The crank shaft and connec
ing rod bearings are of nickel babbit
made in a shell mould and interchang
able. The cams are of hardened stee
and the valve lifts have each a ¾-inc
hardened steel ball held in a socket whic
rolls over the cam and minimizes wea
When the cams are in neutral position th
valves are closed. By sliding the cam i
either direction the engine is compounde
and the steam may be cut off at any d
sired point, and a further movement
the cam in either direction will simpl
the engine, and thus practically double i
power.

This engine is designed to run withou
lubricant in the steam, as the splash i
the crank case is sufficient. On the dow
stroke the compression in the crank cas
is released thru a large check valve, bu
on the return stroke the air must com
thru any leakage space there may b
about the bearings. As the leakage woul
not be sufficient to supply the crank cas
with atmospheric pressure, there is
slight vacuum and the lubricating oil wi
not escape thru the bearings.

The Newcomb Carburetor Co., 190
Broadway, New York City, manufacture
of the Newcomb carburetor, advise u
that they are now dealing only with a
tomobile and marine engine manufactu
ers, not with users.

Mr. John D. Hodgkins, for several yea
manager of the St. Louis branch of th
Firestone Tire & Rubber Company, wi
hereafter represent that company at A
lanta, Ga. Mr. O. O. Petty has been a
pointed manager of the St. Louis office.

The Vulcan Iron Casting Works, Ne
Britain, Conn., is making all kinds of sem
steel and malleable iron castings for th
automobile trade. They do not finis
these castings, but make them up fo
manufacturers to do their own finishing

In order to avoid the confusion betwee
the names, Thomas Forty and Thoma

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Carburetor Troubles

with the

Rutenber Carburetor

It overcomes completely all the troubles common to most all carburetors. It makes a poor engine good and a good engine better and increases the power 25 per cent. It is unaffected by atmospheric conditions and is reliable always. You can be sure of reliable carburetion under all speeds.

We can prove every claim we make and urgently request every manufacturer, individual owner and dealer to write for information, which will be cheerfully furnished.

Write to-day.

E. A. Rutenber

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nue, Cleveland, O. On the front of the herewith will be noticed an L-shaped and a short pin or stud in the same.

The "Cleveland" Electric Tail Light.

n the slot and pin in this relation the rent is on and the lamp in operation. turn off the current the lamp body is ed out till the pin strikes the bottom he L, and then turned to the left. This p will burn 200 hours on two Nunser No. 16 "Acme" dry cells.

"Vesuvine"

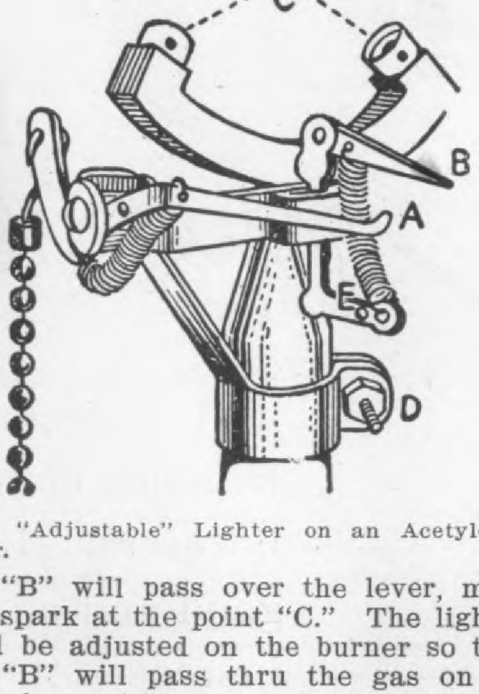
nder the name of "Vesuvine" a new minum paint has been introduced by H. Chavant & Co., chemical engineers, Jersey City, N. J.

his new paint shows the remarkable perty of standing a very high degree temperature without burning off. The kers advise us that iron plates painted n Vesuvine have been brought to a red heat, and have not suffered in the t after being subjected to this temature, far higher than reached by the nders of internal combustion or steam ines. It makes a durable coating for ines, exhaust pipes, mufflers, boilers, m pipes, radiators, etc. It is a pretive of rust and is water proof. Half cans sell at 50 cents, pints at 85 cents quarts at $1.50.

The "Adjustable" Lighter

he Adjustable Lamp Lighter Co., 16-20 rl street, Newton, Mass., has placed on market a device for lighting gas burn- This lighter is called the "adjusta- for the reason that it is adjustable to open flame gas burner. It is operated, erably, from two extra dry cells which

post. The lighter is then adjusted on th side of the burner so that when the cha is pulled the arm "A" which engages th



The "Adjustable" Lighter on an Acetylen burner.

lever "B" will pass over the lever, ma ing a spark at the point "C." The lighte should be adjusted on the burner so th lever "B" will pass thru the gas on i flat surface. After the lighter is adjuste as above the screw at point "D" is tigh ened. The electrical connection is mad thru the hole at "E," the return to th batteries from any convenient point o fittings or piping.

Turner Brass Works, of Chicago, ha completed its new factory at Sycamor Ill. It now has 40,000 square feet of floo space, and heating and lighting plants i separate buildings.

Mr. Couzens, secretary and treasure and also manager of the sales departmen of the Ford Motor Company, has returne from an extended European tour, durin which nearly all the important cities o the old world were visited in plannin more extended foreign shipments. Th company now claim to be the large American exporters, shipping regularl 24 runabouts per week to London, 16 t Berlin and 8 each to Paris, Milan an Brussels.

Barnett Drop Forging Co., Easthampto Mass., are doing some work for the aut mobile trade and are well equipt for tur ing out both light and heavy automobil forgings. They have had considerabl success in forging axles, both front an rear, which they forge solid and accurat to required dimensions. Their exper

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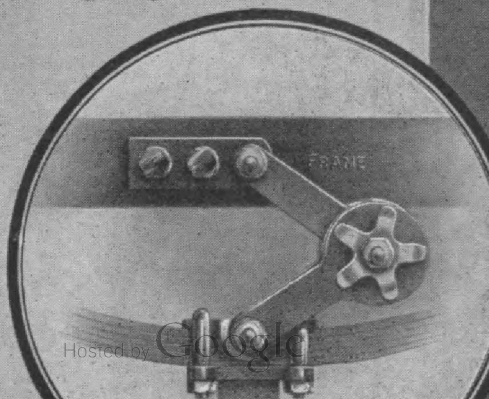
Your car needs this

On
Sharp Turns
and over
Rough Roads

THE
TRUFFAULT-HARTFORD
SHOCK ABSORBER

Is Indispensable
to Safety and Comfort

Adopted as part of equipment by seventeen prominent manufacturers.



HARTFORD SUSPENSION CO.
E. V. HARTFORD, Pres.
67 Vestry St., New York

Applications made at our Garage,
212-214 W. 88th St., N. Y.

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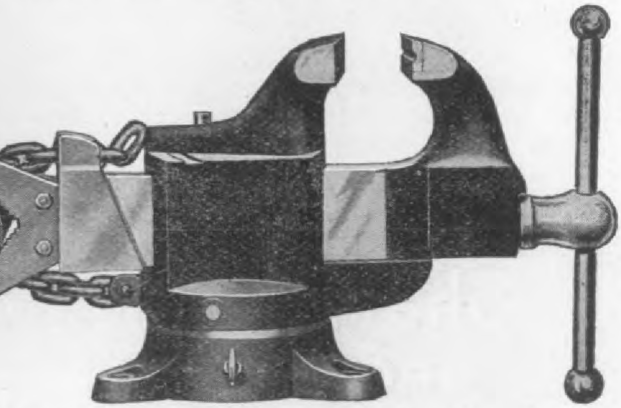
Pittsburg Automatic Vise & Tool Co., sburg, Pa., in a new type of their tsburg" Vise just placed on the mar- It is the usual custom to locate the jaw in the throat of the regular jaw, in the new Pittsburg Vise attachment rear of the draw bar has been utilized ead of the throat of the vise, and the arrangement is said to eliminate sev- objections to the old plan.

the end of the draw bar is fitted a e-like casting, to which are attached pipe jaws made of a specially mixt steel, hammered, forged and oil tem-



tsburg" Vise with New Pipe Attachment.

d. The jaws are placed close to- er. A small lug, screwed in the rear he vise directly under the slide bar, otted so as to permit the reception of link of a chain.

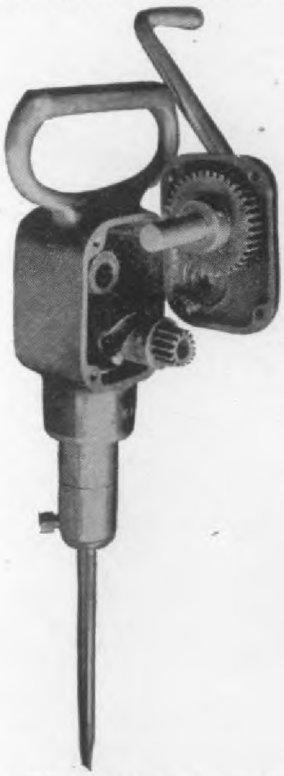
ith the casting in position on the rear e vise, and one end of the chain made to the lug by means of a small pin, pipe is placed in the jaws and the n thrown around it, a link being t into the lug on the top of the ng. Then with both ends of the chain firm, a half turn of the main screw he vise throws the draw bar back- ls, drawing the chain tightly around pipe and, securely locking it against possible rotation or movement.

all the "Pittsburg" Vises are auto- c in movement, the swivel in the base he vise is also locked automatically n the pipe is locked. If the work is red to be held on the outside of the h, the screw is loosened and the vise eled around, thus locking both the and the vise.

e attachment can be left in place as as wanted, thus not interfering with other jaws of the tool, or it can be ntly removed by a pull of the pin.

---

a spool, the whole so arranged as to giv an alternating motion to the screw-drive blade portion which enters the slot in th valve top. This alternating motion cause the valve to be turned one-quarter revolu tion to the right and then one-quarter rev olution to the left. Each revolution o



The "Jef" Valve Grinder.

the handle gives four revolutions of th pinion with its cylinder, and consequentl four repetitions of the back and forwar valve grinding movement. The handl can be given any desired speed. In orde to ease the operation of the grinder a bal thrust bearing is used beneath the disk The entire working parts are lubricate by a grease packing, and the device re quires no attention during an entire sea son.

The entire outputs of the America Motor Car Company, and the Overlan Automobile Company, both of Indian apolis, Ind., will be marketed by Th American Motor Sales Company, recentl organized by J. N. Willys, of Elmira, N Y., and others, and located at Eightiet street and Broadway, New York City.

Hotchkin Manufacturing Co., 1256 Mich igan avenue, Chicago, is continuing th Hotchkin Anti-Jolt device without chang for 1908, having found it perfectly satis factory in the past. A new method of at taching, however, will be employed fo

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BOSCH IGNITION.

is without question the most perfect ignition system produced in the World. The leading automobile manufacturers of America, France, Italy, Germany, Switzerland and Belgium equip their cars with Bosch Magnetos. Their unqualified indorsement and continued use of the Bosch Magnetos is a guarantee of their worth.

In all of the world's great automobile races the Bosch Magneto has proved its superiority. The result of the Grand Prix Race Shows that out of 38 cars entered 28 were equipped with Bosch Magnetos including the winner (Fiat) the second car (Renault) the third (Brasier) This fact demonstrates beyond a doubt that the best ignition system is the Bosch Ignition System. Be sure your 1908 car is equipped with a Bosch Magneto.

Warning Against Imitation

Possibly the highest compliment that could be paid to the Bosch Magneto is its imitation by unscrupulous manufacturers who are endeavoring to copy the Bosch Type "D 4" Magneto. This has been so cleverly done that anyone unfamiliar with the machine would fail to note the difference.

See that the word "BOSCH" is stamped on the Magneto when purchasing.

ROBERT BOSCH,

NEW YORK, Inc.,

160 West 56th St.

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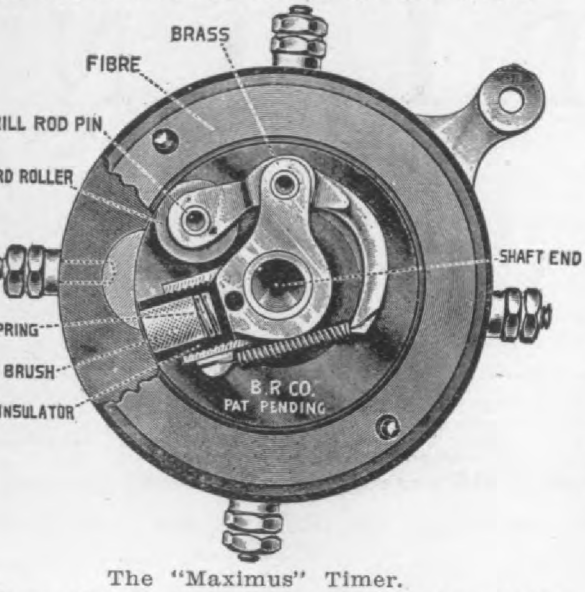
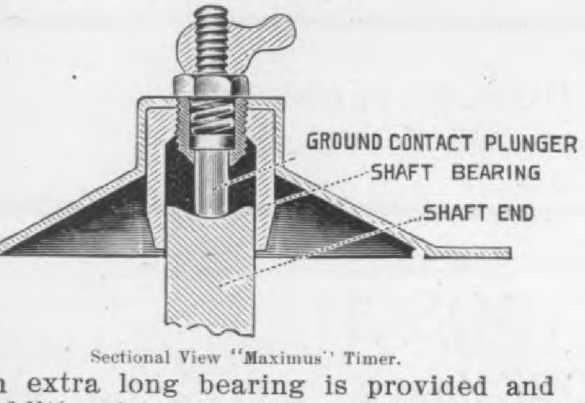
commutator with improved features
ed to overcome the objections to this
e. A gauze brush enclosed in a fiber
is prest lightly against the track or
tact surface on which the roller re-
ves, the object of this being to scrape
wipe away any dirt, worn particles or
k deposit accumulated on the track.



The "Maximus" Timer.

hey claim that the roughening of the
ments is overcome by arc deposit being
ped away at every revolution, and that
h shorter contacts can be employed
account of the positive contact made
a clean surface, reducing battery con-
ption.

n extra large roller constructed of drill
is used to reduce wear on the roller
Another exclusive feature is the
nd contact plunger in the cap or
r, fitted with a terminal thru which
ground wire from the battery is fast-
l, providing a clean direct path for
return current, and contributing the
n to the regular firing.



Sectional View "Maximus" Timer.

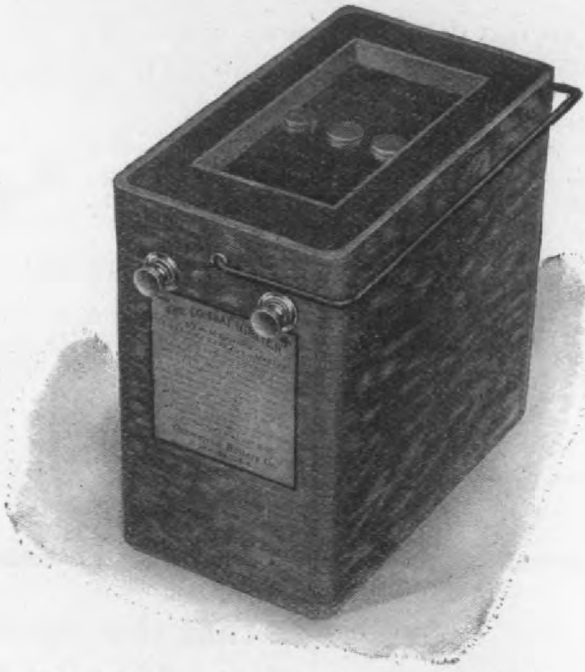
n extra long bearing is provided and
dditional bearing is prest into the cap
over, into which the shaft is extend-
This bearing also serves to hold the

intervals, assuring exact timing. Anoth
feature is the exposed fiber. Heretofo
this has been prest into the shell or bod
and it was found that by accumulatin
grease and oil between the fiber and th
shell the fiber was inclined to bulge o
swell.

The "Combat Igniter" Sparking Batter

We show herewith a 6-volt 60-amper
hour Combat Igniter, especially designe
as a sparking battery for automobile
motor boats, stationary engines, etc.
is the product of the Commercial Sparl
ing Battery Co., 204-208 Michigan stree
Chicago, Ill.

A special feature claimed for the ba
tery is a one-piece heavy hard rubbe
cover (patented) constructed so as to forn
a well to hold any of the electrolyte tha
may get on the top when replenishing o
charging. The handle is made of sprin
wire, and is detachable. All the conne
tions inside are very strong, being cas



The "Combat Igniter" Sparking Battery.

and completed at the factory. The ce
is enclosed in a neat, quartered oak bo
with instructions printed on a transfe
just underneath the terminals in fron
The battery is claimed not to slop, as no
a drop of fluid can get out of cells excep
thru small apertures in the vent plug
and then only when the box is turne
completely over. There is no metal abou
the battery that acid can reach or co

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The Complete Victory of

Goodrich Tires

The Successful Choice of Glidden Tourists

From the stand point of results the sweeping victory of Goodrich Tires in the 1907 Glidden contest is the most complete and convincing set of tire evidence now offered to prove tire value.

The start showed Goodrich Tire popularity.

More cars equipped with Goodrich Tires than any other make and equalling the combined number of all other makes.

The finish showed Goodrich Tire worth—actual, tangible road evidence of mile in and mile out wearableness verified by the fact that every trophy winning car in both the Glidden and Hower contests were successfully carried from start to finish on Goodrich Tires, also **not a single car in the contest equipped with Goodrich Tires was penalized for tire troubles.**

The B. F. Goodrich Company

AKRON, OHIO, U. S. A.

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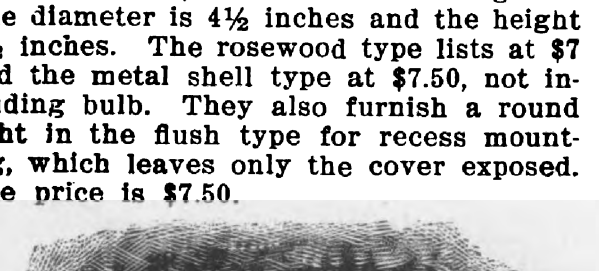
venty-seventh street, New York City. ie is a round type with metal shell in ace of the usual rosewood base. The

orage Battery Supply Company's New Style Dome Light, Round Type.

ell and rim are removable in one piece, ving a lock joint to hold it in place. e bulb is held by spring contacts at the ds. This type is also furnished with sewood base, the cover screwing on. e diameter is 4½ inches and the height inches. The rosewood type lists at $7 d the metal shell type at $7.50, not in- ding bulb. They also furnish a round ht in the flush type for recess mount- , which leaves only the cover exposed. e price is $7.50.



orage Battery Supply Company's New Style Dome Light, Oval Type.

Their new oval light is furnished only recess mounting, and is 4 inches long 2¼ inches wide by ¾ inch deep. Price $10 without bulb. Bulbs, 4, 6 or 8 volt es list at 60 cents each.

The fixtures here referred to have silver- ted reflectors. Rims may be silver

One of these, Style 299, is intended m for warmth while in the car; but other style 297, is of the legging ty fastened on with straps and buckles, a fits more snugly, so that it would be c venient while the user is on or off t car.

The "C and F" Auto Boot Style 297

Style 299 is made of kid with wool l ing and top. The sole and insole are oak leather. The height is 9 inch These boots are made in men's sizes fr 7 to 12, and in boy's sizes from 1 to 6

Style 297 is 14 inches high, and ma in the same sizes. The materials us are practically the same as in Style 2 Hand work exclusively is employed making these boots.

Frank G. Dwight, Jr., for the past t years with the Knox Automobile Co pany, has just taken charge of the Phi delphia office of the Jones Speedomet Company.

W. H. Conant, formerly manager the Vehicle Battery Department of t Gould Storage Battery Company, has cepted the position of general manager the Pittsburg Motor Vehicle Company, Pittsburg, Pa.

A. R. Davis has been appointed sec tary and general manager of the Garfo Co., whose offices will hereafter be in t Whitney Power Block, on East Twel

HE VERY LAST DROP IS AS GOOD AS THE FIRST

"PANHARD" OIL

ver varies. It is scientifically compounded and accurately prepared. It
eognized throughout the automobile and motor boat trade as the **STANDAR**
for use in the cylinders.

It develops and maintains the highest efficiency of the engine. Don't cr
e the motive power of your car by using some cheap oil. This is fa
onomy. Demand **"PANHARD"**—the oil that will not char.

GEO. A. HAWS

72 Pine Street

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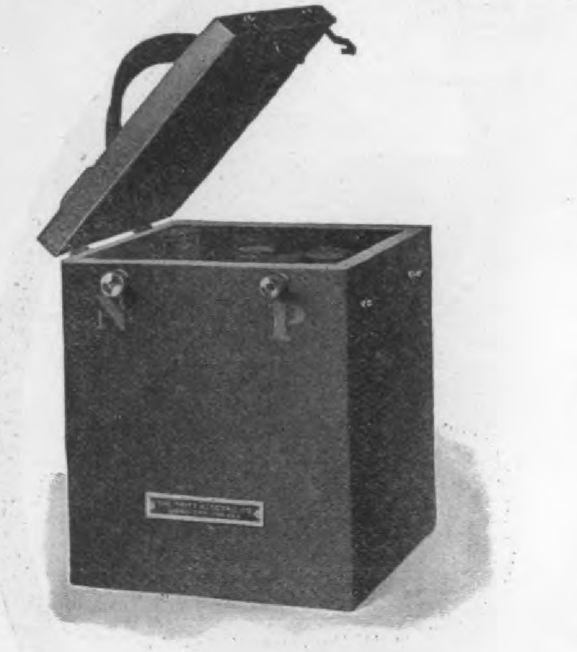
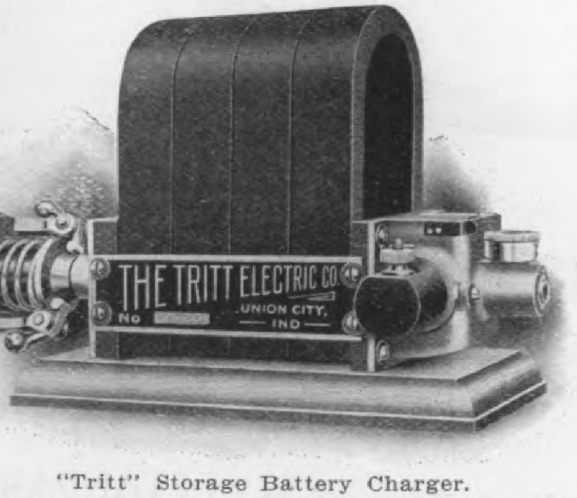
e battery charger especially designed to used in conjunction with each other an automobile or launch ignition sys-



The "Tritt" Ignition Battery.

n. The battery jars are of hard rub-, and are reinforced at necessary nts. A special composition, impervious heat and cold, is used in setting the ls. One side of each grid in each cell covered with a lead plate which holds



"Tritt" Storage Battery Charger.

active material in position despite the ing of traveling over rough roads. The tes are insulated from each other by d rubber separators, and the elements connected with straps of lead alloy high conductivity and great strength. solder is used.

moulded hard rubber cover is fitted each jar and a large rubber vent plug,

high. Price is $12.

The new charger the same company offering, is, briefly, one of their Vim Ma netos used in conjunction with an au matic circuit breaker and a governing d vice. When it speeds up to a pre-dete mined point the fingers of the governi balls engage a plunger, which in tu closes the circuit between the "Charge and the Storage Battery, thus causing t current from the "Charger" to dischar into the Storage Battery. This operati continues until the motor slows down stops when a strong spring returns t plunger to its normal position and ope the circuit between the "Charger" a the battery, thus preventing the batte from losing its current. The action of t circuit breaker is thoroly automatic, a does not depend upon electrical ener for operation.

The machine can be run either by fr tion from the flywheel or by pulley driv by a round or flat belt.

The battery charger lists at $20, but t charger and storage battery are sold t gether for $27.50. The charger is 11 inches long, 7½ inches high, 5 inches wi and weighs 18 pounds.

"Speedwell" 10 H P. Motor

In the advertisement of A. H. Yocom Co., of Reading, Pa., on page 286 of o September number we wrongly used t cut of their 20 H. P. "Speedwell" in co nection with information regarding the H. P. size. The 10 H. P. motor is illu trated in the reading pages of this issu and readers are referred to the illustr tion, which appears on page 180, for correct impression of the appearance the 10 H. P. size.

Carl H. Page has resigned as manag of the New York branch of the Whi Company, to take effect October 1, a George W. Bennett has been appoint his successor.

The Garford Motor Car Company, o ganized by the Garford Company, who fo merly manufactured chassis for Raini and Cleveland cars, have decided to ma ket a complete Garford car as such.

The White Company has recently co pleted the new home for White cars Boston. The building is the largest Boston devoted entirely to one sing make of car. It is located at 130 Ne

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Pleasure Cars

A TIRE IS JUST AS GOOD AS IT IS made to be—no better. That's the reason underlying the superior service given by

"Firestone" TIRES

—it's the superiority of fine up-river Para rubber over the cheaper compounded article.

—the superiority of an organization of exclusive tire experts over general rubber goods makers.

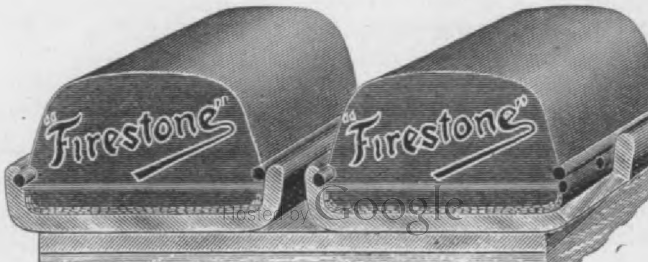
—examine and compare these tires; test one or two on your car beside other makes.

The largest exclusive rubber tire makers in America.

FIRESTONE TIRE & RUBBER CO.

AKRON, OHIO

New York **Boston** **Philadelphia** **Chicago** **St. Louis**
Detroit **Buffalo** **Pittsburg**



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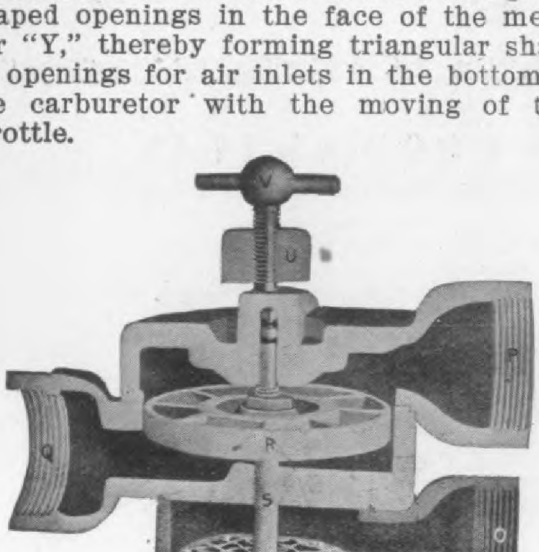
lown in section, the illustration being uitably lettered to make clear the de-cription which follows:

The gasoline enters at "A," and is then ltered thru a gauze "C," after which it oes thru the needle valve "D."

The throttle plate "J" contains four penings (not shown) in its surface, corre-ponding in shape to the equilateral trian-es, which, upon the throttle lever "K" eing moved, causes these triangular penings to move across other rectangular haped openings in the face of the mem-er "Y," thereby forming triangular shap-d openings for air inlets in the bottom of e carburetor with the moving of the rottle.



Sectional View "Scientific" Carburetor. Lettering fully explained in text.

The needle valve "D" is connected to e plate "J" by the pinion fastened to its ter end meshing into the rack con-ined by this plate. As the valve "D" is readed into the member "Y," moving e plate "J" causes the needle point of)" to unseat in direct proportion to the ening of the throttle; consequently the nount of gasoline allowed to enter is al-ays directly proportional to the amount air admitted. Since the cut shown was ade a method has been adopted where-the length of the arc thru which the edle valve revolves can be accurately justed to engines differing as to bore d stroke.

At the opening of the inlet valve of the

against the hot plate of the member leaving the carburetor thru the pipe nected at "O," a perfectly proportio and thoroly homogenous gas, and no mist, it is claimed by the makers.

The exhaust pipe from the engine connected at "P," and upon the open of the exhaust valve the rapidly mov exhaust gases cause the ball bearing bine wheel "R" to revolve at a high ve ity, and this wheel, retaining its mom tum, after the first exhaust pressure sides, continues to draw the burned ga from the cylinder, thus securing a m complete scavenging of the engine.

The five main members of the carbu tor body are clamped together by crab "U," thus making possible an alm instant disassemblement, if for any ca it is ever found necessary, and furth makes possible the easy setting of members "P," "O" and "Q" in any di tion which may be most convenient the attachment of the pipes.

"De Luxe" Pillars for "Alco" Burn

The American Lava Tip Co., Cl tanooga, Tenn., has just brought ou new type of pillar for acetylene burn The new pillar is called the "De Lux Its most important feature is the he gonal base which permits of screwing pillar on by means of a small S-wrench stead of a plier which must be used

Alco Burner in the New "De Luxe" Pillar

round based pillars, often damaging th The "De Luxe" pillar is also exceptiona strong, being turned from a solid br rod, and is threaded interiorally at upper end as well as at the base, burner tip being also threaded so that

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Reliance

SPARK PLUGS

Patented in France and Belgium. U. S. and other Foreign Patents Pending

Produces A More Intense Spark Than Any Other Plug

Requires Less Battery Power Than Any Other Plug

IF A PLUG WILL SPARK IN WATER IT IS

ABSOLUTELY INFALLIBLE

For Soot, Oil, Carbon or Their Combinations Cannot Be Compared With Water as Short-Circuiting Matter.

The **RELIANCE SPARK PLUG** is the result of a newly discovered phenomenal action of the electric spark when discharging from a minute platinum electrode embedded in and brought flush with the face of the insulating block, thereby concentrating and intensifying the spark so it not only destroys all short-circuiting matter, but prevents its deposit, without interrupting its normal function of igniting the gases or charges. No valves, moving parts or dinky arrangements are used, the action being purely electrical.

DON'T FAIL TO SEE DEMONSTRATION AT N. Y. SHOWS

Space G, 3d Floor, Grand Central Palace **Space 205 Madison Square Garden**

PRICE, $2.50 EACH, POSTPAID

½ inch, Metric, Autocar, or Association Thread.

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JEFFERY DEWITT COMPANY

vely to the manufacture of lenses and ass parts of automobile lamps and archlights. Back of this factory is not ly the extended experience and knowl-ge of the proprietors, but the experi-ce of earlier generations of the Matisse nily who for over 50 years have made ses in France, and were early recog-zed by the French Government as ex-rts in this line. Carlo and Albert Ma-se, who are respectively president and e-president of the Matisse Lens Manu-cturing Co., have for many years been entified with the lens and mirror indus-es in this country, and this experience ggested to them the use of mirror lens lectors for automobile lamps.

The glass used in Matisse mirrors is de under the personal supervision of the tisse brothers to insure sufficient ten-e strength and correct optical qualities. is prest in molds and annealed to make capable of withstanding great heat and nperature changes.

The first process consists in smoothing d shaping the rough glass as it comes est from the foundry. This is done by nd grinding with steel and abrasive terial, and is continued with various grees of the finest Turkish emery. The s is then ready for the pumice wheels varying quality, which effect a clean nsparent surface on both sides of the s.

The next process is the polishing, first felt wheels, then on patent machines, h the finest imported rouge. This is icate work, and must be handled by perts to maintain an absolutely smooth face on each side of the lens, espe-lly on the convex side, for the silver cess to follow.

The lens is then washed with distilled ter to efface all impurities, and is then dy for the silver or reflective finish. e quality of the silver is the most es-tial factor in the entire work, as it is this medium alone that reflection of a manent nature is due.

After the silver bath the lenses are nged into a copper solution which as-s in retaining the silver; they then s thru a final solution and are painted h a special preparation.

The lenses are then placed on a special ussing apparatus to determine the ex-focus, are then trade marked, labelled become identified as the finished pro-t.

The special feature for the coming sea-

tread, which differs in construction fr the 1907 tread, and is said to be gree superior to the latter.

It is made of three thicknesses chrome leather full across, thru wh closely-set rivets with hat-shaped he

Fig. 1. Woodworth 1908 Tire Tread.

are carried, turned and clinched. T flange or brim of each rivet head prese an increased area to the surface of leather, insuring it greater protection a longer life.

All of the tread that can be injured the steel covering, etc., as shown in F 1, to shield it from punctures, cuts a abrasions.

By this new form and manner of c struction the makers claim to have creased the mileage more than 50 cent., as they have proved by actual t outs.

Fig. 2. Woodworth 1908 Tire Tread.

To protect the sides of the tread fr being scuffed and worn when run in r or against curbstones or street car trac a special Woodworth Tread is made w broad oval-headed steel rivets set cl together to take the wear and shield t tire, as illustrated in Fig. 2.

The outside strip formerly used now tends the full width. The new buckle a strap are stronger, more durable and ne er in appearance than the old.

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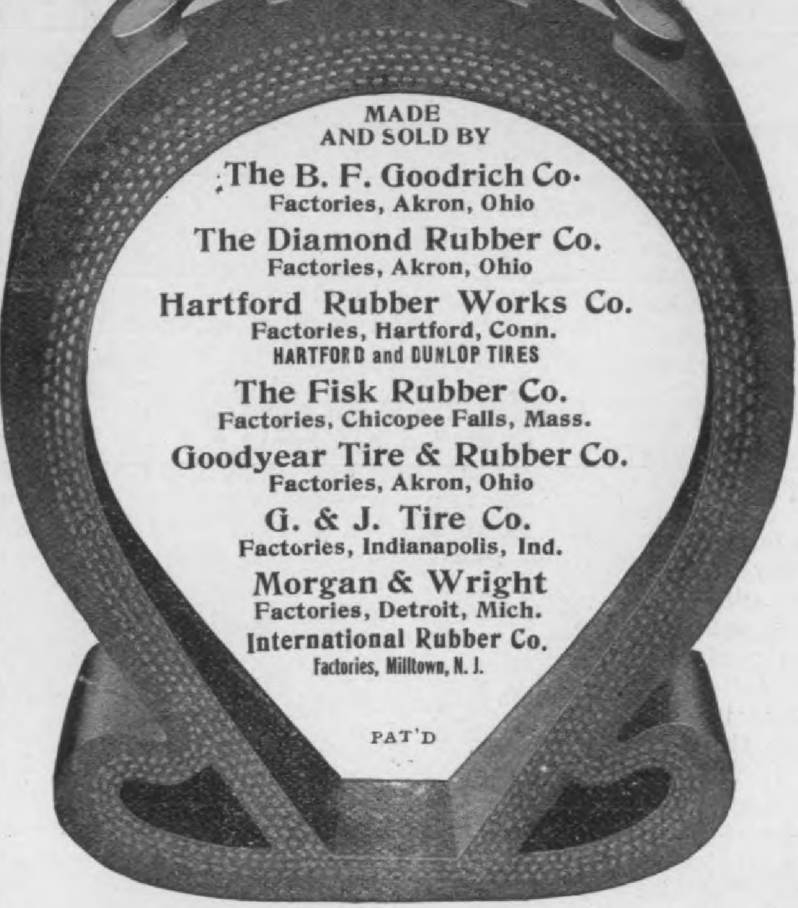

Won't Slip Tread Tires

1

They hold their own; they hold the road,
And at no curve need they be slowed;
Upon the earth they keep their grip—
And Bailey Tread Tires won't slip.

2

They're Tires that hold the Right O' Way,
They've come to go—and come to "stay,"
And while you go the merriest clip
The Bailey Tread Tires won't slip.

3

They're "knobby" Tires that stand all strain,
The "Rubber Studs" are safe and sane;
The stretch of ice you need not skip
For Bailey Tread Tires won't slip.

4

For Auto, Auto-Bi or Bike
They lead in speed on track and pike,
They neither ravel, rend nor rip,
And Bailey Tread Tires won't slip.

5

They "corner" all the turns with ease;
No "Heart in mouth" if you have these;
No sudden short-turn brings a tip
For Bailey Tread Tires won't slip.

6

They are not skidders that **skidoo;**
All roads are pleasure roads to you;
The "Won't Slip" Tread, says every lip,
Is rightly named "Won't Slip." (A. W. B.)

The **world wide** popularity of the Bailey "Won't Slip" Tread Tire has been made entirely on its merits. The "mouth to mouth" advertising by those who **ride** them and who have found in them a tire which proves its **reliability, durability** and **superiority** over **any** and all anti-skid tire tread constructions has made it impossible for **8** of the largest tire manufacturers in the United States to supply the demand for Automobiles, motor cycles and bicycle tires with Bailey Tread. There is no **metal** in the Bailey Tread to **heat** the tire, **pull** loose from the rubber or **tear** the **road bed.** The **rubber studs** of the Bailey Tread are the **true** principle that give **perfect traction** and prevent **skidding.** They are to the Automobile what the **rudder** is to the **ship.**

N. B.—The extra cost of the Bailey Tread Tires on the List more than smooth of same make, is 2½ and 3 in., $1.50 each; 3½ in., $2.00 each; 4 in., $2.50 4½ in., $3.00 each; 5 in., $3.75 each.

N. B.—Now ready: Bailey's "Won't Slip" Tread Bands for covering all makes and sizes of smooth, new or partly worn tires at nominal cost by Bailey Tire Manufacturers. Write us for descriptive booklet.

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C. J. BAILEY & CO.

Dealers' Department

The Halsey Automobile Company of St. Louis

The Halsey Automobile Company, of 3908-18 Olive street, St. Louis, Mo., is acting as agent for the Packard, Stevens-Duryea, Buick and Franklin cars, under the management of O. L. Halsey, president; H. H. Walker, secretary, and J. D. Perry Lewis, treasurer.

In response to an inquiry regarding advertising this company realizes the use of advertising mediums for securing new business, placing the "Automobile Trade Journal" first, and then newspapers. The company's success is due largely to the good results the customers have obtained from their cars, and it exerts a great deal of energy toward this end. The company uses the card index system in following up prospective buyers until a sale is consummated. After a sale is made the customers are kept in touch with from time to time. The company does not make a specialty of trading in second-hand cars, except to sell same on a 10 per cent. basis.

It is the belief of this concern that the principal trouble with agents in selling cars is first, cutting prices; second, trading; third, poor attention to customers after they have sold them. In regard to the precepts required to be followed by salesmen this concern demands that the salesmen deal in an absolutely straightforward and honest way, making no statements that can not be backed up, and also that they look after their customers after they have sold them. The salesmen are employed on a salary and commission.

A fully equipt garage for care and maintenance of cars is provided. The repair room is also well equipt with lathes, drill presses, etc.

Some experience has been had with grafting chauffeurs, but when found out they are "nipt in the bud."

Trading of Second-Hand Cars

As a rule most buyers of second-hand cars are as careful in their selection as those placing orders for the latest models, and are generally patient, and will wait for the car they want. The disposition of all the machines that have had but a year's use and possibly less, particularly at this stage of the industry, when the depreciation in value is not great, has become a wonder to the general public. But upon investigation among the big dealers an interesting condition exists, in that not one of them has any hesitation in taking in trade a car of standard make from a purchaser of the make they handle. But where do they go? One dealer, for instance, whose place is located on Broadway, New York, has a waiting list of buyers for second-hand cars of just such and such finish and equipment, and the minute he gets one of them off it goes. He has instituted an entirely new plan of dealing with them. On the third floor of his establishment he has a special room for overhauling and repainting them, and not one can leave his place until it shows the same efficiency as it had practically when new.

Retail Notes

The Diamond Rubber Company, of Akron, O., has opened a branch at 1207-09 Main street, Los Angeles, Cal., in charge of F. O. Nelson.

R. M. Owen & Company, of New York, in order to secure more convenient and commodious sales quarters, has leased the property at 1759 Broadway, which was formerly occupied by Smith & Mabley.

The G & J Tire Company has opened a branch for the sale of its product in Buffalo, N. Y., at 912 Main street, under the management of Mr. Frank Berrodin, doing away with the agency at 9 West Huron street.

The Collection Department of the New York Automobile Trade Association, recently established, is proving very successful. The association now has a membership of sixty-one local dealers and garage owners, making it the largest association of its kind in existence.

Manager John L. Snow, of the New England Peerless Company, at Boston, Mass., has kept a polished show chassis in his salesrooms on Columbus avenue all thru the season, and customers have taken much pleasure in studying the mechanism there revealed. Now that the season for closed cars is approaching Manager Snow has placed in his salesrooms a limousine body in the rough. Alongside is a finished body of similar style to permit comparisons. The rough body shows many points which are concealed when the body is finished. One of the cushions have been ript open, showing the method of putting in springs and curled hair. This, with samples of broadcloth and leather coverings, makes a complete exhibit of the Peerless quality in upholstery.

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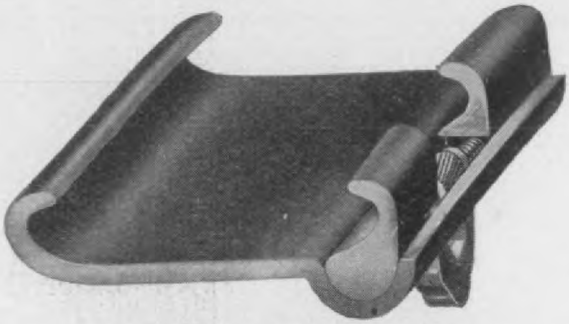
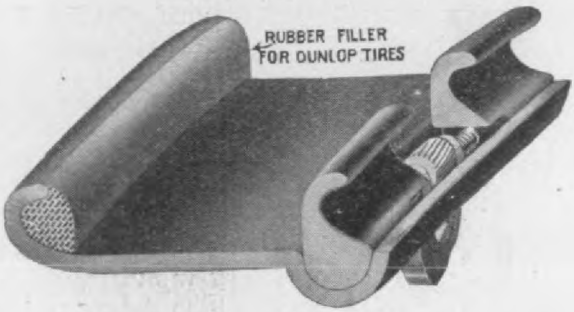
The improved Morgan & Wright

For Morgan & Wright

and all other tires.



For Clincher



For Dunlop

This unique rim is easily the most important rim achieve since the advent of the automobile. It simplifies the use of va types of tires as no other rim pretends to do. It is as valuable a tribution to the industry as are tires of the quality of Morg Wright's.

Bear in mind that this rim will accomodate every make of Clincher or Dunlop tires, as well as every type of mechanically fastened tires but one. Standard measurements thruout, including inside diameter. Solid bead.

MORGAN & WRIGHT, Detr

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Commercial Motor Car Department

Experience of Commercial Motor Car Users

Laundry Co. Finds Motor Car Delivery Pays

Troy Steam Laundry, Auburn, N. Y., uses a 10 H. P. Cadillac Model M in collecting and delivering laundry. The loads average 300 pounds and the car makes about ten trips per day, totaling about 25 miles per day. Fuel expense averages $5.50 per month, lubricating oil, 50 cents and repairs $3. This machine, while costing more than a horse outfit, does about twice the work, and while this concern formerly used but one horse and wagon (total cost with harness, $395), it covered only about 15 miles per day, and two teams would be required to do the work the $1100 Cadillac machine is doing.

They are of the opinion that the car should, for their purposes, be of about 15 H. P. and geared low, so that its maximum speed would be about 15 miles per hour. Easy springs, 32-inch wheels, and solid tires are also recommended by this concern.

They find that drivers are too anxious to drive fast and believe that with a 15-mile-an-hour car solid tires could be successfully used. They had solid tires fitted to the rear wheels and have found that they are perfectly satisfactory at speeds at which such a car should rightly be run.

They calculate depreciation at 25 per cent. per annum, which is 5 per cent. more than for horse-drawn outfits.

Simpler and More Durable Cars Needed

According to the report of the experience of the Chicago office of the Standard Oil Co., commercial cars should have more durable tires, fewer and simpler mechanical parts and greater strength in vital parts.

They use two machines, a 14 H. P. Packard truck of 2 tons capacity and a 45 H. P. Biddle-Murray truck of 3 tons capacity. These cars operate in a radius of 5 miles and make 4 trips per day; total mileage of 25-30. The Packard car cost $2750 and the Biddle-Murray $3500. Ten horses and five 2-ton trucks were formerly used in this work, but each covered only about half as much ground as each motor car now covers, making but 2 or 3 trips per day. The horse-drawn outfits cost about $610 each.

The operating expense includes $30 per month for gasoline per car, $4 for lubricating oil, $50 for repairs and $75 for the operator. This is almost as low as the expense for the maintenance of the horse teams, which included $14 per month for care and feed of each horse, $2 for shoeing, $4 for repairs to each wagon and $60 per month driver's wages.

Like others, they have found that a good, careful, intelligent driver is essential to the success of a motor car in business use.

Fire Chief Pleased with Stanley Runabout

Chas. S. Allen, chief of the Trenton, N. J., Fire Department, writes under date of August 16 that he is much pleased with the service rendered by a Stanley steam runabout which he placed in service April 25 last. He uses a Model E X, 10 H. P. car, which weighs 1000 pounds and carries as high as 3 men to the fires. The mileage covered, of course, varies greatly each day, but probably averages 5 miles. The car cost $850 and has required practically no repairs so far. Fuel expense averages $6 per month and oil $1.

The horse formerly used cost about $14 per month for care and feed and $6 per month for shoeing. The value of the outfit was $560, and, of course, the same priced man runs the car that formerly drove the horse. The time saved in arriving at a fire is a great advantage, enabling the department to act more promptly and resulting in the saving of both lives and property.

Motor Car in the Auto Supply Business

Riverside (Cal.) Auto Transfer Co. use a 45 H. P. 1906 Stearns touring car in delivering automobile supplies. It averages 3 trips per day and operates in a territory of 100 miles radius. The car cost $4500, and a $100 per month operator with a $60 per month helper are employed. Repairs cost $50 per month; gasoline $35, and lubricating oil $4. This service is, of course, not a fair test of motor cars in business use, as the use of a high-priced touring car made for luxury and speed cannot, of course, be compared to a commercial car on the score of economy.

Five auto delivery trucks are now in use for the delivery of books to the sub-stations of the Chicago Public Library.

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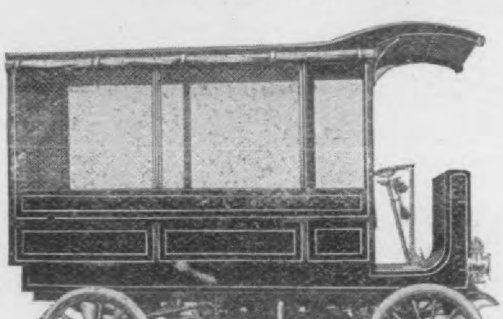
The Rapid
MOTOR VEHICLE CO.

PONTIAC, MICH.

There is a Rapid Car For every line of business.

D 21 Without Top.



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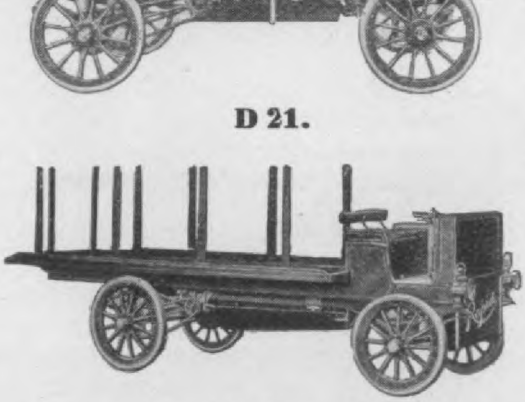

D 62.

In our factory, the largest in the wor devoted exclusively to the making of gasoli commercial power wagons, we build over 2 standard models adapted to every line of bu ness.

Light delivery wagons, heavy trucks, ba gage wagons, hotel busses, hospital ambulanc chemical fire engines, sight-seeing cars of m dium and large capacity, are a few of our ever day production. We also design many ca to meet the special requirements of our cust mers. Prices range from $1600 to $400 Every car guaranteed.

Rapid cars, equipped with famous Rap two-cylinder motor, are not an experime Hundreds are in practical use in every part the country, hauling heavy loads, on every ki of roads. Write me, and I will tell you ho agents can make money selling Rapid Mot Cars. Illustrated catalog sent free.

B. M. HENRY, Sales Manager.

Rapid Motor Vehicle Co.

PONTIAC, MICH.

See our exhibit at t N. Y. Automobile Show

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aced under the driver's seat and raised oards at the front, where it does not ere with the size of the carrying plat- yet is accessible.

forces it against the engine. A carburetor of the float feed type is used. The cylinders and pistons are made of a composition metal and are finished to gage by grinding.

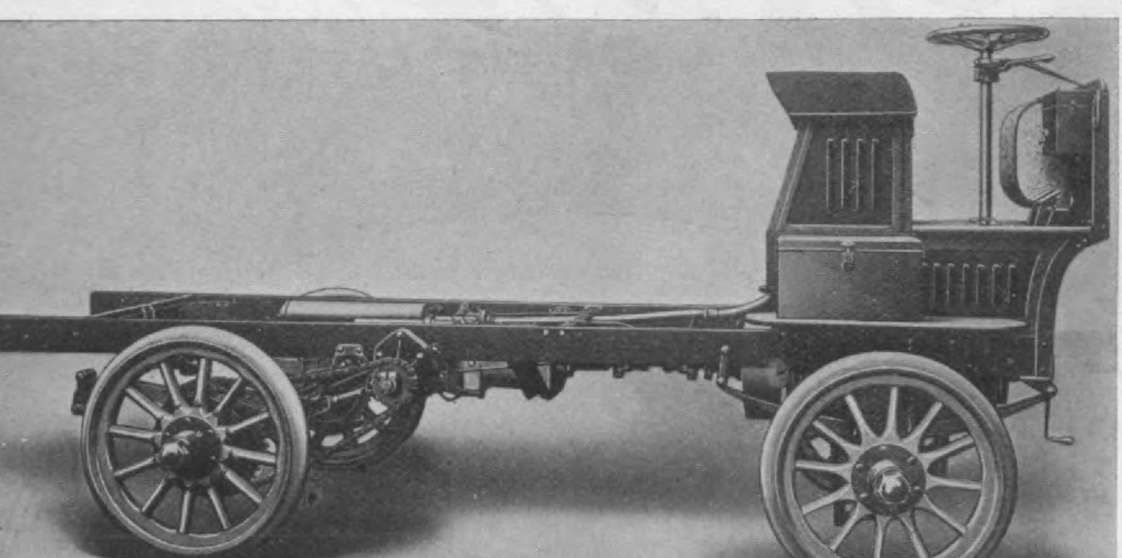

Fig. 1. Side view of Sayers and Scoville air-cooled gasoline truck, body removed. Capacity lbs.; wheel base 96 inches; tread 60 inches; tires solid, 3½x32 inches front and 3½x34 inches Motor, 25 H. P., 4-cylinder, vertical at the front, air-cooled, internal expanding clutch, -speed sliding change speed gear, side chain drive. Weight of chassis, 2600 lbs. Price, with 6 feet wide by not over 13 feet in length back of the driver's seat, $2500.

machines have a capacity of 3000 lbs., 60-inch tread and can be fitted with not exceeding 13 feet in length back seat and six feet wide. The weight chassis is 2600 pounds.

The mechanically-operated interchangeable valve parts are hardened thruout. The valve cages and valve seats are not pocketed down in the cylinder, but are set on top and have an extremely large air-cooling area. Any

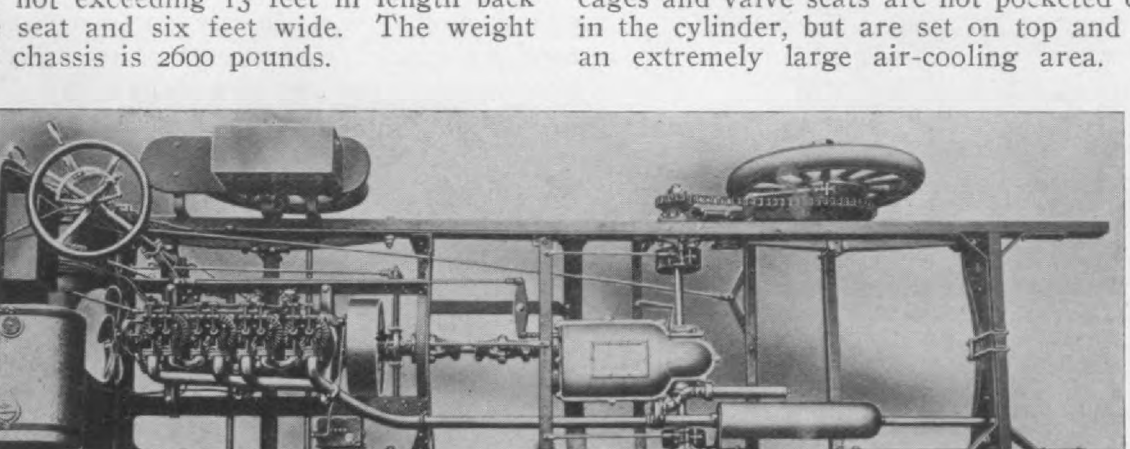

Fig. 2. Plan view of Sayers and Scoville air-cooled truck, showing the arrangement of the en- change speed gear, tanks and oiler. Engine on an angle sub-frame. Two sets of brakes of ontracting band type, one on the jack shaft and the other on the rear wheels. Brakes pro- with equalizers. Frame, armored wood. Springs semi-elliptic front and platform rear. solid 3½x32 front, 3½x34 inches rear. Equipment, 10-gallon gasoline tank, oil tank, ½-gal- lamps, horn, oil can, funnel and complete set of tools.

MOTOR.

four vertical cylinders are 4-inch bore -inch stroke and carry integral cast

individual valve may be quickly removed for inspection without disturbing any other part. The crank shaft is hardened and finished

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The Meiselbach Trucks

ONE, TWO AND 3 TONS.
ONE SPEED FORWARD.
ONE SPEED REVERSE.
Friction Drive, Perfectly Supported.
All Wheels on Timken Rollers.
POWERFUL BRAKES.
The Simplest and Easiest Controlled
Trucks yet Shown.
CANNOT BE OVER-SPEEDED.
THIRTY HORSE POWER.

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n section. The bearings are of white s.

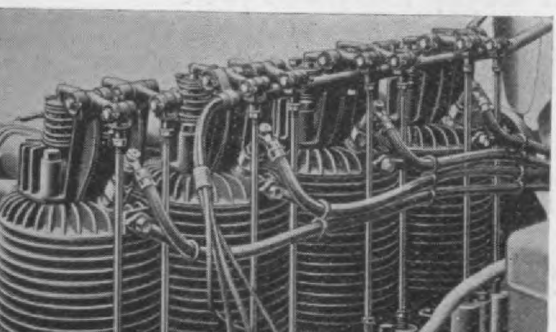
he crank case is of special aluminum al- The oil basin is divided into four com- ments by ribs, insuring proper lubrica-

g. 3. Four-cylinder, 25 H. P. air-cooled motor ayers and Scoville truck, showing the ribbed s and deep, thin cooling flanges cast integral the cylinders; overhead valves operated by r arms; brass fan mounted on H. B. ball ngs; timer accessibly located on the end of a al shaft; jump spark ignition from storage ry and auxiliary dry cells.

for all cylinders while ascending or de- ding hills. The cam shaft and lower of crank case may be removed without rbing the other parts of the engine.

LUBRICATION.

he lubricator is of the 4-feed shooting n type, and has a separate pump for each ; no screws are used internally. The is enclosed and has all working parts nerged in oil. It is positive ratchet driv- and forces the oil at a pressure of 75 ds, in a quantity which varies according he speed of the engine. Equipt with a glass and gage strainer.



4. Four-cylinder air-cooled 25 H. P. motor

the coil. All wires are heavily insulated an oil-proof, and are supported by neatly-ar ranged brackets. Terminals are provided a the ends of all wires, which are kept on th opposite side of the car, and out of reac of the lubrication system.

TRANSMISSION.

Sliding gears, standard improved desig three speeds forward and one reverse, wit direct drive on high gear to differential. Th gears are of large diameter and wide fac flange bolted to shafts and made o the highest grade nickel steel ground to standard after hardening. Timken rolle bearings are used thruout the transmissio

The differential case is integral with tha of the transmission and has bevel gears en closed in a steel housing. These beve gears have a square hole to receive th squared end of the jack shaft. This trans mission is built for heavy, continuous serv ice. Jigs and templets are used in its man ufacture, insuring accuracy and interchange ability of parts.

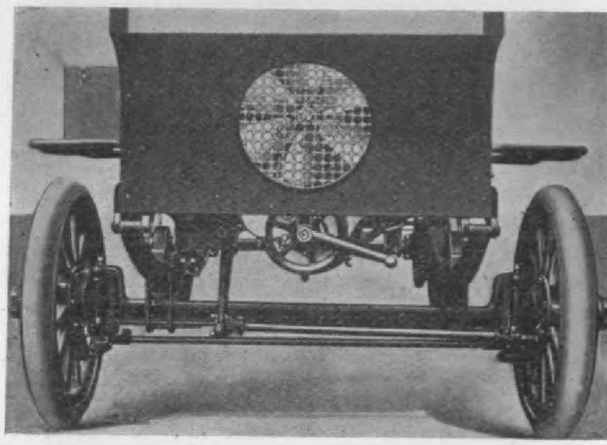


Fig. 5. Front view of the Sayers and Scovill air-cooled truck, showing the fan arrangement high, straight front axle and the steering gea

The transmission case is made of best al uminum alloy, well ribbed and reinforce and oil-tight. The jack shaft revolves o large annular ball bearings enclosed in a stee casting, which is directly connected with th radius rod, thereby putting no strain o the frame.

The clutch is of the internal expansio type, 15 inches diameter, faced with leather reinforced with 200 hickory pegs and re- volves on a roller bearing.

CONTROL.

The steering gear is irreversible, with 16- inch hand wheel, operated by worm and nut The small self-finding gear shift lever is sit- uated under the hand wheel, thus enablin the operator to shift gears without changin his natural vertical position. Two pedal

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For Freight and Passenger Service.

¶ In successful operation under all kinds of conditions and service in all parts of the country.

¶ Sold under a liberal guarantee by a company in position to back it up.

¶ Manufactured complete in our own large plant which is devoted exclusively to the production of high grade commercial vehicles.

¶ Not an evolution from a pleasure vehicle, but designed strictly along truck lines with a surplus of strength in all parts.

¶ One man and a **Reliance Truck** will do the work of three men and three horse-drawn trucks, with an operating cost about equal to one horse-drawn truck. (We give you data and names of users to prove it.)

Write for catalog, and state kind of service in which you use trucks.
Some good territory open for responsible agents.

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e rear springs are platform, 2½ in. wide, in. centers; cross spring 2½ in. wide and in. centers. The front axle is of 2½ in. beam construction and does not require usual bend in the center, giving greater d clearance, as will be seen from the cut. e rear axle is dead and is 2¼ in. solid are. Timken roller bearings are used. e frame is constructed of 2x5 in. sound , armored by ¼x5 in. steel plates. The od sill is shock-absorbing and with the el plate makes the frame firm and strong h no tendency to sag.

BRAKES.

Two independent sets of brakes are used. ey are of the contracting band type. The gular light running brakes are of such size to prolong the life of the tires, which is important factor. They are situated on side shaft, and as their adjustment can- t be affected by the radius rod, they al- ys remain the same. The emergency brake is transmitted to the radius rod, th by relieving the springs of this strain. B sets of brakes have long equalizers.

The wheels are second-growth hicko spokes 2-in. thick on front and 2¼ thick on the rear wheels. The drivi sprockets on the rear wheels serve as inner hub flange and are fastened by ⅝-inch bolts in the center and twelve inch bolts around the outside; these b pass thru the spokes and have a spe head to prevent the spokes from splitting

The interchangeable sprockets are cut the use of ⅝x1¼-inch Diamond roller s chains. The radius rod is a steel casti and acts as a shock absorber. There two especially designed universal joints tween the engine and transmission. T are dust-proof and can be taken apart qui ly without the aid of tools. The muf readily quiets the exhaust pressure and constructed so it can readily be taken ap and cleaned.

Improved Form Of The "Hubbard" Patent Wheel Tire

The Hubbard Patent Wheel Tire, manu- ctured by Arthur H. Middleton, 2821 N. oad street, Philadelphia, Pa., and de- ribed in our December, 1906, issue, page 3, has recently been improved by the addi- n of steel tread plates, as here illustrated. The tread of the new tire is made of cast

Section of New "Hubbard" Patent Wheel Tire, Showing the New Steel Tread Plates.

el plates which are placed on top of the bber cushions, thereby preventing the rub- r from coming in contact with the ground. his construction, it is claimed, will not re- ce the resiliency of the rubber but will otect it from being cut with stones, rocks, c., nor will it destroy the non-skidding

The machine is to be used as a po patrol wagon. It is to be of steel body, H. P., and large enough to carry eight policemen and the chauffeur.

The vehicle is to carry a good si squad of policemen to any point wh there is more serious trouble than the n immediately available can handle. It be able to go much faster than the p have observers there at that time.

Railroad Automobiles at Isthmus of Panama

The purchasing agent of the Pana Canal Commission has advertised for t automobiles suitable for carrying ten p sons each and capable of a speed of miles an hour on the railroad across Isthmus of Panama. The engines must stout enough to climb a grade of 8 per c and to increase their speed to 25 per c above normal, or, in other words, to m fifty miles an hour. The car must b ordinary stove gasoline and have a ca city to go 125 miles at full speed and lo It is the purpose of the commission place these cars in the inspection dep ment for the use of the chief engineer his assistants, who now have to rely passing passenger, freight, dirt or spe trains in inspecting the work along canal.

Jason C. Stamp, Wheeling, W. Va., cently placed a "Rapid" car in use tr

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y not equip your car with *Indestructible Steel Wheels*— no expensive wheel accidents need happen, for structible Steel Wheels **cannot** collapse. They are *ly* wheels that cannot. No matter what your speed w great the weight you carry, you are **always** safe.

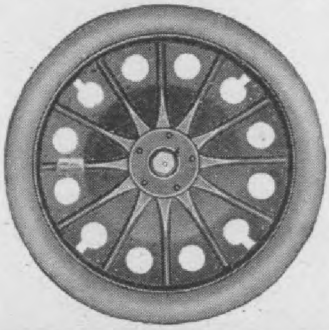
They are as flawless in design and material as a ste bridge—weigh no more than wood—cost no more—co lect less mud and dirt—look better—ride easier—ad resiliency—save wear and tear on any vehicle equippe with them.

Let us quote price for a set attached to your hub an rim for your touring car, runabout, truck or wagon.

NDESTRUCTIBLE STEEL WHEELS

to wheels often make 440 revolu- a minute. Going at this rate, severe jolt or extra strain is liable nash an ordinary wheel to pieces. esult may be a bad "spill." It is ys an expense.

th Indestructible Steel Wheels you nate all possibility of broken ls. Even should one be dented by ing over a curb at a fast clip, it be fixed with a common hammer. l *never* have to buy a *new* wheel.



Ringling Brothers, in referring to t famous Somersault Automobile, say this Indestructible Steel Wheels:

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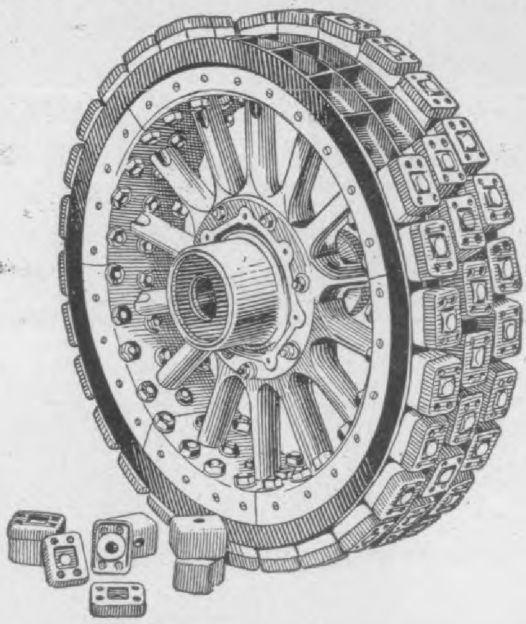
The Hubbard Patent Tire



Made of rubber sections, bolted into recesses in a cast steel channel, the bolts forming a non-skidding surface. A washer of cast steel covers the face of the rubber and extends over the edge keeping the rubber from being cut or torn by wear. This does not affect the non-skidding qualities, nor reduce the resiliency of the rubber.

The life of these tires is many times greater than that of

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ad in 1904, a one-ton delivery wagon, ith a pair of opposed cylinders for the otor and a two speed forward and re-erse friction drive. Experiments with e friction drive were continued, with any changes and improvements, up to e sale of the first Meiselbach bevel-iction, double-disk drive truck in June, 06. This first Meiselbach car sale was ade to a Milwaukee company, which put e one-ton truck at work with loads up 3500 pounds, and claim it has never lost day's service since. The company de-nds entirely on this one truck, has no ams at all, and says that the car can do e work of three horses.

were similar, with a different angle for high-speed pinion. All the pinion disk coacting surfaces were thus mitted to have correct angles, so that pinions could drive the disks without and the opposed disks held the tar-pa pinions up to their work. This tar-pa has a strong friction engagement with ished gray-iron surfaces, is very dura is reasonable in price, and wears rou keeping its shape and angle perfectly, tually improving by service, so far as known.

The first motors used in the Mei bach trucks were 2 cylinders, 5x4½ ches, showing 18 H. P. at 800 R. P. on the testing stand. The friction pini

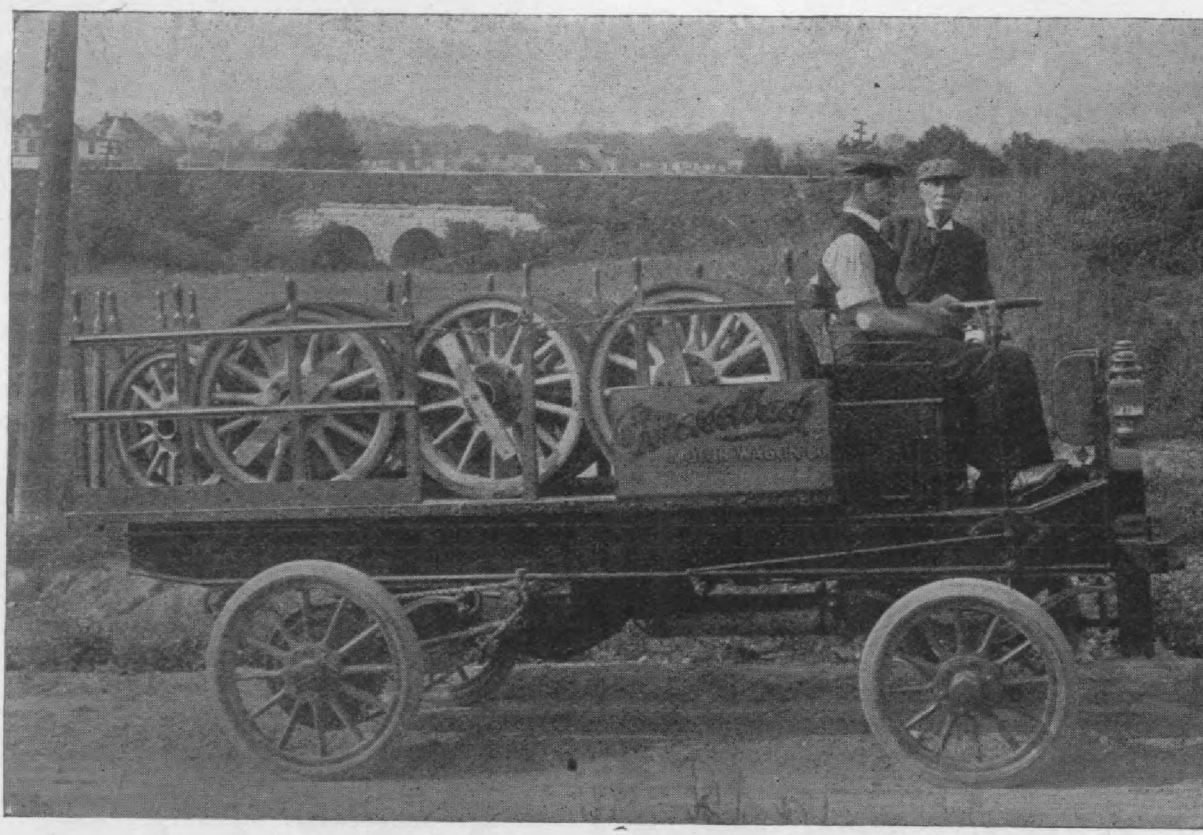

Fig. 1. Meiselbach 1908 Trucks, three sizes, same general appearance, specifications as fo ws: Wheel-base, 84, 96 and 108 ins.; gage, 60 ins.; tires, one- and two-ton trucks, solid, a 4 ins. diameter by 3½ to 6 in. wide. For the three-ton truck the tires are 36x6 ins. Motor ame for all three models, a pair of cylinders, horizontal, opposed, 4-cycle water-cooled 6x4 ns. Beveled friction drive, one speed forward and one speed reverse, with side chains to th riving wheels.

The first Meiselbach driving gear was o speeds forward and a reverse, the ve being 3 beveled-friction-pinions on a att lengthwise of the car, capable of parate engagement with two different-meter, opposed, gray-iron friction-disks. e engagement of one pinion with the ger surfaces of the disks gave low-eed forward, while the engagement of e opposite bevel-friction pinion with

were 8 inches larger and the opposed gr iron disks were 24 inches large diamet The disks run in opposite directions, course, and the motion of one disk is versed by gearing to a sprocket-sha while the other sprocket is fixt direc to the other disk-shaft, the wheel drive ing by side chains. This first truck h 14 miles high-speed and 6 miles low-spe and reverse, motor 800 R. P. M. T

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The high speed forward is omitted in the 1908 Meiselbach Trucks, which have only one speed forward and one speed reverse. The piston area is increased by making the pistons 6 inches diameter with the same 4½ inches stroke. The friction pinion diameter of 8 inches is retained, and the large diameter of the opposed gray-iron members is reduced to 22 inches. The maximum speed of the 1908 Meiselbach Trucks will be 10 miles, varied to lower speeds to suit intended service by changes in the numbers of sprocket teeth.

Three sizes of these trucks will be supplied in 1908, one ton, two tons and three tons paying load. The trucks weigh 3800, 4500 and 5000 pounds, respectively, and sell for $2,000, $2,500 and $3,000. The trucks are all of the same general appearance. Special bodies are fitted, however, for special service.

Now that the small gas engine is fectly "flexible," there is but very l if anything, to be gained by keeping piston area as small as possible; in the constant practise is to increase p area.

The increased cylinder diameter in 1908 Meiselbach trucks is an improver and permits any speed up to maxi tho the reduction from the motor to drivers has a constant ratio.

RELIABILITY OF FRICTION DRIVIN

At first sight, friction driving s much more likely to suit pleasure than commercial wagons, which mus powerfully driven to carry heavy l But all persons familiar with the per ance of friction driven passenger car well aware that the friction turns wheels just as strongly as the sliding

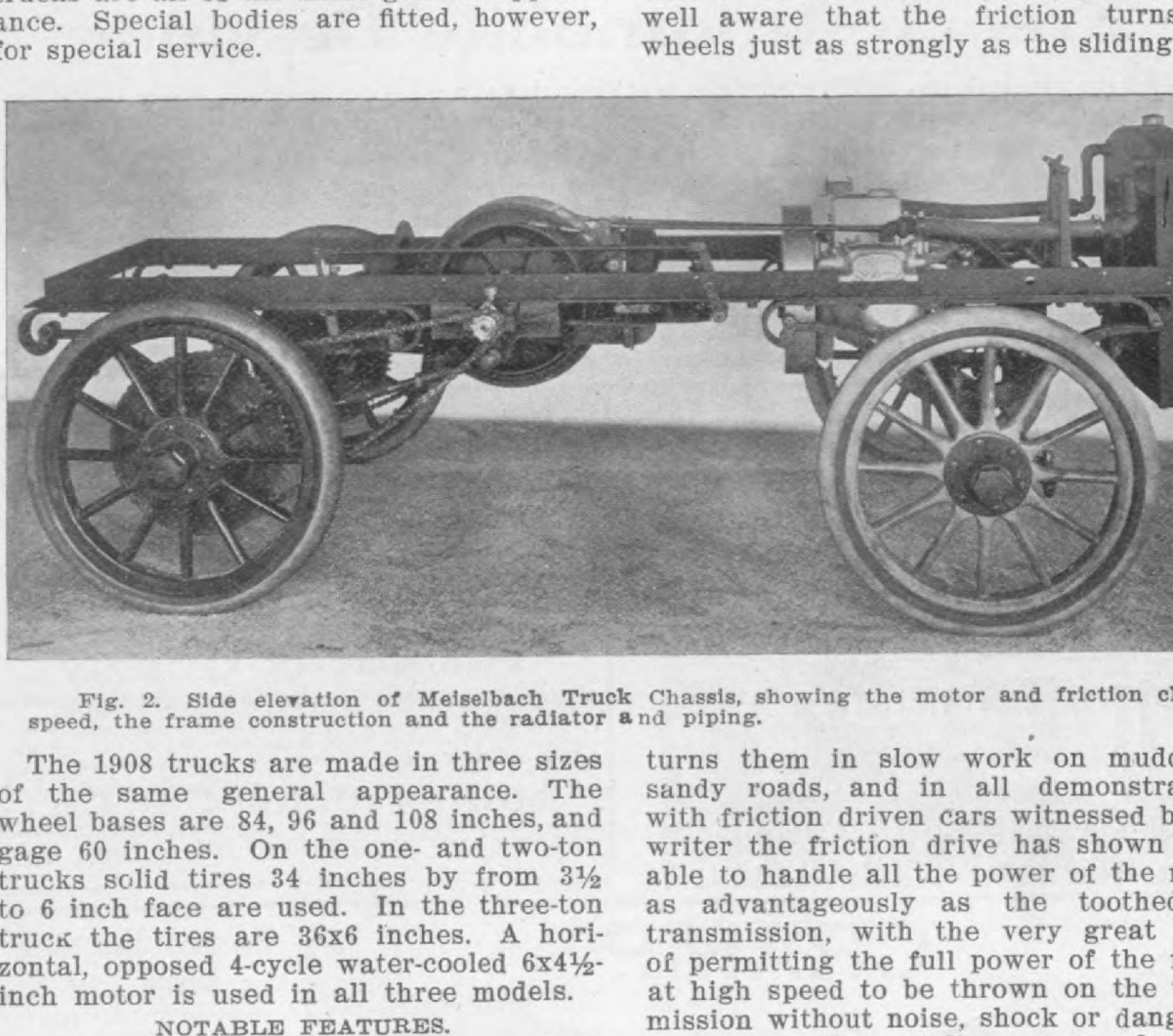

Fig. 2. Side elevation of Meiselbach Truck Chassis, showing the motor and friction c speed, the frame construction and the radiator and piping.

The 1908 trucks are made in three sizes of the same general appearance. The wheel bases are 84, 96 and 108 inches, and gage 60 inches. On the one- and two-ton trucks solid tires 34 inches by from 3½ to 6 inch face are used. In the three-ton truck the tires are 36x6 inches. A horizontal, opposed 4-cycle water-cooled 6x4½-inch motor is used in all three models.

NOTABLE FEATURES.

The distinctive feature of this truck is the single speed friction drive, same reduction ratio forward and reverse, which is discussed and illustrated and described in detail under various following subheads. No differential is used with this

turns them in slow work on mud sandy roads, and in all demonstra with friction driven cars witnessed b writer the friction drive has shown able to handle all the power of the as advantageously as the toothe transmission, with the very great of permitting the full power of the at high speed to be thrown on the mission without noise, shock or dang breakage. The sliding gear de skill and caution in handling, a therefore much inferior to the fri drive, which can be handled without or discretion, and without danger in charge of low-priced drivers.

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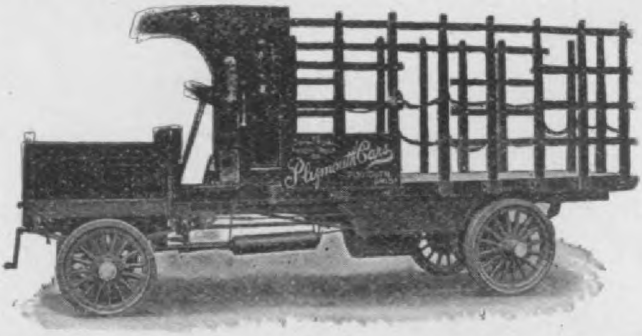
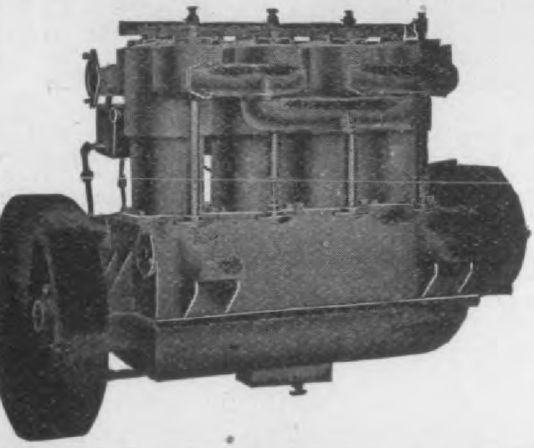


Two and Three Tons Capacity

Duplex Friction Transmission



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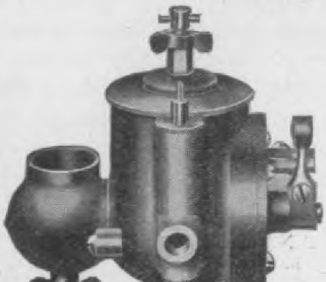

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THE NORTH CHICAGO MACHINE CO.

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ve in 1907 were 8 inches diameter by 3 hes long. These pinions drove well, l gave no trouble, keeping their form fectly. When the 1908 change was de to one forward speed only there was gain in available room, and the paper ions, still 8 inches in diameter, were de 6 inches long, with considerable re- tion in the pressure required to make drive effective. It is not the inten- n to use this drive in slipping engage- nt, the only slip expected being on ves.

pled to the crank-shaft, all in plain bea ings, splined to permit the beveled pap pinions to slide but not turn on it. The pinions are moved by levers as clear shown in the illustrations, and stand no mally out of engagement with the o posed bevel faced members of the fri tion drive, either pinion being forced in contact with the opposed members at th will of the driver, thru a hand lever fo the forward drive; the right princip pedal applies the brakes and the left pri cipal pedal engages the reverse whe

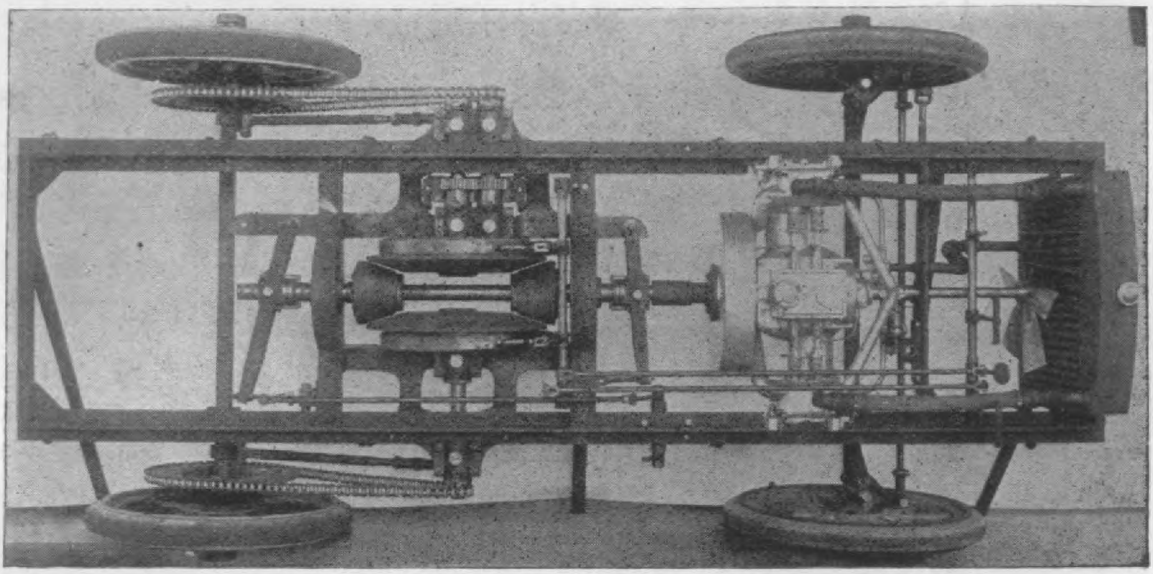

Fig. 3. Plan of Meiselbach Truck Chassis. The crank-shaft is coupled to the friction pinion aft, which has two tar-paper bevel pinions fitted to slide on it. These pinions coact with bev- d friction wheels, one on each side of the pinions, so that either paper pinion can be forced o friction engagement with the two cast-iron bevel wheels. Because one pinion engages the ont side of the bevel wheels and the other engages the rear side of these friction wheels the otor turning its shaft always in one direction, can be made to turn the beveled wheels either y.

The beveled wheels run in contrary directions. To make them turn the truck rear wheels the same direction a sprocket is fixt directly to the shaft carrying one bevel wheel, with ain to rear wheel, and a toothed gear is fixt to the shaft of the other beveled wheel; this gear gages an equal gear fixt to a shaft carrying a second sprocket, with chain to the other rear eel.

ll the thrusts of the friction drive are en by circles of caged balls. The nework is steel castings, so that any red strength and stiffness can be ob- ed. The weight of the one-ton ssis, shown in these illustrations, is nt 3200 pounds, without the body.

THE CHASSIS FRAME.

ne chassis frame sides are two ths each, of angle steel, 2x3x¼ for one-ton truck, 2½x3x¼ for the two-ton, 3x3x¼ for the three-ton truck. These lengths have their wide sides riveted ther, so as to form an assembled T- ion bar, placed with the flat side down. respective chassis ends are made of

pushed forward. A third, smaller, peda opens the muffler. The spark and thro tle control are had by ratchet-retained le ers on top of the hand wheel. The stee ing is by rack and pinion, one full tur of the hand wheel for the full sweep of th front wheels. All the wheels are o Timken rollers. The direction of motio of one of the opposed friction members i reversed by a pair of steel spur gears, D. P., 24 teeth, 1¼ inches face. Thi makes one side chain longer than th other. The chain tension is regulated b struts with right and left threaded sleeve checknut retention.

BRAKES AND SPRINGS.

For the one-ton truck the springs ar

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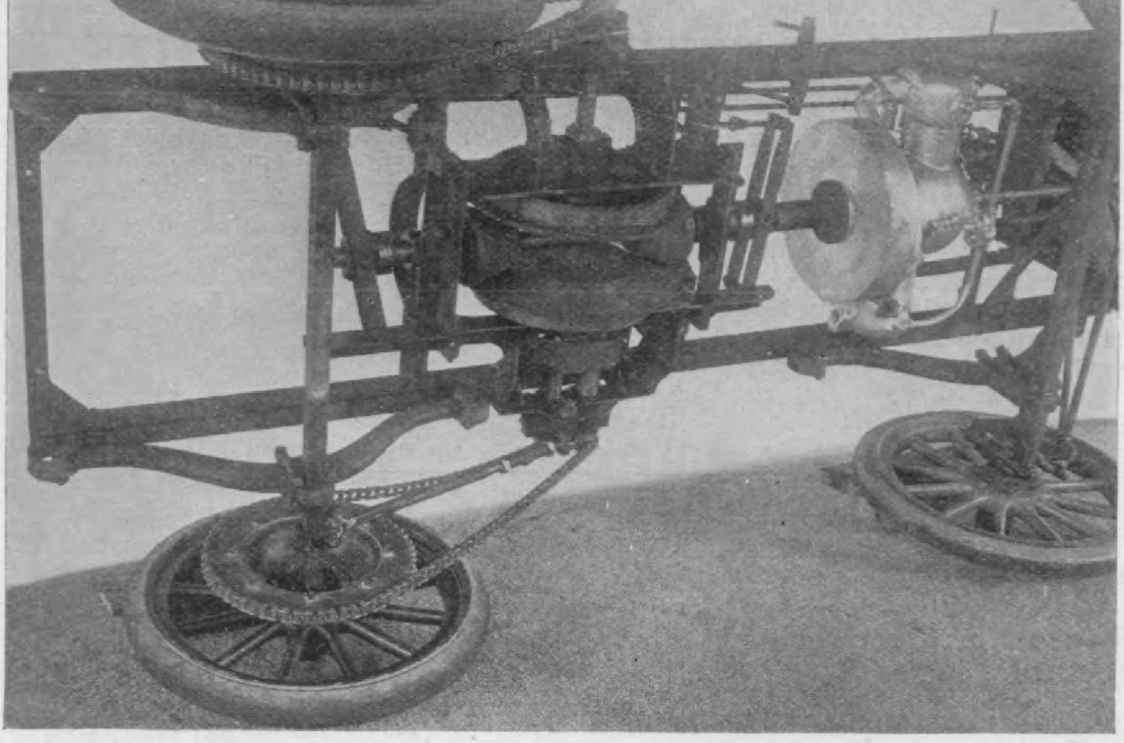

Fig. 4. Under side of Meiselbach Truck Chassis. The friction drive framing is a one piec teel casting.

e three-ton truck, 38 inches long by 3 ches wide, with 12 leaves. The brake rums, 18 inches diameter by 2 inches ce, are integral with the opposed friction ive members, and the fiber faced brake ands are pedal applied thru the usual 3-ole levers. These very large diameter akes, on the cross-shaft, are extremely owerful, and hold the truck securely un-er all conditions.

NO BALANCE GEAR.

It will be at once noticed by the motor r expert that this 1908 Meiselbach fric-on drive has no special means for driv-g the outside wheel faster than the in-de wheel when rounding a curve, such is supplied by the balance gear in the dinary forms of motor car drives. This ems at first thought to be a serious ob-ction, but in practice the truck runs per-ct y well, driving on curves as strongly, all appearance, as on a straight-away urse.

This will be less surprising to those who member that all railway locomotives d cars turn both wheels at the same te on curves, save for the small surface eed variation had by the slight coning the car wheels. Many attempts have en made to vary the speeds of the in-le and outside car wheels in rounding rves, but so far as the writer is aware

fixt to one axle, but each wheel is dri by a separate friction action, so that slip occurs between the paper frict pinion and its coacting, beveled, gray-i friction-wheel, with both the pinion

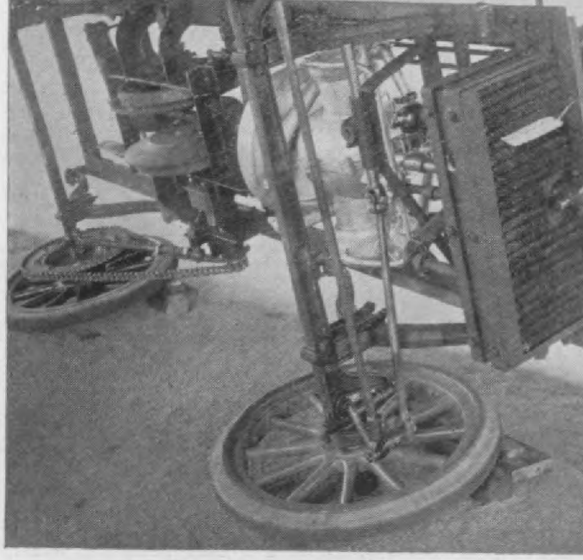

Fig. 5. Front axle of Meiselbach Truck I-section, steel drop-forging, no welds, rack pinion steering.

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slight on curves of large radius, and there is no perceptible loss of power due to this slip. There is, of course, some loss of power by slipping, as it is work done with no useful effect, but a run of some miles on a country road with plenty of turns showed nothing different from the action of an ordinary truck with a sliding-gear and balance-gear of the usual form.

ON THE ROAD.

Saturday, August 31, a one-ton Meiselbach truck, with the single-speed-forward-and-reverse-friction-drive, all as shown in illustrations herewith, was loaded at the North Milwaukee factory with 2060 pounds of car wheels, Mr. Meiselbach driving and the writer as observer. The car was under perfect control, the large brakes holding it with ease on any incline, and a photograph was taken with the loaded car standing on a stiff grade, which does not show its real steepness in the picture.

The truck was driven seven or eight miles over a rough gravel road crossed by a number of trolley tracks, and having plenty of turns and one very sharp rise to a ridge, much steeper than the one shown in the illustration, but enclosed by high fences on each side, so that no picture could be taken.

The control was perfection, leaving nothing to be desired in the way of convenience, and was very easy on the driver. There was no vibration of the drivers seat or foot-board, and the speed was under such ready control that the car could be handled over obstructions very much better than is possible with a horse-drawn truck.

The pace seemed slow, but was more than double that of wagons drawn by walking horses. Several heavy wagons, both loaded and unloaded, drawn by horses were passed.

The very large brakes on the cross-shaft held the car to any desired rate of speed at all times and under all conditions, so that the wheels could be eased down any drop in the road surface with no jolting, and, as before said, the truck could be stopt and started readily on any incline the friction engagement permitting a start at full motor speed with no shock or jar. In a word, the friction drive was ideal in action, and the lack of the high speed. which might enable an unloaded truck to save some time, is more than balanced by the certainty that the truck cannot be driven faster than is prudent.

Motor Ambulance Service

One of the newest ideas in automobile construction is the recent product of the Rapid Motor Vehicle Company, of Pontiac, Mich. This is an ambulance especially designed for the peculiar needs of hospitals, sanitariums, city dispensary departments and others, requiring, in their service, an ambulance capable of making exceptionally quick runs and under varied conditions.

This motor car ambulance can be geared to attain a maximum rate of from fifteen to thirty miles per hour. The body is full panelled with seven bevelled glass drop windows, covered with curtains of the finest silk pantasote, assuring perfect light and ventilation. Entrance is made by means of two steps in the rear of the body, and along each side is arranged a full-size emergency cot.

There are seats on the inside for three attendants; one in the center of the forward end of the car and one at the foot of each cot. The driver's seat, which is of tufted leather, extends the full width of the bed, four feet six inches, and will comfortably seat three persons. Under the seat are two spacious drawers used for supplies. A gong is used instead of the regulation auto horn. The tires are three-inch solid rubber, which obviate the possibility of punctures or other tire troubles during emergency runs; while the full platform springs insure easy riding even over rough and hilly roads.

Max Gabrowsky has given up the general management of the Rapid Motor Vehicle Co., of Pontiac, Mich., to engage in a new field of work, and is succeeded by Harry Hamilton.

Mr. E. T. Shepherd, superintendent of the Chicago Fire Insurance Patrol, Chicago, advises us that for the last two years he has tried to find a motor car that would be suitable for his business, but has failed. He is in the market for one that will carry weight and have speed.

As a result of the agitation which ensued when the Mayor vetoed the Philadelphia Motor 'Bus ordinance, a new ordinance providing for the operation of motor 'buses was introduced in Council. This new measure provides that machines may be operated on Broad street, between League Island and the city limits, and on the full length of Diamond street. It also permits the vehicles the use of streets within three squares of the Auto Transit Company's proposed terminals, and in case of blockades the use of the nearest parallel street.

The great possibilities attending the use of automobiles as conveyors of mail over rural delivery routes are clearly shown by a test recently made at South Bend, Ind. The route selected was twenty-five miles long, supplied 115 families, and is said to be the hardest mail route in St. Joseph County. With a horse and wagon it takes eight hours to cover this route, but in the test the mail carrier drove a Studebaker electric and cut the time to three hours.

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and at all good automobile supply stores in all leading cities.

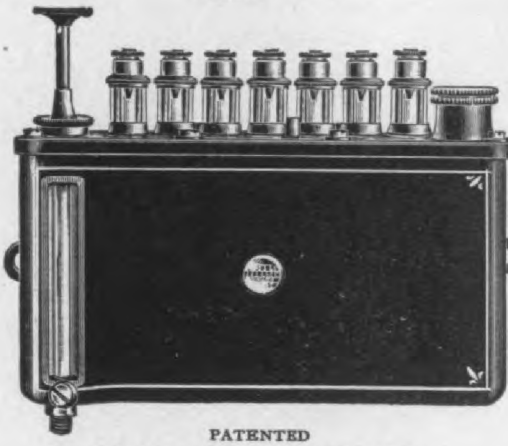
Send for our Mobo booklet —"*How to Clean Well Varnish and Paint on an Automobile*" It's free.

THE PEDERSEN Mechanical Lubricator

Has earned the name of being

"The Best Oiler on the Market"

Type X



PATENTED
Mechanical Lubricator

BECAUSE—

There are no Check Valves or Springs to get out of order.

It can not gum up. Works in cold or hot weather with same adjustment.

Has constant Sight Feed.

And many other valuable features.

Ask your dealer about it, or write

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icago Motorcycle Endurance Run

ree perfect scores with Walter Dav- leading was the result of the sec- annual endurance run of the Chicago rcycle Club, September 14 and 15, Kokomo, Ind., and return. Of the y entries received twenty-six started 414-mile run. At the end of the first run to Kokomo nine cars showed even of which were on time. On the n a few others dropt out, leaving three clean scores, which were Wal- Davidson, riding a Harley-Davidson; ge W. Lyon, riding a Torpedo ma- e, and Fred Jergenos on an Indian. er Davidson made the best showing, ng thru without any tire trouble and adjustment whatever on his machine. made the best record in the shortest , making the distance between Koko- and Chicago in 8 hours 30 minutes. schedule time being 12½ hours.

"Hilaman" 3½ H. P. Motor Cycle

ne A. L. Hilaman Co., Moorestown, ington County, N. J., now manufac- s a 3½ H. P. model of the Hilaman or cycle. The cylinder is 3¼ inch by 3½ inch stroke, and is fitted with e valves 1⅝ inches in diameter. Two heels, 8¾ inch diameter and 1½ inch bronze. The crank shaft is of tool steel A hollow ⅝ inch wrist pin is used. The crank pin is ⅞ by 1⅝ inches in diameter and the main bearings 1x2 inches.

The piston is very light, and is 3½ in ches long and fitted with 3 rings ¼ inch wide, step cut. The connecting rod is o drop forged steel. The equipment con sists of Splitdorf coil; Corbin Duplex coaster hubs; Goodrich or G and J tires 2¼ or 2½x8 inches. Long bars with grip control are used. The wheel base is 5 inches. Weight complete is 170 pounds The price of machine complete is $210.

Motorcycle Races at Wheaton

The following is the result of the motor cycle race meet at Wheaton State Fair Grounds, September 13, under the auspices of tne Chicago Motorcycle Club:

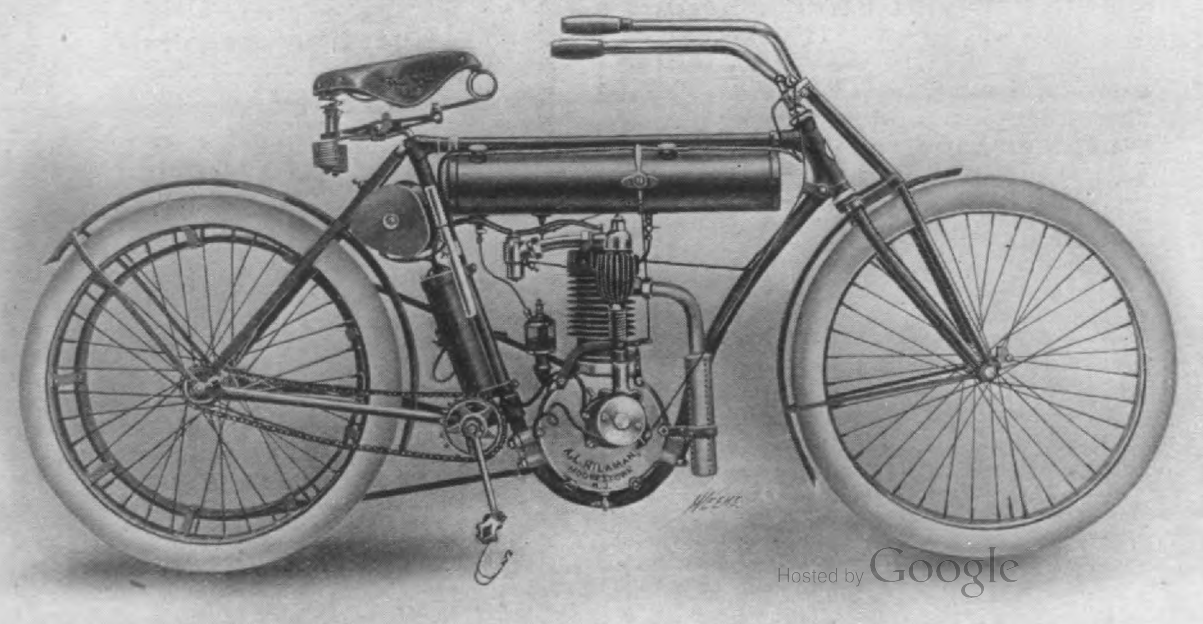
Three-Mile Exhibition Race—George W Lyon riding 5 H. P. Simplex Peugeot time, 4.02.

Five-Mile Race—C. S. Hinkly, ridin Harley-Davidson, first; time, 6.55, wit George W. Lyon, Simplex Peugeot, second

Three-Mile Exhibition Race—A. J. M Cullon, riding Racycle; time, 4.45.

Second Meet of Philadelphia M. C. Clu

Owing to the success of the recen motorcycle meet at Point Breeze track



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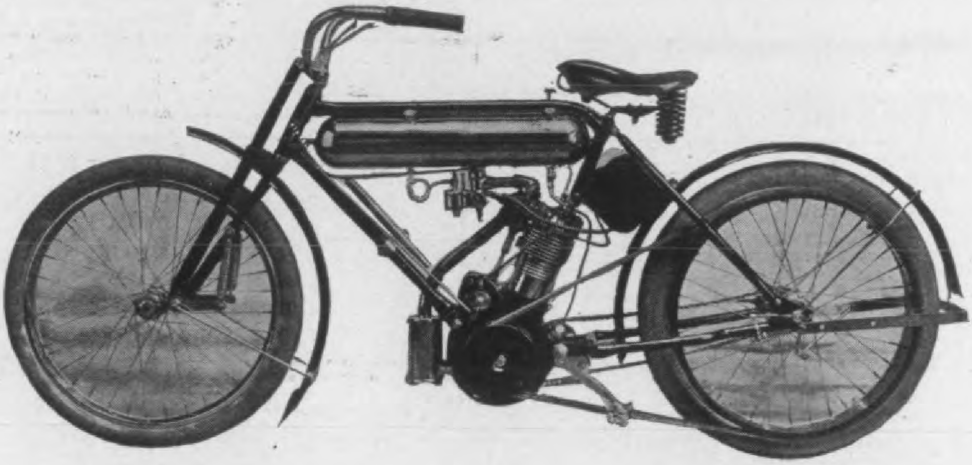

M. M. FOR 1908

AND ready for immediate delivery. These machines are equipped with 26″ **Wheels,** 2¼″ G & J tires, 20″ **Frame,** thus allowing the seat post to come in a line with top of frame. Color bright vermillion, option black or M. M. blue, **Full Nickled Rims,** producing the richest appearing Motor Cycle ever built.

Our Engine with its **Newly Designed Cylinder** developing more than 3 H. P., together with the splendid M. M. belt transmission using a 1¾″ wide, highest quality, **Barnes Endless Mineral Tan,** double thick, sewed belt, gives you more power, strength, stability, speed and endurance than any other single cylinder Motor Cycle in the World.

A New Battery Arrangement, New Idler Device for the Chain, with long rear adjusting slot, admitting of a longer range of adjustment, thereby taking up any slack that might appear in the belt, and doing away with the belt idler. **Belt Removable Through Rear Frame by Simply Removing One Bolt.**

We are equipping these machines with **Patent Motor Stand,** light, compact and built to the frame ready to hold your machine at a moment's notice.

On tank will be found a priming device in direct connection with the cupped petcock on cylinder head, thus admitting gasolene to cylinder for easy starting in cold weather by simply pressing a button.

These are only a few of the improved features found on the M. M. for 1908. *Write for our latest circular.*

Agents get busy—good territory still open.

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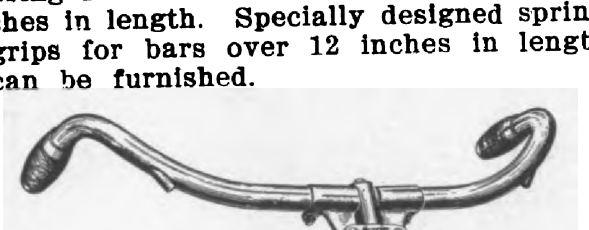
American Motor Company

pring Handle Bar herewith shown. It is

The "C-A" Bar Attachment showing position of springs.

he product of the C-A Cycle Handle Bar Co., 1931 Broadway, New York City.

By means of this device the jolt and ar experienced in riding a stiff and rigid bar are said to be entirely absorbed. It can be attached to any make of machine using handle-bar steering not over 12 inches in length. Specially designed spring grips for bars over 12 inches in length can be furnished.



The "C-A" Spring Attachment with Bars Attached.

The C-A Spring Bar can be adjusted to any desired position, is provided with compression springs which are adjustable to any required tension, is free in action, and allows of very rigid steering. The price of the device polished and nickled is $6.00.

Atlantic City's Industrial Handicap Cycle Race

The successful 25-mile Industrial Handicap at Atlantic City, N. J., August 31. originally planned as a feature of the C. M. A. and the C. P. A. A. convention, was won by Philip Kury. Fifty-six of the sixty-nine starters finished. Preceding the race was a parade of over 100 bicyclists to the course. Results:

Place Winners.

1. Philip Kury, Roy W 1.13.23 4-5
2. Samuel Rein, Roy W 1.13.24
3. R. Nelson, Pleasantville 1.13.24 1-5

Time Winners.

1. C. A. Sherwood, N. Y. A. C. ..1.08.57 4-5
2. Chas. Mock, C. R. C. of A. .1.08.58

BI AND MOTOR CYCLE Contained and Separate Generator L
"BABY GRAND" Motor Boat, Car
Searchlights. Consult 20th Century Catalo
AUTOMOBILE LAMPS—20TH CENTURY MFG.
19 Warren St.,

Torpedo Motor-Cycles
Our own Spring fork
Ride comfortably
Powerful motor
Easy to handle
Does the work
On road and track.

THE HORNECKER MOTOR MFG. CO., Whiting, Ind

The police force of Owensboro, Ky. be provided with bicycles for use on duty.

Muskegon (Mich.) Motorcycle Club its annual election of officers on Se ber 6. Dr. C. J. Dove was elected dent.

Philadelphia Motor Cycle Club ha moved to new quarters at Broad and tingdon streets, where it has a large bi room, two smoking rooms, meeting card room, bath and garage accom tions for 100 machines in the basem

The Chicago-Milwaukee motor record recently made by Messrs. Wl and Alofsin, has been beaten by Cl W. Van Sickle, whose elapsed tim four hours and seventeen minutes. Van Sickle has been given the first c record certificate issued by the Ch Motor Cycle Club, which has under to time officially and certify to re made between Chicago and adjoining

The Federation of American cyclists has issued sheet No. 1 of M. Selected Tours," covering New and the New England States, and distances, etc., of six leading tours. F. A. M. registered repair shops ar given. The map and data are print strong manilla cardboard of such s to fold to convenient width to f pocket.

At the first race meet of the Ph phia Motor Cycle Club, held at Breeze track on Saturday, Augu some notably fast time was ma Kellogg, on a 3 horse-power Indian 5 miles in 6 minutes 2 1-3 seconds. Klein rode 25 miles in 33 minutes onds, with a 3 horse-power Harley son. The time for the special mil trial by Walter Goerke riding an 8 power Indian, was 1 minute 3 4-5 se one second slower than the motor ca record.

Mr. Bicycle Dealer:

Are you interested in establishing a reputation for selling reliable goods? If so, foremost in your line should be

KOKOMO BICYCLE TIRES

They are economical, durable, and speedy, and are sure to give satisfaction.

The "New Oxford" and "Kokomo Defender Special"

Either will add to your prestige and profit, and the users' happiness.

Write For Particulars

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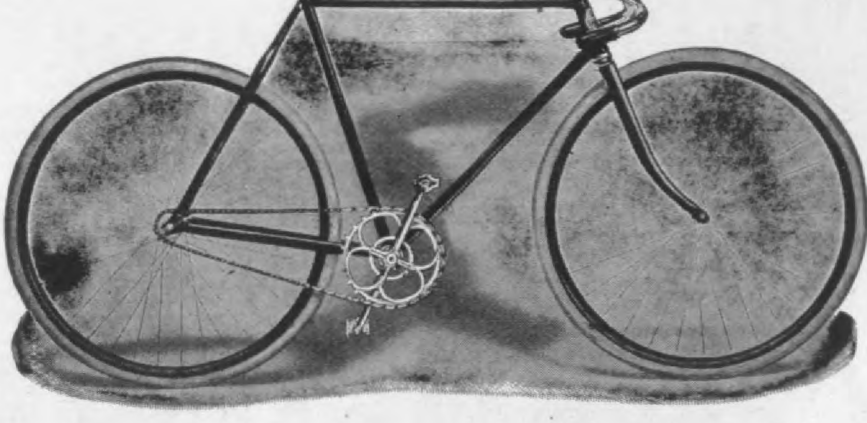
YALE AND SNELL BICYCLES



Product of the LARGEST Manufacturer of HIGH GRADE BICYCLES in the UNITED STATES. We have ALL satisfied agents and riders. They receive value for their money. Would you like to join our family?

A card will bring our catalogue.

The Consolidated Manufacturing Co.

STATION "B." **TOLEDO, OHIO.**

Motor Cycle Accessories
THAT ARE WORTH WH

Simplex Speedometer
Accurate and Reliable, $5

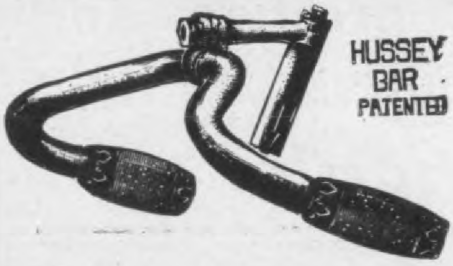
Simplex Headlight
The very best imported, $1

Simplex Siren . . $1

Waterproof V Belts, Simplex Belt H
Cable Clips, Bowden Wire, Belt Rims

Sole U. S. Agent for the
World Famous Peugeot Motors.

Prospect Motor Mfg. Co
7-9 Park Place, Brooklyn,



Hussey Handle Bar

ARE THE BEST. Mr. Dealer,

Specify them on your bicycles regardless of make.

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IN THE

NATIONAL MOTORCYCLE ENDURANCE CONTEST

It is significant that the

Corbin Coaster Brake

Outnumbered all others by more than

3 to 1

and that

of the 31 survivors who used Coaster Brakes, 22 had Corbins and that of the 15 medal winners 8 were similarly equipped.

"Good Wine needs no Bush," nor does a good Coaster Brake.

The Corbin Screw Corporation

NEW BRITAIN, CONN.

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FREE!
Handsome Gold Watch

Send us thirty-six "NEVERLEAK" cer tificates and we will send you this handsome solid gold filled watch—fully warranted fo ten years—number 12 size, very latest thi model; fitted with the bridge model, 7-jewe American movement. Watch is stem win and stem set and in appearance and for accu rate time is the equal of a watch for whic you would pay $100 or more.

Any certificates with "NEVERLEAK"- the wonder in tire mending—will be accepte on the watch.

Twenty-four certificates will entitle you t the Regulator Clock; Twelve certificates t the Brass Sign, mentioned in previous ad Send certificates direct to

Buffalo Specialty Compan

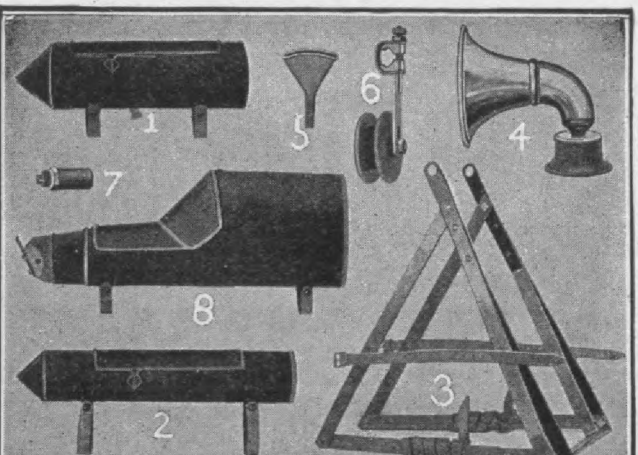
BUFFALO, N. Y.

Motor Cycle Specialties

Tool Boxes, Battery Cases, Stands and Luggage Carriers, Idlers, Electric Horns, Lamp Brackets, Cyclemeter Brackets, Pocket Funnels, Etc.

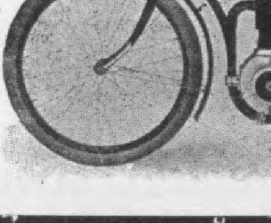
Indian and Yale Motorcycles

PARTS AND REPAIRS.



$185.00 MERI

MERKEL SPRING FRAME 3-H. P. Motor Cycle.
In a class by itself. If you do not know and want to find ask any of the hundreds of riders or write.
MERKEL MOTOR CO., 1098—26th Ave., Milwaukee, W



Who would th of building Bicyc Coaster Brak Lawn Mowers, S ing Machines etc., etc., with using The STAR RETAINERS therein

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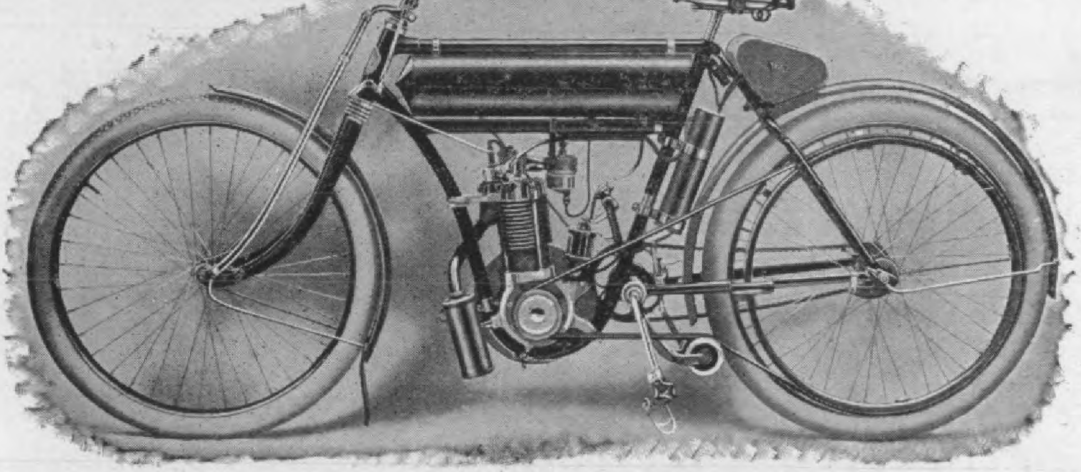
W. H. O. tell us'



1907 YALE-CALIFORNIA MOTOR CYCLE---Price $185

In the Endurance Contest New York to Providence, R. I. July 30 and 31, 305 miles. Three Yale California Motor Cycles entered and all three came through on time at every control making a showing not equalled by other makes double its power.

This is proof of Yale-California reliability.

A Card Will Bring Our Catalogue. **We Ship Promptly**

THE CONSOLIDATED MANUFACTURING CO.
TOLEDO, OHIO.

None but Words of Praise for the

MORROW COASTER BRAKE

Read the following:

Springfield, Mass,
August 2nd, 1907.

ECLIPSE MACHINE CO.,

DEAR SIRS:—

I would like to say in regard to your Morrow Coaster Brake for Motorcycle, that I received in June, 1907, I have used the brake and have tested it well and I can truthfully say I have never used a brake that will work with as little energy and hold the Motorcycle as well and on all occasions as will your Morrow Brake. I have recommended it to others.

Wishing you every success, I am sincerely yours,

ROLLIN A. RICHMOND, JR.,
118 Green St.

P. S.—I am using it on an Indian Motor.

ECLIPSE MACHINE CO

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Hine-Watt Manufacturing Co.
58-60 Wabash Ave., Chicago, Ill.

BICYCLES and BICYCLE SUPPLIES

Seldom Equalled
Never Excelled

Manufacturers' Supplies Co.
418 ARCH STREET, Philadelphia, Pa.

The HARLEY-DAVIDSON MOTORCYCLE

A winner wherever it competes.
Prompt deliveries guaranteed.

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE, WIS.

INDIAN MOTORCYCLES

Hendee Mfg. Co.
Springfield, - - Mass.

The Reliance

Best Motor Cycle Proposition
in the world :: :: ::

RELIANCE MOTOR CYCLE CO.
ADDISON, N. Y.

THE A. & J. MANUFACTURING CO.
Sole Manufacturers, THE ORIGINAL A. & J. Repair Hanger and Braziron.
The best cast iron brazing compound.
Special motor cycle bracket and hanger for builders
26 W. Randolph St., Chicago, Ill.

BRADLEY MOTOR CYCLES
Single and Double Cylinder, $200 and $275

C. E. Bradley Motor Co.
268 Diamond St., Philadelphia, Pa.

JOHN S. LENG'S SON & CO.

IT ISN'T LUCK

That the

CURTISS Motorcyc

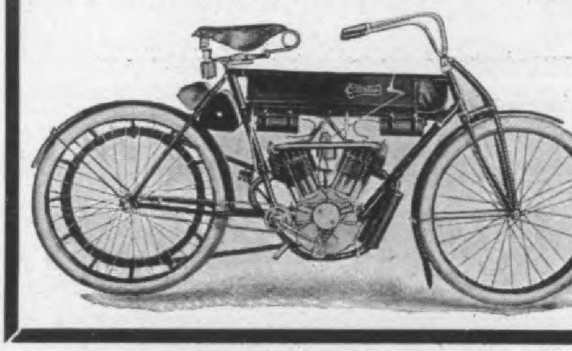
entered in the Endurance Run won the Diamond Medal, the h
award for multicylinder motorcycles, maintaining the best a
for reliability, hill climbing and economy against a field of six
American and six foreign makes.

It isn't LUCK that the Curtiss in the 30½ cubic inch class
speed trials, with heavier riders, won the FIRST and SECOND
ing its nearest competitors, with equal cylinder capacity, by s
and making a WORLD'S RECORD by a mile in 56 4-5.

It isn't LUCK that in the 61 cubic inch class the CURTISS D
CYLINDER won easily. And the same applies to the hill clim
track events where the Curtiss machines fully demonstrated
superiority.

Write for our booklet "Achievements"

G. H. CURTISS MANUFACTURING
HAMMONDSPORT, N. Y.

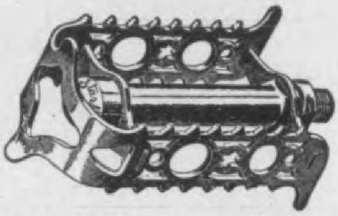


Persons Saddles
Are said to be
The Best in The World
PERSONS MANUFACTURING COMPANY
Worcester, Mass.

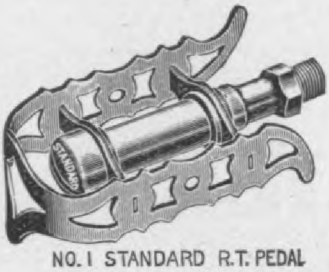
Mayo Motor Cycle
The Most Perfect Mechanically Constructed.
Power and Speed to Spare.
MAYO DAMPER CO., Pottstown, P

A motor cycle service has been insta
on Mt. Wilson, Cal., along the trail l

NO. 3 BRIDGEPORT R. T. PEDAL



NO. 3 STAR R. T. PEDAL



NO. 1 STANDARD R.T. PEDAL

Make The Bicycling World Revol

THEY are exclusive equipment on the majo of high-grade wheels because of their unva ing excellence and permanent value.

MADE FOR MEN'S, WOMEN'S, OR CHILDREN'S WHEELS

We Also Manufacture

"Diamond E" Spokes and Nipples, "Sager", "Star" and "Export" T Clips, and the "Breech-Block" Spark Pl

THE STANDARD CO

TORRINGTON, CONN.

THOR

Must be on the Motor in your Motor Cycle if it is genuine, and a winn

Supplied by the following manufacturers:

Reading Standard Cycle Mfg. Co., Reading, Pa.
Miami Cycle & Mfg. Co., Middletown, Ohio.
The Pierce Cycle Co., Buffalo, N. Y.
Light Mfg. & Foundry Co., Pottstown, Pa.
Fowler-Manson-Sherman Cycle Mfg. Co., Chicago, Ill.
Emblem Mfg. Co., Angola, N. Y.
Hornecker Motor Mfg. Co., Whiting, Indiana.
Brown & Beck, Denver, Colo.
Brown Mfg. Co., Chicago.

Aurora Automatic Machinery Company

AURORA, ILLINOIS, U. S. A.

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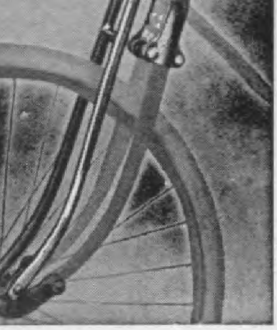

FORK

Easily attached to any bicycle or motorcycle. Absorbs all jars, jolts and vibration.

Send for catalogue.

J. Harry Sager

Rochester, N. Y.

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inger "CAVALRY" Motor Saddle

ion in front suspension spring.

top is raised in front and back sufficient to prevent the rom slipping forward or backward—is curled hair padded s the form of a horseback saddle.

H. & F. MESINGER MFG. CO.

1807 First Avenue New York, U. S. A.

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onvert Your Bike

ito a Motorcycle

ERIE 2 H. P. attachment fits any frame without alteration. Easily attached by anyone. A hill climber. 1000 in use.

2 & 3 H. P. MOTORCYCLES, MOTORS, CASTINGS, ETC.

SEND STAMP FOR EITHER CATALOGUE

TORCYCLISTS Send 15 one-cents stamps for new book "THE MOTORCYCLE." It tells about mechanism, care, tion, how to get more power, etc. Name make of rcycle for low price on accessories for same.

rcycle Equipment Co., 4 Lake, Hammondsport, N. Y.

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breakable Wrenches

Years of Service in every Wrench

Unexcelled for Lightness and Strength.

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articles for a complete Bicycle, but we have added to this line a specialty of Tubings, Lugs, Stems, Stays and other fittings. All makes of Cups and Cones, to help the repair man.

Come to us with your troubles, and we will supply you. See Catalogue 1907.

Auto Line Tires, Tubes, Lamps, Generators, Goggles, Carburetors, Timers, Coils, Switches, Mufflers, Jacks, etc., at **Rock Bottom Prices.**

Write for Catalogue and Discount Sheet.

Progressive Cycle & Automobile Supply Co.

81 Chambers St., N. Y.

Motor Cycle Supplies

HORNS, SADDLES, PARTS

Send for our Catalogue

F. A. BAKER & CO.

37 Warren St., N. Y.

THE ORIGINAL.

THE SARTUS

Ball Retainer

(Brought Out in 1896)

BEST ANTI-FRICTION

THE SARTUS BALL BEARING CO.

155 Spring Street, NEW YORK CITY

THOMAS AUTO-BI MOTORCYCLES

Built for every day practical use by the average man.

THE THOMAS AUTO-BI CO. 1453 Niagara Street BUFFALO, NEW YORK

CROUCH MOTORCYCLES

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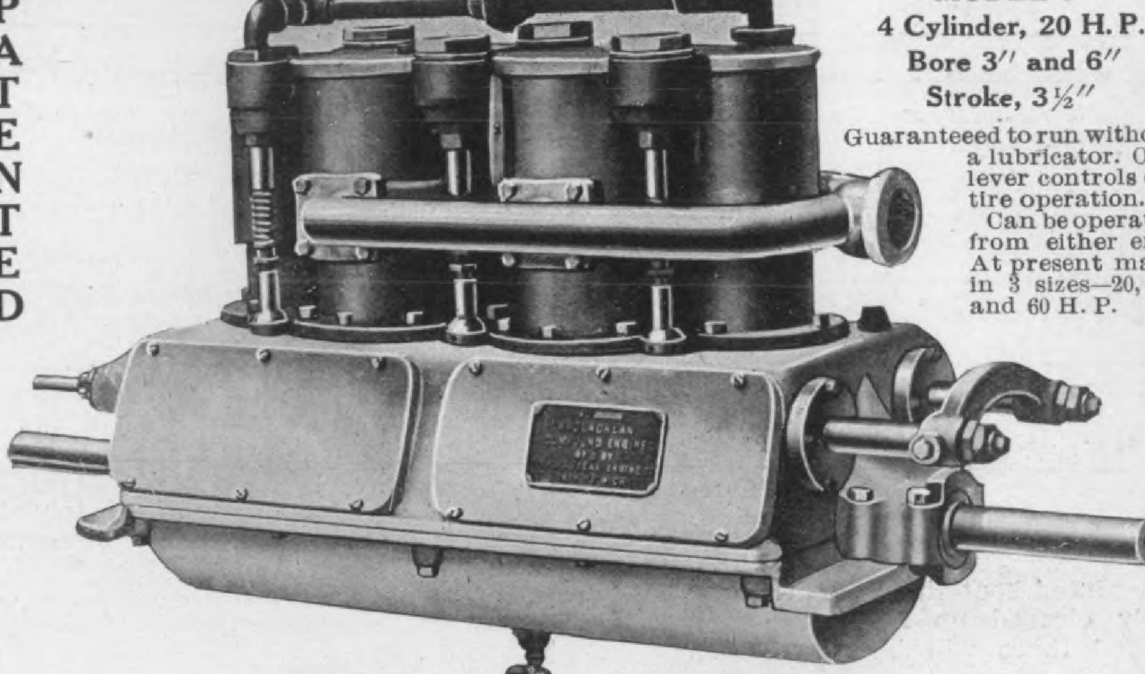


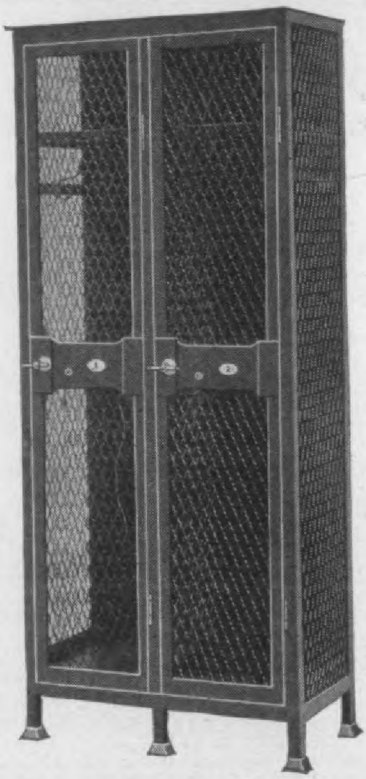
4 Cylinder, 20 H. P.
Bore 3″ and 6″
Stroke, 3½″

Guaranteeed to run withe
a lubricator. C
lever controls
tire operation.
Can be opera
from either e
At present m
in 3 sizes—20,
and 60 H. P.

MODEL C

The only single acting compound steam engine on the market designed and built for highly superheated st
and 1000 degrees of superheated steam has no material affect on this engine and does not require a thermostat reg
tion on flash boilers. Requires less space, is the simplest and most flexible compound steam engine in the world.
This engine has no receiving chambers, pipes, or any other spaces between the cylinders to absorb the heat f
the steam. Write for particulars. Manufactured by

DETROIT STEAM ENGINE CO., 15 Gilman St., Detroit, Mich.



STYLE "X"
Expanded Metal

STEEL LOCKERS

MINIMIZE INTERIOR FIRE DANGER

OUR LOCKERS ARE BUILT OF
EXPANDED METAL
OR
SHEET STEEL
AND HAVE MANY SUPERIOR POINTS OF CONSTRUCTION

WRITE FOR PRICES AND CATALOGU

E. A. DARBY COMPAN

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Marine Coming Events

ober 1.—Illinois Valley Yacht Club Motor Race.
ober 5.—Motor Boat Club of America. Mem- Race.
ember 7-14.—Annual Motor Boat Show, l Central Palace, New York. National As- ion of Engine and Boat Manufacturers.

1908.

uary 1-8.—Chicago Motor Boat Show, eum, American Association of Engine and Manufacturers. Chester E. Campbell, Mgr., k Square, Boston.
uary 14-18.—Hartford Automobile Dealers' Foot Guard Hall.
uary 25-February 1.—Boston Motor Boat Mechanics' Hall. New England Engine Boat Manufacturers' Association. Chester mpbell, Mgr.
il 6-11.—Buffalo, Convention Hall, Motor and Sportsman's Show. D. H. Lewis, Mgr.

hree Shows—One Management

e motor boat show situation has been ly cleared up for the coming sea- and there will be but one show in of the three show cities—New York, on and Chicago, with Chester I. pbell, the show expert, as general ger of all three.

e first national show of the season be at Grand Central Palace, New , December 7 to 14, under the aus- of the National Association of En- and Boat Manufacturers.

e Chicago show, under the auspices ne American Association of Engine Boat Manufacturers, is the second ne list of national shows, and will be at the Coliseum January 1 to 8, 1908. year two rival shows were held in ago, and the trade was practically di- l into factions, but the situation now been arranged to the mutual satis- on of all concerned.

e third show will be at Boston in the anics' Building, January 25 to Feb- 1, 1908, under the auspices of the England Engine and Boat Associa-

three associations have appointed Campbell as general manager, and he stablished his headquarters at 5 Park re, Boston, Mass.

U. S. Rules to be Enforced

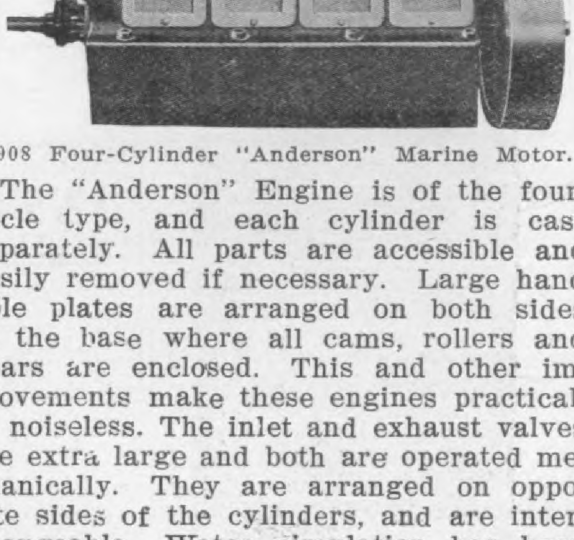
ited States Steamship Inspectors of ny have issued instructions to all own- f motor boats now skipping up and the Hudson, that the new rules re- y established for the guidance of these river craft must be faithfully obeyed. e new rules to be enforced by the in-

mouth and each boat will have a fog horn If the craft is engaged in carrying pas sengers for hire extra equipment for safety of life, such as life preservers, etc., must be carried. The operator of the boat will have to be licensed and a card copy of the pilot rules must be exhibited in a con spicuous place.

1908 "Anderson" Marine Motors

The Anderson Marine Engine Co., Shel byville, Ill., has made several importan improvements in its engines for 1908, the 4-cylinder 5x6 model of which is here shown.

By the use of a recently patented de vice, each cylinder is oiled automatically by an individual oiler, which is so de signed and arranged that it opens and closes automatically with the starting and stopping of the engine. This system is very positive and effective, and the manufacturers claim it is impossible for a cylinder to run dry as long as any oil remains in the cup. All bearings are also oiled by a positive system, and the splash system is dispensed with entirely.



1908 Four-Cylinder "Anderson" Marine Motor.

The "Anderson" Engine is of the four cycle type, and each cylinder is cast separately. All parts are accessible and easily removed if necessary. Large hand hole plates are arranged on both sides of the base where all cams, rollers and gears are enclosed. This and other im provements make these engines practical ly noiseless. The inlet and exhaust valves are extra large and both are operated me chanically. They are arranged on oppo site sides of the cylinders, and are inter changeable. Water circulation has been given much consideration, and the engine can, it is said, be run continually any number of hours without overheating any part. Cylinders and heads are cast in one

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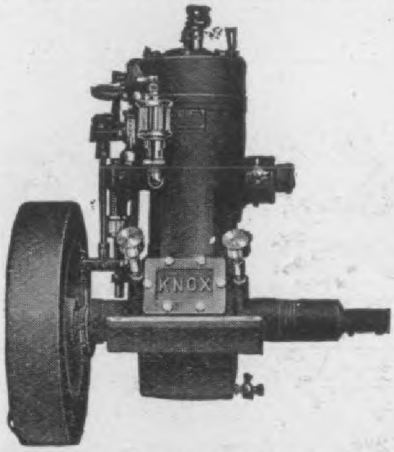
Knox Motors

Marine and Stationary.



Marine, Three Port, 2½ to 13 H. P.
Marine, Four Cycle, 20 and 40 H. P.
Stationary, Four Cycle, upright, 4, 6 & 9 H.P
Strong, Simple, Reliable, Economical.
1907 Catalogue ready.

Camden Anchor-Rockland Machine Co.

CAMDEN, MAINE, U. S. A.

BRANCHES: Boston, 226 State St.
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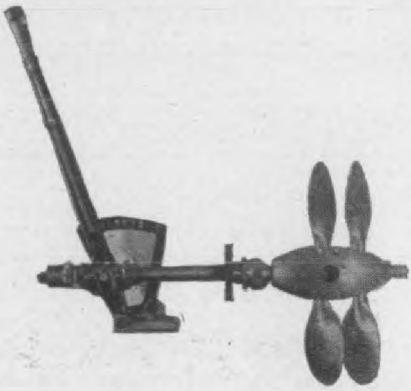
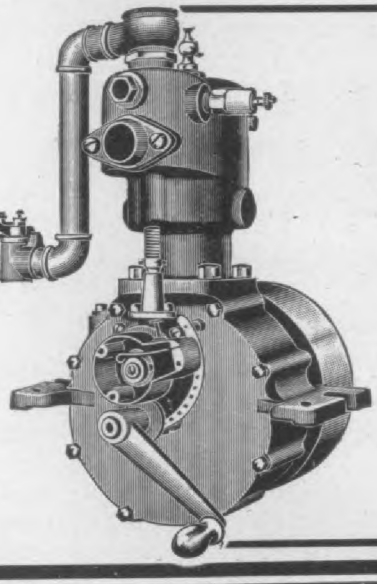


Our propeller does what no other reversing wheel or gear can do.

Write for our booklet and see what we guarantee.

C. F. ROPER & CO.

HOPEDALE, MASS.



The Most Power and Reliability ever given for the money

The "LITTLE GEM" Marine Motor

Price $100, including carburetor, spark coil and batteries. Bore 2 ⅞", stroke, 3¾", 2½ H. P.

It is the lightest and strongest motor on the market, weighing but 72 lbs. We stand back of every engine we sell.

It is impossible to get anywhere near this value elsewhere at double the price. Send for further particulars. A word to the wise is sufficient.

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THE HARRIMAN MOTOR WORKS,

South Glastonbury, Conn., U. S. A.

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MARINE ENGINE

The 2-Cycle-Engine-Sensation of the Year. Entirely new improved design introducing many exclusive features. on Gasoline, Distillate, Kerosene or Alc

Pats. Pend.

ACTUAL 2 H.P. Bare Engine $2

COMPLETE ENGINE with Fresh Water, Boat, Fittings ... $22.00

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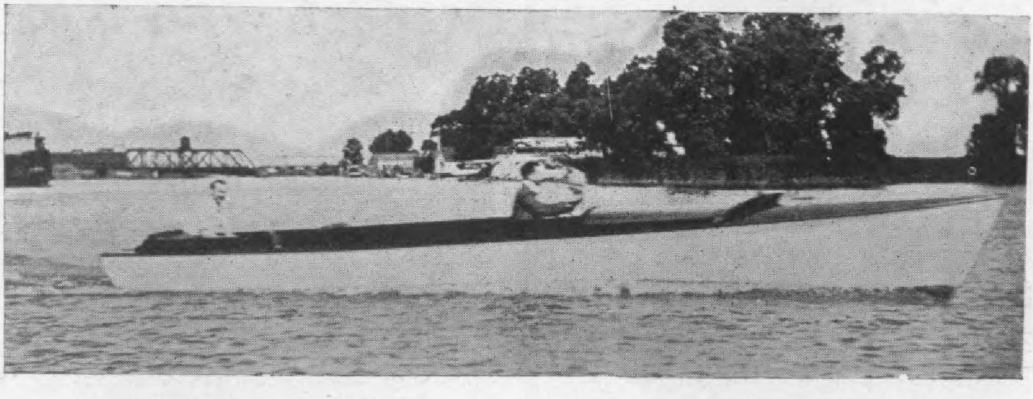
ew 32-footer, is here shown at speed. hey will make a specialty of this design uring the coming season, and already ave finished up several of them, the one lustrated having been shipt to a Palm each, Florida, customer.

New "Hunter-Weckler" Hull

Hunter-Weckler Boat Co., McHe Ill., lately put out for a Chicago man craft here shown. He uses it as a cruiser. The hull is by the Hu

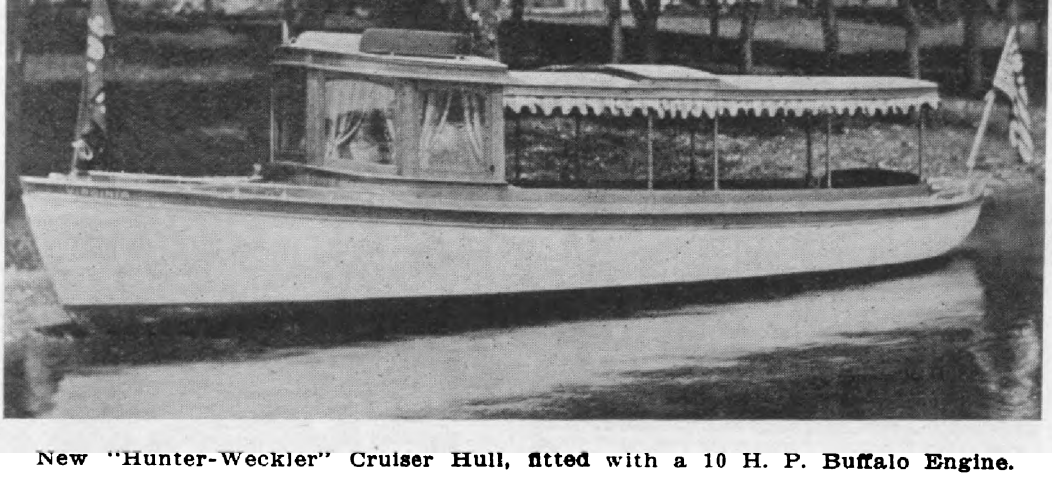


New "Matthews" 32-Foot Runabout.

This boat has a 5 feet 4 inch beam, and designed with a hard bilge line to obin exceptional stability and a full floor the cockpit. The motor is located forard under a hood, with controls and tarting connection on a bulkhead at the fter end of the hood. A seat for the perator is provided in the rear of the ood, under which the gasoline tank is arried. A thwart seat is placed at the

Weckler Company, but it is equipt wi 10 H. P. Buffalo motor, which gives speed of about 9 miles per hour.

The length over all is 32 feet and beam is 7 feet 6 inches. The decks, ering board, sheer streak, coaming, are finished in quarter sawed white The hull has a 1⅛-inch oak frame, ribs 1⅛-inch by 1¼-inch, and spaced 7 ches; ⅞-inch cypress planking, lo



New "Hunter-Weckler" Cruiser Hull, fitted with a 10 H. P. Buffalo Engine.

ern, and the balance of the cockpit left pen for the use of chairs.

The Matthews special form of construcon, with frames running from gunwale gunwale in one piece, a light outside eel and a wide inner keelson, under hich the frames are rabbetted, is used. he planking is ⅝-inch cedar, copperstened thruout. Planksheer decks

seats forward and aft of motor, whic installed just aft of the steering w forward. It is left entirely open chairs. This cruiser has proved worthy and satisfactory all round.

The Puckett Boat Works, Franklin, is making a specialty of a 22-foot launch equipt with a double cylinde

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dere is positively the
lest, smoothest run-
most powerful en-
on earth.
quality consid-
it's the lowest
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absolute satis-
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Write at once
new catalogue
ing Ten sizes,
o 27 H. P., at
s that will
y interest you.

2½ H P $60
(With complete equipment.)

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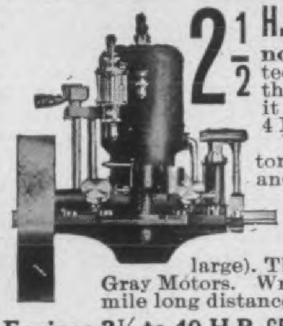
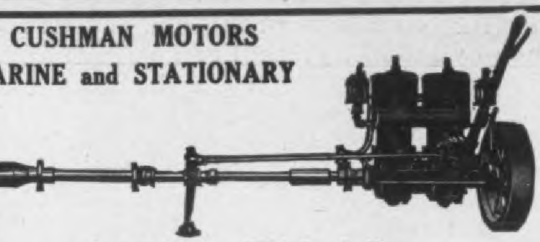
OTOR CO., 432 GUOIN ST., DETROIT, MICH.



2½ H.P. Complete Outfit $65
not bare—and guaranteed to develop more than 3 1-2 H.P.—in fact, it is as powerful as most 4 H.P. engines.
We built and equipped a new f
tory last winter—the most mode
and up-to-date plant in the world
voted exclusively to maki
marine engines. We are n
moving into another new a
larger plant—5 stories (3 times
large). This shows the enormous demand
Gray Motors. Write today for the story of the
mile long distance race on Lake Erie, also catal
Engines 2½ to 40 H.P. GRAY MOTOR CO., 28 Leib St., Detroit, Mi

CUSHMAN MOTORS
ARINE and STATIONARY



8 to 10 H. P. Weight 185 lbs.
gned for service. Material best obtainable, work-
ship unsurpassed. Cylinder, Piston Rings and Crank
t ground. Bearings hardened. Write for catalogue.
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ern Branch, J. N. LIMEBURNER, 84 Chambers St., N. Y. City.
W. W. STEPHENS, Agent, 6 Reade St., Greater N. Y. City.
n Branches: DENVER GAS ENGINE & APPLIANCE CO., Denver, Col.
SEATTLE HARDWARE CO,, Seattle, Wash.

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ONE WAY
Clutches

Send for
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MARINE
SPECIALTIES
SNOW & PETRELLI MFG. CO., New Haven, Conn.

Perfection

MARINE MOTOR

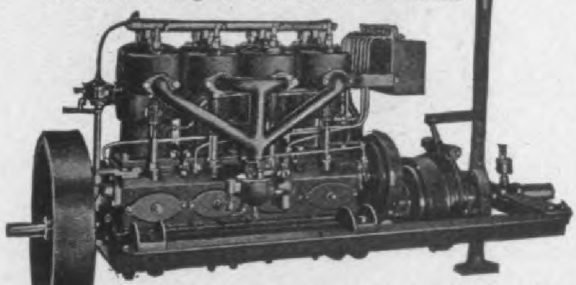
For real service, for looks, finish and power the Perfection beats any motor ever sold at anywhere near its price—can't be beaten at any price.

2 H P $45 COMPLETE

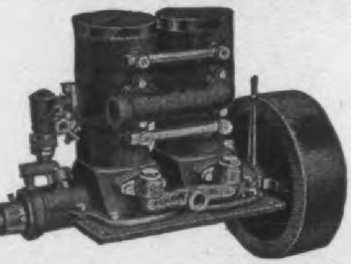
Simple, speedy, reliable and reversible. No cranking. Price is for engine complete with full boat equipment—NOT BARE. Fully guaranteed and backed by one of the largest plants in the business. Send for handsome catalog of all sizes.

CAILLE PERFECTION MOTOR CO.
1303 Second Avenue, Detroit, Mich.

IF you want a high grade boat outfit, write for illustrated catalogue. Our motor boat outfits



are light in weight, reliable in operation, and are built for fast hard work, with the least vibration and noise. Sizes 6 H.P., 22 H.P., 40 H.P. and 50 H.P.
F. A. SEITZ CO.
151 Frelinghuysen Ave. Newark, N. J.
Agents Wanted



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"WATKINS" ENGINES

have kept pace with the march of motor boat progress They are, and always have been, practically perfect in durability, quality, design, material and workmanship. They are engines of unquestioned reliability. Our catalog is yours for the asking.

THE FRANK M. WATKINS MFG. CO.
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e motorboat races of the Naugatuck
ey Motorboat Club, at Derby, Conn.,
ust 24, were a success. The 25 mile

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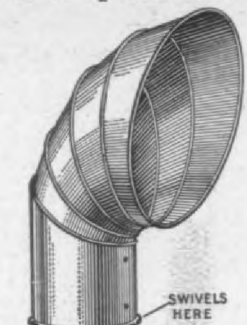
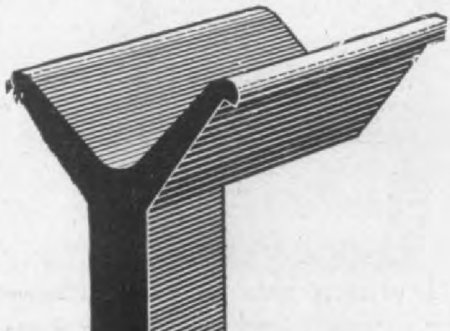
High Grade Marine
and Auto Engines, 2



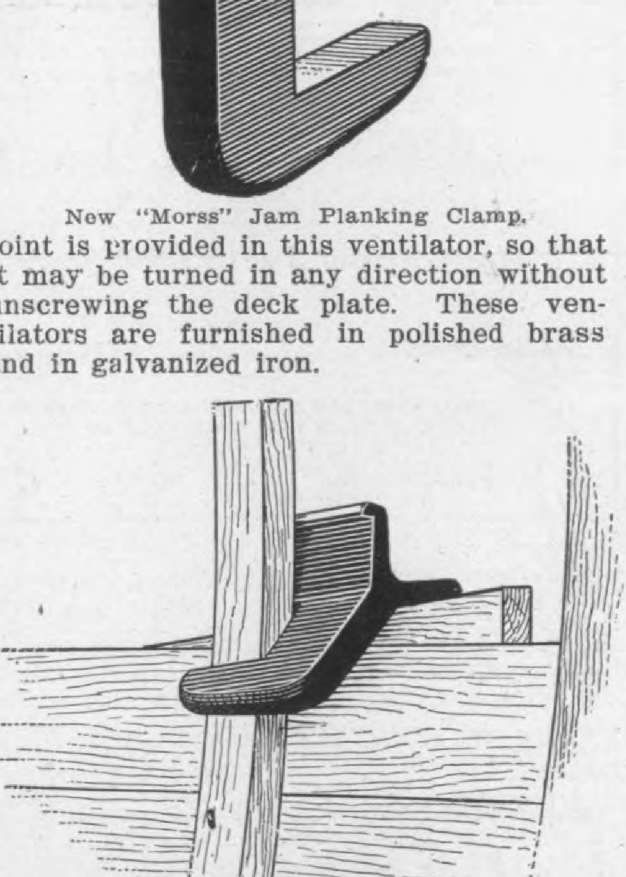
The New "Morss" Ventilator for Motor Boats.

rade, which are here illustrated. One is a ventilator of handsome and efficient design. It is fitted with deck plate and may be removed when not needed, the orifice being closed by a screw cap. A swivel



New "Morss" Jam Planking Clamp.

oint is provided in this ventilator, so that t may be turned in any direction without nscrewing the deck plate. These ventilators are furnished in polished brass nd in galvanized iron.



so that the plank will not slip up
thus makes a backing for a wooden we
As the wedge is driven it forces
plank down against the one beneath,
making a tight seam.

The clamps are made of tough cast
enameled, and six sizes are furnishe

1908 Changes in "Moore" Engin

Palmer-Moore Engine Co., 313-317
Washington street, Syracuse, N. Y.,
made several improvements in
"Moore" marine motors for 1908,
chief changes being in the method o
ing the connecting-rod and the shap
the cylinder-heads. Formerly the c
der-head bolts went thru the water-ja
but a change has been made to allow
passing thru solid stock, while at
same time preserving a sufficient w
jacket in the heads. This is a decide
vantage when salt water use is co
ered. In oiling the connecting-rods
employ the pump principle as made p
ble by their cross-head guide cons
tion to force the oil thru the rod itse
to the bearing. The oil-cup is located
the bottom of the cylinder, and as fa
can be seen there is no connection
tween the cup and the rod, yet the
tem is said to work perfectly, and is
neat and attractive in appearance.
makers have thoroly tested its effici
during the last two months.

Petoskey Boat Co., Petoskey, M
builds a large number of motor boat
cluding several stock designs 16 t
feet in length. One of their leaders
21 feet by 5 feet boat which is equipt
a 4 H. P. single cylinder motor, at
or a 6 to 7 H. P. double cylinder mot
$400. The same type of boat 18 feet
and fitted with a 3½ H. P. motor lis
$250, and the smaller launches lis
$125 and upwards.

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CYCLE AND

AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 5. PHILADELPHIA AND NEW YORK NOV. 1, 1907

October Edition, 20,097

16,353 Copies mailed.
4,783 Copies Delivered to News Company.
1,207 Copies to Philadelphia and foreign, etc., under stamps.
400 Copies held in reserve.

22,743
2,646 Back numbers sent out.

20,097 Total copies October edition.
Of these
12,209 Were paid subscriptions.
4,783 Delivered to News Company.

16,992
934 Returned to News Company, to October 19, 1907.

16,058 Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the October issue was 20,097.

Of these, 20,953 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 20½ ounces, representing 16,353 copies, and 2,646 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

New Jersey Club's 24-Hour Endurance Run

New Jersey Automobile and Motor Club's 24-hour race set for Friday and Saturday, November 15, and 16, will be merely an endurance contest on a twenty-four hour schedule. The route as laid out will be covered twice in the two days, and will take the contestants over 94.4 miles. Consumption of gasoline and oil will not figure in the awards, but the contestants will be scored for repairs and replacements and for tardy arrivals at controls. In this run the cars will be considered in one class, the division of touring cars and runabouts not being made.

Coming Events

November 2-9—A. L. A. M. Show, Madison Square Garden, New York.

November 9-16—Annual Show, Philadelphia Auto Trade Association.

November 15-16, Newark, N. J., New Jersey Automobile and Motor Club's 24-hour endurance contest.

November 11-23—Olympia Motor Show, London, Society of Motor Manufacturers and Traders.

November 12-December 1—Paris Show, Grand Palais and Place Des Invalides, A. C. of F.

November 22-30—Stanley Automobile Show, London, Eng.

November 25-30—Auto Show, Baltimore, Md., Auto Dealers' Association.

November 29-December 6—Chicago Automobile Parts Show, Casino Garden.

November 30-December 7—Chicago National Automobile Show, S. A. Miles, Mgr., 7 E. 42nd St., New York City.

December 5-22—Touring Car Exhibition at Berlin, Germany, under direction of Kaiserlicher Automobile Club.

December 14-21—Local Show, St. Louis, Mo., Auto Manufacturers' and Dealers' Association.

December 19-22—Commercial Vehicle Exhibition at Berlin, Germany, under direction of Kaiserlicher Automobile Club.

December 21-January 2—Automobile Show, Brussels, Belgium.

December 26-28—Reliability Trials of the South Indian Motor Union.

December 28-January 4—Importers Salon, Madison Square Garden, New York City, C. R. Mabley, Sec. and Mgr.

1908.

January 18-February 2—Fifth International Auto Exposition, Palace of Fine Arts, Valentino Park, Auto Club of Turin, Italy.

January 4-11—Dublin Show, Ireland.

January 14-18—Automobile Show, Foot Guard Armory, Hartford, Conn.

February 10-15—Detroit, Mich., Tri-State Automobile and Sportsmen's Association's Show in Light Guard Armory.

March 7-14—Sixth Annual Auto Show at Mechanics Building, Boston, Mass., Boston Automobile Dealers' Association, Chester I. Campbell, Mgr., 5 Park Square, Boston.

March 9-14—Buffalo, N. Y., Automobile Show, Buffalo Automobile Club, 760 Main St., Buffalo, David H. Lewis, Secretary.

March 20-28—Automobile Show, Liverpool, England.

March 21-28—Cordingly Show, London, England.

March 21-28—Auto Show, St. Lawrence Rink, Toronto, Canada, M. Jaffry, Mgr.

March 26-April 24—Second Annual International Commercial Vehicle and Motor Boat Show, Olympia, London. Society Motor Manufacturers and Traders.

April 5-12—Third Annual Automobile and Sportsmen's Show, Montreal, Canada. Arena. M. Jaffry, Mgr.

April 16-11—Second Annual Show of the Pittsburg, Pa., Automobile Club.

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A Criticism

To the Editor:—

In your issue of September 1st, under the title of "Considerations of Motor Car Elements," Mr. Hugh Dolnar criticises the design of speed indicator driving.

We are well aware of the difficulties connected with the driving of speed indicators from the front wheel, but we do not agree with Mr. Dolnar when he stated the rear axle as the initial point of drive fills all conditions.

The first instruments which we attached to motor cars were driven just as Mr. Dolnar suggests, by bevel gears (incased) and solid shafts, the drive being taken from the line shaft directly back of the change gear box. This drive would seem to be ideal, and we were very much surprised when the owners of these cars complained that the odometers did not always show the same distance between certain points. We investigated this carefully and found that the error was caused by the slipping of the rear wheels on mud and ice. One of these gentlemen while driving his car in the early part of the winter with a friend, overtook a farmer with a load of hay. As it was impossible to pass at that point, he slowed up and remained behind the load of hay. His friend suddenly remarked: "That farmer has a fine team; they can walk ten miles an hour." He answered: "Impossible. Why do you think they can walk ten miles an hour?" He replied: "Your Auto-Meter indicates ten miles, therefore, they must be going at that rate." As they both knew this could not be a fact, they investigated and found that the rear wheels were turning much faster than the front ones, the road at that place being covered with an inch or two of mealy snow.

After this experience we never attempted to drive from the rear wheels, as it was fully demonstrated that an accurate instrument must be driven from the front wheel.

Mr. Dolnar also states that an indicator could be sold for a lower price if there was not so much trouble with the drive; this is possibly true, but if driven as he suggests it would require an entirely different arrangement for every different make and model, and the cost would be greater than at present.

Our company has devoted a great amount of time and expense to the drive of the Auto-Meter, and we believe that we have as nearly perfect a drive as it is possible to make at the present time. By the use of self-cleaning spur gears on the wheel and a pair of hardened spiral gears enclosed in an aluminum case on the knuckle, and a swivel joint at the lower end of the shaft, which does away with bending of shaft when steering the car, we have eliminated most of the trouble which arises from ordinary use. We cannot, however, guard against accidents which wreck the wheel or axle and steering gear.

Mr. Dolnar says he does not know of one speedometer shaft which went through the Glidden Tour in good shape. This may be true, but the Auto-Meter had a good number which were in perfect condition and registered accurately at the end of the tour. The Auto-Meters on the following cars were in perfect condition: 10-11-13-14-16-17-25-27-29-33-37-39-44-48-49-51-52-54-58-60-90-100-106.

Yours very truly,
WARNER INSTRUMENT CO.

Stock Car Race Next Spring

At a recent meeting in Hotel Astor, October 15, of those interested in a stock tour car race over the highways, it was decided to hold such an event next spring. The event will be of international character and will be run under the sanction of the American Automobile Association, altho managed by the Metropolitan Automobile Association. Plans of organization offered by Mr. Morrell, ex-chairman of A. A. A., were agreed upon by those present. All conditions for the contest are to be determined by the Rules Committee. Those present were organized into a committee to inspect the various routes under consideration. and also other routes that were suggested at the meeting.

Germany Wins International Balloon Race

Pommern, the German contestant in the International long-distance balloon race starting from St. Louis, Mo., Monday, October 21, landed at Asbury Park at 8.45 A. M., Tuesday, October 23, after an aerial flight of 885 miles, thereby winning the first prize of the International Aeronautic Cup and a cash prize of $2500.

On Octobber 23, the last day of the St. Louis aeronautical carnival, Lincoln Beachy, of Toledo, Ohio, won a prize of $2000 with his four-cylinder gasoline propellor airship, sailing to the windward and return over a course of one and a half miles. He covered the course in four minutes and forty seconds.

Get descriptions of all 1908 cars by subscribing for the Journal, and having your subscription start with the June number in which the first 1908 car descriptions appeared. We have some of the last five issues on hand in which over fifty 1908 cars have been described, and will include them in new subscriptions as long as the supply lasts. Send $2 now, and be sure of these valuable numbers, as well as the December and future important numbers. Cycle & Automobile Trade Journal, Forty-ninth and Market streets, Philadelphia.

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Bay State Gymkhana

The Bay State Automobile Association's second annual gymkhana held at the Newton Athletic Grounds, October 12, proved very successful. Walter Schmunk driving a White steamer won chief honors of the day, he having succeeded in capturing first place in four of the contests.

The contestants in the cigar race were required to start their cars at given signal, drive to a barrel stop, dismount, and take a match, remount and drive to another barrel, take a cigar and light it, and then drive once around the quarter-mile track.

Schmunk's time was 58 2-5 seconds, two seconds better than that of his nearest competitor. Mr. Schmunk also won the backward driving contest, circling the track in 44 3-5 seconds. Mr. Schmunk's third victory was in the barrel-touching event, in which he touched all the barrels in 2.13 1-5 seconds, and his fourth victory was the barrel knocking over contest.

The twelve-miles-an-hour was won by Harry W. Knights in Pierce Arrow. The brake test, in which contestants were required to stop on signal while moving at 15 miles an hour, was won by John L. Snow with his Peerless, which he stopped in 18 feet, 4½ inches. Ralph Coburn with a Maxwell was second, stopping in 21 feet 4½ inches. The obstacle race went to Ralph Coburn with his Maxwell.

Continual Increase in Exports

Exports for August, 1907, in automobiles and parts, show an increase of $39,391 in value over those of the corresponding month of 1906.

	August 1906	August 1907
Automobiles, and parts of	.....	.....
Exported to—		
United Kingdom	$122,630	$129,300
France	15,250	45,385
Germany	7,569	8,093
Italy	1,125	436
Other Europe	7,280	18,011
British North America	150,210	135,905
Mexico	103,498	34,488
West Indies and Bermuda	12,159	56,372
South America	12,093	25,050
British East Indies	2,228	7,239
British Australasia	11,124	40,637
Other Asia and Oceanica	20,099	3,656
Africa	209	25
Other countries	1,657	1,925
Total automobiles, and parts of	$467,131	$506,522

Nashville Meet

At a recent meet at the Cumberland Park course, Nashville, Tenn., Lewis Christie Strang, driving Walter Christie's racer covered a mile in 54 seconds.

The summaries: Two miles, open to touring cars; first heat—Joe Yowel's Pope-Hartford won. Time, 2.55.

Second heat—Won by Newman Hill's Pope-Hartford. Time, 3.00.

Third heat—Johnny Green, driving Oldsmobile runabout, first. Time, 5.04, for three miles.

Final heat—Wayne substituted for Oldsmobile, driven by Johnny Green, first. Time for five miles, 8.53.

Time of trial by Lewis Strang, driving Christie's car, .57, .55, .54.

Chicago Fall Meet

Chicago Automobile Club's twice postponed fall meet, was at last held at Harlem track on Saturday, October 12. Nine events composed the meet. The half hour race, reduced from an hour was won by 20 horse-power Cadillac, covering 23¾ miles. C. W. Van Sicklen riding an Indian, won the ten mile open, the ten mile handicap and the three mile open motorcycle events. Following are the winners:

Ten-mile open motor cylce race for machines of 30.65 cubic inches' capacity, standing start—C. W. Van Sickle. Indian. Time, 12.46.

Three-mile, free-for-all for cars, listing at $1,500 and under—R. L. Bartol, 15 H. P. Ford. Time, 4.40.

Five-mile race for runabouts or roadsters listing at $3,000 and under—George Farnsworth, 20 H. P. Cadillac. Time, 6.36.

Three-mile open motor cycle race for machines with 30.65 cubic inches' capacity—C. W. Van Sickle, Indian. Time, 3.49 4-5.

Five-mile Chicago Automobile Club members' race, contestant coming closest to 12 minutes for 5 miles to win—W. G. Lloyd, Jr., 20 H. P. Stoddard-Dayton. Time, 11.57 2-5.

Pursuit race for stock cars—Charles P. E. Schilpp, 45 H. P. Stearns six. Time for 4 miles, 3.58.

Ten-mile free-for-all, flying start—Charles P. E. Schilpp, 45 H. P. six-cylinder Stearns. Time, 10.22.

Half-hour race, reduced from 1 hour—George Farnsworth, 20 H. P. Cadillac, distance 23¾ miles.

Ten-mile motor cycle handicap—C. W. Van Sickle, 2.30, Indian. Time, 11.00.

Chicago's Proposed Three Day Run

A three days' reliability run covering 600 miles is the latest project of the Chicago Motor Club. The dates selected are Tuesday, Wednesday and Thursday, November 26, 27 and 28, during the week preceding the Chicago show.

The first day will be to South Bend, Ind., and back; the second day to Milwaukee and return, and the third day to Rockford, Ill., and return. Three classes will be provided, cars selling at $1,500 and under; cars at $1,500 to $3,000, and cars over $3,000.

Hartford (Conn.) Automobile Dealers' Association will hold their coming show in Foot Guard Hall, January 14-18.

Low rates to New York City, on all the principal railroads east of the Rocky mountains, including the Canadian provinces were secured by the American Motor League for its members during the automobile shows in New York City.

The show committee for the Importers Salon, to be held in Madison Square Garden, New York, December 28 to January 4, announces that it has found it necessary to utilize the entire Mezzanine balcony, as well as the platform to accommodate the accessory exhibits.

Two shows will be held in Detroit this season. The Detroit Automobile Dealers' Association will hold its show in Riverview Park Auditorium, December 9-16, and the Tri-State Auto & Sportsman's Association will hold a show at the Light Guard Armory, January 10-15, 1908.

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"America's Best"

THE 1908 LINE

—OF—

"R-S" MOTOR CYCLES

Will Be Exhibited At The

NEW YORK AUTOMOBILE SHOWS

GRAND CENTRAL PALACE

Oct. 24th to 31st.

GALLERY FLOOR, - SPACE "D"

—and—

MADISON SQUARE GARDEN

Nov. 2nd to 9th.

SPACE No. 244 - BASEMENT.

and we cordially invite our patrons and interested parties to inspect our exhibit.

Reading Standard Company,

READING, PA.

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TRADE JOURNAL

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Philadelphia, November 1st, 1907

The Early Automobile Show

For several years there has been an agitation among the members of the trade for an earlier show date, when the weather conditions are much more favorable and there is time for the manufacturers to prepare for early deliveries in the spring. The early date also allows many purchasers to obtain closed body cars for use during the winter months.

Altho many of the manufacturers were somewhat taxed to prepare for the show this year, it opened promptly on time with practically all exhibits complete and it is evident that in succeeding years, if the early date is adhered to, there will be no difficulty in preparing the exhibits by the latter part of October. As the cars change less and less each succeeding year there has been more agitation for the abolition of yearly models, and it has been advocated very strongly from certain quarters that the changes which are made be placed upon the cars as soon as perfected, regardless of the season. Altho this appeals to many, it is very evident that just as long as the public desire a yearly show the manufacturers will be more or less forced into reserving for first appearance at the show the new features which they are incorporating in their cars. The present automobile, contrary to the belief expressed by many, has not reached finality of design; the high wheel type of car is at the present time passing thru successive stages of evolution, and is destined more or less to effect the general design of the American automobile. In all probability several years will pass before these vehicles reach anything like finality of design, and their influence is already beginning to show in the design of the older and better known automobile types. Larger wheels are much in evidence, and particularly in the smaller and more medium priced cars the constructions are more nearly approaching high wheel designs. The clearance on all of the cars is somewhat greater than in previous years.

It was expected that the high wheeled vehicles were simply for the West—strictly a Western product, but anyone visiting the present New York Grand Central Palace Show could not help but be imprest by the number of high wheeled vehicles there shown. This is significant, as it points clearly to the fact that these cars are already entering the Eastern field, where it was considered they were not a necessity owing to the better condition of the roads in this part of the country as compared to the West. Even at the recent carriage show in New York, several vehicles of this type were shown, and from the records it will be found that many of them were sold to Eastern users.

Taking into consideration the changes which are shown at the present exhibit, it is very evident that for some years to come makers will be of necessity forced to have yearly models. However, the era of finality in motor car design is not far in the future, as is shown by the fact that many of the older established reputable firms have practically made no important changes for at least two and in some cases three years.

The Hand Writing on the Wall

It is matter of surprise to some at least, intimately connected with the production of American automobiles that so few of our well known manufacturers are reading "the handwriting on the wall" which only too clearly indicates the fact that the enormous field for commercial vehicles is almost ready for the harvest. In the construction of our pleasure vehicles there is no question but that many successful American manufacturers took their cue directly from European practice. If anything is clearly shown by European practice at the present time, it certainly is the fact, that commercial vehicles are not only rapidly increasing in numbers, but are in many cases considered an absolute necessity to the large houses of Europe. It is not unusual to see an entire block lined closely with gasoline de-

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livery wagons belonging to a single concern, and it is a well known fact that these vehicles even in competition with the cheapest class of delivery are not only holding their own, but are showing an ever increasing balance on the right side of the ledger.

One line in particular has already shown itself to be of great value, namely the town cab. In Europe these vehicles are every day increasing in numbers and their popularity seems to be unabated. So far in this country very little attention has been given to gasoline cabs, and only one or two manufacturers are making any marked effort to prepare for the production of such cars. If the American manufacturer would follow as closely the trend in the commercial vehicle line as was done in connection with pleasure vehicles, it would be possible to place very soon upon the market trucks which would compare favorably with the product of many of the older concerns of Europe who have had several years experience in this line of building and the discrepancy in the time at which the Europeans and the manufacturers of this country started in the manufacture of the self-propelled vehicle would be largely made up.

The construction of commercial vehicles, as far as heavy work is concerned, is an entirely separate and distinct problem, to that of the manufacturer of the successful pleasure car, and much time and money are required to develop a reliable truck. In the field of light delivery the contrast in the commercial and pleasure vehicles is far less marked and the transition from the manufacture of one to that of the other is comparatively easy, but no greater mistake can be made than to attempt to apply to large trucks the same type of chassis which gives the most successful results as a parcel delivery vehicle.

Manufacturers of large European trucks are already investigating the American field and making preparations to place lines of their vehicles in this country, and unless the American manufacturers speedily prepare for the demand, which is already beginning to rapidly increase, they will not be ready to supply well tried and thoroly efficient vehicles, capable of competing with the cars from abroad, some of which have been tested in actual service for many seasons.

All the foreign automobile shows, like our own, are also scheduled earlier than usual this year. The show in Copenhagen, Denmark, runs from September 28th to October 7th. The big English show, held in the Olympia, London, is billed from November 11th to 23rd, and the rival show, the Stanley Show of London, opens in Agricultural Hall, November 22nd, closing November 30th. The Paris show, under the auspices of the Automobile Club of France, has its Exposition Decenniale de L'Automobile, in the Grand Palais, and Esplanade des Invalides, running from November 12th to December 1st. The German show in Berlin opens December 5th and closes December 22nd. The Italian show at Turin, Italy, opens January 18th and closes February 2nd.

Trade Journal's Information Bureau

The Cycle and Automobile Trade Journal in order to assist in making the shows more successful, will inaugurate an Information Bureau and an Appointment Bureau at their booth, located on the Main floor of the Grand Central Palace and in the Basement at Madison Square Garden, near the entrance in each case. Information can be secured as to the whereabouts of any person, and messages delivered or appointments made.

Italian Garden Effect for Madison Square Garden

The decorative scheme for the annual show of the Association of Licensed Automobile Manufacturers, in Madison Square Garden, November 2-9, has been decided on. The color scheme will be gray, crimson and white. The setting will be that of an Italian terraced garden. Altho there will be some statuary and staff work there will not be as much as last year, thus allowing more space and adding to the out of door feeling. There will be no starry sky overhead, but the girders of the big dome will be screened by a canopy of soft material of a rich warm gray tone.

Some twenty-five American makers will produce six-cylinder cars for the coming season. Eleven of these models will be shown at the Licensed Makers' Show in Madison Square Garden, New York. The lowest priced one costs $3,500, and the highest priced, $6,500.

This and the last issue of the Journal have dealt with the New York Shows. In the next issue we will describe all new things exhibited at Madison Square Garden not described in this issue, and in addition will publish a forecast of the Chicago Show. The succeeding issues will also have important features. The January issue will contain the Eighth Annual Buyers' Guide, the February number will be the Boston Show number, and the March number the Eighth Annual Complete Vehicle Review. If you are interested in the developments in the motor car industry, you cannot afford to miss any of these great features. To insure the regular receipt of the Journal send $2 at once for your subscription. Cycle & Automobile Trade Journal, Forty-ninth and Market streets, Philadelphia, Pa.

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New York, October 24 to 31, 1907

As far as could be judged on the opening ening of the A. C. A. and A. M. C. M. Automobile Show, held in the Grand ntral Palace, New York, the interest d enthusiasm of the general public has t abated and has not been dampened the least by the early date. The usual stle and rapid work preceeding the ivate view in the afternoon of the 24th r the A. C. A. members and their friends, rned the chaos of partial exhibits, boxes, rniture, railings and decorations into a easing and orderly show exhibit. This resto" transformation is one of the most markable features of the New York itomobile Shows.

It is needless to state that the exhibitors both complete cars and accessories were mewhat pushed in order to have their w products in shape for this show, but was also noticeable that on the opening ening practically every exhibit was mplete with very few exceptions, in fact, e exceptions were even fewer than in evious years, and it is unquestionably ue that another year, with the present perience in view there will be no more fficulty in completing the models for ows at this early date, than was formerly perienced in getting ready for the mid-nter shows.

In spite of the financial flurry wh seems to have particularly affected N York City, the buying public and th who showed by their evident interest the various models that they were inte ing to purchase, were out in force.

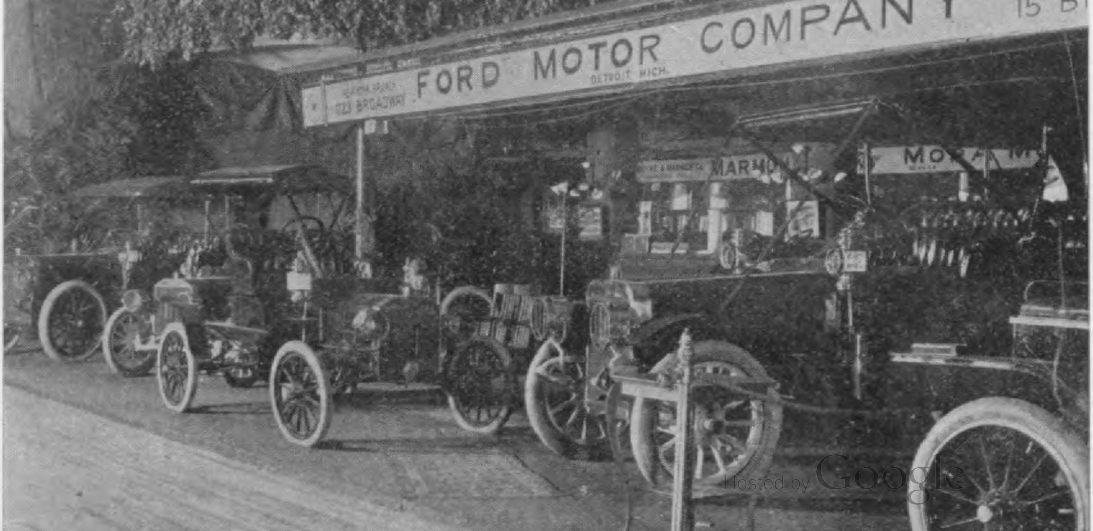
Altho the scheme of decorations is in any way elaborate, yet it is of such nature that the building has been tra formed without the fact being too pro nent or calling attention particularly the decorations. The general effect that of autumn scenes, this being produ by a lavish use of branches and ma tinted autumn leaves. The posts and ot portions which would otherwise be trusive, have been neatly covered in d green, and each exhibit is carpeted in s able red, while the divisions between hibits consists of brass posts with gr rope tretched between. The signs uniform in gold, white and brown. At end of the main aisle, as usual, the c emblem blazes forth in immunerable e tric lights, adding a pleasing glow to entire scene at night. On the whole, show looks extremely business like the information obtained at this ea writing, from the exhibits as would t to bear out in fact, this appearance.

A large part of the space in the build

The Changes of a Year

Iot since the early days of the indus- has there been such diversity as ap- rs at the "Palace" show, and yet this ersity, unlike the diversity of old, is a groping after something unknown; is the expression of a definite purpose no longer cater to a single class, but supply the variety of needs that diver- ed tastes require. Proof of this is inly seen in the fact that many cars w no change whatever except possibly ior refinements; while by their side m the same factory is a widely differ- construction in an entirely new model another class of trade. It is partic- rly true that those makers who have the largest measure of success in the t have been most careful not to nge and jeopardize that success by un- ven radical features. This policy is t also for the buyer, for he knows t the article he buys is not a ques- nable one to be tested at his ex- se, but that it is just what it is rep- ented to be and that he can depend on ting just what he bargains for. And s is as it should be, a sane condition the business. It betokens the passing the fad and the entry of the auto into ctical usefulness rather than, as in the t, largely a thing for ostentation.

n general the changes fall into four sses, viz., limousines, runabouts and gies by shape; and six cylinder-mo- ed when classified by this feature. The rease in the representatives of these sses is evident at once. But the diver- goes even further. It may be seen n the high priced Glide, Chadwick, Na- driven into said bonnets, mark two e tremes of the runabout class. Yet bo have their market with neither maker i terfering with the other. Between the extremes are many fine examples of th class. The friction drive Lambert is o and is doubly interesting because for many years its designer has firmly sto by his belief in this form of drive. Em nating from the Mississippi valley, it h slowly worked eastward and has at la won a place alongside the geared c even in rough and bad roads where was formerly predicted this drive wou fail. That it has not failed simply prov that everything has a place and is right in that place if properly design and built. Counting the motor buggi the increase in this form of drive ov previous shows is remarkable. The E ansville and the Cartercar are exampl of the application of the friction type drive to more expensive runabouts whi the Gearless depends on friction in slightly different form, the surfaces he being true rolling cone surfaces and t rollers simply taking the place of plan tary gears. The Ford runabout is we known, but the Brush is new to many a has a number of new features; its spir springs, solid tires and left side contr all being noticeable at a glance. The ha dozen motor buggies really require a se arate description, for they are really a class by themselves, altho much mo strictly runabouts than many speed ca so called. The pioneer Holsman is amo the number and the variations of its f lowers show in many points the mot car influence frequently to the detrime



ain that the horse vehicle having given tisfaction for generations may be a safe ide.

In touring cars generally, there may noticed much refinement. Better hous- g of the gears; simplification of the oil- g system, doubling of the sparking sys- m from the plugs to the electric source, e use of magnetos, lower hung bodies d increased wheel sizes are all in evi- nce. A number of frames are raised er the rear axle, not with a mere trace a curve or taper but with a bold rise six or more inches. In the American e entire frame is underslung and hangs om the half elliptic springs instead of sting upon them. The effect at first ght is odd, yet it is not freakish, and sitors pass by it without noticing that is other than a low hung chassis. It rtainly gets the weight low and should a valuable contribution to speed and fety over bad roads. It rather con- ibutes to accessibility, for the frame annels are below the mechanism in- ead of above it, and so are more out the way. Better fan mounting, posi- ely driven centrifugal pumps, larger diators, larger exhaust pipes and muff- rs, larger brakes and clutches are in ev- ence. In fact it is beginning to be evi- nt that the brake matter may be over- ne and that there is no more need for plication of brakes to insure certainty an for the duplication, for example of past for "emergency brakes" should been met by better quality instead of greater quantity. The lesser number mits the costs of both making and ma taining to be less, and that is a thing moment to both maker and user. Weig have been reduced in may places with creased power and efficiency; the bet steels available have contributed to p of this and better designs to the mainder. The motor has been much proved by housing many of its parts, often by putting the valves in the h and by the use of an overhead shaft wh it is not housed. The overhead sh avoids the use of a lot of push rods, it is certainly much better to run a sin drive to the top of the motor than ma rods, altho the lubrication of the o shaft adds itself to the opposite side the balance. Three quarter platfo springs tend toward easier riding an saving of tires and seem to be gain Quick detachable tires seem to have m more progress than removable rims. M guards are more continuous than ever, in many cars practically exclude n from below, being continuous from side of the car to the other and join both running boards to the frame, guards curved in cross section are ga ing. Much more could be said did sp permit, but in short, refinement of det and adaptation of the product to varied needs of the market is the keyn

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Significant Exhibits

HIGH WHEEL CARS.

he only high-wheel car shown at the ace in 1907 was the Holsman, opposed -inch cylinders, 12 H. P. motor, d tires, wheels 44 inches front and 48 nes rear, one model only, 3 passengers one seat, price $750. This was the t appearance of a high wheel car at Iew York show, tho the Holsman had n in successful manufacture since 1902 sold about 1 000 cars in 1906.

he unexpected 1907 show event came Chicago, where some eight or ten dif- ent high wheel models, previously un- wn to the public, were on view.

he present 1908 Palace exhibits display less than seven different exhibitors of h wheel cars, showing a large number different models of two and four pas- ger bodies, priced at from $400 to 00. This very striking development exploitation of the low priced, high eel car must be regarded as the most lly significant of all the indications of 1908 Palace Show. All of these high eel cars have horizontal opposed cylin- motors and all or almost all of them air cooled. Very large numbers of high wheeled cars will be built in 8, making motorists of many thousands farmers who have before been bitter onents of the automobile; and creat- a local demand for good roads hith- unknown.

is not too much to say that the high eel car is the most potent agent of tor car advance, motor car price reduc- and motor car popularization in evi- ce at the Palace Show, and that from far-sighted point of view, the high in motor car design and construction muc more distinctly than the licensed associ tion display, which exhibits progress alon conservative lines closely constrained b precedent and conventional tradition.

Granting the truth of this broad stat ment, the Palace Show exhibits indica a yet existent belief in the value of stea for motor car driving, a very rapid in mediate increase in the employment the 2-cycle motor, a greatly increased us of air cooling, the probable adoption the hammer spark and magneto ignitio and an enormous production of high whe cars which must surely work towards pri reductions in all grades of cars now so at $2,000 and under, besides hasteni the day of good roads and of the frien liness of the farmer towards the mot car.

AIR COOLING.

The Marmon car exhibit, by the No dyke-Marmon Company, includes a wat cooled motor at this 1908 show, tho u to this time the Marmon motors ha been exclusively air cooled.

The Marmon Company shows thr models, Model H, a 5 or 7 passenger tou ing car, motor four cylinders, 5x5, tande 4-cycle, water cooled, 45 H. P., or four c linders, two set at 90 degrees to the oth two, 45 degrees each side of vertica plane, a 5x4½ inches, 40 H. P. air coole this chassis is also fitted with a 3 or passenger roadster body. The third Ma mon car is Model G, a 5 passenger ca 104 inches wheel base with the same fou cylinder air cooled motor, 40 H. P., spe ified as alternatively fitted to the Mod H chassis.

It will be seen from this list of Marm 1908 cars that the Marmon engineers ha not yet relinquished their preference f

ate the superiority of air cooling.

While several low wheeled cars changed om air cooled to water cooled motors 1907, this seeming turn towards the nal exclusive use of water cooling is far ore than met by the great numbers of r cooled motor driven high wheel cars hich will be made and sold in 1908.

These air cooled high wheelers all cool e cylinders well, and the good 1908 perormance of many thousands of air cooled pposed cylinder motors cannot fail to reatly influence the cylinder cooling ethods of car motors in general.

It is well known that water cooling inludes many vexatious features, and that ome of the four vertical cylinders airooled motors are wholly satisfactory to eir users.

THE 2-CYCLE MOTOR.

The 1907 Palace exhibit included one ngle example of the 2-cycle motor aplied to car driving shown by the Atlas ompany.

This 1908 show has 2-cycle motor driven rucks by the Reliance Company of Deroit, with two, three and four 5⅛x5 ches cylinders, 2-cycle, water cooled, espectively 30, 45 and 60 H. P. This ne of trucks has been developed since 904, and the present Reliance exhibit inludes three models of trucks, respectively f 2, 3 and 5 tons paying load capacity.

The advantages of the 2-cycle motor for ar driving are specified by Mr. Wilcox, of e Reliance, as (a) simplicity, (b) closer pproximation to uniform torque, (c) reability, (d) low first cost and (e) lower el consumption for equal work than the our-cycle motor.

tor was materially modified before be very successfully used in the Atlas runabout, of which 300 were ordered that season.

For 1908 the Atlas Company sh three 2-cycle motor driven models, passenger touring car, four cylind 4½x4½ inches water cooled, 44 H. two or four passenger runabout driven three 2-cycle cylinders, 33 H. P., an two passenger, two-cylinder runabout, H. P.

In addition to these two-cycle m passenger cars the Atlas Company off but, because of space limitations does exhibit, two trucks, 2 and 4 tons pay load capacity, both driven by two-cy der, 2-cycle motors, 22 H. P., makin line of five models of 2-cycle motor dri cars for 1908 as compared with tw cycle models shown by the Atlas Comp at the Palace in 1907.

Mr. P. A. Williams, Jr., of the A Company, says that the success of Atlas 2-cycle motor is due to simpli larger power for weight, reliability low up-keep cost because of the abse of valves and the valve motion, known to require constant attention the 4-cycle motor.

THE HAMMER SPARK.

The 1908 Garford shows two motor cylinders, 4-cycle and water cooled, 4¾x5¼ inches, 45 H. P., and the o 4⅛x5¼ inches, 35 H. P., both with h mer-spark ignition, magneto current ply only, with no prudential placing storage battery or dry cells. This me of course, stoppage in case of magn failure. The Sims-Bosch magneto, u

dvantages. The magneto is, mechanily, the simplest electric current sup- which serves well for gas engine igni-n. The hammer-spark gives the great- range of motor speeds, as it will ignite charge containing less fuel than the st which can be ignited at the same npression by the jump spark. The Gar-d and the Studebaker use this same nmer spark producing assemblage, with battery and no coil, all constituting the plest possible ignition system and ob-ning, also, the greatest motor flexibil- with a given maximum compression. s placing of the hammer spark in these tors, with magneto current supply only, nighly significant, as it shows how bat-y, coil and spark-plug delays and an-vances may be well avoided.

'he Gaeth cars, a 5 or 7 passenger ton-u body and a 3 passenger runabout, h on the same chassis model, four inders, 4⅞x5¼ inches, 4-cycle, water led, 35 H. P., fits a hammer spark as-ably, Sims-Bosch low tension magneto, h dry cells as an auxiliary reserve, no , Gaeth's patented, single-shaft ham-r spark action.

aeth specifies the hammer spark ad-tages as including (a) greater proba-ty of ignition, (b) greater motor flex-ity and (c) greater motor power, as npared with the jump spark. The th hammer spark action is an extreme-simple and very elegant movement.

he Rainier shows 3 models of bodies, ring car, limousine and landaulet, all one chassis model, with four cylinders, ¼ inches, 4-cycle, water cooled, 50 H. hammer spark, Sims-Bosch low tension gneto, no coil and no auxiliary battery. s hammer spark action is a new de-

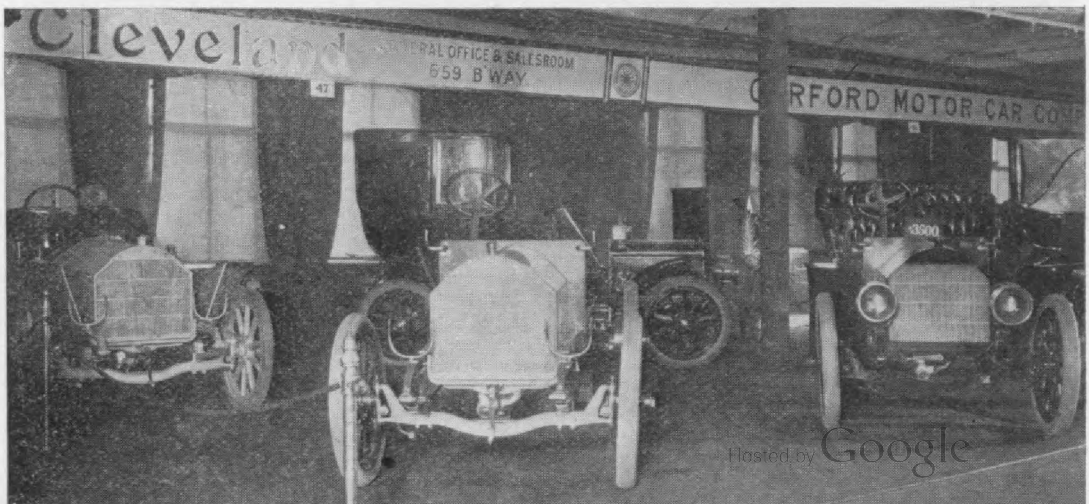
jump-spark are reliability, greater flexib ity of motor power and greater maximu H. P., same piston area and compressio

These two examples of the hamm spark with low tension magneto and wit out the coil, are highly significant exh bits because the 1907 Palace exhibiti showed only one example of hammer spa ignition, while this 1908 display includ three wholly different hammer spark a tions, each one perfect in operation, a each offered with the utmost confiden as superior to the jump-spark.

HUGH DOLNAR.

The Air Ship Exhibit

Aero Club of America have an exhib on the fourth floor showing a number the latest devices in Aero planes, A ships, Flying machines, special baske for baloons and paraphanalia including a cessories and hampers. Included in th exhibit are a number of very light engin for use on the various machines. Tho particularly worthy of note are an cylinder produced by Mr. Peter Coop Hewitt of the Hewitt Motor Co., in whic the cylinders are set 90 degrees apa four in a row, the Francis air ship engi a French production, exhibited by t Prospect Motor Mfg. Co., of Brookly N. Y., the well known Curtis air cool engine in one, two, four and 6 cylinde and two new engines exhibited by t Aero and Marine Motor Co., 60 Lebert Square, Boston, one of which is a 4-cyli der, 2-cycle water-cooled, 40 H. P. a the other is a 9½ H. P. 2-cycle air-cool 4 cylinders weighing 35 pounds.



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Summary of the Shows

We give on the succeeding pages a brief but complete summary of the exhibits at both the Grand Central Palace and Madison Square Garden Shows, and in this issue we describe a very large proportion of the new cars and accessories shown, but as only two days were available for the gathering of these descriptions and illustrations, it was impossible to include full detail descriptions of all in this number, and as we did not wish to print any incomplete description, without adequate illustrations the balance have been held over for our next issue the "3rd show number," and our readers will then have full detail descriptions of everything new.

Cars at the Grand Central Palace

ANDERSON CARRIAGE CO., Detroit, Mich.—Two electric enclosed body models for town service.

ABENDROTH & ROOT MFG. CO., Newburgh, N. Y.—Frontenac 7-passenger limousine, 4 cylinders, 4¾x5, 40-45 H. P., $5000; Frontenac, 7-passenger car, 4 cylinders, 4¾x5, 40-45 H. P., $4000; Frontenac 3-passenger runabout, 4 cylinders, 5x5, 40-45 H. P., $4000. Described in this issue.

ACME MOTOR CAR CO., Reading, Pa.—Acme Model 16, 4-cylinder touring car, 4½x5, 30 H. P., $3500; Model 18, 4-cylinder touring car, 4½x5, 30 H. P., $4000; Model Sextuplet, 6-cylinder touring car, 4½x5, 45 H. P., $4600. To be described in our next issue.

ATLAS MOTOR CAR CO., Springfield, Mass.—Atlas Model R, 2-cylinder, 2-cycle runabout, 4½x4½, 20 H. P., $1400; Model D, 3-cylinder, 2-cycle runabout, rumble seat, 4½x4½, 34 H. P., $1900; Model E, 4-cylinder, 2-cycle touring car, 4½x4½, 46 H. P., $2400. To be described in our next issue.

AUSTIN AUTOMOBILE CO., Grand Rapids, Mich.—Model LX-T touring car, 4 cylinders, 5½x5½, 60 H. P., $4500; Model LX-C touring and runabout, 4-cylinder, 5½x5½, 60 H. P., $4500; Model LX touring and limousine, 4 cylinders, 5½x5½, 60 H. P., $5500; Model XC-T 6-cylinder touring car, 5½x5½, 70 H. P., $6000; Model XC-T 6-cylinder, touring and runabout, 5½x5½, 90 H. P., $6000; Model XC-C 6-cylinder touring and limousine, 5½x5½, 90 H. P., $7000. To be described in an early issue.

AMERICAN MOTOR CAR CO., Indianapolis, Ind.—American Tourist, 4-cylinder, 5x5, 40 H. P., $3200; Model "40," 4-cylinder roadster, 5x5, 40 H. P., $3250; Model "50," 4-cylinder tourist, 4¼x5½, 50 H. P., $4000; Model "50," 4-cycle roadster, 5¼x5½, 50 H. P., $3750. To be described in an early issue.

THE BARTHOLOMEW CO., Peoria, Ill.—Glide Model G touring car, 4 cylinders, 4½x5, 36-40 H. P., $2500; Glide Model 45, special 5 or 7 passengers, 4 cylinders, 4¾x5, 45-50 H. P., $3000; Glide Model H, 5 or 7 passengers, 6 cylinders, 4½x5, 54-60 H. P., $5000. To be described.

BRUSH RUNABOUT CO., Detroit, Mich.—Model 1 A, seats two, single vertical cylinder. 4x4, 6 H. P., $500; Model 1 B, seats two, one vertical cylinder, 4x4, 6 H. P., $550; Model 1 C, package cart, one vertical cylinder, 4x4, 6 H. P., $550; Model 2 A, detachable tonneau, two or four passengers, two vertical cylinders, 4x4, 12 H. P., $800; Model 2 B, delivery wagon, 2 cylinders, vertical, 4x4, 12 H. P., $800. To be described in our next issue.

THE BUCKEYE MFG. CO., Anderson, Ind.—Lambert Model 18 runabout, 2-cylinder, horizontal, 4x4, 18 H. P., friction change speed, $800; Lambert Model S touring car, 2-cylinder, horizontal, 6x4½, 24 H. P., $1275; Model M touring car, 4 cylinders, 4½x5, 35-40 H. P., $2000; Model R touring car, 4 cylinders, 4½x5, 35-40 H. P., $2500. To be described in an early issue.

CAMERON CAR CO., Brockton, Mass.—Model 8, 4-cylinder touring car, air-cooled, 3⅝x3½, 16 H. P., $1050; Model 6, two-passenger roadster, same chassis, except 10 inches shorter wheel base, $850. Described in this issue, page 96a.

CARTER MOTORCAR CORPORATION, Washington, D. C., and Detroit, Mich.—Two models, similar chassis; two 4-cylinder air-cooled engines, vertical under hood at front, 4x4, 60 H. P., with touring bodies and complete equipment, including top, $3500.

CLEVELAND MOTOR CO., New York.—Three 1908 models, similar chasses, 4 cylinders, 5x5, 40-45 H. P., touring car, $3500; 40-43 H. P., runabout, $3500; also a polished chassis and a 1907 car with special Demerest landaulett body, $5500. New features, differential transmission and brakes, to be described in an early issue.

COLT RUNABOUT CO., New York and Yonkers.—40-50 H. P., 6-cylinder, 4½x5, $1750; gentlemen's roadster body, with mechanian's seat on running board. Described in the August, 1907, issue, page 96.

CHADWICK ENGINEERING WORKS, Philadelphia, Pa.—Chadwick "Six" tourabout, 6 cylinders, 5x6, 50 H. P., seating capacity 3, $5500; Great Chadwick Six, 50 H. P., touring car, seats 7, 6 cylinders, 5x6, $5500. Described in the June issue, page 102.

CONTINENTAL AUTO MFG. CO., New Haven, Conn.—Model A runabout, seats 3, 4 cylinders, 4½x4¾, 20 H. P., $2400; Model B runabout, rumble seat, 4 cylinders, 4½x5¼, 35 H. P., $2700. Described in this issue, page 88a.

CRAWFORD AUTOMOBILE CO., Hagerstown, Md.—Model E touring car, 5 passengers, 4 cylinders, 4½x5, 35 H. P., $2500; Model C, 5-passenger touring car, 4 cylinders, 40 H. P., $3000; Model D, 3-passenger runabout, 4 cylinders, 4½x5, 35 H. P., $2500; Model F, touring or limousine, 7-passenger, 4-cylinder, 5x5½ 50 H. P., $3750. Described December, 1906, page 92.

DAYTON MOTOR CAR CO., Dayton, Ohio.—Model 8 G, 6 cylinders, 4⅝x5, 50-60 H. P., $4500; three models on the 30-35 H. P. chassis, 4 cylinders, 4⅜x5; Model 8 K roadster, $2500; Model 8 F touring car, $2500; Model 8 F limousine, $3500; Models SN and 8-H, an 18 H. P. chassis, 4 cylinders, 3⅞x3¾; SN is a laudaulet, $2500; 8-H, runabout, $1700. To be described in an early issue.

DE LUXE MOTOR CAR CO., Detroit, Mich.—50 H. P., 7-passenger limousine, 4 cylinders, 5x5¼, $6250; 50 H. P. landaulette, 4 cylinders, 5x5¼, $6250; 50 H. P., 7-passenger touring car, 4 cylinders, 5x5¼, $5000; 50 H. P. runabout 4 cylinders, 5x5¼, $5000. To be described in an early issue.

DORRIS MOTOR CAR CO., St. Louis, Mo.—Model C, 6-cylinder touring car, 4¼x5, 30 H. P. No price stated. Model C, runabout, seats 3, 4 cylinders, 4¼x5, $2500; Model C, 30 H. P., touring car, seats 4, 4 cylinders, 4¼x5, $2500. To be described in an early issue.

DRAGON AUTOMOBILE CO., Philadelphia, Pa.—24-26 H. P. Touring Car, 4 Cylinders, 4x4½, $2100; 35 H. P. roadster, 4 cylinders, 4½x4½, $1850. To be described in our next issue.

ELLSWORTH, J. M., 518 West Thirty-second street, New York City.—The Ellsworth car described in this issue, page 74.

EVANSVILLE AUTOMOBILE CO., Evansville, Ind.—Two models on the same type 4-cylinder chassis, 4⅜x5¾, 28-30 H. P. friction change speed, Model C limousine, $3500; rumble seated roadster, $2500. Described in the August, 1906, issue, page 118.

EAGLE MOTOR CO., representing the Compound Car Co., Middletown, Conn.—Three models, same chasses, compound engine, high pressure cylinder, 4x4½, low pressure cylinder, 7x4½, 20 H. P.; Model M, 5-passenger touring car, $2000; Model O, 4-passenger touring car, $1800; Model P, 2-passenger runabout, rumble seat if desired, $1600; all models equipt with tops. Described December, 1905, page 122.

FORD MOTOR CAR CO., Detroit, Mich.—6-cylinder touring car, 4¼x4½, $3000; same chassis with runabout body, $2800; Model S, 4-cylinder runabout, 3¾x3¾, $700; same chassis with runabout body without running boards, $600. Prices stated are subject to change. To be described in next issue.

GARFORD MOTOR CO., New York.—Garford 40 H. P., 4 cylinders, 4¾x5½, $4000; Garford 30 H. P. touring car, 4 cylinders, 4⅛x5¼, $3500; 40 H. P. runabout, 4-cylinders, 4⅛x5¼, $3500; 40 H. P. runabout, 4 cylinders, 4¾x5½, $4000; 30

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H. P. runabout, 4⅛x5¼, $3500. Described on page 166, this issue.

GAETH AUTOMOBILE CO., Cleveland, Ohio.—Model 44, 7-passenger car, 4 cylinders, 4⅞x5¼, 35 H. P., $3500. Described in the December, 1906, issue, page 164. K, delivery wagon, 1 cylinder, horizontal, 5¾x7, 12-14 H. P., $1500. Described in the September, 1906, issue. page 186.

GEARLESS TRANSMISSION CO., Rochester, N Y.—60 H. P., 5-passenger car, 4 cylinders, 5x5¾, friction change speed, planetary type, $3500; 75 H. P. touring car, 6 cylinders, 4 13-16 x 5½, seats 7, friction change speed planetary type, $4000; Gearless Grayhound, 6 cylinders, 4 13-16 x 5½, 75 H. P., friction change speed, planetary type, $4000. Described in the September, 1907, issue, page 118.

HATFIELD MOTOR VEHICLE CO., Miamisburg, Ohio.—Hatfield Buggyabout, high wheel type, motor, 2-cylinder opposed, air-cooled, crosswise under body, friction drive with floating rest, 12 H. P., 4 1-16 x 4, $650. Described in this issue, page 144.

HOLSMAN AUTOMOBILE CO., Chicago, Ill.—Two models, same chasses, except for wheel base; high wheeled type, double opposed air-cooled motor, lengthwise under body, 4x4, 12 H. P.; Model 11, surrey type, $800, without top; Model 10, runabout, $750, without top. Five demonstrators on the street; Model H described in our February, 1907, issue, page 262.

IMPERIAL MOTOR CAR CO., Willamsport, Pa.—Model 2, seating 3 passengers, 4 cylinders, 4½x5¼, 30-35 H. P., $2500; Model 2, seating 4, 4 cylinders, 4½x5¼, 30-35 H. P., $2650. To be described in our next issue.

JACKSON AUTOMOBILE CO., Jackson, Mich.—Model C touring car, 2 cylinders, horizontal, 5¼x5, 20-24 H. P., $1250; Model D touring car, 2 cylinders, horizontal, 5¼x5, 20-24 H. P., $1500; Model E touring car, 4 cylinders, 4½x4¾, 35 H. P., $2000; Model E gentlemen's roadster, 4 cylinders, 4½x4¾, 35 H. P., $2000. Described in this issue, page 83a.

KIBLINGER, N. H. CO., Auburn, Ind.—Model E, high wheel type, two-cylinder opposed, air-cooled, lengthwise under body, 4¾x4¾, 9 H. P., $487.50, including complete equipment and top. One demonstrator. Described in our September, 1907, issue, page 106.

KISSEL MOTOR CO., Hartford, Wis.—40 H. P. limousine, 4-cylinder, 4¾x4¾, $3200; touring car, 5 or 7-passengers, same chassis, $2000, or with complete equipment, $2200; also polished chassis. Described in our October, 1907, issue, page 164.

KLINK MOTOR CAR MFG. CO., Dansville, N. Y.—5-passenger touring car, 4 cylinders, 4¼x 4¾, 30 H. P., $2000; runabout, same chassis, $2000. Described October, 1907, page 142.

KINGSTON MOTOR CAR CO., Kingston, N. Y.—Allen Kingston models all have the same motor, 4 cylinders, 5x5¾, 45-50 H. P.; Model E, limousine, $5300; Model D runabout $3900; and Model F, $5500. To be described in our next issue.

LANE MOTOR VEHICLE CO., Passaic, N. J.—7-passenger steam touring car, 30 H. P., Lane type tubular boiler, engine compound condensing; high pressure cylinder 3⅞, low pressure 3¼, $3100; high power roadster, same chassis, except the wheel base, which is 7 inches shorter than the touring car, $2800; 5-passenger touring car, small general design, 20 H. P., high pressure cylinder 3¼, low pressure cylinder 5¼, stroke 3½, $2000; runabout on same chassis, $1800. Special features—runabout throttle control on stationery sector over steering wheel, similar to that of gasoline cars. No hand pumps necessary for either water or fire control. Described in the May, 1907, issue, page 67.

LANSDEN CO., Newark, N. J.—Closed pannel body electric delivery wagon; capacity, 750 pounds; Edison battery, $2450; open top express, 1000 pounds capacity, Edison batteries, $2250; electric tonneau, 5-passenger car, on gasoline lines; solid tires and body suspended on coiled springs; Edison battery; undershung and controller under the hoods, $5000. First time shown. To be decsribed in an early issue.

LOGAN CONSTRUCTION CO., Chilicothe, O.—Model R, 4-cylinder air-cooled delivery wagon, 1500 pounds carrying capacity, 4x4, 20 H. P., $1800; Model T, one-ton truck, 4 cylinders, air-cooled, under seat at front, 4x4, 20 H. P., $2250; Model S, three-tons, 4 cylinders, water-cooled, 40 H. P., 4¾x5, $3500. Three demonstrators, Model S, Model T, and Model O. To be described in an early issue.

OSCAR LEAR AUTOMOBILE CO., Springfield, O.—50 H. P., 7-passenger touring car, 4 cylinders, air cooled by Frayer-Miller blower system, 5½x5½, $3500, fully equipt; 5-passenger touring car, 4 cylinders, 24 H. P., 4 1-16 x 5⅛, $2750; convertable runabout, 4 cylinders, 4 1-16 x 5⅛, 24 H. P., $2500; gentlemen's roadster, same chassis, $2250. Described in our January, 1907, issue, page 116.

MOLINE AUTOMOBILE CO., East Moline, Ill.—Model H touring car, 2 cylinders, horizontal, 5x5, 18 H. P., $1250; Model S touring car, 4 cylinders, 3⅞x4½, 24 H. P., $2000; Model A touring car, 4 cylinders, 4½x5, 35 H. P., $2500. Described in this issue, page 93a.

MOON MOTOR CAR CO., St. Louis, Mo.—Model C roadster, 4 cylinders, 4½x4½, 30-35 H. P., $3250; Model C touring car, 4 cylinders, 4½x 4½, 30-35 H. P., $3500; Model D touring car, 4 cylinders, 4½x4½, 30-35 H. P., $3750. To be described in an early issue.

THE MORA MOTOR CAR CO., Rochester, N. Y.—Racytype "6" runabout, with and without rumble seat, 6 cylinders, 4x5⅛, 45 H. P., $2500; Tourer "6," touring car, 6 cylinders, 4x5⅛, 45 H. P., $3600; Racytype "4" runabout, with and without rumble seat, 4 cylinders, 4x5⅛, 24 H. P., $2350; Tourer "4," touring car, 4 cylinders, 4x5⅛, 24 H. P., $2500. Described in this issue.

MOTOR CAR CO, Detroit, Mich.—Carter car, Model A, touring car, 2 cylinders, opposed, 5½x 4½, 22-24 H. P., $1350; Model C, delivery wagon, 2 cylinders vertical, 5½x4½, 22-24 H. P., $1350; Model D runabout, seats 2, 2 cylinders opposed, 5½x4½, 22-24 H. P., $1250; Model E, with Dayton folding tonneau, 2 cylinders, opposed, 5½x4½, 22-24 H. P., $1350; Model F, detachable tonneau for 2 or 5 passengers, 2 cylinders opposed, 5½x4½, 22-24 H. P., $1350. Described in this issue.

MACK BROS. MOTOR CAR CO., Allentown, Pa.—Trucks and sight-seeing cars, practically all with the same chassis specifications; 4-cylinder motor, 5½x6, vertical at the front, 50 H. P.; 12-passenger car, $4800; 20-passenger car, $5500; 22-passenger car, $6500; two-ton truck, $3800; three-ton truck, $4300; five-ton truck, $5100. To be uescribed in the next issue.

MARION MOTOR CAR CO., Indianapolis, Ind.—Model A-8, 6-cylinder, 3x3, 32-35 H. P., seats 2, $2500; Model 8, 4-cylinder touring car, 4x4, 24 H. P., $2250; Model 8, seating capacity 3. 4 cylinders, 4x4, 24 H. P., $2250.

MAXWELL-BRISCOE MOTOR CO., Tarrytown, N. Y.—Model LC runabout, double opposed motor, 4½x4, 12-14 H. P., $825; Model NC runabout, double opposed motor, 5x5, 16-20 H. P., $1350; Model HC touring car, double opposed, 5x5, 16-20 H. P., $1450; Model D touring car, 4-cylinder, 4¼x4½, 24-26 H. P., $1750; Model M, 5-passenger touring car, 4 cylinders, 5x5, 40 H. P., $3000. Described in the September, 1906, issue, page 105.

MITCHELL MOTOR CAR CO., Racine, Wis.—Model H runabout, 4 cylinders, 4x4, 20 H. P., $1000; Model G, rumble seated runabout, 4 cylinders, 20 H. P., $1250; Model I touring car, 4 cylinders, 4½x5, 35 H. P., $2000; 35 H. P. L limousine, 4 cylinders, 4½x5, $2800. Described in this issue, page 108.

NATIONAL MOTOR VEHICLE CO., Indianapolis, Ind.—Model T, 7-passenger touring car, 6 cylinders, 5x5, $5000; Model R roadster, 6 cylinders, 5x5, $4200; Model R, 7-passenger car, 6 cylinders, 4½x4¾, $4200; Model K, 7-passenger car, 4 cylinders, 4⅞x5, $3500; Model N roadster, 4 cylinders, 5x5, $3700; Model N, 7-passenger car, 4 cylinders, 5x5, $3700. To be described in an early issue.

NORDYKE & MARMON CO., Indianapolis, Ind.—Model H, air-cooled, 4-cylinder, V-type motor, 5x4½, 35-40 H. P., $3500; Model G touring car, 4-cylinder, V-type motor, 5x4½, 35-40 H. P., $3000; Model H, water-cooled touring car, 4 cylinders, 5x5, 40-45 H. P., $3500; Model H roadster, water-cooled, 4 cylinders, 5x5, 40-45 H. P., $3500. 1908 models to be described in an early issue.

OVERLAND AUTO CO., Indianapolis, Ind.—Model 9 runabout, 4 cylinders, 3½x4½, 22-24 H. P., $1250. To be described in an early issue.

PENNSYLVANIA AUTO MOTOR CO., Bryn Mawr, Pa.—Model C, 4-cylinder touring car, 4¾x5¼, 50 H. P., $3000; Model C roadster, 4 cylinders, 4¾x5¼, 50 H. P., $2800. Described in this issue, page 134.

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PIERCE ENGINE CO., Racine, Wis.—Model D touring car, 4 cylinders, 4½x5½, 40 H. P., $3000; Model E touring car, 4 cylinders, 4¼x5, 30 H. P., $2000. To be described in an early issue.

PREMIER MOTOR MFG. CO., Indianapolis, Ind.—Model 45, 6 cylinders, 4½x4½, 45-55 H. P., $3750; Model 30, 4 cylinders, 4½x4½, 30-35 H. P., touring or runabout bodies, $2500; Model 24, 4 cylinders, 4¼x4¼, 24 H. P., touring and runabout bodies, $2250.

PULLMAN MOTOR CAR CO., Chicago, Ill.—Model 16 runabout, 4 cylinders, 5½x5½, 55 H. P., $3750; Model 15 touring car, 4 cylinders, 5¼x5½, 55 H. P., $4000; Model 17 touring car, 6 cylinders, 5¼x5-..., 70 H. P., $5000. Described February, 1907, page 200.

RAPID MOTOR VEHICLE CO., Pontiac, Mich.—Eight models, E-62, one-ton truck, 2-cylinder, horizontal, 5x5, $1600; Model E-21, one-ton, 2-cylinder, horizontal, 5x5, 24 H. P., $1600; Model E-11, full paneled body, double opposed 2-cylinder motor, 5x5, 24 H. P., $1650; Model E-132, passenger vehicle, capacity 12, double opposed motor, 5x5, 24 H. P., $1800; Model E-152, 16-passenger wagonette, 2 cylinders, horizontal, 5x5, 24 H. P., $2000; Model E-44, 1½ tons, 2 cylinders, horizontal, 5¼x5, 24 H. P., $2000; Model E-222, one-ton, 2 cylinders, horizontal, 5x5, 24 H. P., $2400; Model 2-182, 12-passenger wagonette, 2 cylinders, horizontal, 5x5, 24 H. P., $4000.

RELIANCE MOTOR CAR CO., Detroit, Mich.—Model K, 4 tons, 4 cylinders, 5⅛x5, 60 H. P. $4400; Model H, 2 cylinders, vertical, 2-cycle, 5⅛x5, 30 H. P., one to three tons capacity, $2750; Model H, 3 to 4 tons, 3 cylinders, 2-cycle, 5⅛x5, 45 H. P., $3500.

REO MOTOR CAR CO., Lansing, Mich.—Model A, 18-20 H. P., 2-cylinder, opposed, $1250; Model B, 8-10 H. P., single cylinder, horizontal under the body $650; Model C, 18-20 H. P., 2-cylinder, opposed, roadster shown for the first time, $1000. Described in this issue, page 176.

RAINIER MOTOR CAR CO., factory Saginaw, Mich.; offices Fiftieth street and Broadway, New York.—Limousine, 4-cylinder, 45-50 H. P., 5x5¼, $5750; same chassis, 7-passenger touring car, $4500, or with runabout body, $4300

SCHACHT MFG. CO., Cincinnati, Ohio.—Three models of similar chassis; high wheel type, motor double opposed, water-cooled, crosswise under body, 4x4, 12 H. P.; Model H, open cushion tired runabout, $640; with top, $680; Model P runabout, with pneumatic tires, $740. Described in our April, 1907, issue, page 136.

ST. LOUIS CAR CO., St. Louis, Mo.—American Mors, 4-cylinder touring car, 3½x5, 14-18 H. P., $3500; American Mors, 4-cylinder touring car, 4 5-16 x 6, 24-32 H. P.; American Mors, 4-cylinder landaulet, 5x6, 40-50 H. P.

SIMPLEX MOTOR CAR CO., Mishawaka, Ind.—Simplex American, Model D, 4-cylinder, 2-cycle touring car, 5x5, 50 H. P., $4000.

SMITH AUTOMOBILE CO., Topeka, Kan.—Two models on practically similar chasses. The Great Smith Touring Car, motor, 4-cylinder, 4½x5; French rating, 24 H. P., will develop, it is claimed 45 H. P., $2600. 1908 models described in this issue, page 77.

WAYNE AUTOMOBILE CO., Detroit, Mich.—Two models, 4 cylinders, 4½x5¼, 30-35 H. P., Wayne "Thirty," $2500, with touring or runabout body. Described in this issue, page 148.

WELCH MOTOR CAR CO., Pontiac, Mich.—Welch models all have the same motor, 4 cylinders, and one model H, 6 cylinders, all 4⅝x5. The 6-cylinder car is 75 H. P., $6000; Model I, 4-cylinder, 50 H. P., $5500; Model G, 4-cylinder, 50 H. P., $4000.

YORK MOTOR CAR CO., York, Pa.—Models I, 4-40, and J each 40 H. P., having the same 4-cylinder engine, 4 15-16 x 5¼; Model 4-40 seats 3, $3000; Model I seats 5, $3250; Model J seats 7, $3750; Model 6-30, 6 cylinders, 3¾x3¾, 30 H. P., seats 3, $2750; Model H, 4 cylinders, 3¾x3¾, 20 H. P., touring car, $1875. 1908 models described in the October, 1907, issue, page 126.

Cars at Madison Square Garden

AUTOCAR COMPANY, Ardmore, Pa.—Autocar 5-passenger touring car, 4 cylinders, 4½x5½, 30 H. P., $2750; Autocar runabout, seats 3, 4 cylinders, 4¼x4½, 30 H. P., $2750; Autocar runabout, seats 3, 2 cylinders opposed, under the hood at the front, 4x4, 12 H. P., $1200. Described in this issue, page 156.

CADILLAC MOTOR CAR CO., Detroit, Mich.—Cadillac, seats 2, 10 H. P., 5x5, $850; Cadillac touring car, 10 H. P., 5x5, $1000; Cadillac 5-passenger touring car, 4 cylinders, 4x4½, 25 H. P., $2000; Cadillac runabout, seats 3, 4 cylinders, 4x4½, 25 H. P., $2000; Cadillac runabout, seats 4, 1 cylinder horizontal, 5x5, 10 H. P., $1000; Cadillac 5-passenger, 4 cylinders, 4x4½, 25 H. P., $3000. Described April, 1907, page 112.

ELECTRIC VEHICLE CO., Hartford, Conn.—Columbia 5-passenger touring car, 4 cylinders, 4¼x4½, 28 H. P., $3000; Columbia 7-passenger touring car, electric transmission, 4 cylinders, 5½x5½, 48 H. P., $6500; Columbia runabout, seats 3, 4 cylinders, 4¼x4½, 28 H. P., $3000; Columbia landaulett, seats 5, 4 cylinders, 4¼x4½, 28 H. P., 4200; Columbia limousine, seats 7, electric transmission, 4 cylinders, 5½x5½, 48 H. P., $8500. Described in the March, 1907, issue, page 125.

CORBIN MOTOR VEHICLE CO., New Britain, Conn.—Five-passenger touring car, 4 cylinders, air-cooled, 4½x4¼, $2650; 5-passenger touring car, 4 cylinders, water-cooled, 4½x4¼, 32-40 H. P., $2500; runabout, seats 4, 4 cylinders, air-cooled, 4½x4¼, 32 H. P., $2650; Corbin landaulett or limousine, seats 5, air or water cooled, 4½x4¼, 32 H. P., $3500. Described in the March, 1907, issue, page 276.

ELMORE MFG. CO., Clyde, Ohio.—Elmore 5-passenger touring car, 2-cycle engine, 4½x4, 4 cylinders, $2500; Elmore 5-passenger touring car, 4 cylinders, 2-cycle, 4½x4, $2500. Described in our February, 1907, issue, page 253.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.—Four-passenger touring car, 3¼x3¼, 4 cylinders, air-cooled, $1850; 5-passenger touring car, 4 cylinders, air-cooled, 4¼x4, 28 H. P., $2850; also 5-passenger touring car, same chassis, $2850; 4-passenger touring car, 6 cylinders, air-cooled, 4½x4, 42 H. P., $4000; 7-passenger touring, 6-cylinders, 4¼x4, air-cooled, 42 H. P., $4000; runabout, seats 2, 4 cylinders, air-cooled, 3½x3¼, 16 H. P., $1750; runabout, seats 4, 6 cylinders, air-cooled, 4½x4, 42 H. P., $4000; runabout, seats, 4, 4 cylinders, air-cooled, 3¼x3¼, 16 H. P., $1850; runabout, seats 4, 4 cylinders, air-cooled, 4¼x4, 28 H. P., $2850; Franklin, seats 5, 4 cylinders, air-cooled, 4¼x4, 28 H. P., $4000; Franklin, seats 7, 6 cylinders, air-cooled, 4¼x4, 42 H. P., $5200; Franklin, seats 7, 6 cylinders, air-cooled, 4¼x4, 42 H. P., $4000. Described in the October, 1907, issue, page 168.

HAYNES AUTOMOBILE CO., Kokomo, Ind.—Five-passenger touring car, 4 cylinders, 4¼x5, 30 H. P., $2500; 5-passenger touring car, 4 cylinders, 4¾x5, 45 H. P., $3000; Haynes 7-passenger touring car, 4 cylinders, 5½x6, 60 H. P., $3750. Described in the March, 1907, issue, page 215.

KNOX AUTOMOBILE CO., Springfield, Mass.—Five-passenger touring car, 4 cylinders, 4¾x4¾, air-cooled, $2600; Knox runabout, seats 3, 4⅜x4¾, air-cooled, 25-30 H. P., $2500; Knox 5-passenger car, 4 cylinders, air-cooled, 4⅜x4¾, 30 H. P., $3500. Described in the November, 1906, issue, page 114.

MATHESON MOTOR CAR CO., Wilkes-Barre, Pa.—Matheson runabout, seats 4, 4 cylinders, 5x6, 40 H. P., $5500; Matheson, seats 7, 4 cylinders, 5x6, 40 H. P., $6500; 7-passenger touring car, 4 cylinders, 5x6, 40 H. P., $5500. Described in the February, 1907, issue, page 181.

NORTHERN MOTOR CAR CO., Detroit, Mich.—Five-passenger touring car, double opposed, 5½x5¼, 24 H. P., $1600; 7-passenger touring car, 4 cylinders, 5x5½, 40 H. P., $3500; runabout, seats 3, 2 cylinders, opposed, 5½x5¼, 24 H. P., $1600; limousine, seats 7, 2-cylinder, opposed, 5½x5¼, 24 H. P., $2800. To be described.

OLDS MOTOR WORKS, Lansing, Mich.—Five-passenger touring car, 4½x4¾, 4 cylinders, 32 H. P., $1900; 5-passenger touring car, 4 cylinders, 4¾x4¾, 36 H. P., $2750; 7-passenger touring car, 6 cylinders, 4½x4¾, 48 H. P., $4200; runabout, seats 3, 4 cylinders, 4¾x4¾, 36 H. P., $2750; 7-passenger car, 6 cylinders, 4½x4¾, 48 H. P., $4200. Described in this issue, page 90.

PACKARD MOTOR CAR CO., Detroit, Mich.—Seven-passenger touring car, 4 cylinders, 5x5½, 30 H. P., $4200; 7-passenger, 4 cylinder car, 5x5½, 30 H. P., $5600 Packard runabout, seats 2, 4 cylinders, 5x5½, 30 H. P., $4200. Described in the July, 1907, issue, page 64.

PEERLESS MOTOR CAR CO., Cleveland, O.—Seven-passenger touring car, 4 cylinders, 4⅞ 30 H. P., $4500; 7-passenger, 6 cylinder touring car, 4⅞x5½, 57 H. P., $6000; runabout, seats 3, 4 cylinders, 4⅞x5½, 30 H. P., $4300; Peerless, seats 7, 4 cylinders, 4⅞x5½, 30 H. P., $5500; Peerless, 6-cylinder, 7-passenger, 4⅞x5½, 57 H. P., $6000. Described in December, 1906, issue, page 139.

GEORGE N. PIERCE CO., Buffalo, N. Y.—7-passenger touring car, 5x5½, 40 H. P., $5000; 6 cylinders, 7-passenger touring car, 4¼x4⅞, 43 H. P., $5500; 7-passenger, 6-cylinder touring car,

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5x5¼, 60 H. P., $6500; 6-cylinder, 7-passenger car, 4¼x4⅞, 43 H. P., $5500; 6-cylinder, 7-passenger car, 5x5½, 60 H. P., $6500.

POPE MFG. CO., Hartford, Conn.—Pope-Hartford "303," 5-passenger touring car, 30 H. P., $2750. Described in our May, 1907, issue, page 62.

ROYAL MOTOR CAR CO., Cleveland, Ohio.—Royal tourist, 7-passenger touring car, 4 cylinders, 5⅛x5½, 45 H. P., $4000; Royal 7-passenger, 4-cylinder car, 5⅛x5½, 45 H. P., $5000. Described in our February, 1907, issue, page 228.

SELDON MOTOR VEHICLE CO., Rochester, N. Y.—5-passenger touring car, 4 cylinders, 4¼x4½, 28 H. P., $2000; 7-passenger touring car, 4 cylinders, 5¼x6, 45 H. P., $5500.

STEARNS CO., F. B., Cleveland, Ohio.—7-passenger touring car, 4 cylinders, 5⅜x5⅞, 46.22 H. P., $4600; 6-cylinder, 4-passenger car, 5⅜x5⅞, 69.3 H. P., $6250; runabout, seating 4, same chassis, $6250. Described in our December, 1906, issue, page 149.

STUDEBAKER AUTO CO., South Bend, Ind.—5-passenger touring car, 4 cylinders, 4⅛x5¼, 27.2 H. P., $3500; 7-passenger touring car, 4 cylinders, 4¾x5½, 36.1 H. P., $4000; runabout, seats 3, 4 cylinders, 4⅛x5¼, 27.2 H. P., $3500; 4-cylinder, 7-passenger car, 4⅛x5¼, 27.2 H. P., $4200. Described February, 1907, page 158.

STEVENS-DURYEA CO., Chicopee Falls, Mass.—5-passenger touring car, 4 cylinders, 3⅞x4¾, 35 H. P., $3500; 7-passenger touring car, 4¾x5¼, 50 H. P., $6000; 4-cylinder, 7-passenger car, 3⅞x4¾, 35 H. P., $4500; 4-cylinder, 5-passenger car, 3⅞x4½, 20 H. P., $3300; 6-cylinder, 7-passenger limousine, 50 H. P., $6000; 5-passenger car, 3⅞x4¾, 35 H. P., $3500; 6-cylinder, 7-passenger landaulett, 3⅞x4¾, 35 H. P., $4500. Described March, 1906, page 202.

E. R. THOMAS AUTOMOBILE CO., Buffalo, N. Y.—Thomas 4-60 Flyer, 7-passenger touring car, 4 cylinders, 5½x5½, 48.4 H. P., $4500; Thomas 6-70 Special, 7-passenger, 6-cylinder touring car, 5½x5½, 72.6 H. P., $6000; Thomas 4-cylinder, 6-passenger car, 3¾ x 4 5-16, 16.9 H. P., $3000; 6-cylinder, 7-passenger car, 5½x5½, 72.6 H. P., $6000. 1908 cars described October, 1907, page 101.

E. R. THOMAS DETROIT CO., Detroit, Mich.—Thomas 4-40 Detroit 5-passenger touring car, 4 cylinders, 5x4¾, 40 H. P., $2750. Described, October, 1907, page 86.

WALTER AUTOMOBILE CO., Trenton, N. J.—7-passenger touring car, 4 cylinders, 5x5½, 44 H. P., $5000. Described February, 1907, page 217.

WINTON MOTOR CARRIAGE CO., Cleveland, Ohio.—Six-Teen-Six 7-passenger, 6-cylinder touring car, 4½x5, 48.6 H. P., $4500; Six-Teen-Six, 6-cylinder, 7-passenger, 4½x5, 48.6 H. P., $4500. Described in our September, 1907, page 132.

Engines

AMERICAN AND BRITISH MFG. CO., Providence, R. I. (at both shows)—prest steel frames, drop forgings such as described in our January, 1907, issue, page 210; also the "Herreshoff" gasoline motor described May, 1907, page 332, including a new size rated at 40 H. P., but said to develop 55 H. P.

AURORA AUTOMATIC MACHINERY CO., Aurora, Ill. (at both shows), are showing an entirely new 6-cylinder Thor engine; cylinders, 4¾x4¾, developing 55 to 60 H. P. at 1500 revolutions. The engine is very compact and weighs only 728 pounds. It has a special crank case which is made to inclose the magneto, circulating pump and the carburetor, as well as all the parts of the engine. There are quite a number of new features in this engine which will be described in detail in our next number. They are also showing an entirely new Thor motor cycle engine, the main feature of which is an internal transmission gear running on ball and roller bearings inclosed in the crank case.

BRENNAN MOTOR CO., 103 Grape street, Syracuse, N. Y. (at Madison Square Garden)—Brennan "Special" 16 and 20 horse power, opposed motors; three four-cylinder, vertical motors; one six-cylinder motor.

BROWNELL, F. A. MOTOR CO., successors to BROWNELL-TREBERT CO., 634-666 Lexington avenue, Rochester, N. Y. (at Grand Central Palace)—30 H. P. 4-cylinder, 35, 40, 45 and 75 H. P. 6-cylinder motors, all new B-T 1908 models; a new circulation pump and a new carburetor for 6-cylinder motors, practically three carburetors in one, all to be described in our next issue.

THE MANUFACTURERS' FOUNDRY CO., Waterbury, Conn. (at Madison Square Garden)—samples of their gasoline engine cylinder castings, as described in our October, 1907, issue, page 114, and our January, 1906, number, page 1?5, including samples of castings furnished for 1908 engines.

PACIFIC IRON WORKS, THE, Bridgeport, Conn. (at Grand Central Palace), exhibited a 4-cylinder air-cooled automobile motor.

Ignition Apparatus

AMERICAN MOTOR CO., Box 94, Grand Rapids, Mich. (at Madison Square Garden)—the Petite cut-out for disconnecting the ignition current, described in our June, 1907, issue, page 222.

AMERICAN ELECTRICAL NOVELTY & MFG. CO., Spring, Hudson and Vandum streets, New York City (at both shows), exhibit the well known Ever-Ready batteries, Ever-Ready Bulldog battery connectors, portable electric hand lamps, pocket lamps, flashlights, ammeters and volt ammeters.

ATWATER-KENT MFG. CO., 42-46 North Sixth street, Philadelphia, Pa. (at both shows)—the Atwater-Kent Spark Generator, described in our February, 1906, issue, page 321, and the new distributor system to be fully described in a future issue; also a full line of pocket meters which are well known to the trade. An interesting feature of the exhibit is one of their instruments sealed up in a glass case, running on six dry cells, with a Jones odometer and speedometer attached, to show the mileage which can be secured by the use of the Atwater-Kent generator atached to a 4-cylinder engine. This will be run thruout the week.

THE AUTOCOIL CO., 136 Seventh street, Jersey City, N. J. (at both shows), are showing the line of coils which they have been making for some time past, with hard rubber units, including their ammeter coil, all of which have been previously described, and are also showing a new 6-cylinder coil with iron clad units, which is very compact, the 6-cylinder coil being about the same size as the old 4-cylinder coil; this has no terminals whatever outside of the case; has an invisible friction device on set screw, and a spark gap to prevent straining of the coil because of any broken connection, and also a new switch. The coil will be illustrated next month.

AMPERE MFG. CO., 408 West Thirteenth street, New York City (at Grand Central Palace), exhibted the "Best" dry batteries, made in five different sizes, described in the September, 1907, issue, page 162.

BRETZ CO., J. S., Times Building, New York City (at Grand Central Palace) exhibited the Fichtel and Sachs annular ball bearings, which were described in our February, 1907, issue, page 308; and the Umterberg and Helmle high tension magneto, which they have just started to import.

BOSCH, ROBERT, 160 West Fifty-sixth street, New York City (at Madison Square Garden)—"Bosch" high tension magnetos, the exhibit including the "D 6" for 6-cylinder cars, "D 4" for 4-cylinder cars, "H D H" giving four sparks per revolution, "D A V" for 2-cylinder cycle motors, "D A 2" for single cylinder cycle motors, "D O 2" for opposed cylinder engines, "D 2 R" for marine single cylinder motors, "22" high tension magneto, "13" low tension type for large engines, "K S 2" with rotating armature. The Bosch system was described in our December, 1906, issue, page 240, and 1908 improvements will be described in our next issue.

BYRNE, KINGSTON & CO., Kokomo, Ind. (at both shows), are exhibiting their well known line of Kingston carburetors, pumps and muffler, and in each line they are showing a new design. Their new circulating pump and muffler are especially noteworthy.

ALBERT CHAMPION CO., 541 Tremont street, Boston, Mass. (at Madison Square Garden)—1908 "Champion" ignition apparatus.

CONNECTICUT TELEPHONE & ELECTRIC CO., 50 Britania street, Meridon, Conn.)at both shows)—"Connecticut" spark coils with 1908 improvements; a new distributor, new magneto switch, a new inspection lamp, and a new marine coil to be described in our next issue. Besides these new things the exhibit includes the "Connecticut" plug and lever switches, described in our March, 1906, Journal, page 272, and the "Connecticut" gasoline gage, described in our February, 1907, issue, page 310.

CROWN BATTERY CO., THE, 992 Southern Boulevard, New York City (at Grand Central Palace), exhibited the Crown dry cells, described in the July, 1907, issue, page 130.

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DAYTON ELECTRICAL MFG. CO., 89 St. Clair street, Dayton, O. (at both shows), the well known "Apple" ignition system, new features of which were described in our January, 1907, issue, page 352; May, 1907, issue, page 158, and October, 1907, issue, page 172. The outfit was shown in working order, the dynamo, driven off a flywheel as in actual practice, charging the storage battery from which the current was taken, and was distributed to the coils, and hence to a set of plugs, the switches, coils, etc., being mounted on a board representing the dash of a car.

THE DELTA MFG. CO., Bloomfield, N. J. (at Madison Square Garden)—"Delta" No. 8 dry cell for ignition purposes, and the "Delta" spark plug, described January, 1907, page 258, the plug being shown in new form of shipping box, described in this issue.

DOW PORTABLE ELECTRIC CO., Braintree, Mass. (at Grand Central Palace), exhibited a new Komet magneto, which is extremely small and light, and is made in small sizes for motor cycle work; also a new distributor intended especially for double ignition systems. These new devices will be illustrated fully in our next issue. The Dow Company will show their regular line of coils, plugs and switches, which have been illustrated in our past issues. The Komet magneto was described July, 1907, page 128.

EASTERN CARBON WORKS, West Side avenue and Central R. R., Jersey City, N. J. (at both shows)—are showing the Eastern dry cells in a variety of sizes, making a specialty of motor cycle size, in a special case; also the Eastern Battery Connector and the Eastern Volt Ammeter, described April, 1907, page 242.

ELECTRIC STORAGE BATTERY CO., Nineteenth and Allegheny avenue, Philadelphia, Pa. (at both shows)—"Exide" storage batteries, both vehicle and ignition types, both of which have been fully described in these columns. Different types of plates, straps and separators are exhibited on a large wooden panel.

GLEANZER & CO., 26-28 Washington Place, New York City (at Grand Central Palace)—"Nieuport" 1908 magnetos, to be described in our next issue.

GEIZLER BROS., 316 West Forty-second street, New York City (at Grand Central Palace), exhibit the Geiszler storage battery for electric automobiles, and also the Geiszler non-sulphating ignitor, the complete details of which will be given in our next issue.

GOULD STORAGE BATTERY CO., 341 Fifth avenue, New York City (at Madison Square Garden)—"Gould" 1908 vehicle storage batteries, described in this issue, page 209, and the 1908 "Gould" sparking battery, also described in this issue

THE R. E. HARDY CO., 86 Watts street, New York City, N. Y. (at Madison Square Garden)—"Sta-Rite" spark plugs, coils, etc., which have been described in past issues of the Journal, and including the No. 4 Sta-Rite separable plug, described in our December, 1906, issue, page 106, and the two new plugs, described in our October, 1907, issue, page 178; also some plugs of special size for large engines requiring extra long plugs.

HEINZE ELECTRIC CO., Lowell, Mass. (at both shows)—complete line of induction coils, as described in our February, 1907, issue, pages 350 and 434; and a new high tension magneto, to be described next month, and the Heinze timer, described in our February issue, page 296. The exhibit also includes a testing outfit, which is described and illustrated in this issue, page 252.

HERZ & CO., 203-205 Lafayette street, New York City (at both shows)—"Herz" timers and distributors; "Bougie-Mercedes" spark plugs; "B. B." circulation pump; "Herz" tires; "Pater Noster" shock absorbers, and various Herz ignition specialties, descriptions of which have appeared in the following issues of the Journal: January, 1907, pages 254 and 302; February, 1907, pages 362 and 372, and October, 1907, page 196.

JANNEY, STEINMETZ & CO., Fourth and Market streets, Philadelphia, Pa. (at Madison Square Garden)—the Bi-magnet liquid indicator, described in our September, 1906, issue, page 122; Richards aluminum solder, described in our November, 1906, issue, page 162; Flashlight spark plugs, described in our April, 1907, issue, page 238; also a full line of tanks and other prest metal specialties well known to the trade.

JEFFERY-DEWITT CO., 217-219 High street, Newark, N. J. (at both shows)—The "Reliance" spark plug, described in the October, 1907, Journal, page 196; demonstrations given of the ability of the plug to spark in water; also soot and carbon tests of the plug. The demonstrating outfit comprised a representation of a 4-cylinder ignition system, but the plugs were submerged in tumblers of water instead of being in the open, fully proving the good sparking qualities of the plug.

K-W IGNITION CO., 30 Power avenue, Cleveland, Ohio (at Grand Central Palace), exhibited the K-W magneto, described in our May, 1907, issue, page 172; the K-W Master Vibrator, in our October, 1907, issue, page 194, and the Vim Spark Plug, described in our April, 1907, issue, page 194.

THE KOKOMO ELECTRIC CO., Kokomo, Ind. (at Grand Central Palace), are exhibiting the Kingston timers, coils, plugs and switches, which are well known to our readers as having formerly been the product of Byrne, Kingston & Co. They are also showing a new two-pole switch and a new vibrator on their 1908 coil, which will be described next month.

THE KITSEE STORAGE BATTERY CO., E. L. Bevan, General Sales Agent, 628-629 Connell Building, Scranton, Pa. (at Madison Square Garden)—Kitsee sparking battery, described in our May, 1907, issue, page 164.

LAVALETTE & CO., 112 West Forty-second street, New York (at Grand Central Palace), exhibted the Eisemann-Lavalette high tension magneto, illustrated and described in our March issue, page 316; also a line of automobile parts manufactured by Mallicet & Blin, of France. Also the Schmidt patent silent drive chain.

MOSLER, A. R. CO., 163 West Twenty-ninth street, New York City (at both shows)—full line 1908 "Mosler" and "Spitfire" ignition apparatus, including an improved form of the Mosler roller contact timer now fited with ball bearings; the "Spitfire" protector plug described in our January, 1907, issue, page 280; the Mosler eccentric timer described in our February, 1907, issue, page 277; also new control levers and new mica spark plugs, to be described in our next issue.

MOTSINGER REVICE MFG. CO., Pendleton, Ind. (at Madison Square Garden)—the well known Antosparker and the Motsinger Muffler, described in our March, 1906, issue, page 290.

NATIONAL BATTERY CO., 368 to 383 Massachusetts avenue, Buffalo, N. Y. (at both shows)—"National" 1908 ignition and propulsion batteries, described in our next issue, the exhibit including a 6-volt, 60 ampere hour, and a 6-volt, 40 ampere hour sparking battery; also a vehicle battery and a display of battery parts and accessories.

NATIONAL CARBON CO., Cleveland, Ohio (at both shows), are exhibiting the well known Columbia and Ignitor dry batteries. Also tubular auto cells, National jump spark coils, Columbia battery connectors, flashlights and ampere meters.

NEW YORK COIL CO., 338 Pearl street, New York City (at Grand Central Palace), exhibited a new double pole switch equipt with the Yale lock, which can be used with two sets of batteries or batteries and magneto. They also exhibted their well-known line of spark coils and their hammer brake vibrator. Described March, 1907, page 344b.

PITTSFIELD SPARK COIL CO., Dalton, Mass. (at Madison Square Garden)—Pittsfield coils, magnetos and spark plugs. Their latest devices were described February, 1907, page 336, and January, 1907, page 322a.

REMY ELECTRIC CO., Columbus avenue and Twenty-sixth street, Anderson, Ind. (at both shows)—Remy Type H. B. high tension magneto, described January, 1907, page 206; Remy Type R. B. low tension magneto, described march, 1907, page 318; the new Remy Type F high tension magneto, described page 264, this issue.

SEMI-DRY BATTERY CO., Fifth and Essex streets, Harrison (Newark), N. J. (at Grand Central Palace)—the "Dunn" semi-dry cells for ignition purposes, described in our November, 1905, issue, page 162, the line including a new emergency battery, described in our next issue, and a waterproof "Dunn" battery for marine use, described in our June, 1907, issue, page 246.

SPLITDORF, C. F., 261-265 Walton avenue, New York City (at both shows)—the "Splitdorf" line of ignition apparatus, including the new high tension magneto for motor cycles, described in the December, 1906, issue, page 330; the self-cleaning mica plug, described page 274, January, 1907, issue; motor cycle coils, described March, 1907, page 353; new motor cycle spark plug, described September, 1907, page 208; and the new "Splitdorf" motor car coil, described in our next issue.

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STACKPOLE BATTERY CO., St. Marys, Pa. (at Madison Square Garden)—"Stackpole" dry cells for ignition purposes, the "Mills" battery connector, and "Stackpole" battery testing instruments, all of which will be described in a future issue.

TRIUMPH ENGINEERING CO., THE, 226 Lafayette street, New York City (at Grand Central Palace), exhibited the Holsten vibrating spark plug, which has been described in our January, 1907, issue, page 232.

UNCAS SPECIALTY CO., 21-37 Shipping street, Norwich, Conn. (at Madison Square Garden)—Leavitt timer, described February, 1907, page 352; Leavitt timer, described March, 1907, page 284, and other Leavitt specialties.

VESTA ACCUMULATOR CO., 1336 Michigan avenue, Chicago, Ill. (at Madison Square Garden), will show the well known Vesta sparking battery and a full line Vesta electric lamps, described in previous issues.
ment of their business.

WESTERN ELECTRIC CO., THE, Chicago, Ill., exhibit the W. E. Synchronized Ignition System, which is somewhat of a departure in the fact that the coils are arranged in a long hard rubber tube close to the top of the cylinders, so that very short connections only are necessary between them and the spark plugs, and also to the timer. In connection with this a vibrator box containing two vibrators is located on the dash; these can be set independently and used alternatively. An ingenious switch is also located in this box. Full details and particulars of this system will be given in our next issue. They also exhibited a jump-spark coil of their own manufacture, and the well known Nungesser dry batteries.

WITHERBEE IGNITER CO., 541 West Forty-third street, New York City (at both shows)—"Witherbee" ignition battery, described February, 1907, page 350, and the new "Wico" spark plug, described in this issue, page 405; also several new ignition specialties to be described, among which are a wire protected inspection lamp and the Wico timer. A feature of this exhibit is a large Witherbee battery turned into a beehive, containing about 3000 bees.

Lamps, Etc.

ACETYVONE CO., 38 Park Row, New York City (at both shows)—"Acetyvone" generator for producing acetylene gas from cartridges of Acetyvone, described in our March, 1907, number, page 304, and not changed in construction since.

AUTOLIGHT MFG. CO., THE, A. H. Funke, Propr., New York City (at Grand Central Palace), exhibited the well known autolight gas lamps and generators, and a new speed indicator, which will be described in a future issue.

AUTOMOBILE SUPPLY MFG. CO., 139 Emerson Place, Brooklyn, N. Y. (at both shows)—full line of horns and lamps, as described in our January, 1906, issue, page 376; December, 1906, issue, page 284, and September, 1907, issue, page 168; also a number of new styles to be described.

BADGER BRASS MFG. CO., Kenosha, Wis. (at both shows)—1908 models of the well known "Solar" lamps and a new line made under the Bernard patents, under which Badger Brass Mfg. Co. are sole American licensees, all to be fully described in our next issue.

BROOKE AUTOMOBILE SUPPLY CO., 197 Fulton street, New York (at Grand Central Palace) exhibited the Brooke searchlight, Basco luggage carrier for automobile use, and the Basco generator; also a new wind shield.

R. E. DIETZ CO., 35 Laight street, New York City (at Madison Square Garden)—1908 Dietz line of lamps, including two models, to be described in our next issue; also those described in our January, 1907, issue, page 308.

EDMONDS & JONES MFG. CO., 313-315 Riopelle street, Detroit, Mich. (at both shows), are showing their complete line of gas lamps and generators; also an entirely new line of oil lamps, including three sizes of side lamps in both the square and round patterns, and two sizes of tail lamps in both the square and round patterns. They are also showing a new round generator complete, on the same principle as their old generator, described in January, 1907, with several new features, which we will describe next month.

ENGLISH & MERSICK LAMP & FOUNDRY CO., 129-131 Park street, New Haven, Conn. (at Madison Square Garden)—"E & M" lamps and automobile metal fittings, new features will be described in our next issue.

GRAY & DAVIS, Amesbury, Mass. (at both shows)—Gray & Davis 1908 lamps, the line including the fine new straight line searchlight, which is described and illustrated in this issue, page 256; also the recently designed Style 48 searchlight, described in the June, 1907, Journal, page 196, and the new generators, described in our February, 1907, issue, page 268.

HAM, C. T., MFG. CO., Rochester, N. Y. (at both shows)—"Ham" cold blast lamps, which show no changes from last year's designs. These lamps and their special lamp bracket were described in our December, 1906, issue, page 290, and our February, 1907, issue, page 360.

MANHATTAN SCREW & STAMPING WORKS, 67th street and West End avenue, New York City (at both shows), exhibit a line of Phoebus gas and oil lamps, described in our February and April issues. Two new additions to their line are an Alpha type gas lamp and a light magnifier, which is fitted with a magnifying lens. They also show a new low-priced tail oil lamp. The fronts of their oil lamps are now fitted with a new spring catch, which makes them very easily detachable.

NATIONAL SALES CORPORATION, THE, 296 Broadway, New York City (at Grand Central Palace),exhibited the new Multiplex electric lamp, made by the Royal Battery Co. This is furnished in all the usual styles of gas lamps, and is equipt with a very small electric bulb which is wired up so as to give various strengths of light from 16 to 150 candle power; also an electric tail lamp with an electric device which announces when the lamp goes out from any cause whatever by their whistle or bell. This device is described in this issue, page 202. They also exhibited the Pirelli tires, the Conover wind shields, described March, 1907, page 342, and the Geecee batteries, described September, 1906, page 146.

PIERSON MOTOR SUPPLY CO., 1175 Bedford avenue, Brooklyn, N. Y. (at both shows)—full line of lamps, as described in our July, 1907, issue, page 158; also "Puritan" gas tanks, Weiss siren horns, S. C. tire inflators, the Weiss-Underhill speed indicator, and the Racine Folding Chair, descriptions of which will appear in future issues of the Journal.

ROSE MFG. C0., 910 Arch street, Philadelphia, Pa. (at both shows)—"Neverout" double focus searchlight, described March, 1907, page 282; new "Neverout" lamps, described January, 1907, page 314, as well as other new patterns to be described in our next issue, and the 1908 "Neverout" gas producer, in both single and double chamber patterns, fully described and illustrated in this issue, page 226.

RUSHMORE DYNAMO WORKS, 629 South avenue, Plainfield, N. J. (at Madison Square Garden)—"Rushmore" headlights, described in our February, 1907, issue, page 346; 1908 Rushmore generator and headlight for high-powered runabouts, all these products showing no material change; detail improvements are described in this issue, page 203.

SAXON LAMP WORKS, THE, 526 West Twenty-eighth street, New York City (at Grand Central Palace), exhibited in addition to their line of lamps a novelty in the shape of a clock encased in a lamp frame and covered by a glass case. These are made in two sizes, at $10 and $75, respectively. They also exhibited Saxon enunciators, which will be described in future issues.

Jacks

COMPTOIR DE INNOVATIONS, 1693 Broadway, New York City (at Grand Central Palace), exhibited the Delpeuch mechanical tire inflater, the Delpeuch Jack, nightingale whistle; all imported from France.

COOK'S STANDARD TOOL CO., Kalamazoo, Mich. (at Madison Square Garden)—"Cook's" 1908 "Standard" Jack, described in this issue, page 260, and the Cook Standard Tool grinder, described page 358, January, 1906.

DUFF MFG. CO., Westinghouse Building, Pittsburg, Pa. (at Madison Square Garden)—the 1908 model of the "Barrett," described in next issue.

ELITE MFG. CO., Ashland, Ohio (at Grand Central Palace), are exhibiting the Reliable compound tire pump and the Reliable automobile jack, which will be illustrated and described in our next issue.

OLIVER MFG. CO., 203 South Desplaines street, Chicago, Ill. (at both shows), are exhibiting their well known Peerless E-Z and Sampson Jacks, which have been described in detail in various issues in the past.

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Motorcycles

ARMAC MOTOR CO., 472 Carroll avenue, Chicago, Ill. (at Madison Square Garden)—"Armac" 1908 motorcycles.

CONSOLIDATED MFG. CO., Toledo, Ohio (at Madison Square Garden)—1908 "Yale-California" motor cycle, to be described in our next issue.

G. H. CURTISS MFG. CO., Hammondsport, N. Y. (at Madison Square Garden)—1908 "Curtiss" motor cycles and motors.

EXCELSIOR SUPPLY CO., 233-237 Randolph street, Chicago, Ill| (at Madison Square Garden) —X L C R ignition battery, described in our October, 1907, issue, page 160, and the "Triumph" motor cycle, described in our September, 1907, issue, page 206.

HENDEE MFG. CO., 837 State street, Springfield, Mass. (at Madison Square Garden)—the 1908 "Indian" line of motor cycles, including a new 2¾ H. P., single cylinder machine, a new 3½ H. P., single cylinder machine, and a new 5 H. P., 2-cylinder machine; also a new attachment that will change the inlet valves of any of their machines to mechanical operation; also new batteries and magnetos offered in conjunction with the 1908 machines; all to be described in our next issue.

MERKEL MOTOR CO., 1098 Twenty-sixth avenue, Milwaukee, Wis. (at Madison Square Garden)—"Merkel" 1908 motor cycles, to be described in the December Journal.

OVINGTON MOTOR CO., 2208 Broadway, New York (at both shows), are showing the F. N., 4-cylinder motor cycle, as described page 206, August, 1906. They also show this machine with a fore-carriage and a single cylinder machine of the same make. These machines are equipped with Simms Bosch Magneto Ignition; they also show an extensive line of motor cycle accessories.

READING STANDARD CO., Reading, Pa. (at both shows))—R-S motor cycles, tandems, tricars, etc., the 1908 line possessing several distinct improvements over the 1907 model, described in our January, 1907, issue, page 356a. 1908 details will be published in the next issue.

RELIANCE MOTOR CYCLE CO., Addison, N. Y. (at Madison Square Garden)—Reliance motor cycles.

THOMAS AUTI-BI CO., 1443 Niagara street, Buffalo, N. Y. (at Madison Square Garden)—the Auto-Bi motor cycle.

Oils, Polishes, Etc.

ALLERS & CO., H. A., 136 Liberty street, New York City (at Madison Square Garden)—"Solarine" metal polish, described February, 1904, page 160h, and Black Solarine, described page 366, February, 1907, issue.

AMERICAN ALUMINUM COATING CO., 1004 Diamond Bank, Pittsburg, Pa. (at Madison Square Garden)—aluminum coated steel plates, described in our May, 1907, issue, page 142.

COOK'S SONS, ADAM, 313 West street, New York City (at Madison Square Garden)—"Albany" grease, the well known lubricant, and "Perfect" grease cups, which are recommended for automobile use with "Albany" grease, described in our March, 1906, issue, page 294.

DIXON, JOSEPH, CRUCIBLE CO., Jersey City, N. J. (at both shows)—"Dixon" graphite products, including motor graphite, cup greases, chain compound, pipe joint compound, special transmission grease; also crucibles, all of which have been fully described in past issues of the Journal. A feature of the exhibit is a sliding gear transmission running in their special graphite grease.

HARRIS, A. W., OIL CO., 326 South Water street, Providence, R. I. (at both shows), exhibit the well known Harris oils and greases. They have a new wrinkle to show the qualities of their various grades of oils by brass tubes, which rotate, and the weight of each quality of oil is shown by the movement of the oil from the top to the bottom. They have added a new transmission lubricant to their line, which is more fluid than their regular transmission grease, and is light color. They are also furnishing their grease in 25 and 50 pound cans. Another new Harris specialty is the Harris liquid scouree for polishing all metal surfaces.

MILLER'S SONS, WM. P., 75--79 Third street, Long Island City, N. Y. (at Grand Central Palace)—a full line of Miller's lubricants, including the "Pale Light" oil for Packard car and a new fiberous oil, described in this issue, page 204.

NEW YORK AND NEW JERSEY LUBRICANT CO., 14-16 Church street, New York City (at both shows)—"Non-Fluid oils, a practical demonstration being given of a transmisison lubricated with these oils. Non-Fluid oils were described in our November, 1906, number, page 216.

RAIMES & CO., 50 Ferry street, New York City (at Grand Central Palace), exhibited the Globe liquid metal polish.

JOHN T. STANLEY, 642 West Thirtieth street, New York City, N. Y. (at Madison Square Garden)—Mobo auto body cleaner, Shofo hand cleaner, described January, 1907, page 228, and new body and metal polisher.

VACUUM OIL CO., Rochester, N. Y. (at Madison Square Garden)—"Vacuum Mobiloils" and greases in cans and barrels.

YOUNG, O. W., 174-180 Frelinghuysen avenue, Newark, N. J. (at Madison Square Garden)—Young's oils, greases and polishes; also Cox's tire repair outfits, plugs, cements, etc., described in past issues. The latest addition to the Young line is a non-fluid oil.

Shock Absorbers

ACME SPRING CHECK CO., THE, 1717 Broadway, New York (at Grand Central Palace), exhibited the Acme shock absorber, to be described.

AUTO-CHECK MFG. CO., 1876 Broadway, New York City (at Grand Central Palace), exhibited the Rountree-Stimmel auto check, which will be described in a future issue.

COMSTOCK SHOCK ABSORBER CO., 1775 Broadway, New York City (at both shows), exhibted the Comstock Shock Absorber, described in our August, 1907, issue, page 136.

CRESCENT PARTS CO., THE, 244 West Forty-ninth street, New York City (at Grand Central Palace), exhibited the Crescent removable rim, formerly the Harburg removable rim, which was described in our December, 1906, issue, page 96.

DIEZEMANN SHOCK ABSORBER CO., 420-424 East 106th street, New York City (at Grand Central Palace)—the 1908 Diezemann Shock Absorber, described and illustrated in this issue, page 182.

F. R. V. AUTO PARTS CO., 116 Nassau street, Room 705, New York City (at Grand Central Palace)—"F. R. V." transmissions, gearless differential, steering gears, shock absorbers, and other automobile parts. The shock absorber is described in this issue, page 222, and the gearless differential on page 258, while the other products will be described in future issues of the Journal.

HARTFORD SUSPENSION CO., 67 Vestry street, New York City (at both shows)—1908 Truffault-Hartford shock absorber, described in this issue, page 268; the device being demonstrated on two miniature motor cars running on a moving roadway; one car equipt with the Truffault-Hartford shock absorber, and the other without any such device.

HOTCHKIN MFG. CO., 1265 Michigan avenue, Chicago, Ill. (at both shows)—"Hotchkin" 1908 anti-jolt device, which is not changed materially from the 1907 model, described in the March, 1906, Journal, page 298, the slight changes being given in this issue.

PERFECTION SPRING CO., 2414 Superior avenue, Cleveland Ohio (at Grand Central Palace), exhibited the McIntyre Perfection spring, which has an auxiliary spring to absorb the shock. This spring was described in our October, 1906, issue, page 162.

SAGER CO., J. H., 265 South avenue, Rochester, N. Y. (at both shows)—the "Sager" equalizing springs, described in our February, 1906, issue, page 398; the "Sager" flexible springs, described in our December, 1906, issue, page 270, and a new tire grip.

STOLP SHOCK ABSORBER CO., No. 20 Fletcher street, New York, exhibited a shock absorber, consisting of a coil spring, holding a long lever which intervenes between the spring and axle. This device is not yet being manufactured for the market. As soon as it is ready for the market we will describe it fully.

SUPPLEMENTARY SPIRAL SPRING CO., 4524-4526 Delmar avenue, St. Louis, Mo. (at Grand Central Palace), exhibited their well known spiral spring shock absorbers in a variety of sizes, and also attached in several different ways. Decribed December, 1906, page 218.

VICTOR SHOCK ABSORBER CO., THE, 1937 Broadway, N. Y. (at Grand Central Palace), ex-

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hibited Victor shock absorbers, which were illustrated in our April, 1907, issue, page 240.

Speed Indicators and Odometers

AUTO IMPROVEMENT CO., 304 Hudson street, New York City (at both shows), are exhibiting a large number of new novelties. Their speed indicator is now shown in three styles, the tourometer registering up to 50 miles, also showing a mileage for the trip and season. The roadster giving speed to 65 miles and mileage, trip and season. The Universal giving the same as the roadster, with an addition of a clock, all showing on the one dial. Their vulcanizer, a small one, and which was described last January, is now supplemented with two new sizes, one a shop size for inner tubes principally, and the other a large shop size for inner tubes and shoes. Another new addition to their line is the Ever-Ready spark plug. These new articles will be described in a future issue. They also exhibit the Ever-Ready starter, which has been described heretofore, and the Ever-Ready tire tube, described in February, 1907, page 312.

HICKS SPEED INDICATOR CO., 1263 Atlantic avenue, Brooklyn, N. Y. (at both shows), shows an improved speed indicator, combined with odometer and clock, illuminated by an electric light; in this issue, page 201; also the 1908 Jones speed-also an annunciator, to be described.

HOFFECKER CO., Park Square Motor Mart, Boston, Mass. (at Madison Square Garden)—the "Hoffecker" Speedometer, 1908 model, described in this issue, page 242.

INDEX SPEED INDICATOR CO., 719 Hennepin avenue, Minneapolis, Minn. (at both shows)—formerly the Oliver Instrument Co.—the 1908 "Index" speed indicator, described in our December, 1906, number, page 298, and not materially changed, only refined in detail.

JONES, JOSEPH W., Broadway and Seventy-sixth street, New York City, N. Y. (at both shows)—a new speed controling device, described in this issue, page 201; also the 1908 Jones speedometer, and a new $25 instrument, both to be described.

JONES, W. S., 112 North Broad street, Philadelphia (at both shows), exhibits the well known Lee speedistimeter, which has been described in our May, 1907, issue, page 162, and also in previous issues. He also exhibited for the first time the Phelps Vehicle Recorder, an entirely new instrument which records the movements of any vehicle to which it is applied, showing the number of stops, time the vehicle started, time occupied in trip, and the lapse of time between every stop and start. In other words, a complete record of its movements. This ingenious device was described October, 1907, page 158.

KILGORE MFG. CO., Old Town, Me. (at Madison Square Garden)—Kilgore 1908 shock eliminator, described in our August, 1907, issue, page 134.

LORING SPEED GAUGE CO., 91 Marshall street, Somerville, Mass. (at Madison Square Garden)—"Loring" 1908 speed gage, described in this issue, page 205, demonstrating devices being used to prove the accuracy of the instrument to spectators.

R. H. SMITH MFG. CO., Springfield, O. (at both shows)—the "Springfield Motormeter," a speed indicator, the 1908 model of which was described in our October, 1907, issue, page 176.

STEWART & CLARK MFG. CO., 502-520 Diversey Boulevard, Chicago, Ill. (at both shows)—"Stewart" 1908 speedometer, including a new type with odometer enclosed, and the new "American" speedometer, a moderate priced instrument, both of which are described in this issue, page 216. A feature of this exhibit is a cabinet on which several of the speedometers are placed with the shafts running down to a motor beneath, the motor operating the instruments each at a different speed.

VEEDER MFG. CO., Hartford, Conn. (at both shows)—"Veeder" speed and distance indicating instruments, including the well known "Veeder" odometer and the 1908 "Veeder" tachodometer, to be described.

WARNER INSTRUMENT CO., 117 Roosevelt avenue, Beloit, Wis. (at both shows)—the Warner "Auto-Meter," described January, 1907, page 302, and May, 1907, page 144, with recent improvements, described in this issue, page 244.

WINCHESTER SPEEDOMETER CO., INC., Motor Mart, Broadway and Sixty-second street, New York City (at both shows)—exhibited the Winchester speedometer, the latest model of which was described in our September, 1907, issue, page 150.

Tops, Wind Shields, Etc.

THE AUTO ACCESSORIES MFG. CO., 265-269 Jefferson avenue, Detroit, Mich. (at both shows), show their line of wind shields, lamp brackets, etc., as previously described. They also show a new detachable rumble seat designed especially for Maxwell runabouts. This can also be placed on other runabouts of similar pattern. Other new things shown by them are the Duquesne extended front tops for runabouts and touring cars, a one-piece tire holder, which is fastened to running board and does not touch the body; robe and foot rails, lace and button tire covers, and special tire covers to match the paint and trimming of the automobile.

BLUE RIBBON AUTO & CARRIAGE CO., Cannon street, Bridgeport, Conn. (at Madison Square Garden)—automobile bodies, one limousine, one tonneau, one runabout; the latter was described in our May, 1907, issue, page 153, others to be described.

L. C. CHASE & CO., 89 Franklin street, Boston, Mass. (at Madison Square Garden)—"Chase" automobile top fabrics in "Chase Leather" and "Chase Rubber," single and double fabrics, including a large number of styles and patterns.

DUANE & CO., W. J., 304 West Forty-fifth street, New York City (at both shows)—the Schildback divided wind shield, described in our August, 1906, issue, page 140; the Beecher divided wind shield, described in our May, 1907, issue, page 166; the Voltz divided wind shield, described in this issue, page 266; a cape top, described in our March, 1907, issue, page 330; slip covers and a new goose neck body iron, to be described in our next issue.

THE HILL MFG. CO., 25 Fuller street, Buffalo, N. Y. (at Grand Central Palace)—"Hill" bodies, tops, auxiliary seats and wind shields, including a new auxiliary seat, No. 12, and a new body with folding rear seat for high powered runabouts, described in this issue; also a new wind shield.

HOPEWELL BROS., 42 Osborne street, Cambridge, Mass. (at Madison Square Garden)—full line of fabric goods, as described in our February, 1907, issue, page 326; also a line of robes.

KLAUDER, CHARLES L., B street and Allegheny avenue, Philadelphia, exhibit a large line of chrome tanned leather for automobiles.

MUTTY CO., L. J., 28 Summer street, Boston, Mass. (at Madison Square Garden), will exhibit foreign and domestic waterproof fabrics of every description for tops, slip covers, storm covers; also a line of special automobile robes made from "pure rubber interlined" plush and of mackintosh material.

MANHATTAN AUTO TOP VO., 249 West Sixty-fourth street, New York City (at Madison Square Garden)—line of limousine bodies, cape tops, glass wind shields, and detachable limousine tops similar to the one used on Welch cars, to be described.

PANTASOTE CO., 11 Broadway, New York City (at both shows), exhibit an automobile body upholstered in "Pantasote" and fitted with a "Pantasote" top. A tank of water made of Pantasote and containing fish demonstrated the waterproof quality of this material. Samples of fabrics for tops, slip covers, etc., are included, and several automobile seats upholstered in Pantasote, a fabric well known to the trade.

J. M. QUINBY & CO., 27 Division street, Newark, N. J. (at both shows)—Quinby bodies on a "Simplex 30" limousine, a "Simplex 30" touring car, a "Simplex 30" runabout, and a "Panhard" 35 H. P. touring car.

RANDS MFG. CO., 51-55 Macomb street, Detroit, Mich. (at both shows)—Rands tops, lamp brackets, removable tonneau seats, wind shields, etc., late models of which have been described in the following issues of the Journal: February, 1907, page 300; March, 1907, page 344b; June, 1907, page 360, and September, 1907, page 148.

SPRAGUE UMBRELLA CO., Norwalk, Ohio (at both shows)—"Sprague" 1908 tops and wind shields, including the 1908 wind shield, illustrated on page 190 of this issue, and the tops and bow rests, described in our January, 1907, issue, page 234.

SPRINGFIELD METAL BODY CO., 364 Birnie avenue, Springfield, Mass. (at Madison Square Garden), metal bodies in various styles.

TROY CARRIAGE SUNSHADE CO., THE (at both shows), exhibited the Troy combination wind shield, which can be used either as a folding glass front or hub screen, illustrated in this issue, page 190.

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AUTOMOBILE
art, Boston, Mass., show the Shaw self-sealing
ner tube, which can be used in any clincher
re. The tube is made of two layers of rubber,
ith a layer of plastic compound between them
ree-eighth inches thick. It is claimed that this
mpound will prevent punctures, or rather, seal
nctures of any kind or number.

AJAX-GRIEB RUBBER CO., Fifty-seventh
nd Broadway, New York, N. Y. (at both
ows—1908 Ajax-Grieb wrapt tread tire

COMMONWEALTH RUBBER CO., 1001 Flat-
on Building, New York City (at Grand Central
alace)—the Mitchell punctureless tire, formerly
ade by the Mitchell Punctureless Tire Co., and
escribed in our January, 1906, number, page
6. No material changes in construction.

CONTINENTAL CAOUTCHOUC CO., 43 Warren
reet, New York City (at Grand Central Pal-
e)—full line of "Continental" flat and round
ead tires, and the "Continental" steel studded
re, described in our January, 1906, issue, page
6; also the "Continental" demountable rim, just
troduced to the American trade, to be described
our next issue.

DIAMOND RUBBER CO., Akron, Ohio (at
oth shows)—"Diamond" flat tread, regular
ead, Bailey tread and non-skid tires, includ-
g the new "Diamond Electric" and new "Dia-
ond Mechanical," to be described in our next
sue. The exhibit included the "Marsh" remov-
ble rim, described in our March, 1906, issue,
age 328; the "Diamond" wire mesh base solid
re for commercial cars, described in our May,
906, issue, page 254; the "Diamond" quick de-
achable rim, described March, 1907, page 332,
nd the "Diamond" white rubber truck tire, de-
cribed June, 1907, page 242.

EMPIRE AUTOMOBILE TIRE CO., Trenton,
. J. (at both shows)—"Empire" tires and a
ll line of tire sundries, descriptions of which
ave appeared in the April, 1907, Journal, page
70, and the May, 1907, Journal, page 145.

EMPIRE STATE TIRE CO., 75 Erie County
ank Building, Buffalo, N. Y. (at Madison Square
arden)—tires, tire protectors, etc., described in
ur July, 1907, issue, page 136.

FISK RUBBER CO., Chicopee Falls, Mass. (at
oth shows), are exhibiting the well known Fisk
res with removable rims, which have been de-
cribed and illustrated in various issues. Their
atest devices were described in the September,
907, issue, page 162.

FIRESTONE TIRE & RUBBER CO., Akron,
hio (at both shows)—the "Firestone" dual
read tire, described in our July, 1907, issue,
age 140, improved by corrugation on the treads;
he "Firestone" demountable rim, described at
he same time; the Firestone detachable tire,
being partially flat. A complete descriptio
the new G & J automobile tire will be give
our next issue. They also exhibit their sp
repair kits, tire protectors, etc., which have
described in previous issues.

B. F. GOODRICH CO., Akron, Ohio (at
shows)—"Goodrich" tires in plain tread,
tread, Bailey tread types, and the Good
Quick Detachable tire and rim. These tires
rims show no change over 1907 models, descr
in our February, 1907, issue, page 342, and
tember, 1907, page 210.

GOODYEAR TIRE & RUBBER CO., Ak
Ohio (at both shows)—"Goodyear" tires, inc
ing the new Heavy Tourist type, describe
the June, 1907, Journal, page 218; the G
year detachable motor cycle tire and rim,
scribed April, 1907, page 266; also the
"Cord" detachable tire for electric cars,
scribed in this issue, page 220, and the G
year truck tires, described in the August,
Journal, page 188. Their exhibit also incl
the usual line of universal rims with detach
and clincher types of side rings, Bailey t
tires, etc.

HARTFORD RUBBER WORKS CO., Hart
Conn. (at both shows), are making a spec
of the new 1908 Midgley quick detachable
which has the regular clincher rim on one
and the quick detachable device on the o
as is described on page 192 of this issue.
are also showing the Midgley wire tread tire
their regular styles of clincher tires, Turner
rubber tires, and soft rubber bumpers.

HEALY LEATHER TIRE CO., Healy Buil
New York City (at Madison Square Garde
the 1908 Healy leather tire, described in thi
sue, page 203, and the Healy leather motor
tire, described in this issue, page 296; inner t
described July, 1907, page 144, and a new
valve, to be described; also the Healy detac
tire grip, described in our May, 1907, issue,
174.

LEATHER TIRE GOODS CO., THE, Ne
Upper Falls, Mass. (at both shows)—1908 "W
worth" tire tread, described October, 1907,
216; 1908 Kant Skid and new leather inner
described in this issue, page 220.

LONG & MANN CO., Rochester, N. Y
Grand Central Palace)—the "Minute" tire
described in our October, 1906, issue, page
improved by slight changes, to be described;
a new tool for loosening the shoes, to be
scribed; and a new vehicle washer, describ
our next issue.

MOTZ CLINCHER TIRE & RUBBER CO.
ron, Ohio (at both shows), are exhibiting a

corrugated flat and other treads, and also anti-skid style.

ORGAN & WRIGHT, foot of Bellevue street, oit, Mich. (at both shows), are making a ialty of the Midgeley quick detachable rim, improved 1908 model, and they are also ex- ing a new line of hard rubber battery boxes large variety of sizes in any number of bat- s. Also a new line of spring bumpers made olid soft rubber. They also show their usual of detachable and solid rubber tires, which been described from time to time in our mns.

EWMASTIC TIRE CO., Broadway and 68th t, New York City (at both shows)—tires with "Newmastic;" also the "Newmastic" r tube and the "Parker" rim, described in issue, page 270. A feature of the exhibit single tube tire made by joining the edges clincher casing and filling it with "New- ic."

ORRIS AUTO CO., Saginaw, Mich. (at both s), are exhibiting the Standard tire pro- r for the prevention of punctures and blow- It consists of an auxiliary shoe, which a patented bead, which grasps the tire proper out any mechanical fastening, and is dust water tight. Described in the October, 1907, , page 190.

ENNSYLVANIA RUBBER CO., Jeannette, (at both shows)—"Pennsylvania" tires, as de- ed in our January, 1907, issue, page 306, slight changes in materials as detailed in issue, page 202.

NEU L'ELECTRIC CO., New York City (at d Central Palace), exhibit the Pneu L'Elec- tires in several styles, and Grouville & Ar- bourg carburetors.

ESTO DETACHABLE RIM, Lincoln Trust ling, 403 Jersey City, N. J. (at Grand Cen- Palace), exhibit the Presto Detachable Rim, ibed June, 1907, page 212.

EPUBLIC RUBBER CO., Youngstown, Ohio both shows), are exhibiting a new detach- tire and rim, which will be described in next page 168.

TRENTON RUBBER MFG. CO., of Trenton, J., exhibit a complete line of inner tubes f automobile tires, solid and cushion tires; al tire repair stocks for both inner tubes and shoe brake linings, especially made automobile ho

VOORHEES RUBBER CO., 48 Day street, Ne York City (at Madison Square Garden), will e hibit tire repair materials.

Component Parts

THE A-Z CO., 527-9 West Fifty-sixth stree New York ity (at Madison Square Garden)—t A-Z Bulge Square Seamless Tube Radiator, d scribed June, 1907, page 190; metal racing ru about body; hoods, metal racing seat "backet;" metal trunks; gas, water and exhau manifolds, and other metal specialties, describe page 348; February, 1907, Journal; a new radi ter suspension; also several new specialties, i cluding tool boxes, trunks, etc., to be described

AMERICAN BALL BEARING CO., Edgewat Park and L. S. & M. S. Ry., Cleveland, O. (both shows), are exhibiting their well know line of ball bearing axles and hubs, previous described; also the Baker self-aligning thru bearing for propeller shafts, and show sever new axles for the new 6-cylinder cars which a now being placed on the market.

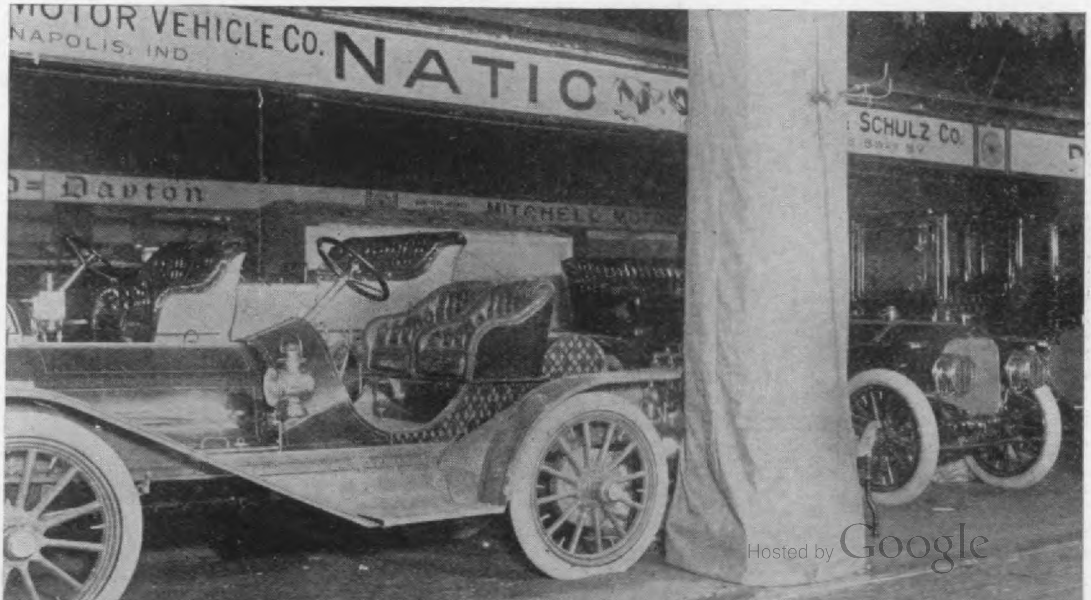
BALDWIN CHAIN AND MFG. CO., 37 He mon street, Worcester, Mass (at both shows are exhibiting a new detachable chain in add tion to their old line of riveted detachab chains. The pins of this new chain are rivete on one side and are held in place on the oth side by a steel collar which fits in the slot in t other end of the pin. The Baldwin & Co. a also showing a line of sprockets which they a now making a specialty of. The new chain w be illustrated in our next number.

BREEZE CARBURETOR CO., 276 Halse street, Newark, N. J. (at both shows), are e hibiting an entirely remodeled carburetor, whic will be described in our next issue. They a also exhibiting a new gasoline strainer, whic was described in our March issue, page 324.

BRISCOE MFG. CO., 1427-57 Woodward ave nue, Detroit, Mich. (at both shows), are exhibi ing their usual extensive line of metal guard bonnets, fans and radiators, which have been de scribed from time to time in our past issues.

BROWN-LIPE GEAR CO., 208 South Gedde street, Syracuse, N. Y. (at both shows)—th well known "Brown-Lipe" differentials, steerin

INEHART CLINCHER TIRE & RUBBER Akron, Ohio (at both shows), are exhibit- he new celluloid tires for touring cars, de- ed on page 203 of this issue. They are also ing their well known Swinehart double tire for trucks, with a chain stretched d the space between the two tires, which only strengthens the tire, but acts as an



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ecial drop forgings, prest steel frames, sames of gear steels, valve steels, frame steel, ckel steel, chrome and chrome nickel steel.

CARPENTER STEEL CO., Rooms 1908-10, 100 oadway, New York City (at Madison Square arden)—samples of "Carpenter" steel, deribed in our February, 1906, issue, page 328.

CORTLAND FORGING CO., Cortland, N. Y. t both shows)—complete line of forgings for tomobile tops and bodies, as described in our ay, 1907, issue, page 152, and previous issues, ominence being given to their bow sockets and ifting rails for runabout tops.

C. COWLES & CO., Water and Chestnut reets, New Haven, Conn. (at both shows), are hibiting their usual large line of car fittings, nges, handles, speaking tubes, annunciators, c., among which is a new locking handle for nneau doors. Their specialties have been deribed in past issues.

THE WM. CRAMP & SONS S. AND E. B. CO., each and Ball streets, Philadelphia, Pa. (at th shows)—front axles of "Parsons" manhese bronze, crank cases and gear cases of e Locomobile, bearing castings of Parsons hite brass for the Packard, Stearns, Peerless, ocomobile, Olds and other prominent cars; also w types of gear cases for the Corbin, Columa, Bartholomew, Royal, Rainier, Thomas and ennsylvania cars, and a new one-piece rear le casing of Parsons manganese bronze for the orbin car.

DIAMOND CHAIN & MFG. CO., 241 West eorgia street, Indianapolis, Ind. (at both ows)), full line of "Diamond" chains, the latt types of which are described in this issue, ge 212. The exhibit also included the Diaond steering knuckles and I-beam front axle, scribed in our April, 1906, issue, page 184.

GEMMER MFG. CO., Detroit, Mich. (at both ows)—the "Gemmer" steering gear, latest odel of which is described in this issue, page 4.

GRAY-HAWLEY MFG. CO., 605-609 Fort reet, West, Detroit, Mich. (at both shows)—Gray-Hawley" mufflers, "Autochimes," etc., new atures of which are described in this issue, ge 212; other features have been described as llows: Steam and air valve, September, 1907, ge 154; muffler cut-out and safety valve, Aust, 1907, page 150, and January, 1907, page 6. Also double acting foot pedal, which will described in our next issue.

THE GLOBE MACHINE & STAMPING CO., amilton avenue, Cleveland, Ohio (at Madison uare Garden)—the "Radio-Escape," July, 1907, sue, page 164, and the Globe foot rests and mp brackets, described in our August, 1907, ise, page 168; also a line of brake drums and nds, tool boxes, and other metal specialties.

HANCOCK MFG. CO., Charlotte, Mich. (at both ows)—"Hancock" lubricators, described in our

HARTFORD AUTO PARTS CO., 438 Asy street, Hartford, Conn. (at both shows; re sented by J. S. Bretz Co., sales agents)—"H ford" universal joints, described in our J 1906, issue, page 162, the exhibit including eral new types, the line now including joints the transmission of from 10 to 100 horse po also complete sets, including joints and sh machined to car makers' specifications ready installation in the chassis, in which form Hartford Auto Parts Co. is now making a cialty of furnishing these joints to the trad

HAYES MFG. CO., Maybury Grand avenue G. T. Ry., Detroit, Mich (at Grand Cen Palace), are exhibiting their metal guards hoods well known to our readers; also the m tool and battery boxes, which have lately added to their line. A new exhibit in their is the new metal body with detachable run seat, designed for the Ford four-cylinder about, and adaptable to other runabouts. will be described and illustrated in our issue.

HESS-BRIGHT MFG. CO., N. E. Corner N teenth and Hamilton streets, Philadelphia, (at both shows)—H-B ball bearings, the ex including bearings taken out of various cars have been used considerably, and a set of b ings taken from a railway axle that have run 65,000 miles, and show no perceptible w The constructive features of H-B bearings described in our August, 1904, issue, page 4

HYATT ROLLER BEARING CO., Newark J. (at both shows)—"Hyatt" Flexible R Bearings, which have not been changed s described in our August, 1905, issue, page 7

HOLLEY BROS. CO., 661-673 Beaubien st Detroit, Mich. (at Madison Square Garden)—" ley" 1908 carburetor described in our Aug 1907, issue, page 154; "Holley" 1908 stan magnetos and a special "Holley" magneto for Ford Runabout to be described in a future is

HYDRAULIC PRESSED STEEL CO., Clevel Ohio, (Grand Central Palace) exhibited prest frames, brake drums and other prest steel p described in the June 1, 1907 issue, page 18

INDESTRUCTIBLE STEEL WHEEL CO., Michigan Boulevard, Chicago, Ill., (at Mad Square Garden) "Indestructible" steel wh commercial type described in our October, issue, page 184, and the new pleasure car, pattern described in this issue, page 228. T wheels were also exhibited on demonstrating as standard equipment.

JOHNSON, ISAAC G., & CO., Spuyten Du New York (at Grand Central Palace), exhi a number of samples of their direct steel cast which are used for crank shafts, connecting front and rear hubs, foot brakes, radius sprockets, gear cases, etc.

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e S & B variable speed transmission described our March, 1907, issue, page 296.

KROUSE, R. E., 8612 Main Park avenue, veland, Ohio, (Grand Central Palace) exhibited Krouse Carburetor, which will be described in uture issue.

THE LIGHT MFG. & FOUNDRY CO., Potts-n, Pa. (at both shows), are exhibiting a large nber of difficult castings in their well known to Brand Aluminum; also a number of parts Manganese and Phospho Bronze. They also w some special parts made of their plastic nze. These products were described in detail our March, 1907, issue, page 168.

MERCHANT & EVANS CO., 517 Arch street, iladelphia, Pa., (at both shows)—The Hele-aw clutch; the "Evans" cnange speed gear; Evans back axle; the "Star" metallic tire e and samples of steels which they are im-ting. The clutch and other parts are briefly cribed in this issue, page 207, but will be cribed in detail and illustrated in a future ue.

METAL STAMPING CO., 30-50 Hubert street, w York (Grand Central Palace) exhibited a of radiators and brass car fittings, including ndles, curtain fasteners, etc. Radiator de-ibed March, 1907, issue, page 284, and cur-n fasteners September, 1906 issue, page 126.

MIDGELY MFG. CO., Dublin avenue, Columbus, o (at both shows)—"Midgeley" tubular steel eels described in the February, 1904, Journal, e 160d; the 1908 Midgeley universal rim, de-ibed in this issue, page 192; also samples of ctric welded work produced in their new plant ently erected for this purpose.

MUNCIE AUTO PARTS CO., Muncie, Ind. (at dison Square Garden) Selective and Progres-transmission gears, control and brake levers, e clutches, steering wheels and glass, uni-sal joints and parts for same.

MORTON CO., THE, Worcester, Mass. (Grand tral Palace)exhibited their crank shaft grind-machines, also a large number of crank fts which have been ground on these machines. y supply the machines and also supply the chined crank shafts. This company also ex-ited a large variety of shapes in which they ply alundum, which is a grinding compound ch they supply to the trade.

HINEAS JONES & CO., 301-311 Market Pederson oilers, including the new Type C, wh is described and illustrated in next issue, their Type LI, described in our May, 1907, iss page 128.

PRECISION APPLIANCE CO., 832-840 Au avenue, Chicago, Ill. at Madison Square G den), will show the "Hill" precision oiler i variety of types; also one fully equipped au mobile dash, showing their dash oilers, se rate sight feeds, and separate sight tests; oilers in chassis in full operation, distribut the oil not only to bearings, but also to an luminated plate glass foot-board.

PROSSER & SON, THOS., 15 Gold St., N York City (at both shows), exhibit a large sortment of parts made of "Krupp Spe Steels," of which they are the importers.

SCHWARZ WHEEL CO., Twentieth and Gl wood avenue, Philadelphia, Pa. (at both sho —"Schwarz" wheels in all types for both ple ure and commercial cars from the lightest r about to trucks of 5 or 6 tons load capacity. change has been made in the construction this wheel since described and illustrated in December, 1904, issue, page 196.

SHELBY STEEL TUBE CO., Frick Buildi Pittsburg, Pa. (at both shows)—various parts automobiles made of "Shelby" steel tubing, s as coils for steam boilers, front and rear a tubes, steering columns, telescoping operat rods, etc., the newest feature of the "Shel exhibit being a seamless steel engine cylin shown to suggest to designers the possibili of seamless steel for this purpose.

STANDARD WELDING CO., Central ave and Seventieth street, S. E., Cleveland, Ohio both shows)— numerous types of special tachable, demountable and mechanically faste rims for automobile tires, special shaped ba and flanges, the G & J motor cycle beaded e clincher rim, tubular steering wheel, chuck ri or gear blanks, muffler and exhaust tubes, de onstrating their seamless steel products f nished on contract; also a line of electrica welded parts to show the work of this dept.

SPICER UNIVERSAL JOINT MFG. CO., Ma son avenue and West Third street, Plainfie N J. (at both shows)—the 1908 spicer univer joint, which has been improved to make it m dust proof, to be described in an early issue.

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STANDARD BRAKE CO., 101 West Fifty-sixth street, New York City (at both shows)—"Standard" metal to metal brakes and clutches, described in our July, 1906, issue, page 128, and "National" cork inserts as used in automobile brakes and clutches, the exhibit including samples from various makes of cars using the cork inserts, which were described in our May, 1906, issue, page 182.

STANDARD ROLLER BEARING CO., corner Fiftieth and Lancaster avenue, Philadelphia, Pa. (at both shows), full line of ball and roller bearings, such as described in our April, 1907, issue, page 142, and the new "Grant" roller bearing, described in this issue, page 210.

TIMKEN ROLLER BEARING AXLE CO., Canton, Ohio)—Timken shaft drive rear axles, described January, 1907, page 298; front axles for commercial cars, described page 345, January Journal; a new front axle for heavy touring cars; new front axles and hubs, and the new Hedgeland equalizer, to be described in an early issue; also a new commercial car front axle, to be described in our next issue.

WARNER GEAR C., Muncie, Ind. (at both shows)—1908 "Warner" steering gears, change speed gears, and control levers, described in this issue, page 211; also the well-known Warner differential gears in both spur and bevel types, described in previous issues.

WHITLOCK COIL PIPE CO., Hartford, Conn. (at both shows)—"Whitlock" radiators, described January, 1907, page 210, and pipe bendings for exhaust outlets, etc., to be described in an early issue.

WHITNEY MFG. CO., Hartford, Conn. (at both shows)—1908 models of the "Whitney" chains, which show no radical changes, but are improved in quality, as described in this issue, page 92a; also Whitney keys and key cutters, and the Woodruff system of keying.

WHEELER & SCHEBLER, Shelby, Barth and Sanders streets, Indianapolis, Ind. (at both shows)—"Schebler" 1908 Model F carburetor, described in this issue, page 228, and the Model E, described in the January, 1907, Journal, page 230. Are also showing a new Model G carburetor, which is extremely small and neat, and designed particularly for motor cycle Ford four-cylinder runabouts and other small runabouts. They supply special fittings for this carburetor. Another new device exhibited by this concern is a gasoline strainer, which will be illustrated next month.

Miscellaneous Accessories

ACETYLENE SPECIALTY CO., 105 Walker street, New York City (at Grand Central Palace)—a new French type comprest gas tank described page 242 this issue.

ALLEN AUTO SPECIALTY CO., 1933 Broadway, New York City (at both shows)—"Allen" tire holders and covers, described August, 1906, page 144; "Allen" tire lock, described December, 1906, page 297, and a new tire lock, described in this issue, page 196; also lamp covers, license pads, etc.

ALUMINUM SOLDER & REFINING CO., Oswego, N. Y. (at Madison Square Garden)—"Aluminite," described in our October, 1907, issue, page 172, for soldering aluminum to aluminum or to any other metal.

AUTO IGNITER CO., 1947 Broadway, New York City (at Grand Central Palace), exhibited their flaming pocket lighter, described in this issue.

AUTOMOBILE SCHOOL, THE, of the West Side Y. M. C. A., have a booth explaining their system

AUTO SPRING REPAIR CO., THE, 54 Maiden lane, New York City (at Grand Central Palace), exhibited their automobile spring repairing device, which was illustrated in our May, 1907, issue, page 164.

AUTO PUMP CO., Springville, N. Y. (at both shows), are showing the Spencer Giant Air Pump which has been improved by making it more compact than heretofore and more fully enclosed. They have also added to their line the Spencer gasoline tank gage, which is operated by an electric indicator. These two novelties wil be illustrated in our next number.

AVERY PORTABLE LIGHTING CO., Milwaukee, Wis .(at Madison Square Garden)—the "Autogas" tanks for gas and for tire filling, described, respectively, in our September, 1906, issue, page 164, and in our January, 1907, issue, page 240.

S. F. BOWSER & CO., Fort Wayne, Ind. (at both shows)—"Bowser" gasoline and oil storage systems to meet all requirements, as illustrated and described in the following issues of the Journal: March, 1906, page 302; June, 1906, page 152; July, 1906, page 138, and December, 1906, page 291. Also a new wheel tank for lubricating oil, and a new roll top cabinet for lubricating oil, both of which are described in this issue, page 260.

THE CHANDLER CO., INC., 31 Taylor street, Springfield, Mass. (at Madison Square Garden)—line of name plates furnished for various prominent makes of cars, sill plates, hub caps, metal tags for designating parts, patent plates, radia-) tor front plates, and similar plates, the exhibit including a number of new and attractive designs.

COES WRENCH CO., Worcester, Mass. (at both shows), exhibit their well known line of steel handle wrenches to which they have now added a 4-inch size, which is the smallest wrench they have ever made. These wrenches are made in sizes up to 21 inches in length. Another specialty of Coes Wrench company is the key model wrench for large work. This is made in sizes from 28 inches to 72 inches, the latter being the largest wrench ever produced, one of which forms a prominent part of their exhibit. This wrench opens 12⅛ inches and weighs 166 pounds. J. C. Carthy & Co., 21 Murray street, the New York agent for the Coes Wrench Company, are looking after the trade at the Coes booth.

CLOVER MFG. CO., 228 West Fifty-eighth street, New York City (at Grand Central Palace), exhibted the Clover brand grinding compound for grinding valves, piston rings, crank shaft bearings, etc. It is put up in double cans containing two grades, coarse and fine.

COLUMBIA NUT & BOLT CO., Bridgeport, Ccnn. (at both shows)—the "Columbia" lock nut, to be described in an early issue.

CONSOLIDATED OPTICAL MFG. CO., THE. 115 West 129th street, New York, are showing special auto goggles especially for the eyesight of the individual that they are intended for.

DANIELS, W. S., 52 Church street, Boston, Mass., exhibited the Standard Speedometer, manufactured by the Parker Mfg. Co.; the Universal Robe Rail, manufactured by the Auto Rail & Equipment Co., Grand Rapids, Mich.; Ball wrench, manufactured by the Ball Tool Co., Boston, Mass., all of which are entirely new devices, and will be exhibited in future issues. Hc also exhibited the Bemus Ball Bearing Timer and the Bemus Distributor, and the elastic Tire Filling and Covert Jacks.

DOWNING, CHARLES J., 54 Warren street, New York (at Grand Central Palace), exhibited a large number of automobile accessories for which he is manufacturer's agent.

ELECTRIC & MECHANICAL DEVELOPMENT CO., THE, Asbury Park, N. J., exhibit Hickley's patent A. C. current rectifier for transforming alternating current into direct current. This will be described in detail in a future number.

GABRIEL HORN MFG. CO., 1407 East Fortieth street, Ceveland, Ohio (at both shows)—"Gabriel" horn, described in our November, 1906, issue, page 204; also a new 28-tone horn with keyboard; new "Gabriel" cut-out valve, described in this issue, page 206, and the "Gabriel" shock brake, described in our April, 1907, issue, page 178.

GILBERT MFG. CO., New Haven, Cohn. (at both shows), exhibit their extensive line of tire brackets, tool cases. helmets and other fabric specialties, which include several new articles, among which are the new button tin case, new spare tin locks and a tin trunk, which fits inside of the spare tire. They also exhibit the Bowers carburetor, which has been described in previous issues.

INTERNATIONAL AUTO HORN MFG. CO., 151 East 126th street, New York City (at Grand Central Palace), are exhibiting a very large line of automobile horns of their own make; also bulbs. reeds and flexible tubing for same. They also exhibit brass tire irons and acetylene gas generator tips. Horn has been decsribed July, 1907. page 172.

IDEAL CARRIAGE WASHER CO., Rochester, N. Y., exhibit their well known devices for washing automobiles in the space of the New York Sporting Goods Company, consisting of the Ideal carriage washer and sponge holder and the Ideal automatic water saver.

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KING OPTICAL CO., JULIUS, THE, 2 and 4 Maiden lane, New York (at both shows), exhibit an extensive line of goggles, new styles of which we illustrated in our February, 1907, issue, page 276; also the new Goggle No. 2, described in this issue, page 203.

MASURY, JOHN W. & SON, 44 Jay street, Brooklyn, N. Y. (at both shows), are exhibiting an extensive line of automobile colors, varnishes and finishes.

MILLER, CHARLES E., 97 Reade street, New York City (at both shows)—one of the most complete lines of automobile accessories, including several lines of his own manufacture and many others on which he controls the sale. Several of his most recent novelties were described in late issues of the Journal, as follows: Auto Jack, January, 1907, page 264; Miller Speedometer, December, 1906, page 274; La Bassoon Horn, November, 1906, page 194, and the latest Miller Spark Plug, described in this issue, page 190.

MODEL MFG. CO., 15 Frankford street, New York City (at Grand Central Palace), exhibited a timograph for recording the movements of the car when in use, and the length of time used. They also exhibited the Acme tire chain, which is a series of stamped metal links, which cross the tire and are fastened around the felloe of a steel chain. These devices will be described in future issues.

MONOGRAM & CREST ENGRAVING CO., 1556 Broadway, New York, (at Grand Central Palace), exhibited a large line of name plates and engraved metal monograms, also Crest's in various metals.

NATHAN NOVELTY MFG. CO., 88-90 Reade street, New York City (at Grand Central Palace), exhibited a large line of the Nathan products in fabric, such as storm aprons, tool cases, top covers, etc., and also two entirely new accessories—Nathan's coat rail bags, described September, 1907, issue, page 172, and Nathan's tire trunks were described in October, 1907, issue, page 188.

NEW YORK SPORTING GOODS CO., 17 Warren street, New York City (at both shows)—full line of automobile accessories, prominence being given to the Pitsfield Spark Coil Co.'s spark coils, magnetos, commutators, switches and Jewel plugs, for which goods they are Eastern agents; Morgan & Wright tires, for which they are New York agents; Motor Goods Mfg. Co.'s line of lamps, spark plugs and accessories and imported French "Marchand" horns, for which they have the sole sale in the United States; Weed chain tire grips, Gabriel horns, Brown spark plugs, C. O. T. specialties, and the Baby gasoline torch, for which goods they are special distributors.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS, THE, 146 W. 56th St., New York City (at Grand Central Palace), have quite a large exhibit of the machines and apparatus from their school.

NOONAN, A. S., AUTOMOBILE & MACHINE WORKS, Rome, New York (at Grand Central Palace), exhibited Noonan's well known patented automobile and motor cycle tools and specialties, which have been described in February, 1907, page 283.

PATTERSON, GOTTFRIED & HUNTER, 146-150 Centre street, New York City (at both shows)—automobile repair kits, wrenches, screw drivers, etc., described in our October, 1906, issue, page 150; January, 1907, issue, page 280, and July, 1907, issue, page 172; the "Auto C C" wrench set and several new specialties, including tire pumps, oil guns, etc., to be edscribed in a future issue.

POST & LESTER CO., 20 Sargeant street, Hartford, Conn. (at both shows)—1908 Volier Horns, Duryea Goggles, Royal De Luxe Lamps, and a complete line of motor car supplies. Descriptions of their newer specialties appeared in our January and March issues, pages 312 and 332, respectively.

PREST-O-LITE CO., THE, Box 484, Indianapolis, Ind. (at both shows). The "Prest-O-Lite" gas tank, partially described in past issues and to be fully described in our next issue; Prest-O-Tyre tanks, described in our March, 1907, issue, page 293.

RANDALL-FAICHNEY CO., Sudbury Building, Boston, Mass. (at both shows), exhibit their well known line of high class oil guns and pumps, among which is a new combination oil and grease gun described February, '07, page 306. They also exhibit the Webster gasoline tank.

SCANDINAVIAN FUR & LEATHER CO., 14 West Thirty-third street, New York City (at Grand Central Palace)—automobile clothing, including garments of every description in new styles for the 1908 season to be illustrated in a future issue.

SHALER, C. A. CO., Waupun, Wis. (at both shows); 1908 line of "Shaler" electric vulcanizers which includes a variety of new types described in this issue, page 188.

SHERWIN-WILLIAMS CO., THE, 601 Canal Road, N. W., Cleveland, Ohio (at Madison Square Garden), automobile colors and finishes.

SPRINGFIELD PORTABLE CONSTRUCTION CO., Springfield, Mass. (at Grand Central Palace), exhibit one of their portable garages, also a working model showing their method of construction.

STOKES RUBBER COMPANY, JOSEPH, Trenton, N. J., exhibited a line of hard rubber goods, including steering wheels, handles, motor cycle grips, radiator caps, battery jars and cases, etc.

TURNER BRASS WORKS, Sycamore, Ill. (at both shows). The Harroun Auto Bumper, described on page 140, issue of July, 1906; Martin reserve and safety alarm described January, 1907 issue, page 290; Martin fuel strainer, described page 222, this issue; the Turner safety alarm pump, described July, 1906, page 136; the Turner carburetor, described March 1903, issue, page 72; Turner name plates, aluminum castings, coat rails and foot rails.

VALENTINE & CO., 257 Broadway, New York (at Madison Square Garden)—automobile varnishes and colors; also a large assortment of various colored panels and glasses, showing stripings, in order that the automobile buyer may get a clear idea of just what color his car will be when finished, and will materially aid him in the selection of the shade he has in mind.

VENTILATED CUSHION AND SPRING CO., Jackson, Mich. (at both shows), are exhibiting the Rough Rider cushion spring and ventilating cushions, described May, 1907, page 141.

WOOSTER, WILLIAM, 88 Chambers street, New York City (at Grand Central Palace), exhibited a large line of automobile accessories, for which he is agent.

WRAY PUMP & REGISTER CO., 191 Mill street, Rochester, N. Y. (at Madison Square Garden)—Wray pumps and pressure registers.

WEED CHAIN TIRE GRIP CO., 28 Monroe street, New York City (at both shows), are exhibiting the well known Weed Chain Tire Grip, with which they now supply a new device called an adjuster, which keeps the chain taut, preventing it from coming in contact with the guards. They also show a new solid tire device, which is applied in similar manner to their regular device, but which is equipt with chrome nickle steel plate on the tread. These two new devices will be described in our next issue.

AUTOMOBILE CLOTHING

COHEN, FRANK & CO., Brooklyn, N. Y., exhibit the Arygle auto boots for cold weather motoring.

MANN CO., LEON, 699 Broadway, New York City(at both shows), exhibit an extensive line of automobile clothing.

MORRISON, McINTOSH & CO., Grinnell, Iowa (Grand Central Palace), exhibited a large line of Grinnell ventilated air cooled Rist-Fit gauntlets, including a new style, which has a slide snapping buckle, making a very quick and neat fastener. Illustrated on page 263, this issue.

REGAL COAT COMPANY, 36 East Twelfth street, New York City, exhibit automobile coats made of high-grade "Lucenta" satin, cravenetted and rubberized. This material has a rich lustrous finish and is furnished in a large variety of colors.

Two dollars sent now to the Cycle & Automobile Trade Journal, Forty-ninth and Market street, Philadelphia, will assure your getting the December and eleven other succeeding issues of the Journal. As the descriptions of 1908 cars constitute a special feature of the Journal at this time of the year, no issue should be missed.

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ctured by the Blomstrom Manufacturing mpany, Detroit, Michigan, was two rs, a five passenger touring car and a ree passenger runabout, same chassis d same price, $2250. This same line of rs, a five passenger touring car and three passenger runabout, one chassis ly, will be continued for 1908 under the me name, The Blomstrom "30,", and at e old price $2250, altho the 1907 assis has had detail improvements ade, notably an increase in cylinder nensions from 4 3-16x4½ in 1907 to ⅛x4½ for 1908, which gives something e 5 H. P. more than the Blomstrom 1907

is two completed cars per day, and expected total 1908 production is ab 200 Blomstrom "30" cars, 125 or 130 passenger touring cars and 70 to 75 passenger runabouts.

The Blomstrom "30," 1908 5-passen touring car has a wheel base of 112 inch gage 56 inches, and tires all 32x3½ inch The motor has four cylinders, 4⅝x inches, 4-cycle, water-cooled, nominal H. P. Sliding-gear speed-change, 3 f ward speeds and a reverse with be gear to the divided rear axles are us The weight is 2250 pounds and the pr $2250, including 5 lamps, mats, horn a

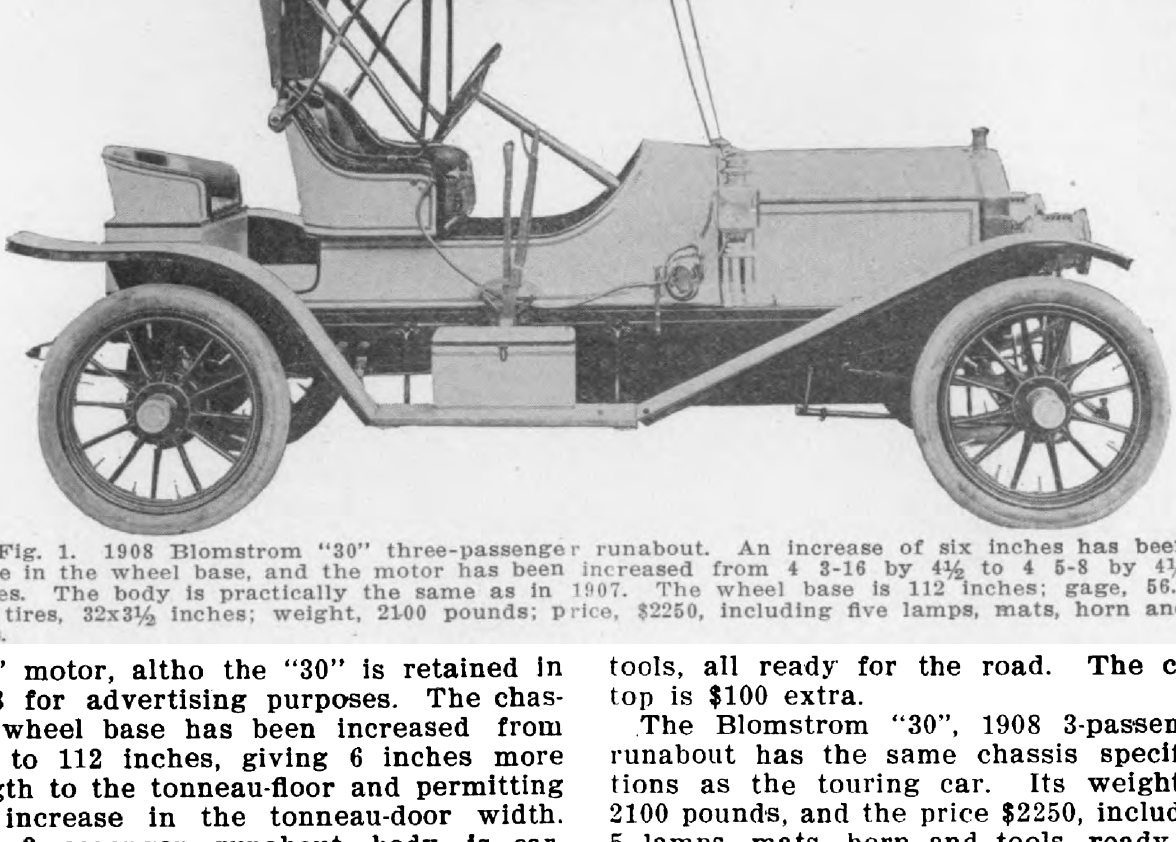

Fig. 1. 1908 Blomstrom "30" three-passenger runabout. An increase of six inches has been de in the wheel base, and the motor has been increased from 4 3-16 by 4½ to 4 5-8 by 4½ hes. The body is practically the same as in 1907. The wheel base is 112 inches; gage, 56.3 l tires, 32x3½ inches; weight, 2100 pounds; price, $2250, including five lamps, mats, horn and ls.

0" motor, altho the "30" is retained in 08 for advertising purposes. The chas- wheel base has been increased from 6 to 112 inches, giving 6 inches more ngth to the tonneau-floor and permitting increase in the tonneau-door width. e 3-passenger runabout body is car- d over to 1908 without change, other an increase of length due to the added inches of wheel base.

This company is making its own four- linder motors. The cylinders are cast dual-units and are of such proportions to make the connecting rods symetrical, th the rod-bodies in the middle of the ist-bearings. This somewhat increases e motor total length, but greatly im- oves the wearing qualities of the con- cting-rod boxes.

The Blomstrom factory has been aug-

tools, all ready for the road. The ca top is $100 extra.

The Blomstrom "30", 1908 3-passen runabout has the same chassis specifi tions as the touring car. Its weight 2100 pounds, and the price $2250, includ 5 lamps, mats, horn and tools, ready the road. The cape top for this Bl strom "30" runabout is a recent desi reaching far forward in front, but hav only two bows. The price of this top shown is $90.

NOTABLE FEATURES.

These 1908 Blomstrom "30" cars are last thing in motor car design thru C. H. Blomstrom is one of the most perienced of motor car builders, and designs are of carefully selected deta from accepted practice, with many origi features of decided merit. The clutch

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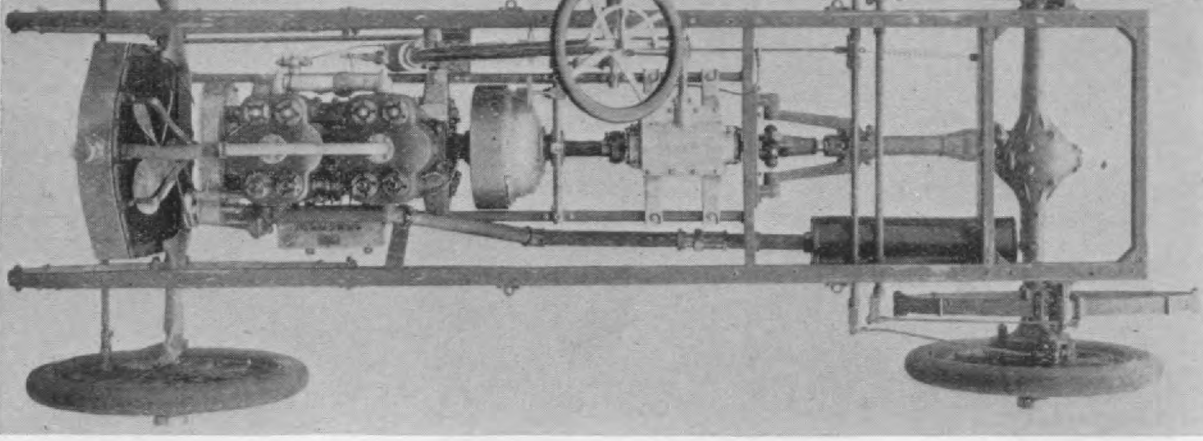

Fig. 2. Plan of 1908 Blomstrom Chassis, showing the sub-frame, the enclosed clutch, an e forked forward end of the cardan shaft housing, which acts as a torsion rod.

le way either to the front or rear, nds between two-grey-iron, beveled mbers, which are pinched by toggles l bell-cranks against the bronze-ring el faces, as shown in Fig. 3. The y-iron clutch member inclined faces fitted with cork inserts, giving a soft gagement and a powerful slipping drive. The touring car bodies are "straight e" effects, with wide doors and ample m. The runabout body has the front rd deeply cowled with sheet steel and cowl sides are continued to the front t panels, so as to enclose the driver's t-space at the sides without the placing doors.

The sliding gears are by Warner, the ering action is worm and worm-gear tor and the springs are half-elliptics in nt, and full-elliptics in the rear. The peller shaft casing is in integral assem- with the bevel-gear housing at the r and has a long fork at its front which is jointed at each side to the ssis-frame cross-girt brackets, in line h the single universal-joint between line-shaft and the propeller shaft.

The axles are all tubular, by the Weston tt Company. The front wheels are on circles of balls in adjustable 3-point rings. The divided axles are on Hyatt ers and have the driving wheels keyed their tapered outer ends with hex nut ension. The propeller shaft is also on att rollers at both ends, bevel pinion ust taken by a disk ball-bearing. The r balance-gear has ball-disks at each .

THE SPRINGS.

The front springs, half-elliptics, are 38 nes long by 2 inches wide, 7 leaves, ded at each end, tongued and grooved, ted forward and linked in the rear. rear springs, full elliptics are 38

The chassis frame is prest steel, inches greatest side depth. The mot and sliding-gear box are placed on a su frame. The chassis frame is 34 inch wide, with sides straight and parallel.

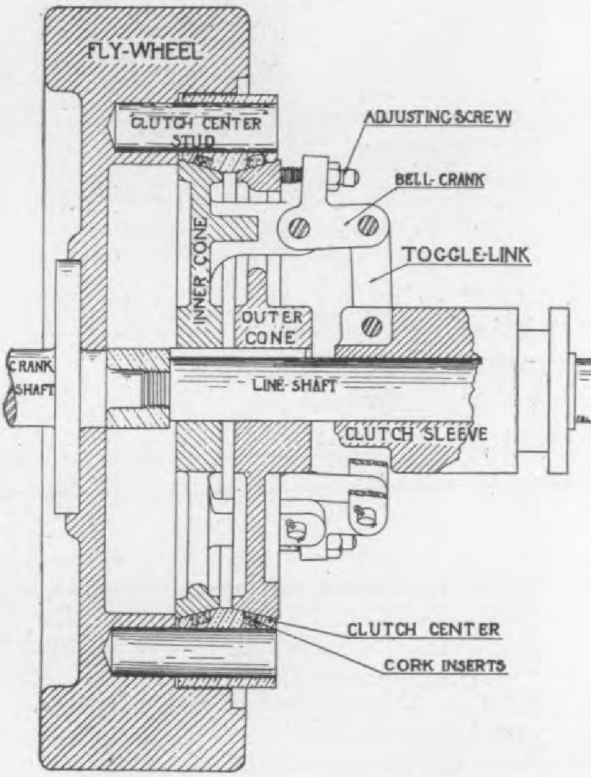

Fig. 3. Mid vertical section of 1908 Blom trom "30" clutch. The clutch is normally e gaged by a coiled spring, which pushes the sli ing toggle member forward and so actuates t three bell-cranks which pinch the front and re clutch disks, fitted with cork inserts, against t bronze ring 17 deg. internal faces, placed b tween the two co-acting grey iron clutch me bers. The bronze clutch ring is slipt on t cylindrical studs projecting rearwardly from t fly-wheel, so as to freely adjust itself to equ contact with the two grey iron clutch member

THE MOTOR.

The cylinders 4⅝x4½ inches, are ca in dual-units, symetrical, two valves

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xis. diameter.

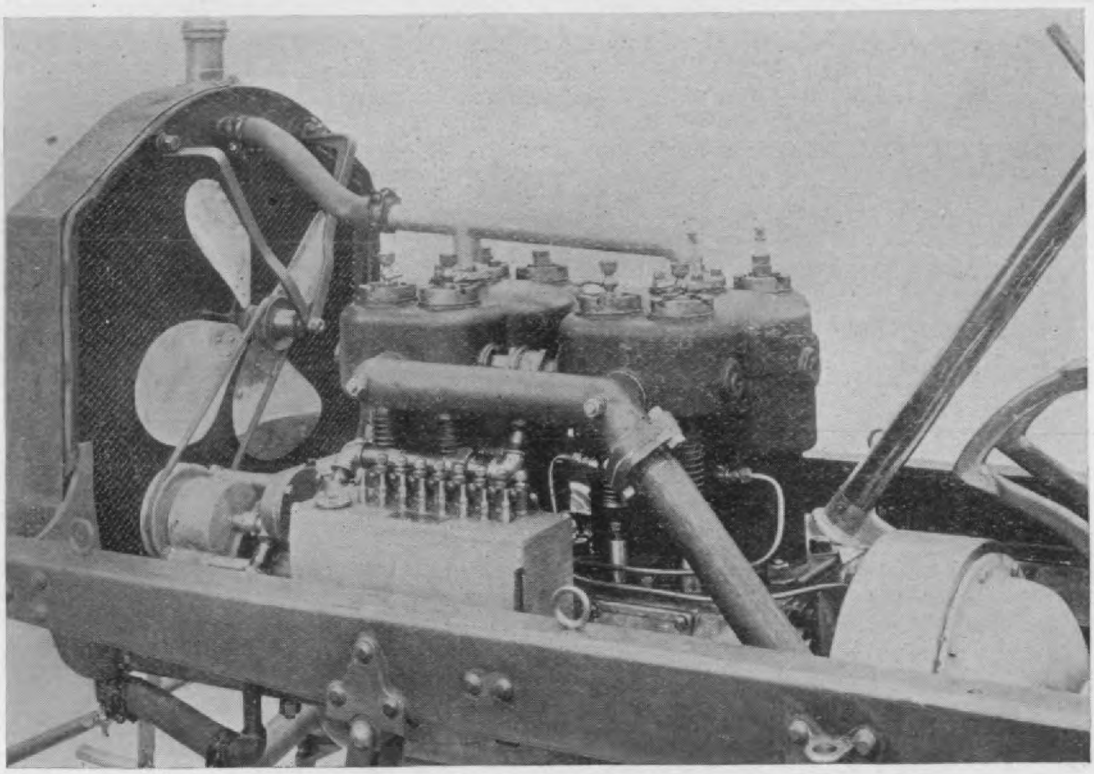

Fig. 4. Blomstrom "30" left side of Motor in chassis.

The water circulation is by a gear-riven two-pinion pump, and all the motor ater-piping is brass tubing, with rubber-ose lengths to the radiator top and bot-om.

BRAKES.

The brakes are external bands and ternal shoes, on and in prest steel r hub drums, 10 inches diameter. The ternal brakes are used for ordinary, the external for emergency service.

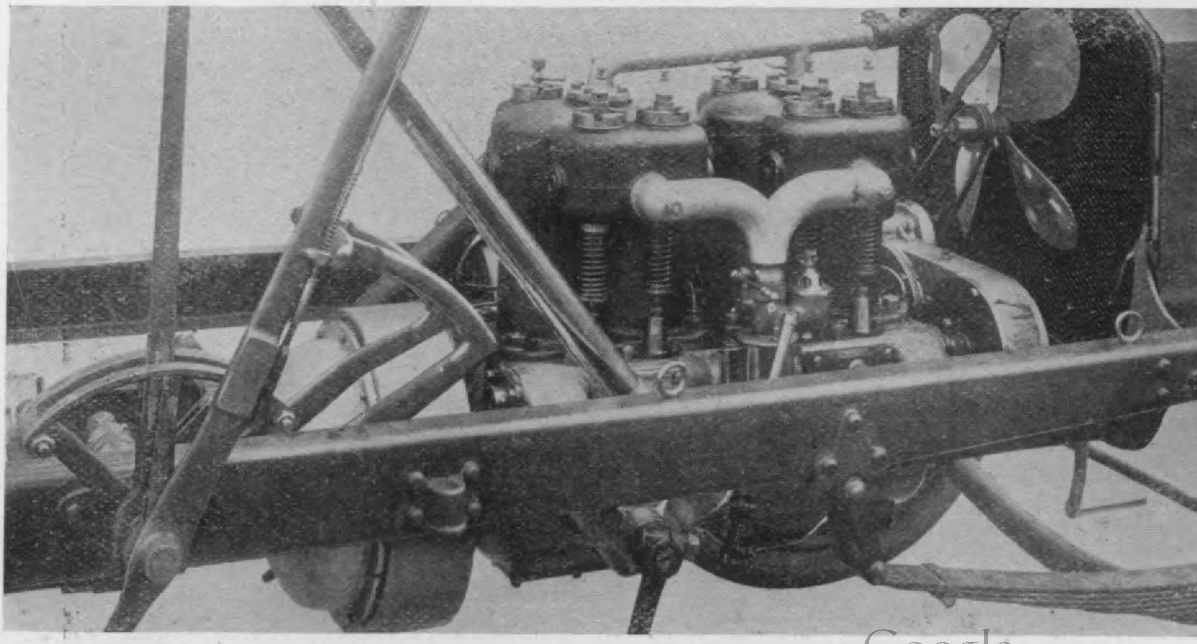

Fig. 5. Right side of Blomstrom "30" Motor, showing the dual unit symmetrical construction intake pipe and ball and socket linkage for operating the throttle.

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supply.

CONTROL.

e spark and throtttle are governed atchet-retained levers on top of the -wheel. Steering is by a worm and n gear sector. There are two outside rs, both latched. The outer lever n pulled backward first disengages clutch and then applies the external gear-shift rocker, as may be, when the hand-lever is rocked sidewise, after which forward or rearward movement of the hand-lever effects the desired gear-shift The foot board has two pedals only; that on the left is pushed forward to disengage the normally spiral-spring applied clutch The right pedal is pushed forward to apply the internal, ordinary brake-shoes.

Lane Steam Roadster

e exhibit of the Lane Motor Vehicle pany, of Poughkeepsie, N. Y., shows gh-powered roadster and a 7-passenger ng car, with identical chasses, motor pound, cylinders 3-⅞ and 6-¼ inches, by 4 inches stroke, fire tube boiler, pounds working pressure, 30 to 120 ., also a 5-passenger touring car, and passenger runabout on a different sis, motor compound 3-¼ and 5-¼ es, cylinder bores by 3½ inches ke, fire tube boiler, 325 pounds working sure, 20 to 50 H. P.

e Lane motive assembly includes a e, vertical,tube air-cooled condenser in , which returns 90 per cent. of the r to the boiler. The price of these steam cars ranges from $1800 to , and the outside appearance of the is made to conform to that of the nary gas engine driven vehicle. The consumption is from 7 to 12 miles to the gallon, with from 4 to 8 miles to the gallon of water supply.

The Lane water and fire control are wholly automatic, no pumps fitted for hand use, while the motor is working which makes it possible to assert that the steam drive is a most convenient and reliable for motor car service.

This is the second New York show number. The December number will be the Chicago show number and will contain in addition to descriptions of all new things at the Madison Square Garden Show not described in this issue, a forecast of the Chicago show. The January number will be the Eighth Annual Buyers' Guide Special and each succeeding issue will have some special features. You cannot afford to miss any. If not a subscriber send $2 at once to the Cycle & Automobile Trade Journal, Forty-ninth and Market streets Philadelphia, Pa.

site, 100x600 feet, Ashland avenue and Thirty-seventh street, Chicago, and now has a two-story and basement steel and concrete factory, 65x400 feet in process of construction, which will be ready for occupancy in August, 1908.

The factory and offices are now located in the old Morgan & Wright factory and office building, 15 to 21 North May street, Chicago.

Work was begun on the 1908 Model E car, here first shown and described, about June 1st, 1907 and the first one was placed on the road about August 10th, 1907.

In Fig. 1 is shown this new Model E runabout. The wheel base is 84 inches gage, regular, 57 inches for middle west trade, and 60 inches for the Northwest and South. The wheels are 40 inches diameter front and 44 inches rear. The tires are all solid 1¼-inch Firestone. The motor, is a pair of opposed, 4-cycle, water-cooled 4¾x4 inches cylinders, nominal 12 H. P. The engine is set cross-wise under the hood, with "Gaeth" type of clutch to the line shaft and a two-forward-speeds-and-reverse sliding-gear to the counter-shaft bevel gear, with an 8-spur-pinion balance-gear to the divided sprocket shaft. Diamond roller chains, 1-inch pitch drive to the rear wheels, which have 10 inches diameter internal bronze rear-hub-drum brake-shoes, 2½ inches face. These bronze brake-shoes are about ¼-inch uniform thickness throuout, and are cam-rocker expanded. The regular body is of the covered buggy type, to seat two passengers.

The Reliable Dayton chassis frames are

not shown, $50.00 extra. Acetylene and gas-tank will be furnished to chaser's order at prices agreed upon. same model with a special coupe bo also furnished. The chassis is the

Fig. 1. The New Model E Reliable D Motor, two-cylinder opposed, 4 3-8 by 4 15 H. P. at 900 R. P. M.; water-cooled, wise, under the hood at the front. A clutch transmits power to a two speed a reverse sliding gear, driving a divided jack Side Diamond Roller chains drive to th wheels. The frame is second growth ash. feed precision oiling is used. Front whe inches and rear 44, with Sarven hubs; base, 84 inches; tread, 57 inches, sta weight, 1100; price, with two oil side tail lamp and complete outfit of tools, f. o. b. Chicago.

as in Fig. 1, weight about 1200 po With this body the price is $1200, i ing three lamps, mat and tools.

The Model F is a surrey, the whee is 98 inches, and save for some inc of weight at certain points the chas

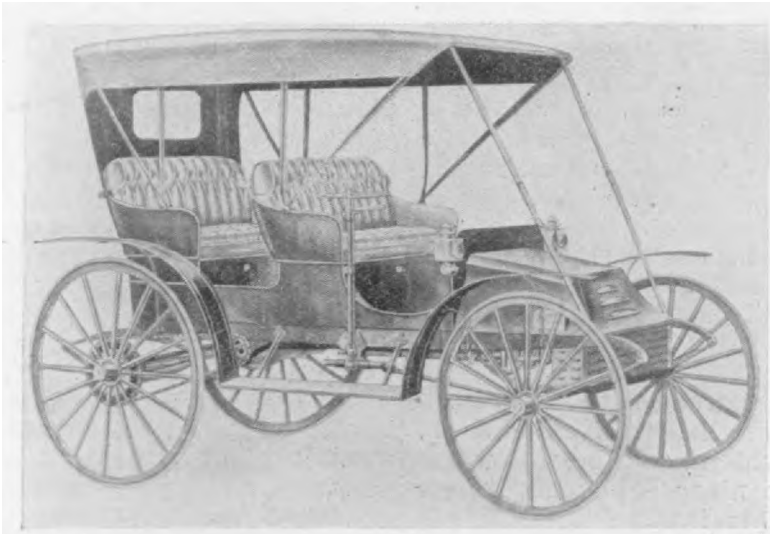

Fig. 2. Model F Reliable Dayton is a Surrey somewhat heavier than Model E, but the same motor and chassis arrangements. The wheel base is 98 inches, weight, 1400 po The price, with lamps and tools, is $925; surrey top, as shown, $50 extra.

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Upon the same chassis a light delivery wagon, Model G is constructed, but is somewhat heavier all thru. The wheel base is 98 inches, gage 57 inches, the front tires are 36x1⅝ inches; Firestone, solid, and the rear tires are 40x1¾ inches Firestone. The motor is a pair of 5x5 cylinders, set crosswise under the drivers seat, and develops 18 H. P. A sliding-gear speed-change giving two forward speeds and a reverse, transmits power to the divided sprocket-shaft, and 1-inch pitch Diamond roller-chains, drive to the rear wheels. This wagon has a paying load capacity of 1500 pounds and weighs about 1800 pounds.

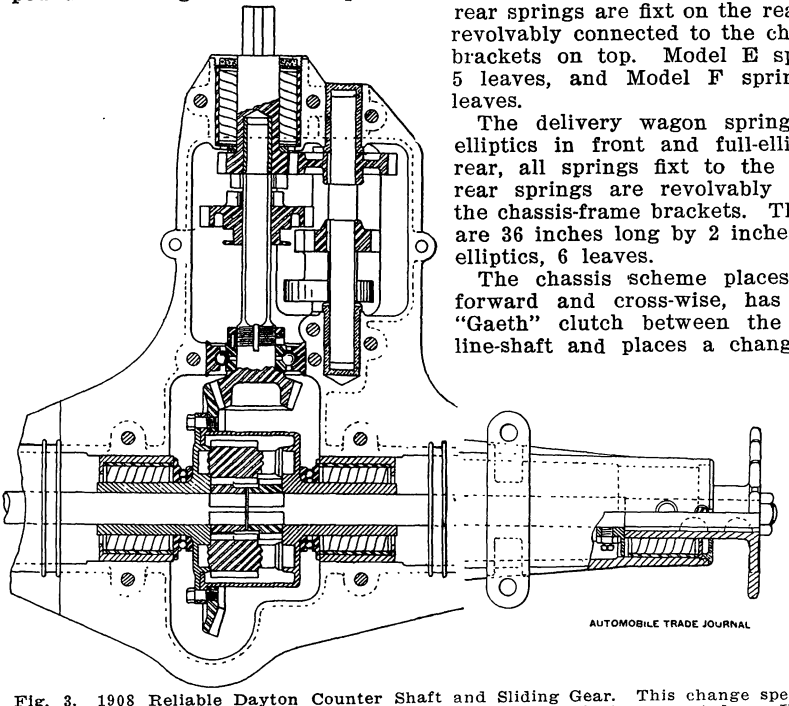

Fig. 3. 1908 Reliable Dayton Counter Shaft and Sliding Gear. This change speed gives two speeds and a reverse. The gears are 6 pitch. The jack shaft is supported on Hyatt Roller bearings. All the gears and the differential are housed in an aluminum housing integral with the jack shaft housing the whole, forming what the manufacturers claim to be the most expensive single piece of mechanism in any carriage type of automobile.

The price is not yet decided upon. The regular equipment will be three oil lamps and tools. Everything else extra.

NOTABLE FEATURES.

Up to these 1908 models, the Reliable Dayton cars have had angle-steel chassis-frames. This has been changed to wood as the stronger, lighter more elastic and more generally suitable material. The particular wood preferred is second growth ash. The corners are held with an outside, right-angle plate, which has a bottom member under the two pieces of wood, and a separate inside angle iron.

In the 1908 car a two speed sliding gear is used, instead of planetary. All wheels are on Timken roller bearings. Both the front and rear axles are solid square steel forgings, 1⅛ inches square in front, and 1¼ square in the rear. The use of rack and pinion steering is also new this year. All the cars have screw adjusted struts, flat joints front and rear. The passenger cars carry their opposed motors under the hood in front, instead of under the body, as formerly. The fuel-tanks of 10 gallons capacity are under the driver's seat. The delivery car has the motor under the driver's seat and carries the fuel tank, 15 gallons capacity, in the rear of, and below, the driver's seat.

SPRINGS.

The springs are all half-elliptics in front, and scroll-head full-elliptics in the rear. The passenger car front springs are 36 inches long by 1½ inches wide, and are jointed in front and linkt in the rear. The rear springs are fixt on the rear axles and revolvably connected to the chassis frame brackets on top. Model E springs have 5 leaves, and Model F springs have 6 leaves.

The delivery wagon springs are half-elliptics in front and full-elliptic in the rear, all springs fixt to the axles. The rear springs are revolvably attached to the chassis-frame brackets. These springs are 36 inches long by 2 inches wide, full-elliptics, 6 leaves.

The chassis scheme places the motor forward and cross-wise, has a modified "Gaeth" clutch between the motor and line-shaft and places a change-gear in a box integral with the aluminum counter shaft housing, as shown in the illustration of the counter shaft construction plan.

The steering is rack and pinion, vertical shaft and steering post. The passenger cars change-gear lever is horizontal and mounted on the steering post, Pierce Great Arrow fashion. The truck changes the gear by an outside, latched hand-lever.

CONTROL.

The steering is by side lever and rack and pinion, vertical steering post. The spark and throttle are controlled by two vertical rockers, outside of the steering post, to which ratchet-retained, horizontal hand-levers are fixt close under the hand-wheel at the rear of the steering-post. The foot-board has two pedals, the left pedal disengages the clutch, which is automatically applied by a 100 pounds coiled spring of 100 pounds tension, when the pedal is released.

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The right hand pedal applies the rear-hub brakes only. There are no brakes save the internal, hub-drum shoes.

THE 1908 CLUTCH.

The illustration herewith given so fully shows this clutch construction as to make an extended description needless. The two half-bands, lined with metal or with fibrous material, are applied by two levers pivoted on one arm of a hub keyed to the line-shaft; the other arm, opposite the first arm, extending outside of the clutch drum circumference and supporting the fixt ends of the two, constricting half-bands. The half-bands are forced into contact with the cylindrical exterior clutch drum by two levers having their short arms jointed to the free ends of the half-bands, while their long inner arms pass the shaft center and impinge the surface of the sliding cone, which forces the inside ends of the levers apart to engage the clutch by powerfully forcing the outer short arms of the levers to approach each other. The cone may be forced to the left by a heel-and-toe pedal, or by a 20 pound coiled spring surrounding the line-shaft. Gaeth uses no spring; the Reliable Dayton clutch uses a 20 pounds compression, clutch engaging spring, not shown in these illustrations, which forces the clutch-cone to the left.

When the clutch-cone is at the left extreme, the clutch is fully applied, the inner ends of the applying levers being separated to the widest extent. With the cone at the extreme right, the inside ends of the levers approach each other, separating the lever outer ends to the extreme, and so disengaging the clutch bands. To adjust the clutch, Gaeth filled the spaces at S, S, see clutch illustration, with washers, more or less in number as the half-bands needed for best effect. The Reliable Dayton places coiled springs in these spaces as shown, and adjusts the clutch by the bolt, nut and check-nut, shown with the springs mounted on the bolt body. It seems better to use the washers surrounding the bolt in the spaces, S, S, and pull the nut up hard.

This general form of clutch is the simplest, lightest, least costly and best in action yet noted by the writer. Most designers would probably prefer the coiled spring and normal automatic engagement as here shown, to the original heel-and-toe pedal action with no spring at all. One arrangement is about as low-cost as the other, and both work to perfection.

The only possible objection to this clutch is its exposure to dust, but with the fly-wheel cased in, as is done in some 1908 cars, and should always be done, this solitary objection dissappears. This form of clutch gives the largest exterior diameter cylindrical clutch face possible inside of the circumference of a given diameter fly-wheel, and so gives the greatest clutch-drum radius without exceeding the fly-wheel diameter for any part of the fly-wheel and clutch assembly. This condition means that the Gaeth clutch can be so constructed as to demand only the lightest possible brake-band surface-pressure for a given width, to transmit a given H. P. This clutch also places a very light weight on the line-shaft, and is extremely low-cost construction.

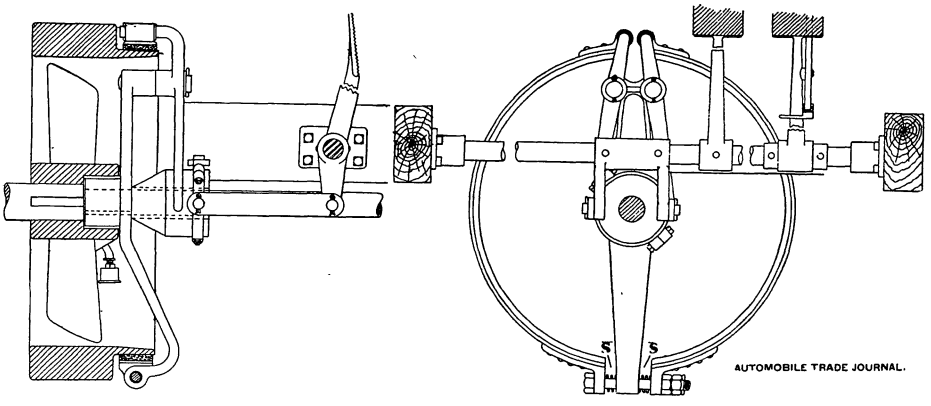

Fig. 4. Reliable Dayton 1908 Clutch. External contracting band, camel's hair lined. The original and unique features of this clutch are described in detail in the text.

THE STEERING GEAR.

The Reliable Dayton goes back to the vertical steering post, with a rack and pinion steering action, and a horizontal change-gear lever, mounted on the steering post. This construction has many advantages, but does not look right to eyes accustomed to the steering hand-wheel.

THE COUNTER-SHAFT.

The frame work is a widely flanged aluminum alloy casting, divided in the horizontal plane of the shaft axles. The bevel pinion shaft is in a 4-point ball bearing next to the pinion; the change-gear is also housed in this counter-shaft casing, with the side shaft on plain bearings. Everything else is on Hyatt rollers, and the balance gear is 8 spur-pinions, with ball thrust bearings for the bevel gear,

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esting line, including the high-
red seven-passenger gasoline car with
t electric transmission. The 38 H. P.

powered, 48 A. L. A. M. rating car since
it dispenses with toothed sliding gear
planetary or individual clutch transmis

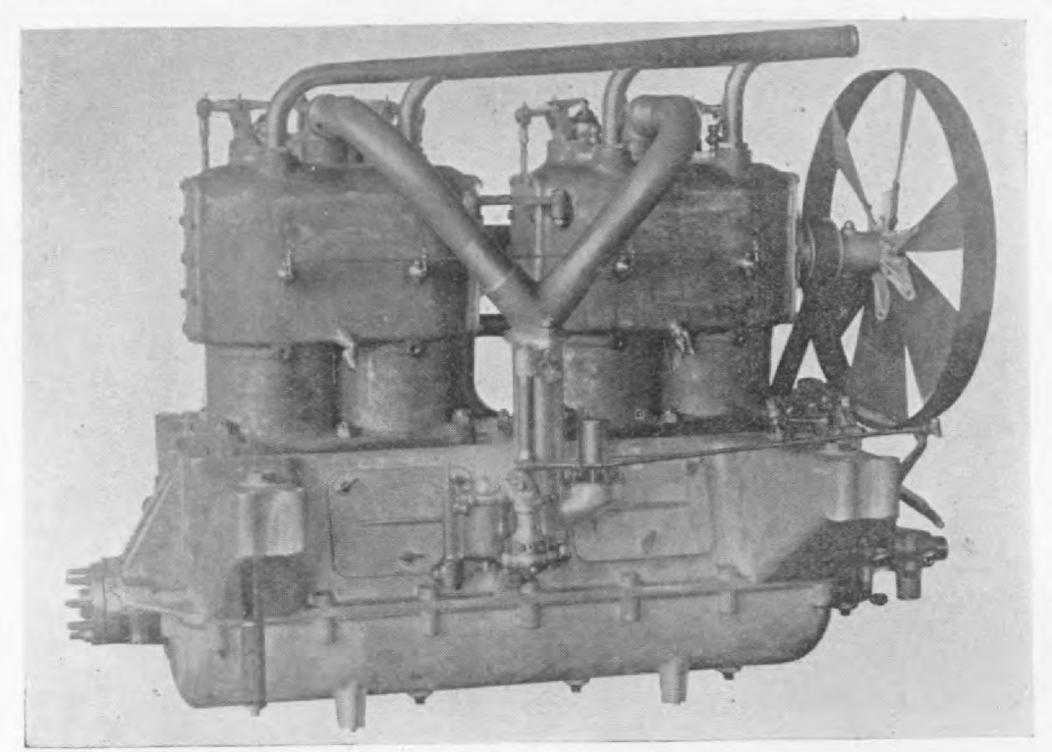
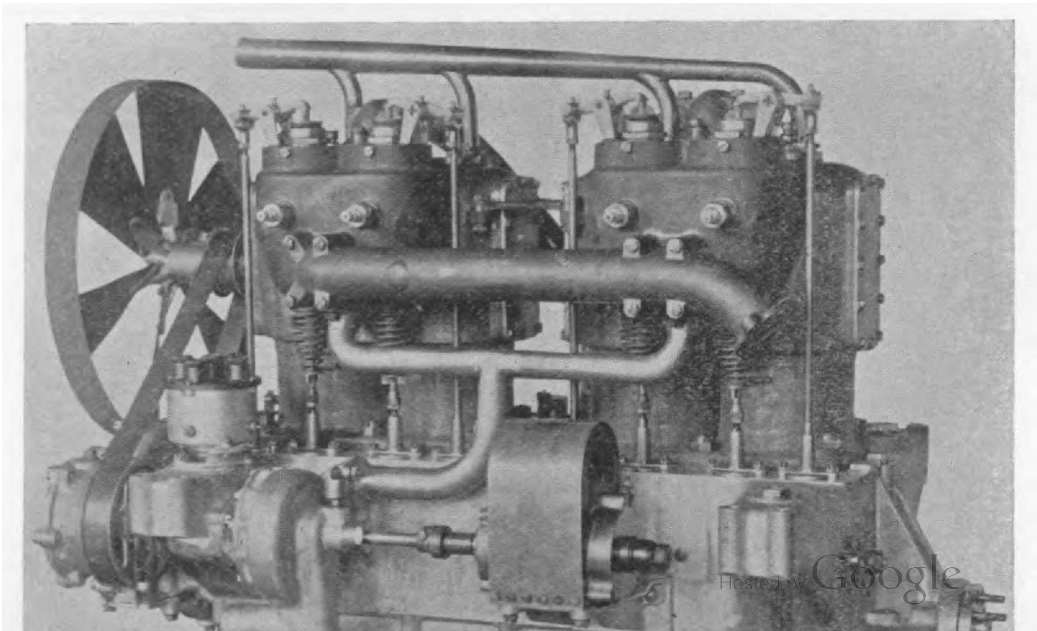


Fig. 1. Right side of the Mark 66—3 Motor, showing the multiple jet carburetor, arrange-
t of inlet pipes, expansion and clearing plates and the rocker arm valve operating mechanism.
two cylinder castings are rigidly tied together at the top as shown.

four-cylinder car is continued with
rtant changes; also the electric
gham. There is also a new chassis
truction in the Electric Victoria
ton, which latter is also supplied with
aside operated Coupe body.

sions, its gas engine power being con
trolled electrically. This Columbia elec
tric transmission was very fully described
in our issues of March, 1907, page 125
and September, 1907, page 58, so only new
features of the motor and chassis will be
here mentioned.



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frame strongly trussed. The bonnet is

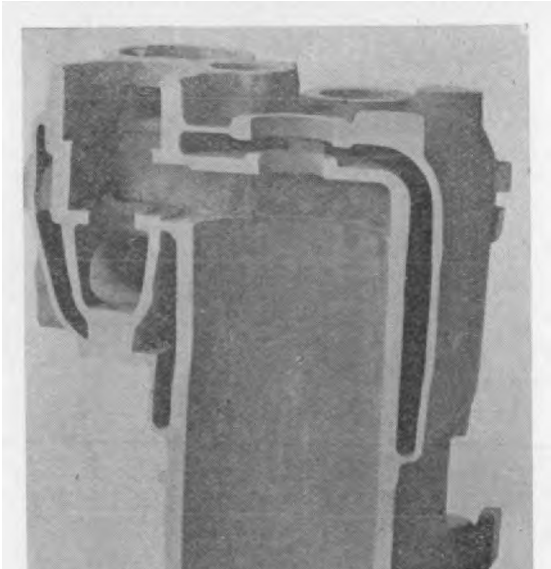


Fig. 3. Section of 1908 Columbia Engine Cylinder, showing the complete water jacketing of the exhaust valve chamber.

made of top piece strongly bolted down with bodily removable side pieces set in gutters and bolted to the top section. The lamp props are braced to cooler support and all irritant small noises suppressed.

THE ENGINE.

In the engine of this new car the cylinders are cast in pairs, 5½x5½. The valve chambers are located with least possible cubical area combined with absolute and uniform water jacketing of the exhaust valve seat and guide, as shown in the sectional view. The inlet valve guide, too, is lubricated to prevent bending, breaking and sticking of the valve stems. The spark plugs are set between the inlet and exhaust valves, are water jacketed and in the path of the incoming gas. The

located below the frame line. The v inlets operated by walking beams, easily accessible on the same side.

The ignition is of high tension type single coil and auxiliary to distri and timer, making four steel contac one time, so constructed that ne primary or secondary wiring moves the spark is advanced or retarded high tension Gianoli magneto is also vided, making thus two systems of tion using a common distributor and mon set of plugs. The oiling is mecha with a sight feed tank on the dash leads to each cylinder and main e bearings. The engine also enjoys a plete splash oil system, all catch b being piped to bearings and the webs having all leads to connecting bearings operated by centrifugal forc well as scoops and provision is also for the return of oil from end engine ings to the crank case, a common se previous trouble. The cam shaft i from the solid and the cam gear is fla on, and driven thru studs as in fly- practice, making for absolute quiet. sure of cam rollers is maintained ag a film of oil overcoming another co cause of noise.

THE LIGHT COLUMBIA.

The make and break engine light cylinder car has has had many and impo changes inaugurated for 1908. Th gine has been increased in size now 4½x4½, and rated 28 H. P., A. L. The water jacket areas have bee creased as well and the make and

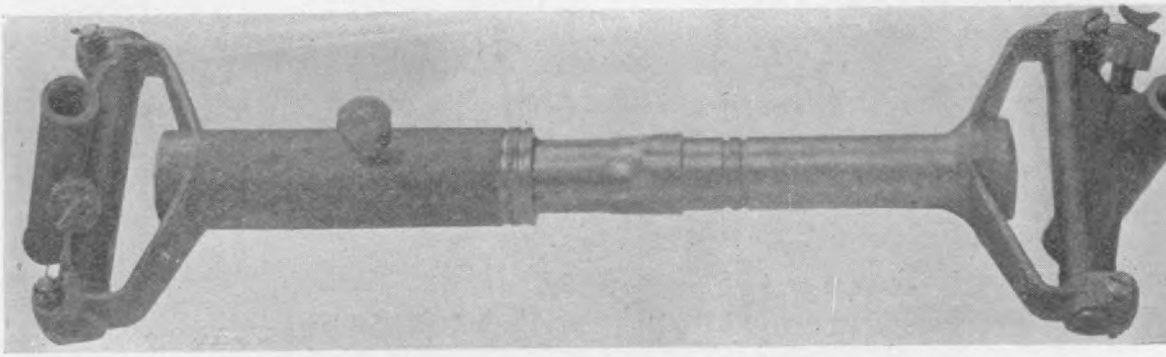


Fig. 4. New Cardan Shaft, with two splines running in key ways.

firing holes decreased in size. The engine gears have been encased an run in oil. There is a new arrang of the water piping, and improveme the carburetor have been made.

The transmission now has Hess-l bearings thruout; the wheels have

W COLUMBIA ELECTRIC PHAETON.

new Columbia Electric Victoria on with very much greater speed, room and mileage capacity is an-ed, of new chassis construction, as as an inside operated Coupe. This car has 32 cells of Oxide battery dis-ed over both axles, a ball bearing which have much more severe use, and so are known to be over strong for electric vehicle use. The controller is of special design with continuous torque, five forward speeds and two reverse.

This new car has a speed of 20 miles an hour. Standard tires are pneumatic, but the vehicle is sufficiently strong for the use of solid rubber tires.

1908 Mora Cars

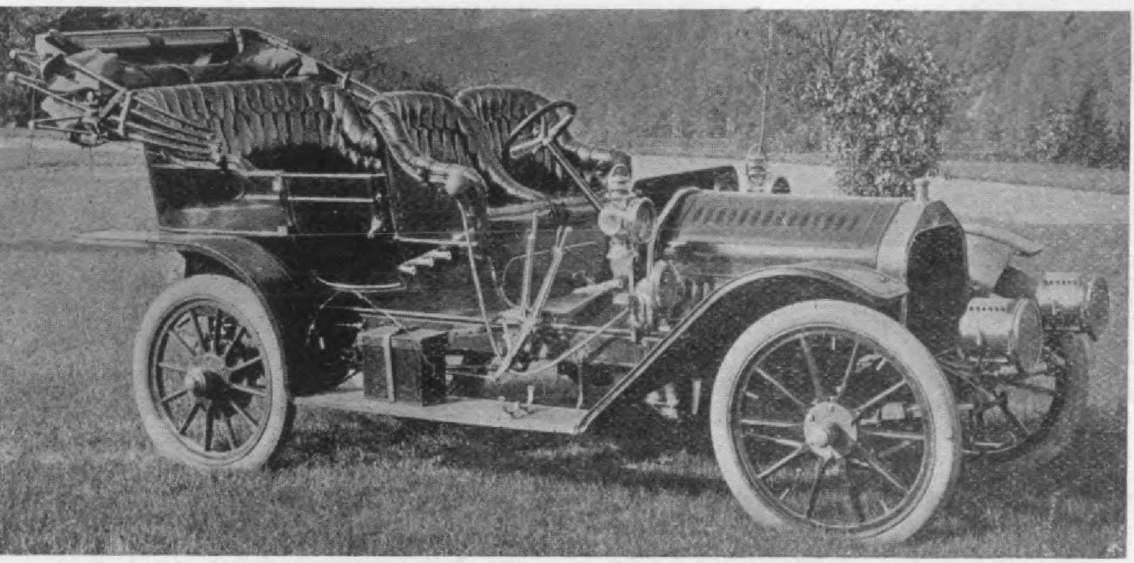
e Mora Motor Car Company, of rk, New York, offers for the season 08 a line of four-cylinder cars very ly changed from 1907 models, and a six-cylinder chassis, the base of two models, a touring car and a "Racy-

e 4-cylinder cars are known as the er" and "Racytype," each with r chassis. The Tourer seats five, wheel base of 103 inches, tread 56 s, and is fitted with 4 by 32-inch The combination wood and steel

CHANGES.

The four-cylinder engine is still built with marine type bearings, but where the boxes were previously made of all bronze, they are now made of malleable iron and nickel Babbitt bushed. The timer is located upright forward instead of at the side, and the carburetor is on the left instead of the right side. The lines of the body of the Tourer have been slightly changed, but the general dimensions are the same as heretofore.

The six-cylinder cars are new and will



'ig. 1. The Six Cylinder 1908 Mora "Tourer." This new model has the following specifica- Six cylinder Motor; 4 inch Bore; 5⅛ inch Stroke; 42-50 H. P. Seating Capacity, Five. le brakes of the internal and external type on the rear wheels; double ignition system, sting of LaCoste Magneto, LaCoste Coil and timer. Weight, 2,500 lbs. Wheel base, 114 s, tread, 56 inches; tires all 36x6. Price, $3,600; with Extension Mohair Cape Top, $3,775.

s are continued for 1908. The four-er motor has 4-inch bore by 5⅛-inch e, and is rated as 24 H. P. A three and one reverse change speed of sual sliding gear type is used. The is $2200, and with an extension pan-top $2310.

"Racytype" seats three and has the chassis specifications with few ex-ns. The wheel base is 98 inches he wheels are fitted with 32 by 3½-

be shown for the first time at the Automobile Club of America Show. The cylinders are of the same size as used in the four, but the engine is supplied with annular type ball bearings for the crankshaft and the cam-shaft and gears. The change speed gear is of the selective type, and also has annular type ball bearings. The front axle is "I-beam" and rear axle is the full floating type.

The wheel base of the 6-cylinder chassis

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band brakes are provided on the rear wheel drums. The frame is of prest steel contrary to the usual custom of the Mora Company.

The six cylinders are rated as 42-50 H. P. Jump spark ignition is used, the source being by battery and also magneto. The change speed gear, as in the other models, is of the sliding type, giving three forward speeds and one reverse, operated on the selective principle. The "Racytype" model is finished in cadet gray and has a seating capacity of either two, three or four people. The body is wood, as are the other Mora cars, well finished. The "Tourer" is similar with the exception of the body, which has a seating capacity of five and weighs 2500 pounds, whereas the smaller six-cylinder model weighs but 2250 pounds. The wheel base of the "Tourer" is somewhat large being 114 inches, and the tires are extremely large, being 36-inch by 6 inches. It will be noted that these are much larger than called for by tire makers, when the weight of the car is taken into consideration, and it will, therefore, show exceptionally long life. This machine carries an 18 gallon gasoline tank while the smaller car is fitted with a 17 gallon tank. This car is shown in Fig. 1, from which it will be seen that the bonnet is not exceptionally large, in fact not larger than many of the four-cylinder cars. The outline of the smaller six-cylinder car which is shown in Fig. 2 is an idea of the up-to-date Racy line of this new model. The price of the touring car is $3600 without top, and $3775 with extension mohair top.

SPECIAL MORA FEATURES.

The special features claimed for the 1908 line of cars by the manufacturers are light weight in proportion to the power, the use of double independent ignition and unit power plant with interval mud-proof pan, and extremely easy riding qualities due to the heavy front spring and springs of the platform type at the rear, making points of suspension central instead of at the ends. Claims of superiority are also made for the marine type of bearings in the motor and transmission. In the six-cylinder cars the use of F. & S. ball bearings in the engine crank-shaft, cam-shaft, and in the change speed gears is pointed out also the fact that the car has very large wheels and tires, giving liberal road clearance. The unit power plant, double ignition of LaCoste magneto and LaCoste coil and timer are also features of merit. On the six-cylinder "Racytype" the rear springs are of the full platform type, that is, there is also a cross spring at the front of the side springs as well as at the rear, which it is claimed makes the car capable of traveling exceedingly uneven roads without twisting the frame as the springs compensate for the uneven road surface.

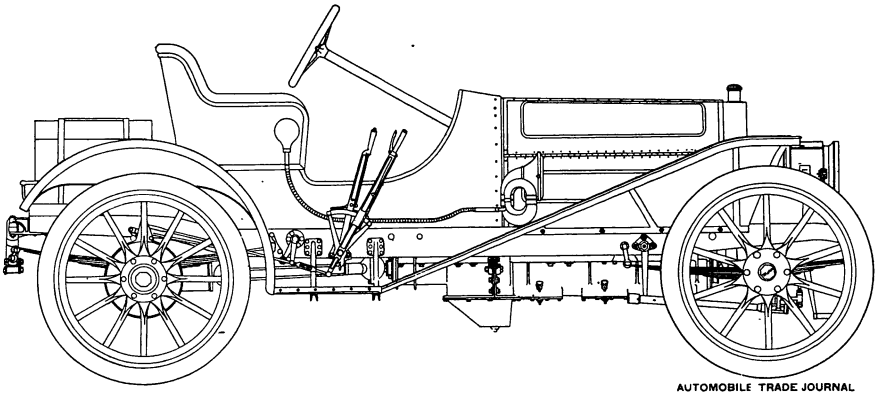

Fig. 2. The 1908 "Racytype" Six cylinder Mora. Chassis specifications similar, with few exceptions, to the "Tourer." Seating capacity, two, three or four people. Wheel base, 105 inches, tread, 56 inches. Tires, 36x3½. 42-50 H. P. Same Ignition and general arrangement as the large car. Weight, 2,250 pounds. Price, $3,500 without top.

Babcock Electric Carriage Company will open a branch in New York City at 1591 Broadway, cor, Forty-eighth street.

The Cadillac Motor Car Company, of Detroit, Mich., will equip its 1908 output with the Midgley universal rim and use as the tire equipment the products of the Hartford Rubber Works Co., the Morgan & Wright and G & J Tire Company.

Over half a hundred 1908 cars have been described in the reading pages of the Journal, besides those described in this number. Many more descriptions of 1908 cars will appear in the December and succeeding issues. To insure your regularly receiving the Journal and avoid missing this and its numerous other valuable features subscribe now. Price $2 per year. **Cycle & Automobile Trade Journal, Forty-ninth and Market streets, Philadelphia.**

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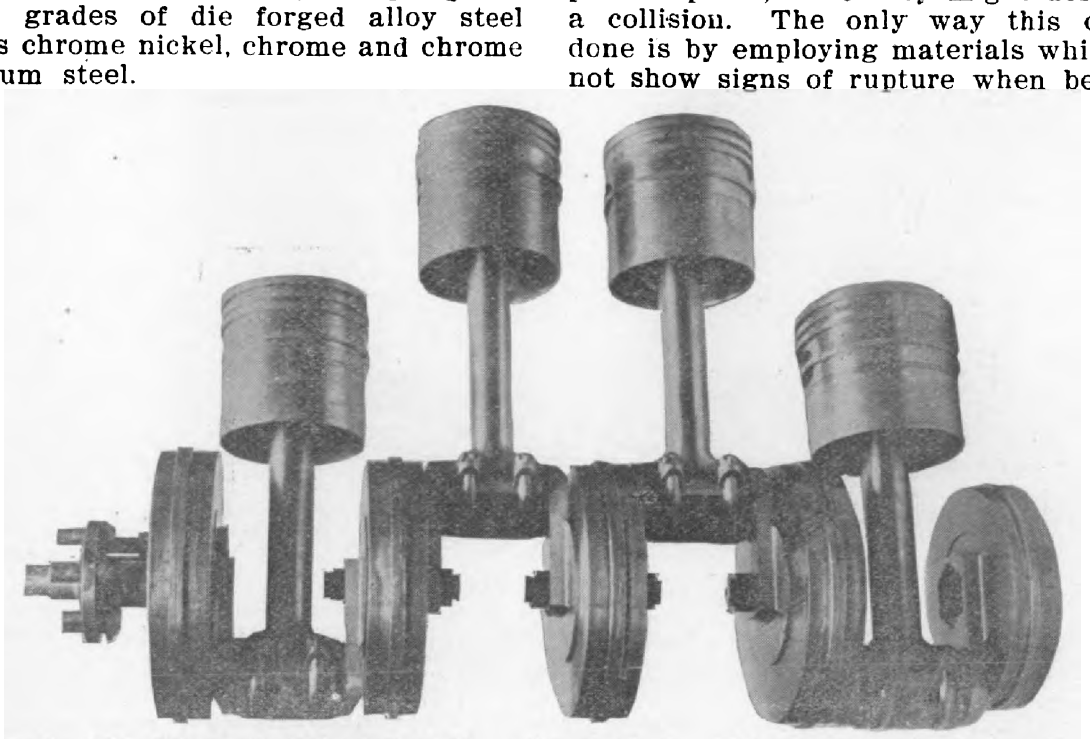
s the result, it is claimed, of many of automobile experience; the con-ions being those shown to be cor-by experiments in a well equipt ıtory by competent engineers. The point claimed for the new car is ct that the very best material com-e with its selling price has been The statement is made that the orth car holds no material in its up of any character, excepting the l grades of die forged alloy steel s chrome nickel, chrome and chrome ium steel.

steel of artistic appearance, great strength and symmetry.

The chassis frames are of special "Krupp" chrome nickel steel. These members are 120 millimeters deep—nearly five inches—possess extraordinary rigidity, and it is claimed are unbreakable. It was the aim of the Ellsworth designers to make every part of such fine material that under no circumstances, would the parts rupture, altho they might deform in a collision. The only way this can be done is by employing materials which will not show signs of rupture when bent 180



'ig. 1. The Ellsworth Patented Built-up Crank Shaft. This shaft is provided with annular bearings, and so constructed of chrome nickel steel in sections that each throw is inde-ently supported by the bearings.

necessary deviations from these cts are as follows: Cylinders, of cast iron; gear and crank cases of num alloy or steel-bronze at the of the purchasers; fly-wheel of ronze, and pistons of gray cast iron.

GENERAL DESCRIPTION.

Ellsworth automobile is of the con-nal four-cylinder motor type, with otor mounted in front; on the chas-rame—without the use of a sub-—so set that the motor does not l in front of the front axle; in fact, ooler of the square tube type is so that its front face is on a line the front axle. In this way the t of the motor is between the two This also improves the steering car.

transmission is of the four speed ve type, direct on the high gear, enclosed differential gears of the

degrees, and flattened under a steam ham-mer.

BEARINGS.

All bearings are of the annular ball type, including the crank-shaft and the cam-shaft, only the connecting rod ends are plain bearings. The respective ball bearings are housed in and separately lubricated, and their sizes are in every instance "in excess of the conservative ratings of the makers."

The thrust loads are taken on thrust bearings. The wheel hubs are of alloy steel and the ball bearings are therefore backed up by a hard resistant metal, instead of cast iron as is often the case. The ball bearings are especially large and well mounted; moreover they are fitted with safeties.

The single cam-shaft does not pass thru the motor case but does pass across the top of the cylinders, in a sepa-

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r the respective members of the crank haft may be done with great accuracy by nen of average skill. The ball bearings re fitted directly to the crank members ithout the intervention of any separate acking member. The joint comes so hat the respective throws are indepen- ently supported by the ball bearings, and he "torque" (double taper non-bottoming) ins, are not required to perform a double

they might seem to be.

The cars will have various weights cording to bodies and equipments, but maximum weight will not exceed nine hundred pounds. This weight conside a forty horse-power motor settles the q tion of hill climbing ability. The stan equipment consists of Continental 920 mm. by 120 mm. for both front and rear wheels. The reserve ab

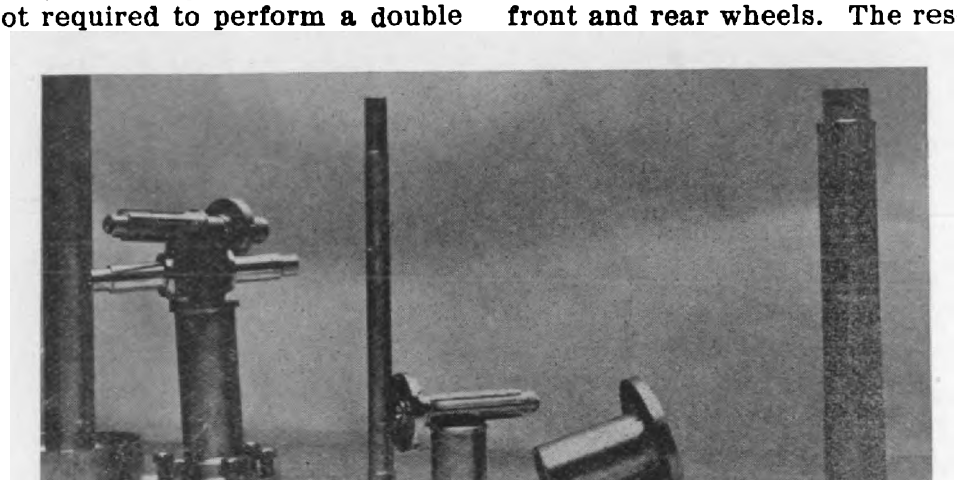

Fig. 2. Some of the Ellsworth Car chrome nickel steel parts with flanges. All flan wherever possible are an integral part of the members.

ervice, as is usually the case. The crank- haft may be disjointed at will without he use of any special tools, and the ball earings inspected. No skill is needed to ake the crank-shaft apart, nor can any nistake be made in assembling.

If a throw is ruptured it can be re- laced quickly, instead of requiring an en- irely new crank-shaft. However, this rank-shaft is guaranteed against breakage rom any cause in service, and any part f it that does fail in service will be re- laced free of any expense. The ball earings will have a long time guarantee laced upon them.

The magneto, timer, carburetor, spark- oil, Speedistimeter and time-piece in he Ellsworth car are all in a water tight ousing, forming the dash-board and ac- essible from the seat at will. What otorist has not used bad language when he timer of his car (located under the ood) filled with muddy water and re- used to work? or who can say he has scaped carburetor trouble from the same ause? This arrangement absolutely pro- ects all these delicate parts, and at the ame time places them in a more ac- essible position.

To attain these advantages the cam- haft was designed to pass over the top

considering the low weight of the ca very large. Because the front and tires are the same size, considerable economy will result.

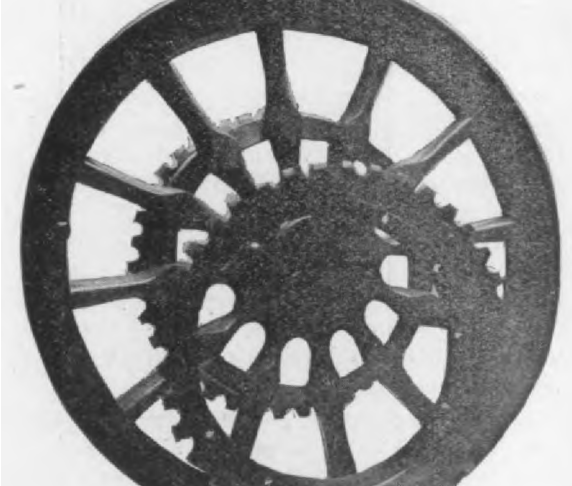

Fig. 3. The Ellsworth Rear Wheel and S ing Link. Attention is called to the fact the sprocket drums are of special auto and the link, as all other parts of the ste mechanism, is particularly sturdy.

THE CLUTCH.

The clutch is of a special patented sign. It consists essentially of a harde

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suitably heat treated to afford the iisite qualities. The clutch runs in nd requires no adjustment at any time. s said to behave nicely, can be made lip at will, holding like "grim death" n the members are in full contact.

THE BRAKING SYSTEM.

esides the regular "differential" brakes the "emergency" brakes the car is pt with "auxiliary differential brakes." brake drums are heat treated and of ial auto steel with large surfaces. The e bands are of special auto steel lined pure annealed copper, with ready effective means of adjustment. The lization of the emergency brakes is cted without introducing an inertia ponent such as follows the use of lizing bars, but the brake cable used not thread thru a tube and therefore not "bite" or bind on the abrupt s. The side levers and foot pedals are hrome nickel steel. The levers and pedals are accessible and the amount movement required to render their ation effective, is well within that to be desirable by motorists of exence. The brakes are not "watered" because they are so designed as render this complication wholy unessary, and on the whole, it is not a idea to have water circulation, be e the chances of a freeze-up are immi, and loose water connections are not nown to motorists.

THE STEERING CONTROL.

e matter of steering is taken care no uncertain way. All the linkages the lever arms it is claimed are of me nickel steel, free from joints and ing and safeties are also provided. is steering gear is claimed to be a nct advance, to be absolutely irrever, and devoid of "lost motion," more it will not develop lost motion, even a long period of service. The gear em is also patented and consists essen y of a right and left double spiral, a thrust component, and a square cut set that takes the load, thus relieving spiral set of any of the shock or the sure.

e steering wheel is of steel with a ogany rim, and the wood is so fash d as to give the motorist a good grip. steering post is of chrome nickel , without brazing. The control sys mounted on the steering post enables motorist to operate the control mem , with either hand, without taking er hand from the steering wheel. it is possible to operate them with th fingers without taking the hand off th wheel. The control linkages are all en closed, but still very accessible.

THE CARBURETOR.

This most important device will not b described in any great detail, at this tim It is of the automatic variety operate on the float feed principle, and th gasoline nozzle is not adjustable. Hot ai

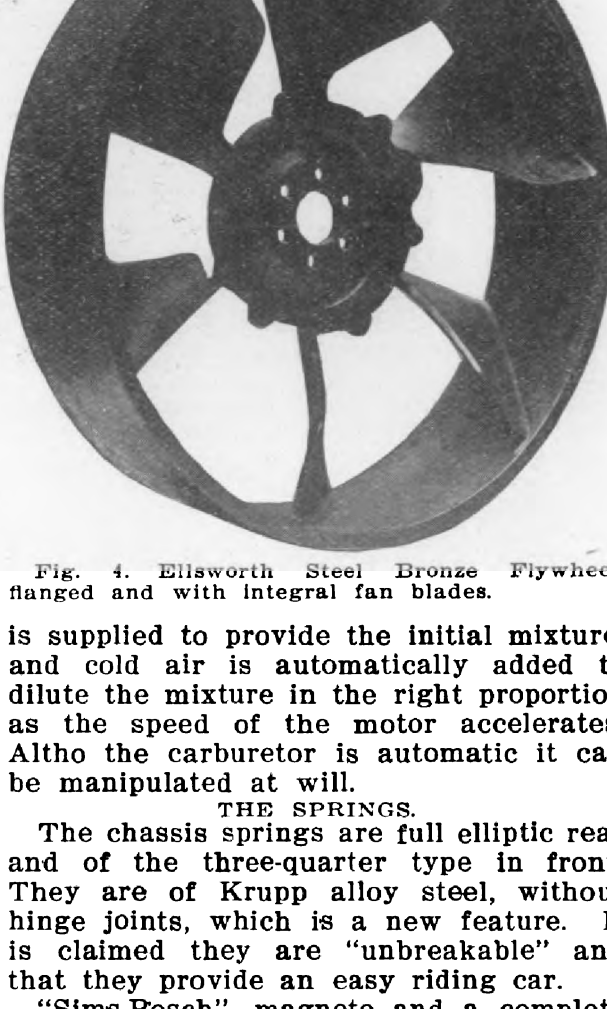

Fig. 4. Ellsworth Steel Bronze Flywhee flanged and with integral fan blades.

is supplied to provide the initial mixtur and cold air is automatically added t dilute the mixture in the right proportio as the speed of the motor accelerate Altho the carburetor is automatic it ca be manipulated at will.

THE SPRINGS.

The chassis springs are full elliptic rea and of the three-quarter type in fron They are of Krupp alloy steel, withou hinge joints, which is a new feature. is claimed they are "unbreakable" an that they provide an easy riding car.

"Sims-Bosch" magneto and a complet double system of ignition are used. Th water pump is of the "centrifugal" typ The oiling system is new and every bea ing is doubly provided for automaticall The oil pump is in the motor case an well protected, and is of substantial buil However, if anything ever does happe to it, the car will run just the same.

The gasoline tank is located in front o the rear axle, with fourteen inches groun clearance, and the gasoline is required t

French type bodies with divided front seat and straight panel behind. The tonneaus are extra wide, seating either three 300 pounds people, as the company states, or four people of ordinary size and the side doors are very wide and open to their full width. The seat fronts are polished, solid mahogany, and the upholstery is of the finest, buffed leather over curled hair and oil tempered steel springs. Pockets for goggles, maps, etc., are supplied in the step box on the right side the corresponding box on the left carries storage and reserve batteries. models are all built upon practically chassis, the general features of w have been but slightly changed over years' car. The equipment consists two side oil lamps, one rear oil lamp, large head lights, gas generator, h tube and a complete set of tools, inclu tire repair outfit, pump, etc. A partic

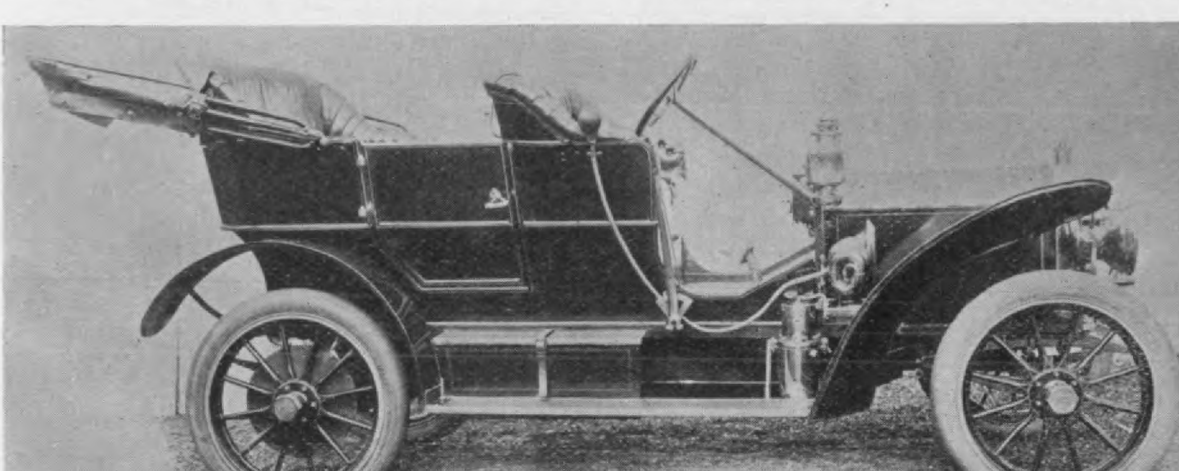

Fig. 1. 1908 Great Smith Car. The Chassis specifications of this machine are but sligh altered from last year's model. The engine has 4½ bore and 5-inch stroke; its French rat is 24 H. P., but it is claimed it develops actually 45 H. P. The body is of the French strai line type with the seat fronts of polished, solid mahogany. Suitable carrying pockets are s plied. The particular Smith features, such as the gear shift lever which automatically dis gages the clutch when moved for a gear shift and subsequently allows the clutch to enga the cone clutch type of rear hub brake; the special multiple disc clutch running in oil; elliptic springs, both front and rear; the removable top of the cylinder water jackets; the s cial Smith oiling device as described in previous models are all continued in the 1908 c Weight, 2,400 pounds. Price, $2,650 F. O. B. Topeka, including two side oil lamps, one rear lamp, two headlights, gas generator, horn, tube and complete set of tools, pump and tire rep outfit.

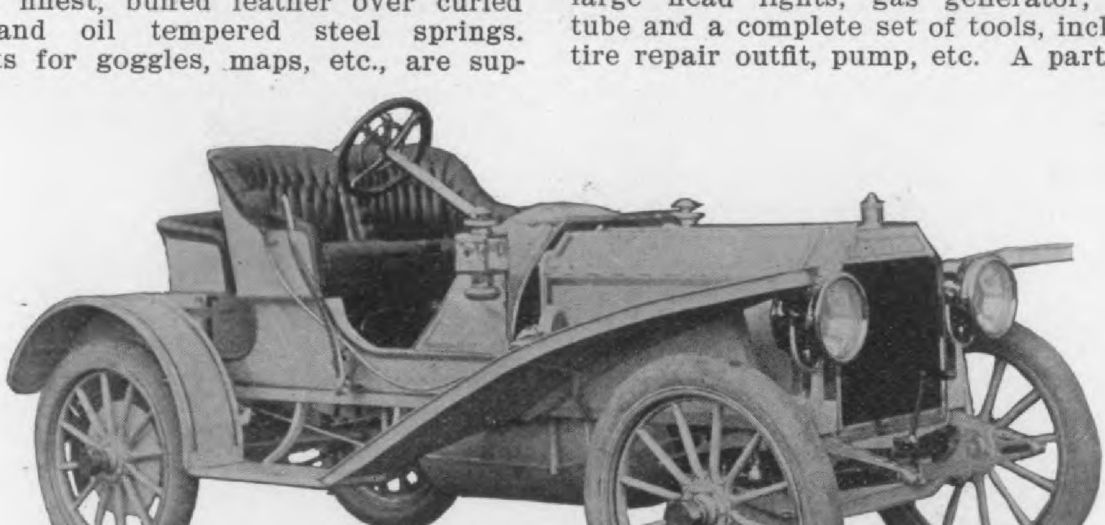

Fig. 2 1908 Great Smith Runabout. This car has very similar Chassis specifications to th of the touring car and is fitted with a runabout body as shown. With a standard equipment car sells for $2,650 F. O. B. Topeka. With rumble seat, the price is $2,740.

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water jacket being removable for ning purposes. The bore is 4½ inches, ke 5 inches, the French rating being 24 P., but it is claimed the motor will lop 45 actual H. P. The crankshaft orged with the grain running around bends and is of high carbon, open th steel. All the bearings are extra e. The carburetor is a special float of Smith design. The three speeds ard and one reverse sliding change d gear is operated with one lever at right of the driver, which automatical- leases the clutch, shifts the gears and vs the clutch to reengage without use ny foot pedal. This device has now in use for several seasons and it is ned to have given perfect satisfaction. e clutch is of the multiple disc type runs in an oil bath. The special h worm and internal sector gear is

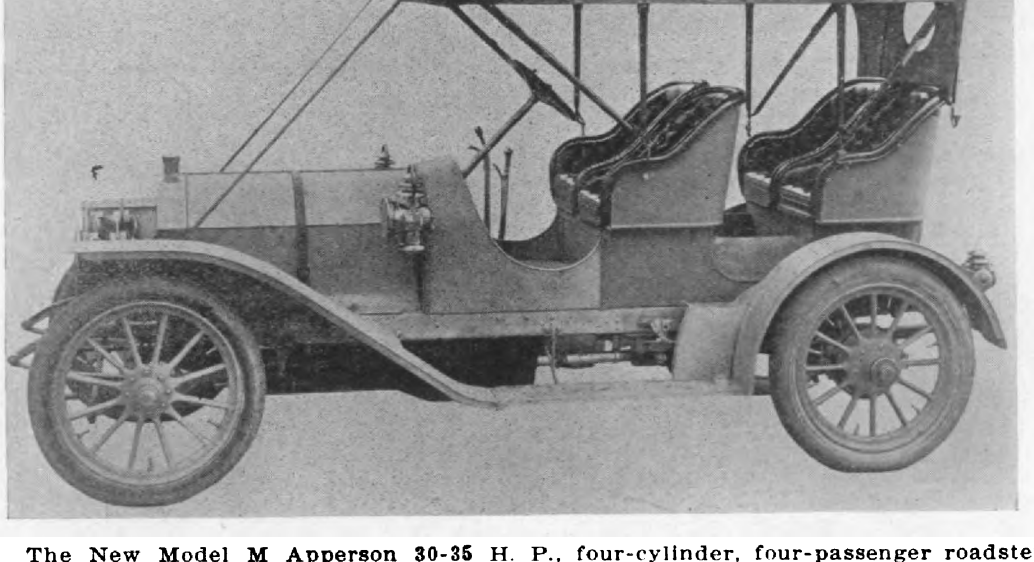
struction has been continually used for ten years and in no instance has it given any trouble; it saves about 100 pounds in weight over all steel construction and there is no trouble due to "fatigued" matter. The springs are 56-inch full-elliptic both front and rear, and the construction is such that no strain is put on them other than that of carrying the body. The front axles are high beamed steel drop forged; rear axles are tubular steel shell with special steel live axles upon roller bearings. The touring car weighs with full tank detachable rim and complete equipment 2400 pounds. The special "Stafford" cone clutch brake is used on the rear wheels. The brakes are operated by independent pedals, the hub brake pedal, which is lacking, first open the clutch and then applies the brake.

Two New Apperson 1908 Models

person Bros. Automobile Company, of omo, Indiana, announce that in addi- to continuing Model J. R., 50-55 H. P. krabbit" runabout, and Model K, 50-55 P. Touring Car, they are now placing the market two new cars, Model M., 35 H. P., four-cylinder, four passenger ster, and Model S, a six-cylinder, 50-55 . Touring Car.

for $2750. The regular equipment on the four passenger car includes a folding top and a three passenger body with the regulation chauffeur's seat, is optional. The entire car is built in the Apperson factory.

This new model has a four-cylinder water-cooled motor, with 4¾-inch bore and 5-inch stroke, rated at 30-35 H. P. The change speed gear is of the sliding selec



ig. 1. The New Model M Apperson 30-35 H. P., four-cylinder, four-passenger roadster with Bore, 4¾ inches; stroke, 5 inches; sliding selective change speed gear; wheel base, 106½ s; gage, 56; tires, 34x4 inches; price, including top, $2750.

e new model M, built with runabout to carry four, with a double system nition thru the use of a magneto and

tive type, operated by side lever and give three speeds forward and one reverse. The inlet and exhaust valves are on an

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ystem with two independent sets of plugs. The front axle is I-beam section, and the ear is of the floating type. Shaft drive s used. The springs are semi-elliptic both ront and rear. The gasoline tank is un-

It is claimed by the company that th the strongest and, for its rated h power, the fastest car in the world. standard equipment included in the price is unusually complete, and con

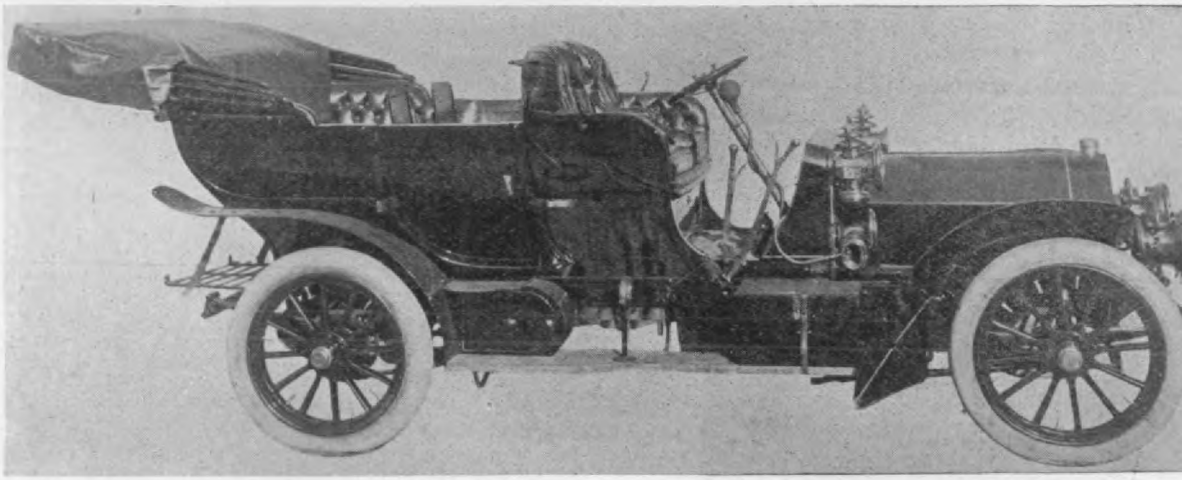

Fig. 2. The Apperson Model K, 50-55 H. P. Touring Car. The standard equipment inclu folding top, robe rail, tire carrier, foot rest, trunk rack, three oil lamps, two headlights, genera and full set of tools. Price, $4200.

ler the front seat. The body is of the prevailing runabout style, but arranged, by means of two "bucket" seats at the rear, o carry four. The price of $2750 includes, a folding top which covers all four seats, or a regular chauffeur's seat at the rear and no top, are supplied. The car is finished in red, and upholstered in the best grade of hand buffed leather. The equipment consists of two headlights and generator, two side lamps, tail lamp, horn and full set of tools.

The Apperson "Jackrabbit," selling at $5000, will continue to be the company's eader in the runabout class.

of folding top, robe rail, tire carrier, rest, trunk rack, three oil lamps, two lights, generator and full set of tool

The other new Apperson car is model S, six-cylinder, 50-55 H. P., s passenger touring car, price $5000. cylinders are 4½-inch bore and 5 stroke. In general design and cons tion it will closely resemble the 50-5 P., four-cylinder touring car, model

The company will continue to cat those who want an unusually high pow high speed, racing runabout by bui its famous "Big Dick," price $7500.

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homas B. Jeffery & Company, Kenosha, consin, U. S. A., builders of the Ram- automobiles, will offer one practically car, the Rambler Model 34. In addi- the Rambler 31, which is a greatly roved Rambler 1907, Model 21, will narketed.

these two 1908 Ramblers, Model 34 be fitted with a tonneau body to seat passengers and a three-passenger bout body, while the Rambler Model vill be supplied either as a detachable eau body, five-passenger touring car as a two-passenger runabout.

he general policy of moderately priced uction adapted to meet the require- ts of the middle classes of motor car hasers, which has carried the Jeffery blishment well to the front among the mobile makers of the world, will be

ascertaining and recording the work don in the car-motor cylinder thruout its cycl of changes, and placed this most complet motor-testing plant in charge of a full competent investigator, so that the entir performance of the Rambler motors i now fully known to its engineering force

The Rambler orders for materials to b used in 1908 are not yet wholly placed but the production will be about 3000 car of somewhat more costly forms than i 1907, and the aggregate materials cos will be greater for 1908 than it was i 1907.

The Model 34 is a five-passenger tourin car with 112 inches wheel base; 56 gag and 36 by 4-inch tires. The four-cylinde vertical, water-cooled, four-cycle motor i 4½ by 4½ inches, with a nominal horse power of 32. The change speeds are b

Fig. 1. The Rambler 1908 Model 34, five-passenger touring car, wheel base 112 inches, e 56 inches, tires all 36x4 inches. Motor four, water-cooled, four-cycle, 4½x4½ inches, cylin- s, nominal 32 H. P., selective sliding gear, three forward speeds and a reverse. Tonneau y, side doors swinging to the front, to seat five pasengers. Weight 2700 pounds, tanks filled. e $2250, including five lamps, gas-tank, mats, horn and tools, all ready for extended touring. e-top extra.

inued, the four-cylinder, five-pas- er touring car being listed at $2250, the four-cylinder runabout the same, e the 1908 Model 31 is placed at $1300 two-passenger runabout and at $1400 n fitted with the detachable tonneau arry five-passengers.

THE RAMBLER FACTORY.

e original Rambler factory had 70,000 re feet of workshop floor space which been increased every year since that e first sale, 1902, until it now covers 00 square feet.

e additions have been principally of tooth roofed structures with concrete s and floors, skylighted, which form y one of the largest motor car fac- s in the world.

selective sliding gear, three forwar speeds and a reverse. The car weigh 2700 pounds with full tanks, and sells fo $2250, including five lamps, gas-tank, mats horn and tool. Tops are extra.

The three-passenger roadster weigh about 2350 pounds and sells for $2250. I is on the Model 34 chassis. The Mode 31 has a detachable tonneau and wil carry five. Its wheel base is 106 inches gage 56 and the tires are 34 by 4 inches The motor as in last year's model is a opposed pair of cylinders set lengthwis of the car under the body. The bore i 5 inches and the stroke 6 inches, th nominal horse-power being 20. A plane tary speed change gear and chain driv to a divided rear axle are used. The ca

n each chassis, making a line of only four ars as contrasted with seven different ehicles in 1907. This great reduction n the numbers of different models and he consequent lessening of the number f different pieces demanded from the actory, gives much greater factory pro-ucing capacity with much more time vailable for the consideration and bet-erment of each detail required, and can-ot fail to both lessen the first cost and nprove the quality of the 1908 cars.

The 4½x4½ bore and stroke is re-ained in the four-cylinder motor of Model 4, but the overhead valve placing and eam valve-action have been changed to oth valves on one side of the cylinders, ith direct valve-action from one cam-

The aluminum crank-box and oil and the grey iron crank-box and sepa grey iron oil pan, both used in the Rambler motors, have been discarded favor of a new, one-piece, grey-iron, c bined motor-base and oil-pan for the gle model of four-cylinder Rambler motor. This grey-iron, integral crank and oil-pan is made with the whole r side open and is a very great impr ment. It is not out of place to note that notwithstanding this change f aluminum to grey iron in the motor b the Model 34 chassis is about 100 pou less weight than the 1907 chassis, u the same bore and stroke motor.

The Rambler Models 21 and 27, 1 showed a new opposed cylinder motor sembly, which boldly enclosed the

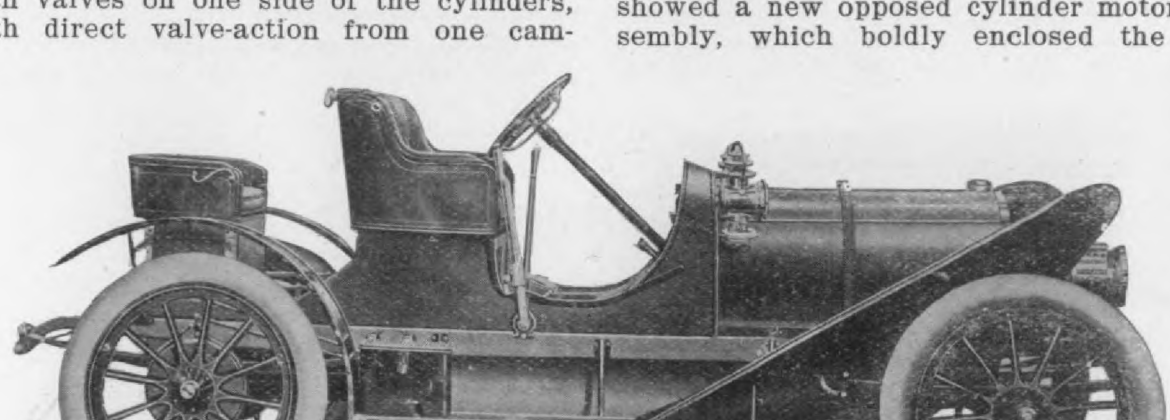

Fig. 2. The Rambler 1908, three-passenger roadster, same Model 34 chassis, to seat th passengers, weight 2350 pounds. Price $2250, including five lamps, mats, horn, tools and tank, ready for the road.

haft. The crank shaft has been enlarged rom 1¾ inches to 2 inches diameter, with n increase in the length of the bearings. he port diameter is carried over un-hanged 1⅝ inches for both intake and xhaust.

The unit propulsion assembly first dopted by the Rambler in 1907 has been nproved by making the sliding gear hange selective, and the side-shaft as ell as the line-shaft is placed on Tim-en rollers. The prest steel brake-drums ave been increased from 10 to 13 inches iameter. The internal brake-shoes are f grey iron, and the external brake-band camel's-hair-felt faced. The bevel gear nd the twelve-pinion spur balance gear ave satisfaction in 1907 and are retained 1908. The spark and throttle control, rmerly had by a tilting ring placed un-er the steering wheel in all previous ars, is obtained by ratchet-retained levers

wheel, clutch and planetary change in a large cylindrical cast alumi housing, fully protecting the plane brake-bands and the clutch from dust road drift, and giving this simple low-cost driving assembly a durab never before attained. For 1908 this s general scheme of assembled-unit, posed-cylinders, propulsion assembly been retained with a larger fly-wh giving a powerful, compact, well ported and perfectly protected const tion.

The ratios of the planetary change have been somewhat changed, the pl tary brake-drum diameters have been creased, and the disc-clutch lubrication been made certain by taking an oil to the inside of the annular friction di The planetary speed changes are all tained by a spring pawl which automati ly engages a notched segment at e

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hes diameter, walls ¼-inch thick, dropt nches in the middle, steel drop-forged ing pads, pinned and brazed in place. stub-axle yokes are steel drop forgings, ced on the tube and pinned and brazed. e stub-axle pin is one inch diameter, dened and ground and is in hardened el bushes. The load is carried on a k ball-bearing. The front wheels are two circles of balls having two point rings. The rear axle is made up in a d assembly with the propeller shaft ing and the change gear-box, with one versal-joint only, at the front end of integral line-shaft, propeller shaft and el-pinion shaft. This single shaft which es the place of three shafts commonly ced between the crank-shaft and bevel r, is squared thru the gear-box, is ered for the bevel pinion seat, and is

sleeves. The spring pads and the brak drum-covers are in one integral malleab casting, split and pinched on the axle tu by two large screws.

The brake drums, prest steel, are inches diameter by 2½ inches face, inches larger diameter and ½-inch mo face than in 1907. The internal shoes a grey-iron castings, jointed and cam-rock expanded. The exterior brake-band is fib lined and three-hole lever applied. Bo exterior and interior brakes are appli thru eveners.

THE FRAME AND SPRINGS.

The frame is of prest steel. The greate frame side depth is 4⅛ inches, width 1 inches. It is 34 inches in the rear and inches in the front. The material is hi carbon steel, 5-32-inch thick.

The springs are all half-elliptics, 2 inch

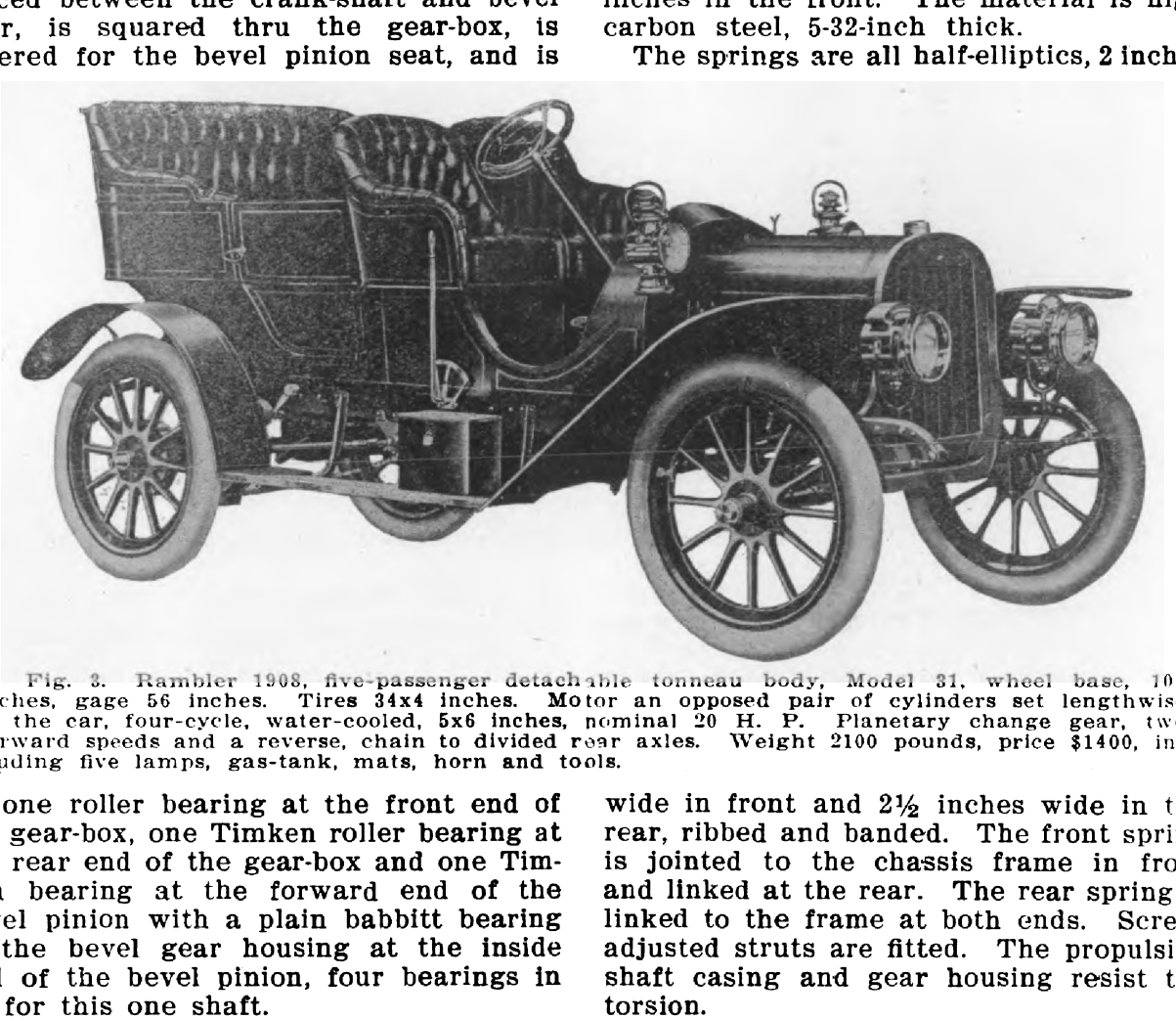

Fig. 3. Rambler 1908, five-passenger detachable tonneau body, Model 31, wheel base, 10 ches, gage 56 inches. Tires 34x4 inches. Motor an opposed pair of cylinders set lengthwis the car, four-cycle, water-cooled, 5x6 inches, nominal 20 H. P. Planetary change gear, tw rward speeds and a reverse, chain to divided rear axles. Weight 2100 pounds, price $1400, in uding five lamps, gas-tank, mats, horn and tools.

one roller bearing at the front end of gear-box, one Timken roller bearing at rear end of the gear-box and one Tim- bearing at the forward end of the el pinion with a plain babbitt bearing the bevel gear housing at the inside of the bevel pinion, four bearings in for this one shaft.

The side-shaft is placed below the line- ft, and is on Timken rollers at each . The gear-box is an integral aluminum ly and rear end, with an applied grey n front head, the front end opening ng enough to permit assembling. The r drive from the line-shaft to the side- ft is thru coiled spring cushions. The

wide in front and 2½ inches wide in t rear, ribbed and banded. The front spri is jointed to the chassis frame in fro and linked at the rear. The rear spring linked to the frame at both ends. Scre adjusted struts are fitted. The propulsi shaft casing and gear housing resist t torsion.

THE MOTOR.

The four-cylinders, 4½x4½ inches a offset 1⅛ inches, ¼ of the stroke. The tegral, grey-iron crank-box has the re end and the top seat for the middle beari box applied. The lower halves of all thr crank-bearing boxes are babbitted in plac the top half of each box is rectangular o

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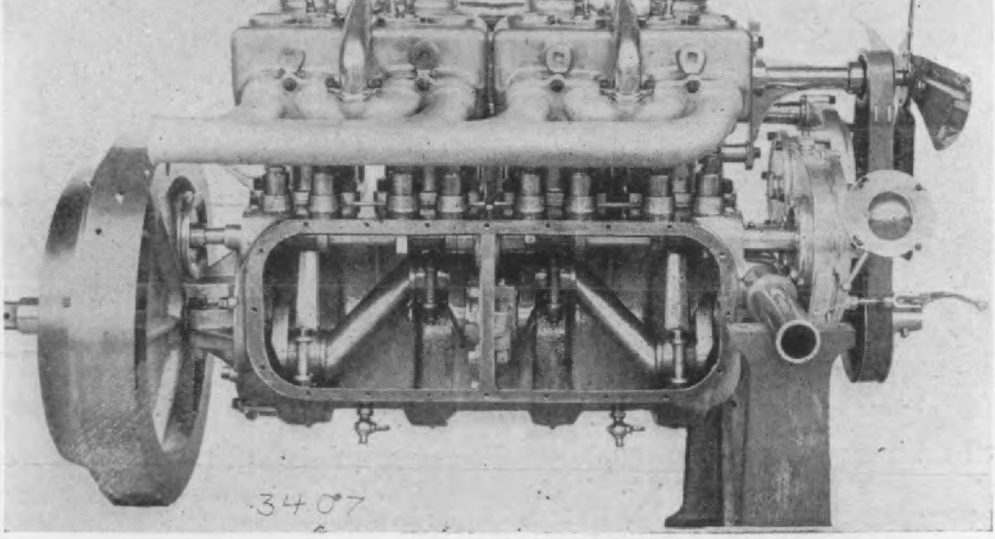


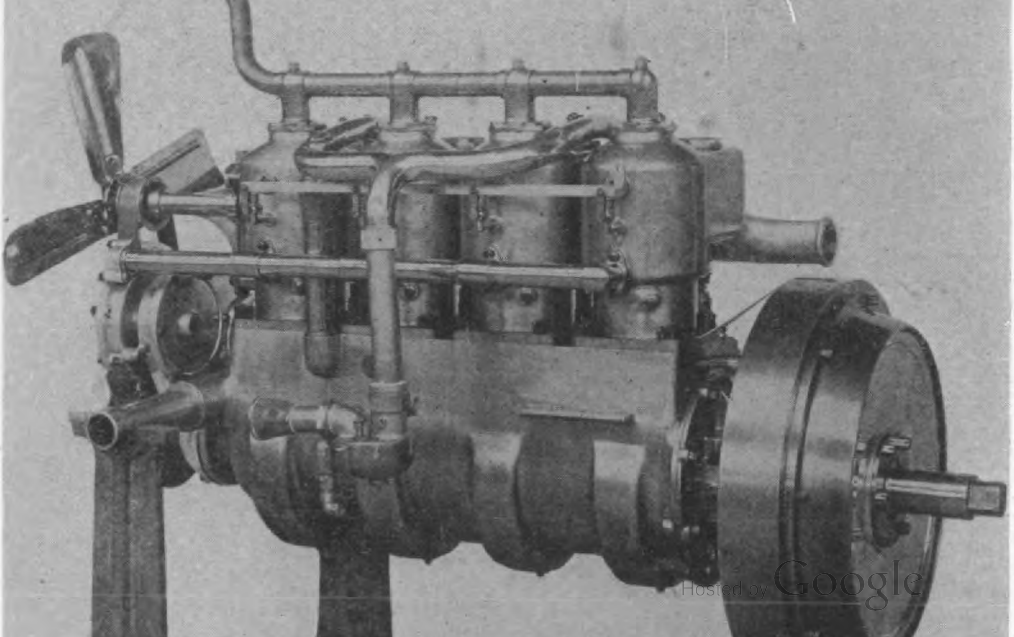
Fig. 4. Rambler Model 34 motor, right-side, cover of integral gray-iron crank-box remove
'he motor has a 3-point support, on a shaft past thru the crank-box in front, and in th
ear the crank-box is journaled in a bearing on the chassis-frame cross-girt.

THE CLUTCH.

The clutch is a reversed cone, leather ced, between two coiled springs, the ger and stronger on the inside, to press e cone to the rear into engagement, and e other coiled spring is placed between e disengaging sleeve and the cone hub. e disengaging action first closes the ex- ior spring on itself and then pushes the ne forward against the internal stronger ring to effect the disengagement. So far e outer coiled spring has no functional ect, but when engagement begins by ease of the exterior spring compression, e cone is between two coiled springs opposed to each other, and this causes "gradual" engagement, altho the clut leather is fixt directly to the cone fa This gives a very flexible slipping enga ment which permits starting the car high gear when the road surface is fa This arrangement is new to the writer a seems to be a real improvement. T universal joint from the clutch hub to t line-shaft is a short, double-ended "w bler," all hardened working surfaces. T thrust of the driving wheels is thru t struts to the chassis frame.

THE MODEL 31 CHASSIS.

The front axle is the same gene



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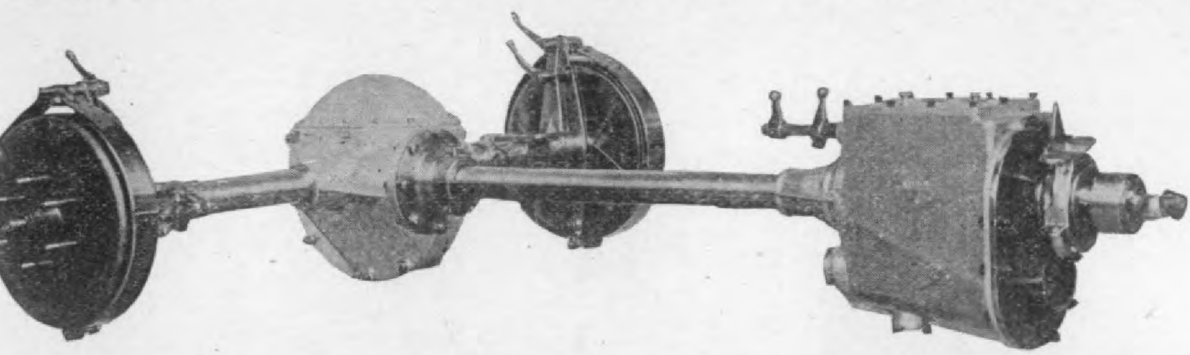

Fig. 6. Rambler 1908 Model 34, gear-box, propeller-shaft sleeve and rear axle, all in one egral assembly. A general description of this very interesting construction is given in the xt of this story.

THE AXLES, SPRINGS AND FRAME.

ave for the chain driving the construc- is the same as that of Model 34. Some the dimensions are reduced for Model while others are the same for both es. The springs are half-elliptics in nt, 35 inches long by 1¾ inches wide, ted in front and linked in the rear. The r springs are full-elliptics, scroll heads, nches long, 1¾ inches wide. The struts screw-adjusted for length, tubular steel ies, flat, vertical joints in the rear and be-joints to chassis frame brackets in nt. The chassis frame is prest steel, eatest depth 4 inches, width 1¼ inches, me sides tapered at the front ends only. is chassis frame is one width only, 34 hes, frame sides parallel.

For Model 34 the rectangular, brass fuel-

other end of which is journaled in bracket on the chassis-frame right-sid

The mechanical oiler, four leads, drive with a coiled-wire belt, sits on top of t crank-box; one oil-lead goes to each cyli der, one to the middle crank-shaft beari and the fourth lead is carried to the di clutch, next to the fly-wheel. The roll chain is one-inch pitch, and the sma sprocket is hardened. The valves for o cylinder are worked directly from the ca shaft. Those for the right cylinder, a worked thru rock-shafts and links, shown in the plan view of the motor. T cam-shaft, spiral gear driven, is vertic

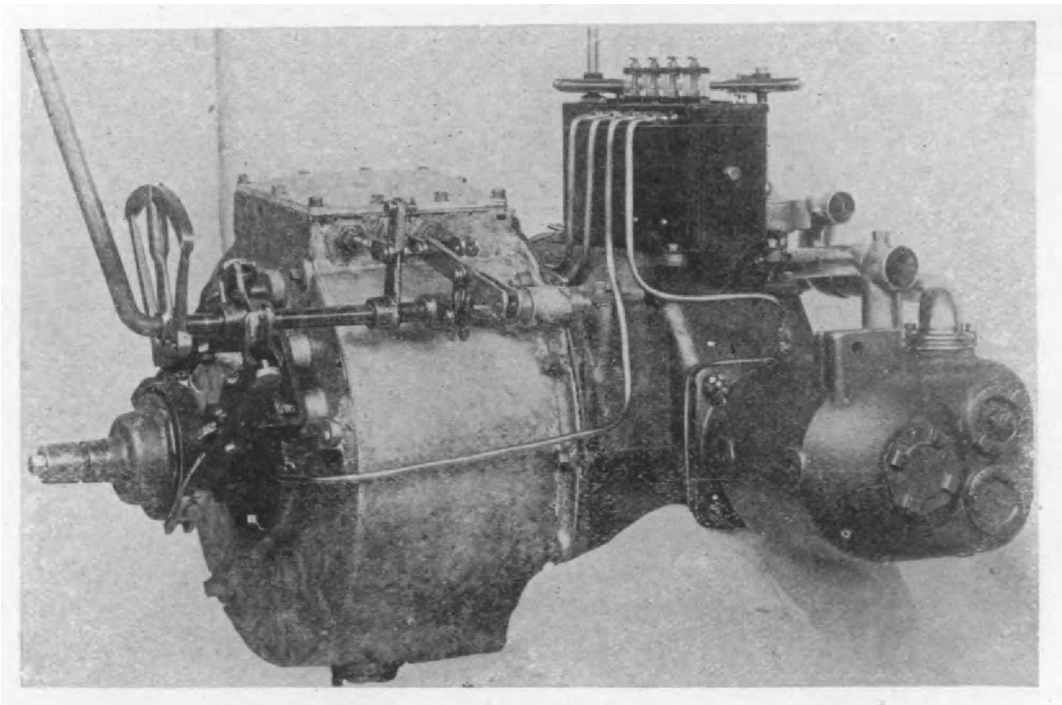

Fig. 7. Rambler Model 31, exterior of motor and speed-change assembly. General descrip on in text of this story.

MODEL 31 BRAKES.

These are rear hub drums 10 inch

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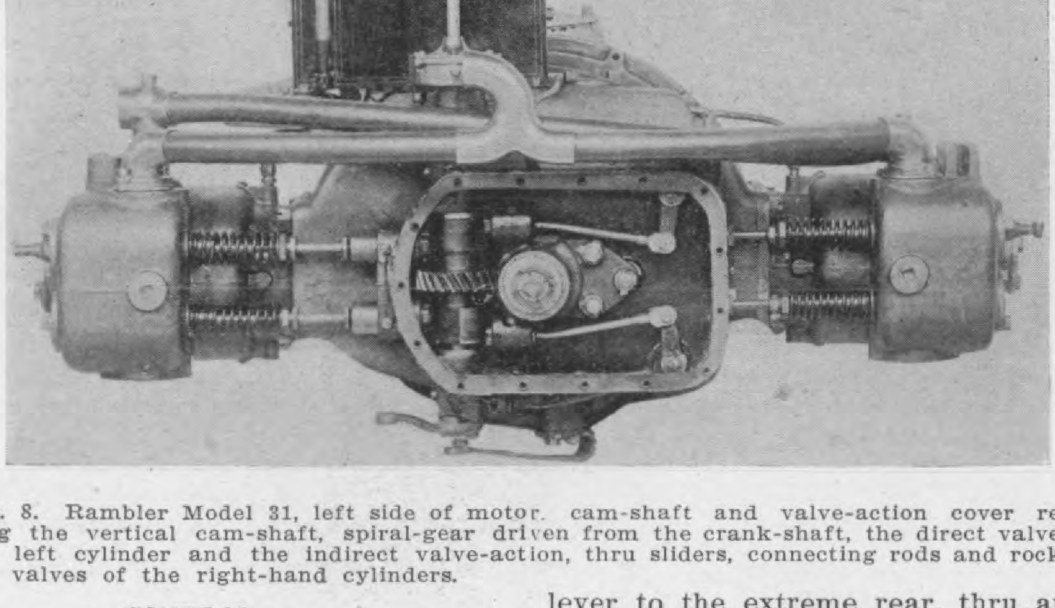

Fig. 8. Rambler Model 31, left side of motor. cam-shaft and valve-action cover remov exposing the vertical cam-shaft, spiral-gear driven from the crank-shaft, the direct valve ac for the left cylinder and the indirect valve-action, thru sliders, connecting rods and rock-sh for the valves of the right-hand cylinders.

CONTROL.

The control is substantially the same or Models 34 and 31. The spark and throttle are regulated by levers, ratchet reained, on top of the hand-wheel. The teering is by a screw, trunion-nut and lotted-arms of the globe-ended steering ell-crank. Model 34 has two outside evers, two large pedals and a horizontal ccelerator pedal. The outside latched and-lever when pushed forward first disngages the clutch and then applies the xternal rear hub drum brakes. The inside ever is rocked sidewise to select the deired gear-shift rod engagement. The left edal is pushed forward to disengage the lutch only. The right pedal is pushed forvard to apply the internal, ordinary brakes nly.

Model 31 has one outside lever and three arge pedals, no accelerator pedal. The outide latched hand-lever has three positions, igh-speed forward; low-speed in rear, nd neutral in the middle. The left pedal s pushed forward to disengage the multiplesk clutch. The middle pedal is pushed orward to obtain the reverse. The right edal is pushed forward to apply the inernal emergency-brakes. The transmision brake is applied by pulling the hand-lever to the extreme rear, thru and the low-speed engagement. Ignition i

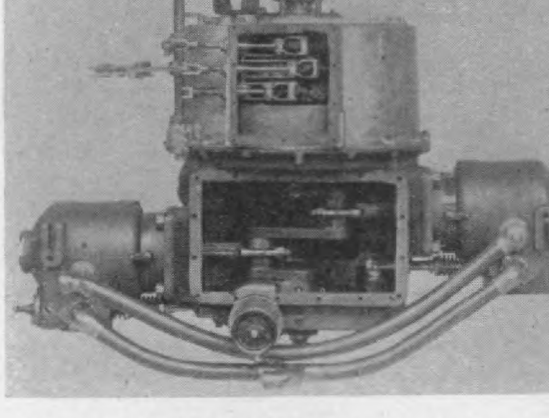

Fig. 9. Rambler Model 31, plan of motor fly-wheel and gear-box casing, with the c box cover and the planetary speed-change c top-cover removed, exposing the cranks the connecting-rod ends, and the planetary b bands. The fly-wheel and planetary gear c is a large, cylindrical aluminum casting, en covering and protecting the fly-wheel and p tary speed-change.

single jump-spark plugs and storage teries in both Models 34 and 31.

Colonial Vanadium Steel

The Colonial Steel Co., Keystone Building, 324 Fourth avenue, Pittsburg Pa., nanufactures a line of vanadium steels for utomobile constructions in different rades of strength, etc., each grade to uit its specific purpose. Grade A is suitble for piston rods, crank shafts, pins, suitable for springs, crank pins, ball roller bearings, etc. The elastic lim this grade is 90,000 pounds per sq inch; tensile strength 150,000 pounds square inch, and elongation 13 per This grade can be annealed readily, will harden in oil or water. Altho spe ly designed for the purposes mentio Grade D will be found extremely valu

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The Loring Auto Appliance Co.

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Loring

SPEED GAUGE

SUPREME

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Michigan, U. S. A., will offer for the on of 1908 a line of four different s of cars with three different styles of sis, an entirely new 4-cylinder model n opposed cylinder, model D, with motor placed cross-wise under the hood ront and a second opposed cylinder, el C arrangement, with the cylinders ed lengthwise under the car-body.

comprising the driving wheels, rear axle bevel gear and housings, together wit propeller-shaft and propeller-shaft sleeve Both the motive assembly and the drivin assembly have all their moving parts case in, completely protected from dust, and th casings also give rigid and substantia support to all of the moving parts.

The full elliptic rear springs are fix

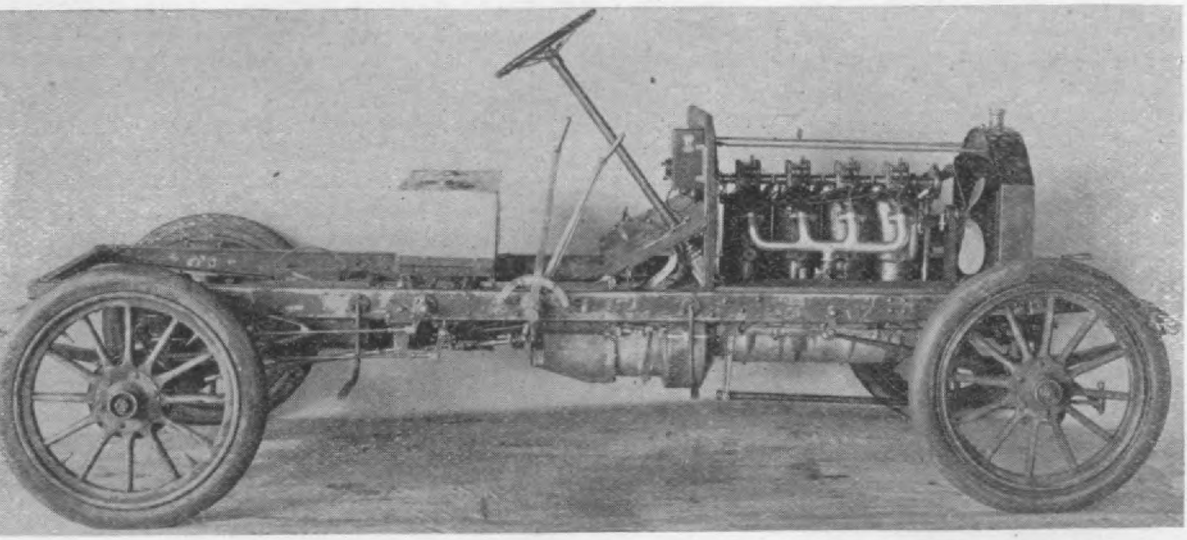

Fig. 1. Right Side elevation, Jackson 1908 Model E.

e new 4-cylinder, model E, chassis is thruout, a new motor, new motor base n assembled unit with the gear-box, whole motor and gear-box on a new of 3-point support and having only universal joint in the very long pro- r shaft, with the propeller shaft sleeve ntegral assembly with the rear-axle -housing.

to the chassis frame brackets on top, an revolutely mounted on the rear axl sleeves below, screw-adjusted struts, ve tical flat joints at both ends being intro duced to transfer the driving-wheel pus to the chassis frame. Two forms of bodie five passenger tonneau and three or fou passenger runabout are placed on this ne 1908 4-cylinder chassis.

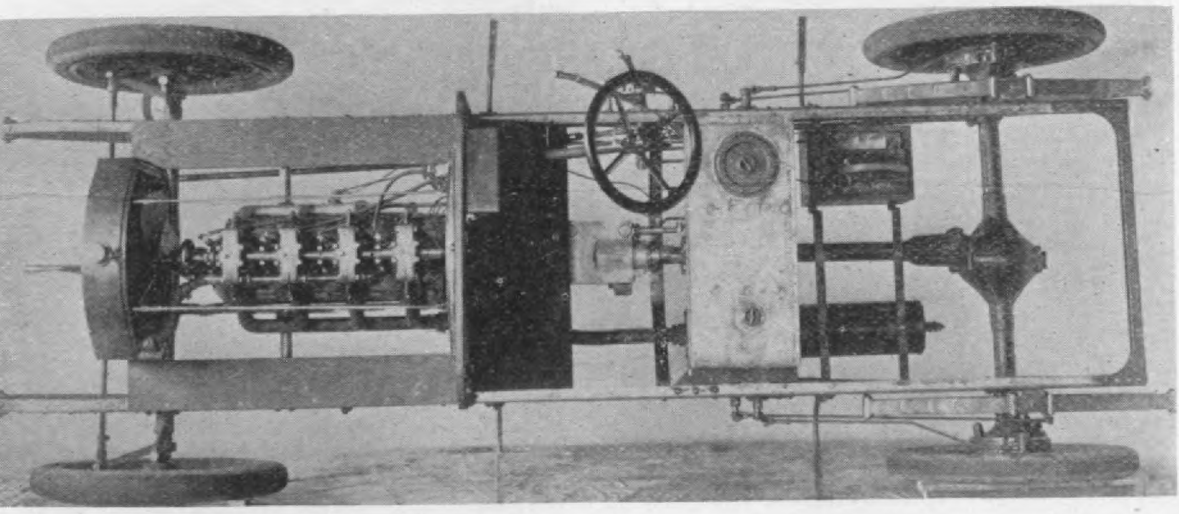

Fig. 2. Jackson 1908 Model E, Chassis plan.

is combination produces a propulsion em, consisting of two assembled units,

The Jackson 1908 model D, was offere under the same designation in 1907, bu

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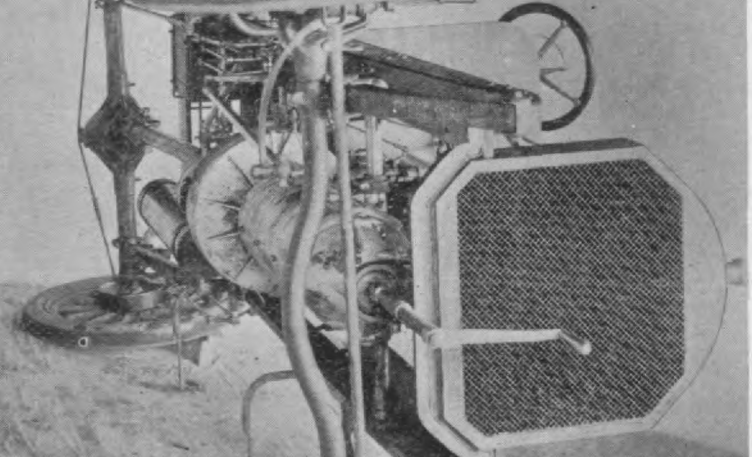

Fig. 3. Jackson 1908 Model E, Front axle, oblique underneath view of chassis. All working parts are encased, making the large, thin, frail, sheet-metal dust-pan needless. The carburetor only is surrounded by a sheet metal casing, which is small and strong. The machinery of this Jackson Model E is all enclosed in substantial steel tubes or castings, and the casings are made to serve as framing. This illustration shows the ½-inch diameter cross-rod, which supports the front end of the motor in journals.

s the selective, three speed forward and reverse sliding-gear, and placing this entire motive assembly on a three-point support. The unit driving-assembly of 1907 is retained in model D, with a single universal-joint at the forward end of the propeller-shaft, but the 1907 half-elliptic springs are replaced by full elliptics, fixt to the chassis-frame brackets on top and resolutely mounted on the rear-axle sleeves below, screw adjusted flat-jointed struts being introduced between the rear-axle sleeves and chassis-frame. The rear full-elliptics greatly improve the riding of this car.

The 1907 Jackson model C. an opposed pair of cylinders set lengthwise under the body with chain to the divided rear-axles, proved to be a very speedy and satisfactory low-price car, and save for a slight change in the control is carried over for 1908, substantially as offered in 1907.

A separate new motor plant, established about a year since, now produces all the Jackson motors, besides giving a chassis assembling room on its second floor. The new 4 cylinder Jackson 1908 model E motor

building, 234-220 feet, ha 100,000 square feet of floor face, to which the Jackson tory will be removed al January 1st, 1908. This building is well lighted and connection with the motor tory, 50x200 feet, 2 sto which will be continued, an new drop forging plant, al 50x150 feet, first worked March, 1907, will give rapidly growing concern r enough for filling its orders.

At the date of this wri none of the Jackson 1908 m bodies are finished, and th lustrations here given show complete cars. The new J son bodies are all straight effects, bringing all the Jackson car bodies into c parative harmony of outlin

In Fig. 1 is shown the J son 1908 Model E, four-cylin chassis, right side elevation. The wh base is 111 inches, gage 56 inches, and tires 34x3½ inches. The motor is 4 cylin 4½x4¾ inches, 4-cycle and water-cooled

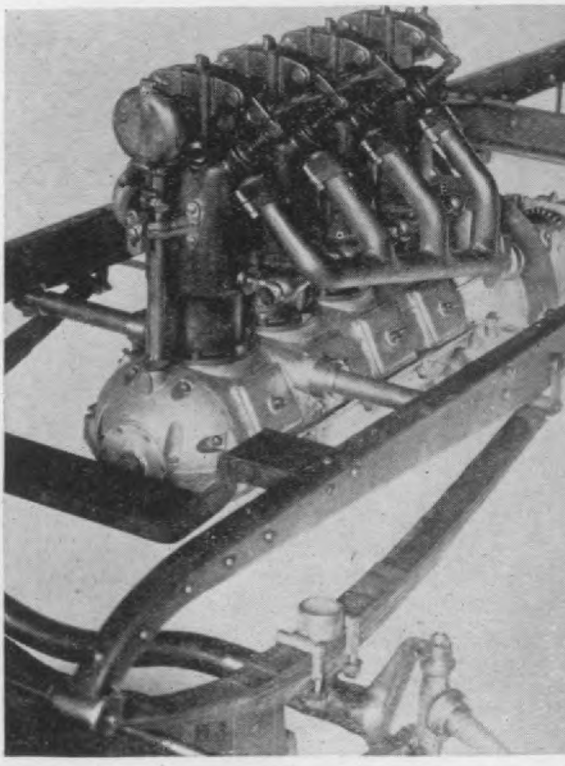

Fig. 4. Jackson 1908 Model E, Left f oblique view of motor and front spring and This picture shows the peculiar journaled motor support, a 1½-inch diameter shaft,

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road. A cape top is $150.00 extra.

and is driven by an entirely new mot

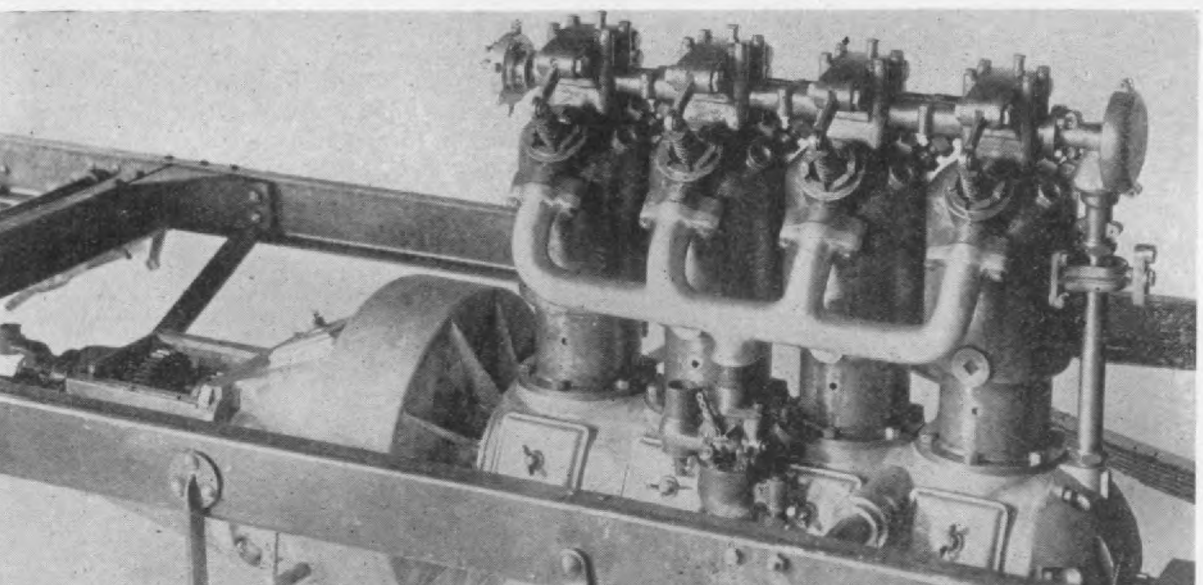


Fig. 5. Jackson 1908 Model E, Right side of motor, in place in chassis frame, showing clear the unit construction.

'he Jackson model E runabout has the ne chassis specifications as the model ouring car. The body will seat either ee or four passengers as desired. It ghs 2100 pounds, and sells for $2000.00, h the same equipment as model E tour- car.

with an overhead cam-shaft, which is bu thruout at the Jackson company's sho The form of the disk clutch has be changed and full elliptic springs have be substituted for the 1907 rear half-ellipti This car has also been lightened, and t tires, 34x4 in 1907, have been changed

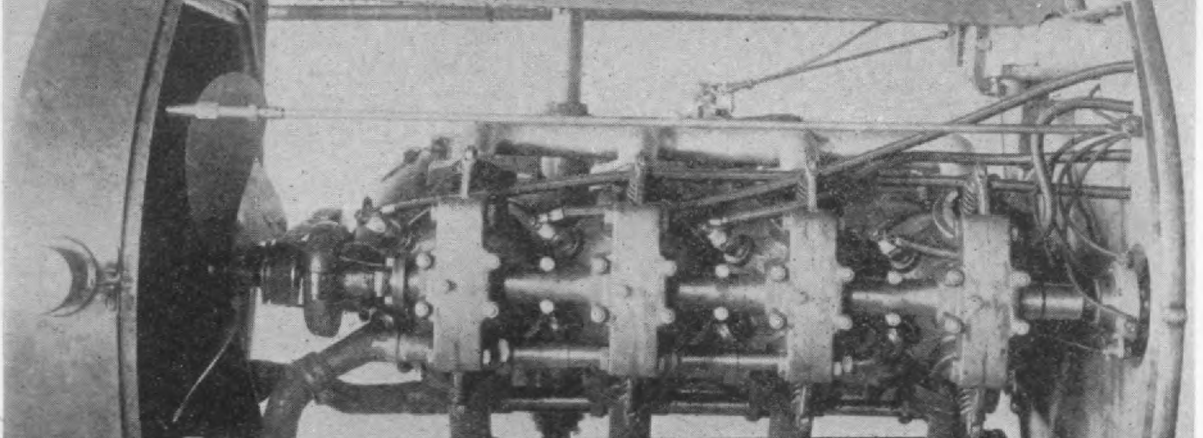


Fig. 6. Jackson 1908 Model E, plan of motor. Note the 1½-inch diameter cross-shaft, fix motor base to support the motor front-end.

ackson 1908, model D, has a wheel base 106 inches, gage 56 inches. The tires all 32x3½ inches. The motor is two

34x3½ inches. The motor has been mov 8 inches to the rear, which improves t load weight distribution.

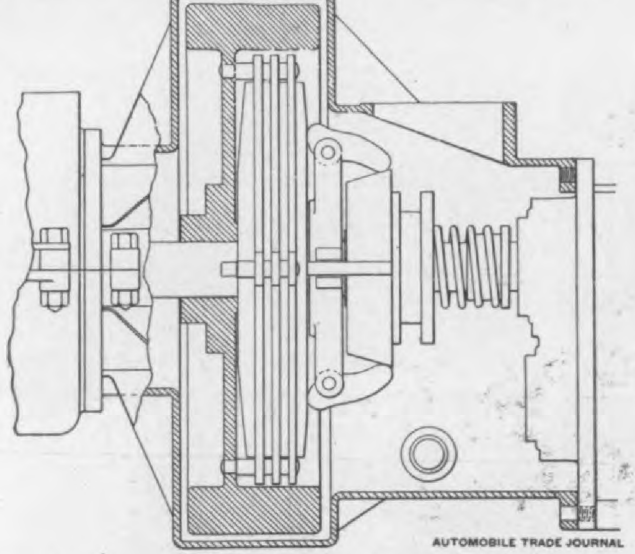


Fig. 7. Jackson 1908 Models D and E, 5-disk clutch construction. Described in the text.

the writer's opinion being next best to the single assembly with no universal joint.

The Jackson 1908 model C, opposed cylinders lengthwise under the car planetary speed-change and chain to the divided rear-axles is regarded by a very large majority of motor-car designers as the best, simple, low-cost motive and propul-

or no vibration, and the chain-drive when naked, has but little friction, s these cheap cars are speedy for power.

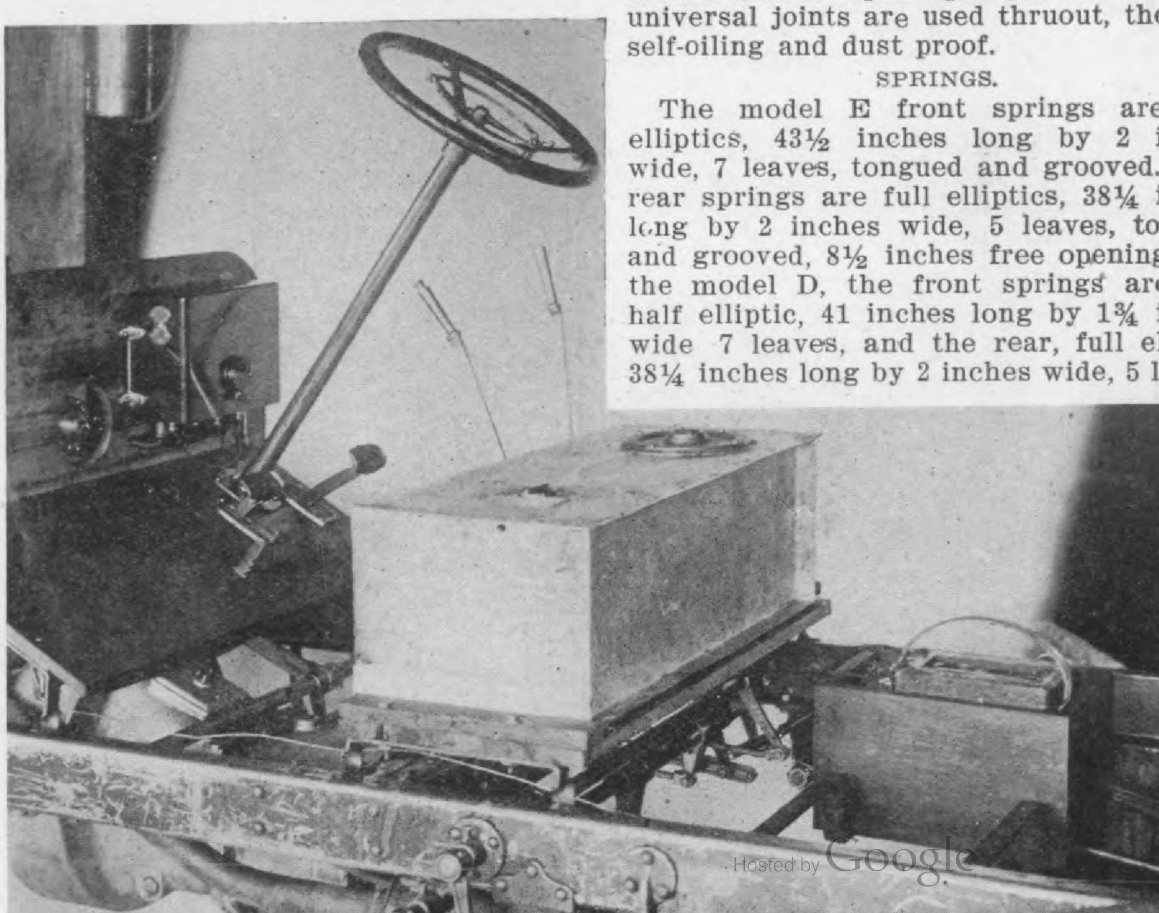
The value of full casing of the and fly-wheel, and the placing of the shaft and change-gear in a substanti sembled-unit framing, cannot be estimated, as it ensures correct alig of coacting parts and complete prot from dust.

THE AXLES.

The front axles are all tubular, W and Mott construction. All front are on two circles of balls in 2-poi justment bearings. The rear axles ar by Weston and Mott. The rear are on the live-axle tapered ends, ke hex. nut retained. The divided axl on Hyatt rollers. The balance gea spur pinions. The propeller-shaft i ried on Hyatt rollers in front, wit Timken roller bearing next to the pinion. All the 1908 models have elliptic rear-springs revolutely mount the rear axle sleeves and fixt on t the chassis-frame brackets. Struts, adjusted length, flat joints at both are used in connection with the revo mounted full-elliptic springs. Blood universal joints are used thruout, th self-oiling and dust proof.

SPRINGS.

The model E front springs are elliptics, 43½ inches long by 2 wide, 7 leaves, tongued and grooved. rear springs are full elliptics, 38¼ long by 2 inches wide, 5 leaves, to and grooved, 8½ inches free opening the model D, the front springs ar half elliptic, 41 inches long by 1¾ wide 7 leaves, and the rear, full e 38¼ inches long by 2 inches wide, 5 l



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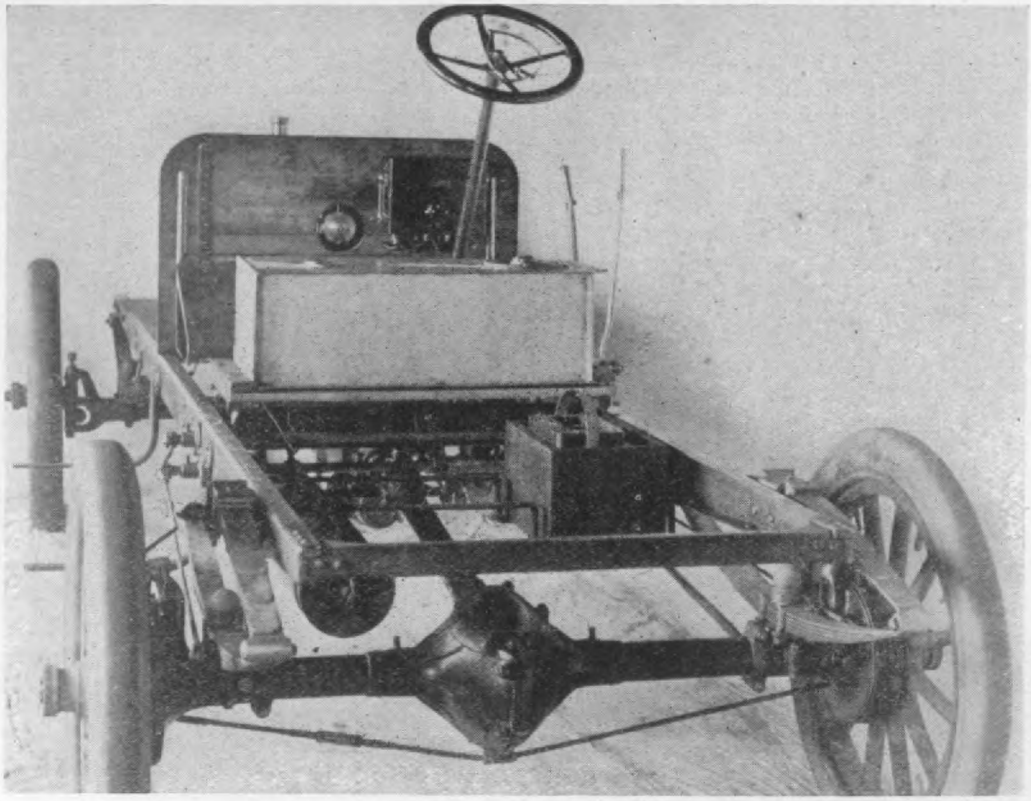

Fig. 9. Jackson Model E, Rear of chassis showing rear axle and full elliptic springs.

SLIDING GEARS.

odels E and D use sliding gears, side- below the line-shaft, line-shaft and shaft on Hyatt roller bearings. The s are of Warner "6-8" d. p., of special , all oil-tempered. The model C etary gear is built by the Jackson Com- , from its own original designs, and

openings 6¼ inches dia., applied by a sliding-cone, normally spring-pressed for ward to co-act with 4 bell-crank levers as herewith shown in the clutch illustration This clutch gives a highly satisfactory gradual and slipping engagement. All the clutch-disk co-acting faces are ground true after hardening. This clutch is ar

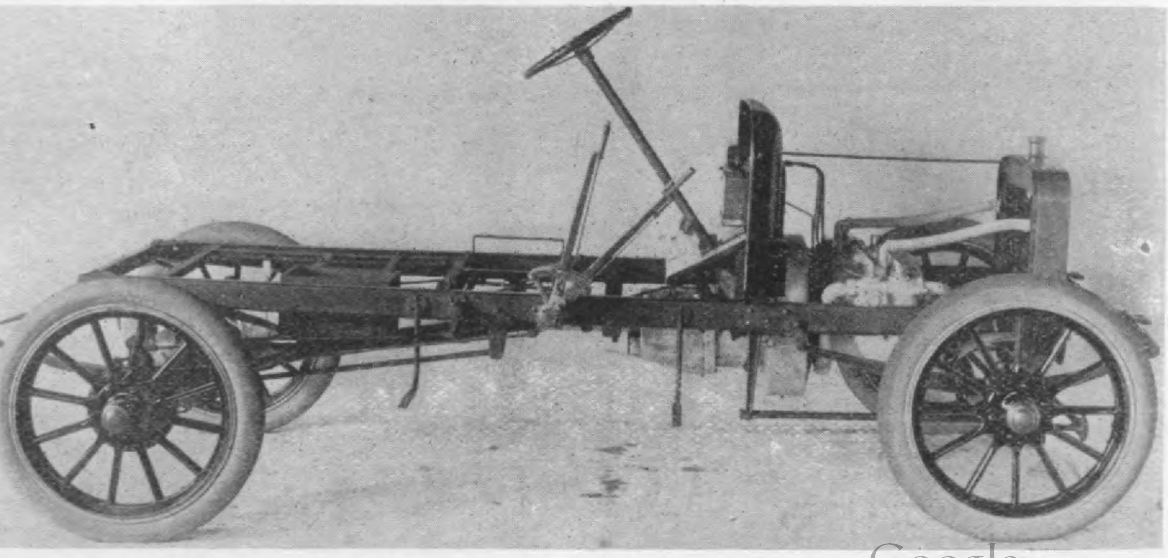

Fig. 10. Jackson 1908 Model D, Chassis right side elevation.

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out the same as the 1907 model E original design and construction of the

pening in the front-board. The cam-shaft s driven by a vertical shaft in front, with wo pairs of bevel gears, gears all encased. The valves are 2 inches in diameter, inlined, and have integral stems. They are

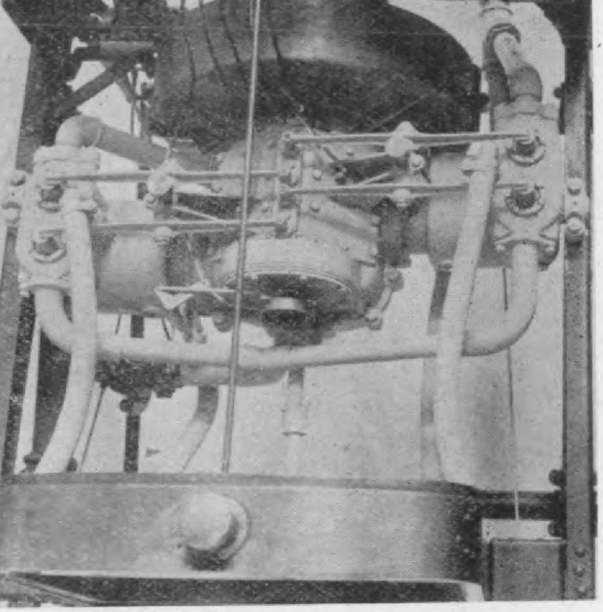

Fig. 11. Jackson 1908 Model D, Plan of opposed motor under the hood. Note the long levers which work the valves, and the boxes on top of the chassis-frame sides which support the front end of the motive assembly.

teel forgings, all alike. The motor-base and oil-basin are of aluminum, with individual oil-pits for each connecting-rod; he oil-pits have small connecting oil holes, with a force-feed oil lead to each of the 4-cylinders; the crank pits are supplied rom the cylinder oiling.

The rods are steel drop forgings, bronze-oushed on top, capt on the crank-wrists. bored and fitted with flanged half-boxes of best babbitt, the boxes being finished all over. Five aluminum-casting members go o make up the motor-base, oil-basin, flywheel, clutch-casing and gear-box, all five pieces being bolted together forming a rigid frame-work assembly, 3-point supported. The 3-point support is by journaling the rear end of the gear-box in a bearing bolted to a chassis frame dropt cross-girt. A bored hole, S, crosswise thru the motor base, takes a 1½-inch diameter steel shaft, having its outer ends supported in bearings fixt in the chassis frame-side channels. The oiling is by a force-feed oiler, with leads to each cylinder and to the various bearings as needed.

BRAKES.

brake-bands are Gandy belting-lined a hole lever applied.

The bevel gears are all special steel oil-tempered. The reduction ratios 4 to 1, and 3 to 1. The solid-stud ch are 1-inch pitch. The small sprockets special steel, oil tempered.

Jump-spark ignition from storage tery current-supply for models D an and dry cells for model C, is used.

CONTROL.

This is the same for models D an and is a worn and trunion nut, trun in boxes sliding in the top slotted a of the globe-end steering bell-crank. model C, the steering is by a hard worm and sector, centers adjustabl eccentric steering-shaft-bushes, screw tained. D and E have the same spark throttle control, two levers, ratch tained on top of the steering wheel. C the spark and throttle control ar an exterior sleeve with a concentric shaft, parallel to the steering post, ha ratchet-retained levers fixt to the sl and rocker upper ends, and located in rear of the steering-post, under the h wheel. In models D and E two ou hand-levers are used, the inside on latched, and when pulled backward

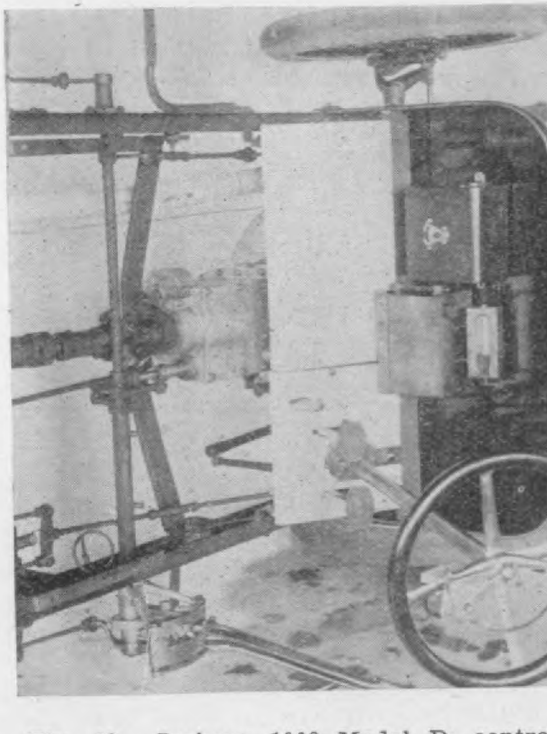

Fig. 12. Jackson 1908 Model D, contro revoluble rear-end of motive-assembly c journaled in the chassis-frame-cross-girt-ca deeply-dropt journal-box, so as to turn This 3 point support, all points journaled f motive assembly avoids all twisting stress this long and large construction, and assure

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the selective change gear. No accelerator pedal is fitted to any of the models. D and E have plunger pedals for opening the muffler, and two large upright pedals of which that at the left disengages the clutch only, while that at the right applies the external ordinary brake only. Model C has one outside lever, latched, which is pushed to forward extreme for high speed, pulled to the rear to mid-position for neutral and to extreme rear for low-speed. There are 3 upright pedals on the footboard. The left pedal is pushed forward for the reverse only. The middle pedal is pushed forward to obtain low forward-speed. The right pedal applies the rear-hub brakes only, and a fourth upright pedal, smaller than the others and placed at the extreme left, opens the muffler.

ON THE ROAD.

Thursday, October 10, a Jackson 1908 4-cylinder model E touring car left the Otsego Hotel, Jackson, at 8.00 A. M., two tonneau passengers, Robert Burman driving and the writer, front seat passenger and was driven first over very bad, sandy roads to Charlotte, 37 miles, and then 20 miles to Lansing, over roads good in some places, but deep sand much of the way, with the driver and writer only, the tonneau passenger returning from Charlotte to Jackson by rail. Friday morning, October 11, the car left Lansing, at 8.00 o'clock, and was driven over rough roads with plenty of sand, to Jackson, 40 miles, at 9.50 o'clock.

This model E was so new that it had been driven only 5 or 6 miles before this run, and had no lamps, no oiler and no mud-guards. One thing it did have that no one suspected, was a front axle set half an inch farther forward on one side of the chassis frame than on the other side, making one front wheel stand nearly an inch ahead of the other, an assembler's blunder, which did not much affect the steering on hard road surfaces, but made things very queer indeed in deep sand, so that from Jackson to Charlotte, over one of the worst loose sand roads the writer ever encountered, it was a case of drive every instant for Burman, with the model E off the road first on one side and then on the other, doing something wholly unexpected every minute, sometimes holding the road all right and then steering to one side or the other just because it took the notion, and crossing the road several times before it could be induced to take the wheel tracks again. The sand was very deep, and the ruts were narrow enough to pinch the tires and the hind wheels naturally tried to go ahead of the front ones, as is always the case in very heavy going, and in this run the front axle misplacing and the deep sand together put the car out of control to an extent which was sometimes really alarming.

As we had no oiler and the motor was new, we kept a good deep oil-pool in the crank-box, and left a smoke trail like that of a locomotive behind us. This new Jackson 4-cylinder engine is very strong on low speed, and is almost silent and ran to perfection all the time, giving plenty of power, making the car a very speedy hill climber. All this part of Michigan is very hilly, with crooked, sandy roads, so that the heavy going and wild steering gave a very severe test, both of power and sound construction. At Charlotte we found what was the matter with the steering and so were less apprehensive thereafter, tho the car continued to make unexpected shoots and slants when pushed in deep sand.

The road from Lansing to Jackson was fair for a good part of the way, tho sandy in spots and not really good anywhere, and we made the 40 miles in about 90 minutes running time, as we had one long stop to educate two horses led by two passengers in a buggy drawn by a third horse.

This 100-mile run of the new model E showed everything to great advantage, and gave a much more convincing demonstration of power, silence and strength of construction, than if the roads had been good and the steering perfect. The Jackson 1908 model E is very still, has excellent springs and can tour American roads all right, no matter how rough or hilly or sandy they are.

The new home of the Matheson car, a handsome concrete and steel five-story and basement building, located in New York City, between Forty-ninth and Fiftieth streets, and running from Broadway right through to Seventh avenue, will soon be ready for occupancy. The upper floor has been arranged as a repair and stock room; three intermediate floors will be used for the garage, and are capable of accommodating 150 cars; a magnificent salesroom, 36-40 feet, with a mezzanine balcony and offices, will be located on the main floor. The building is provided with two large elevators, each having a lifting capacity of 12,000 pounds.

Every issue of the Cycle & Automobile Trade Journal contains information too valuable to be missed by any one interested in the development in the motor car industry. If you are a maker, user or dealer in motor cars and are not a subscriber to this Journal, send us $2 at once and have your name entered. If you desire your subscription to commence with the June number so that you can obtain descriptions of all the 1908 cars, we will so enter your subscription if your remittance of $2 is received before our supply of back numbers is exhausted. Cycle & Automobile Trade Journal, Forty-ninth and Market streets, Philadelphia, Pa.

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horse-power, and selling at $3500. Known as Type XV, it follows very closely the construction details and appearance of the Type XII, of 1907. The cylinders, however, are a trifle larger than last year, and several refinements suggested by the experiences with this car have been adopted.

The cylinders are four vertical, cast in pairs and having the valves in the head on opposite sides with the cylinder walls, heads and valve chambers integral. The cylinders measure 4⅞ by 5¼ inches.

jacket and that for the rear pair is short 1-inch pipe connecting the adj faces of the castings. The return fl by a pipe from the top of the jacke the radiator top. This piping is of ble diameter, that portion leading fro rear cylinders being 2 inches, but in ing to 2½ inches where it is joined b branch from the two forward cylinde belt driven cooling fan is employed.

THE CARBURETOR.

The carburetor which has been use

The 1908 Gaeth Type XV Touring Car, four-cylinders, 4⅞ by 5¼ inches, rated at 35 H Make and break spark ignition is used. The wheel base is 112 inches; tires 34 by 4 inc weight approximately 2700 pounds; price, $3500.

The Gaeth method of grinding piston rings and cylinders which has been used for several years is continued. In this the piston rings are secured in the piston grooves by an adhesive, and are held rigidly in place thruout the grinding process. When the adhesive is dissolved the rings are already in position without the necessity of springing them into the grooves.

Metal to metal gears are used on the cam shaft, and they are placed inside of the cam shaft chamber and run in oil, thus eliminating noise. A special jig has been rigged for grinding the cam shaft gears in place and mating them. At the end of the cam shaft there is an adjustable bearing by means of which the gears are adjustable to wear.

The thermo-syphon system of cooling cylinders, which has been found very satisfactory in many long hard runs, has been

cessfully for several years, is now placed on the open market by a Clev concern. It has a three fold control. air entering from below, the entering line and the mixture passing to the r are all controlled simultaneously fro lever at the top of the steering w The carburetor is of the separate chamber style, and its mixing chamb a vertical cylindrical space fitted w rotable needle valve. This has i base two radial V-shaped opening regulating the air entrance. In its there is a circular opening for contr the exit of the mixture. A part revo of this throttle also effects a part ment of the needle valve in the nozz that with a larger entrance there greater flow of gasoline. No auxilia valve is used, and it is possible to s gasoline valve for a low running poin go up to highest speed without fu

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es. The method of operating the ham- and anvil devices is unique. One ver- shaft rises at the right side, opposite space between the front and rear cyl- r pairs, and is driven by a gear from intake cam shaft. On top of this shaft set of small cranks which work horiz- l push rods that strike upon the gers on the upper end of the moving trodes. Variation of the spark is from steering wheel.

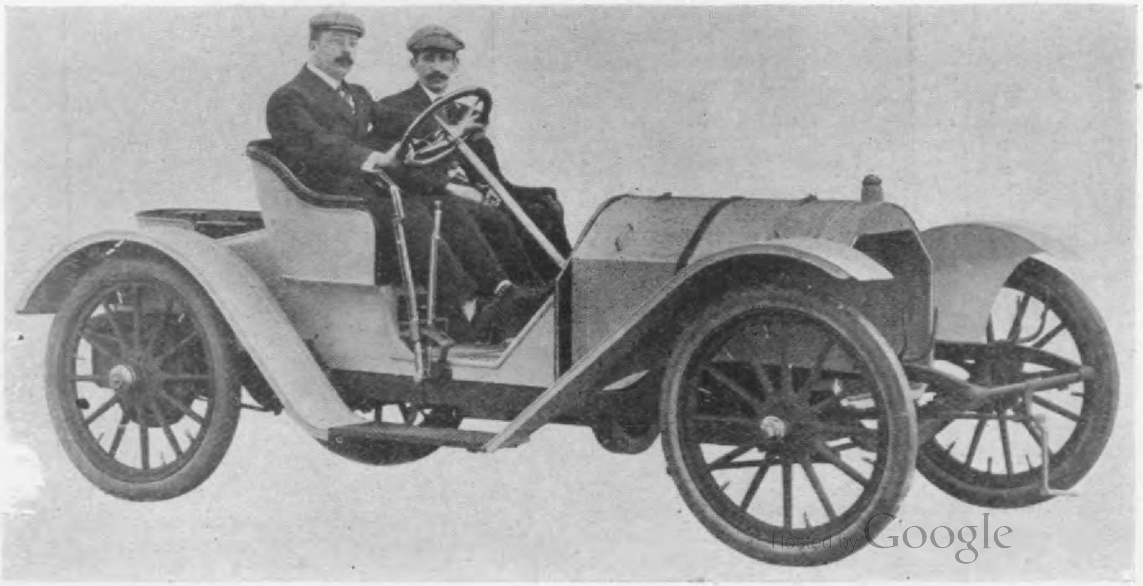
ne Gaeth clutch is of the contracting l type. It consists of a leather lined l, clamped upon a face on the drum of fly-wheel, and is 13 inches in diameter, 1½ inches wide. A cone on a vertical t pushes between a pair of swiveled s at the center and contracts the band. ariations in speed are accomplished by ns of a sliding gear transmission, giv- three forward speeds, all obtained on progressive principle by a backward ement of the speed change lever, giv- respectively all the changes from direct everse. Both shafts in the gear set carried on plain bearings. The bear- and case are split horizontally, and bearings which are special babbitt ls can be removed for adjustments or wals. Chain oilers are used for these ings. The gears of the speed changes made larger and heavier than cus- ary.

here is a double braking system con- ng of two separate drums, one within other, one set contracting upon the r drum, and the other expanding with- he inner drum. Those for ordinary are leather lined bands acting upon

The Gaeth framework is of standar prest steel construction, and has the sid members parallel thruout their lengt These members are 4½ inches wide at th center, and are made of 5-32 stock. Spring this year, are made of a special crucibl steel guaranteed for one year. There ar four semi-elliptic springs, those in fron are 44 inches long, and those in the rea 50 inches long. The forward axle is a I-beam forging with a small drop in th center, and provided with jaw endings fo Elliott steering knuckles. The car has wheel base of 112 inches, has 34 by 4-inc tires, and weighs approximately 270 pounds. It has space in the tonneau sea for three, and there are two swingin folding seats.

In regard to performance the compan state that the first model of this type wen thru the Glidden tour without showin a mechanical defect, and without openin the bonnet seals while in the recent Clev land contest, securing the only perfec score in the latter contest.

A number of 1908 car descriptions ar contained in this issue of the Journal, an over one-half a hundred more have ap peared in the last five issues. From n other source can you obtain the same in formation in regard to 1908 models. I you desire to obtain descriptions of all th cars that have been described, we wi start your subscription with the June num ber if your remittance of $2 is receive before our supply is exhausted. Cycle & Automobile Trade Journal, Forty-ninth an Market streets, Philadelphia, Pa.



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They are as follows: Model "G," five-passenger, four-cylinder, price $2000, or as a limousine, price $3000; Model "G," seating capacity three, same chassis and price

inches for 1908, and the prices of the tonneau body and the two-passe runabout are increased from $950 $1000 and from $800 to $850 respectiv

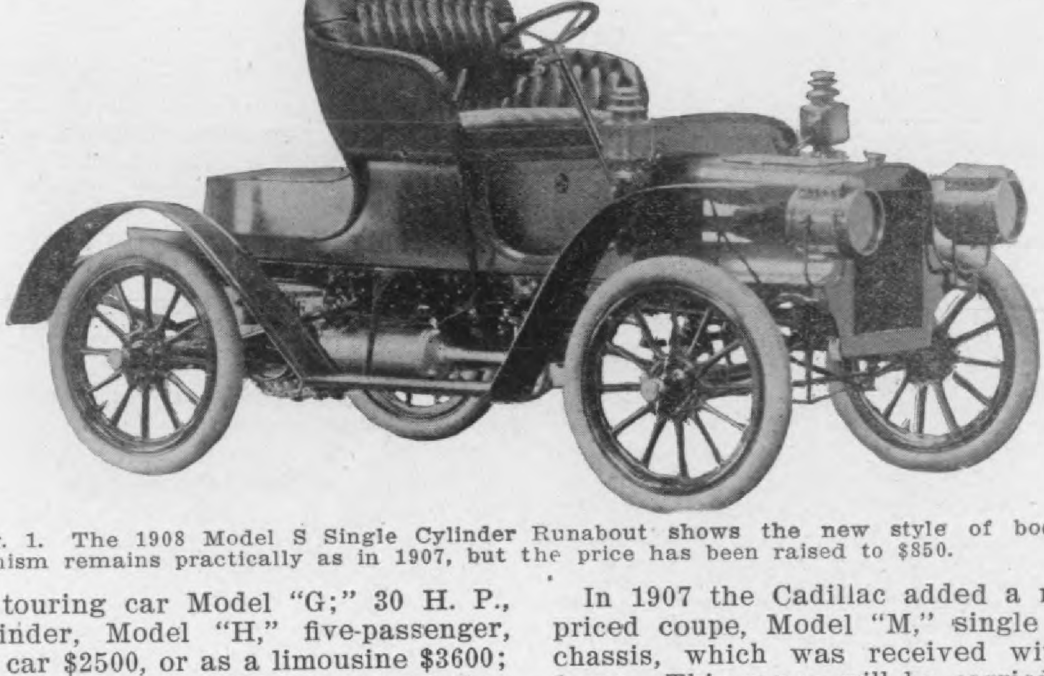

Fig. 1. The 1908 Model S Single Cylinder Runabout shows the new style of body. mechanism remains practically as in 1907, but the price has been raised to $850.

as the touring car Model "G;" 30 H. P., four-cylinder, Model "H," five-passenger, touring car $2500, or as a limousine $3600; Model "S," runabout, $850, or as a touring car $1000, and a light delivery wagon the same chassis, Model M, 600 pounds load, $1000.

The Cadillac 1908 Model "G," four cylinders, nominal 20 H. P., five-passenger tonneau body, will be continued with only

In 1907 the Cadillac added a new priced coupe, Model "M," single cyl chassis, which was received with favor. This coupe will be carried ov 1908 as Model "T," the only change an increase of 6 inches in the wheel making it 82 inches. The price of Model "T" coupe remains the sam in 1907, $1350.

The Cadillac Company offered del

Fig. 2. The 1908 Three-Passenger Cadillac Runabout. This car has the Model G Cha but the body is a 1908 design. Price, $2000.

detail betterments as the 1908 Model "G." In accordance with the latest formula approved by the A. L. A. M., the rating of this Model "G" motor is raised to 25 H. P., altho the motor cylinders

cars, 600 pounds paying load, single inder chassis, in 1903, and while no cial efforts have been made to push commercial Cadillac, its sales have ily increased, and this Model "M" del

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tal Automobile Manufacturing Com- New Haven, Conn. The various ls for 1908 have for the past six hs been on the road, being tested, lemonstrating cars to the company's us agents are now being delivered.

road would not disarrange the steering gear. Ignition and throttle controlling levers are placed on the steering wheel, but do not revolve with the wheel. A foot accelerator is provided, as well as a cut-out. Front springs are semi-elliptic

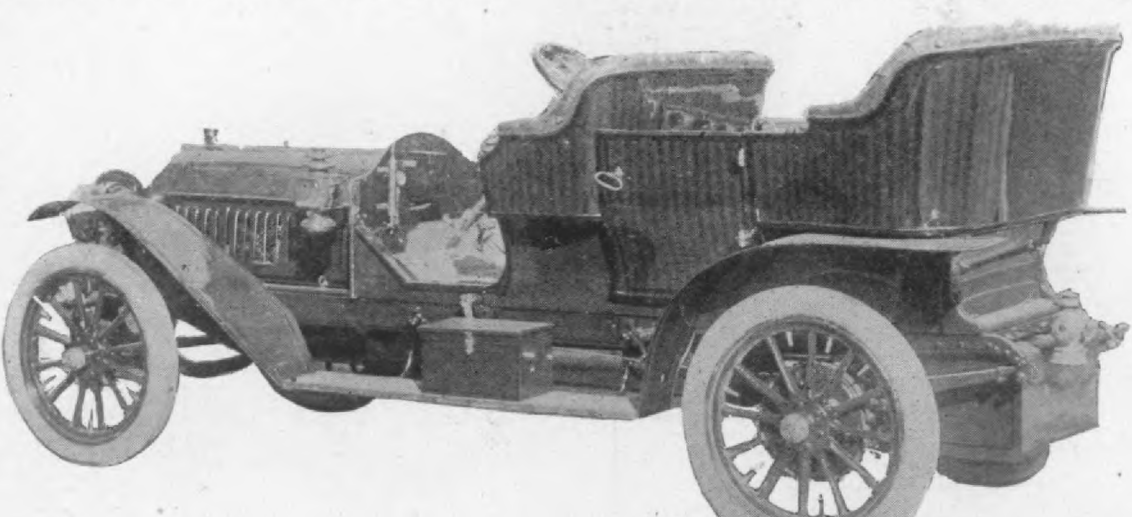
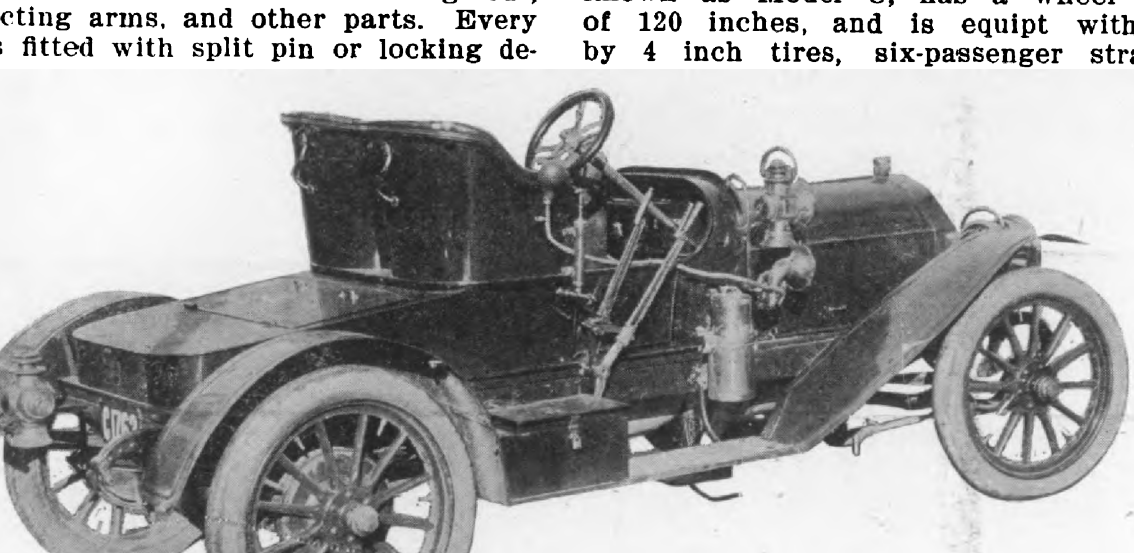


Fig. 1. Continental Touring Car, six-cylinder 1908 model, showing the well proportional hood equipment, straight line body effect, location of the gasoline tank in the rear, and the large brake drums on the rear wheels.

details of the running gear for the us models show great care in work- out. Especially is this true in the ng gear, in which all the parts are erlocked that it is necessary to start e end to take down the steering rods, cting arms, and other parts. Every fitted with split pin or locking de-

with bushed eyeholes, and fitted with compression grease cups. The mahogany dash is a carefully rounded design, and carries the air pump for the gasoline tank.

The standard four-cylinder touring car, known as Model C, has a wheel base of 120 inches, and is equipt with 34 by 4 inch tires, six-passenger straight



ig. 2. Model B 1908 Continental Car, with chauffeur's seat closed under deck, 30 H. P. gn rating, 112-inch wheel base, geared for a maximum of 65 miles; price $2700.

A special ball socket joint, patented e company, is used on both ends of

line body, and lists for $3000. Model B is the same car with the motor somewhat

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he valves are all the same size, me-
hanically operated, and are die forged
rom nickel steel. The crank shafts are
nachined from high grade solid steel, and
re slightly offset from the cylinders.
ive main bearings of Parson's bronze, of
ery liberal size, are used. Connecting
ods are high grade drop forgings. Liberal
ize inspection plates are provided in the
rank case, and the timing and magneto
ears are enclosed in running oil. The
ottom is aluminum, and divided into four
ortions of proper height. The motor de-
elops at one thousand revolutions 40 H.

The finish and equipment of the
it is claimed, are unexcelled—lamps
of special design and of heavy brass;
holstering, any color, being optional
customer; also tires; Hartford shock
sorbers are provided as part of the r
lar equipment. A steel pan under the
tire car protects the mechanism from
and dirt, and at the same time causes
suction, or back draft. The car, i
said, raises very little dust when tra
ing at a good speed over ordinary ro
and it is the opinion of this company
eventually all makers will be obligec

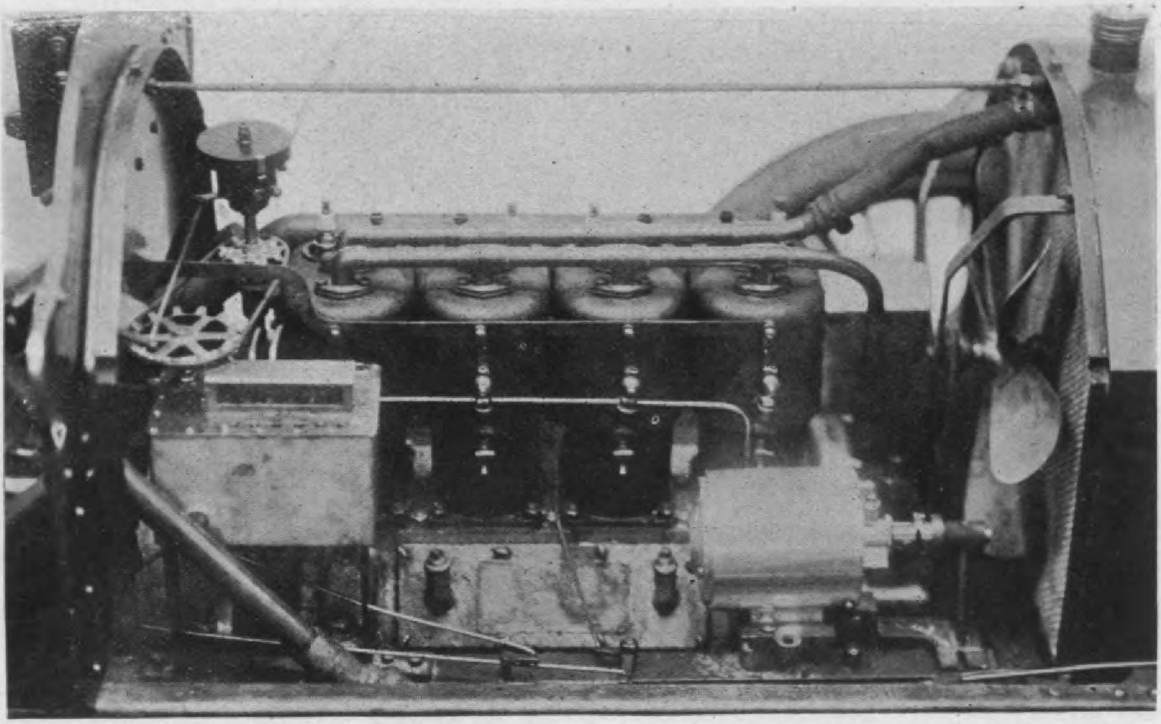

Fig. 3. Model C Continental Motor, showing location of magneto, motor piping compress relief cocks, distributor, lubricator connected to the half time shaft, dash and steering post.

., altho it is the policy of the company
o rate their cars according to the foreign
tandard, 28-32 H. P. The rear axle is a
pecial construction, and extra heavy.
'imken roller bearings are used thruout.
'he car is fitted with torsion rods and
ouble universal joints.

While there has been no attempt to in-
orporate new, or untried inventions, or
adical departures from high standards of
fficiency in the various components
sed, and while many of the strong points
nay also be found in other high grade
ars, yet the car taken altogether is re-
narkably simple, compact, and thoroly
ractical. In evidence of this the company
oints to the records this past season in
nany trials and endurance tests, in which

design their chassis with the objec
meeting ordinances, which are now
forced in Europe, to prevent unneces
raising of dust and dirt.

The 1908 chassis has undergone
few changes, and only modified impr
ments and enlargement of the car are
ticeable. These cars were designed
built on experience gained from hand
all the various makes of cars for the
five years, and the builders do not
tate to say that they have incorpor
good points of other makes, when fo
and have omitted any characteristic
points.

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CHARACTERISTIC FEATURES.

ng of 25 gallon gasoline tank at the of the car; and lockers under front s, all being points which have become dard in foreign cars, and which Amer- manufacturers will eventually have adopt. The exclusive features are: powerful independent brakes, which operated in unison or separately, at one a 10-inch drum with 2-inch face he line shaft back of the transmission ated by foot pedal; a second small e on the line shaft in front of the smission used in connection with the ch; a regular foot brake with a 12- brake band, and 2-inch face; and an rgency brake, which is 2-inch face on -inch brake drum, which is camel's against steel. These brakes are ex- ely powerful, and easy to operate.

THE CLUTCH.

the fly wheel is carried an ingenious powerful clutch, consisting of five s or disks, two of which are phosphor- ze, and the other alternating three of steel. There is no jerk in starting car, and absolutely no chance of the ch releasing except at the will of the ator. There is a heavy coil spring, h throws the clutch in, but is not de- ed upon to hold the same in position, function being performed by bell k levers.

he change speed gear gives three ds forward and one reverse, direct on . Compactness, strength and acces- ity are characteriistics to be noted in transmission, which is enclosed in an inum housing, and fitted with Hess- ht ball bearings. The shaft is of ial chrome nickel steel. Change of is accomplished by side lever in an ot quadrant, in which the emergency e lever also operates.

IGNITION.

nition in all cars is by jump spark storage battery and dry set in re- e, and Lacoste vibrating coil with le throw switch. The company ngly urges all its customers to ify, however, in addition, their special neto, which is used in connection with other system—their double throw ch, before mentioned, and a specially gned distributor—making two inde- ent ignition systems. This latter out- s guaranteed for three years, ab- tely free from annoyance and repairs, to give uniform and continuous opera- all that is required is an occasional g. This outfit lists at $150 extra. system, it is claimed, provides per-

or oil. All working parts are packed grease for a season's running, and 20 pe cent. efficiency is guaranteed over othe systems. The company claims it is a easy to start the motor on the magnet as on the storage battery. With the spe cial compression relief with which th motors are provided it is very easy t spin the motor. The alternating curren of high frequency which is fed directl to the primary coil is the secret of th success of this system. In the coil th inductive effect or magnetic reversals ar

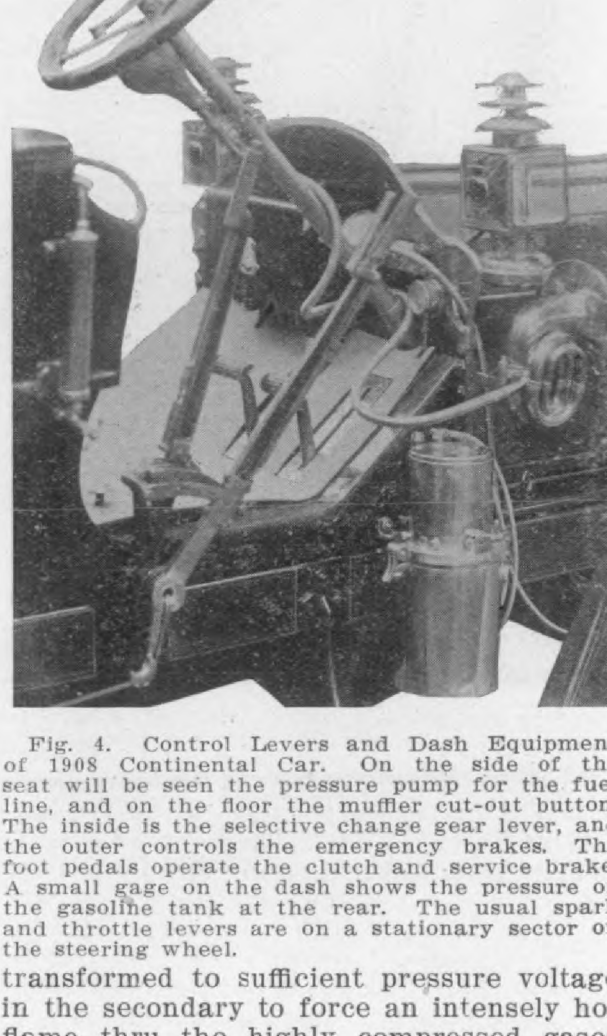

Fig. 4. Control Levers and Dash Equipmen of 1908 Continental Car. On the side of th seat will be seen the pressure pump for the fue line, and on the floor the muffler cut-out buttor The inside is the selective change gear lever, an the outer controls the emergency brakes. Th foot pedals operate the clutch and service brake A small gage on the dash shows the pressure o the gasoline tank at the rear. The usual spar and throttle levers are on a stationary sector o the steering wheel.

transformed to sufficient pressure voltag in the secondary to force an intensely ho flame thru the highly compressed gase in the combustion chambers of the motor Only one coil is used. The timing is ac complished by a combination high-tension distributor and primary timer. The pri mary timing of the magneto is effecte by short-circuiting the magneto primar for such a period of time as the spark i not needed in any of the cylinders i operation. By this method one can switc

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ave been very busy with new designs of
notor cars, and this company will offer
our different styles of cars for 1908, which
vill be placed on three separate and dis-
inct styles of chassis, as follows: The

are very large, including a grey-iron f
dry 125x275 feet, a smithy 75x150 fee
machine shop 125x625 feet, an assemb
and painting department 75x625 feet,
sides storage warehouse, pattern s

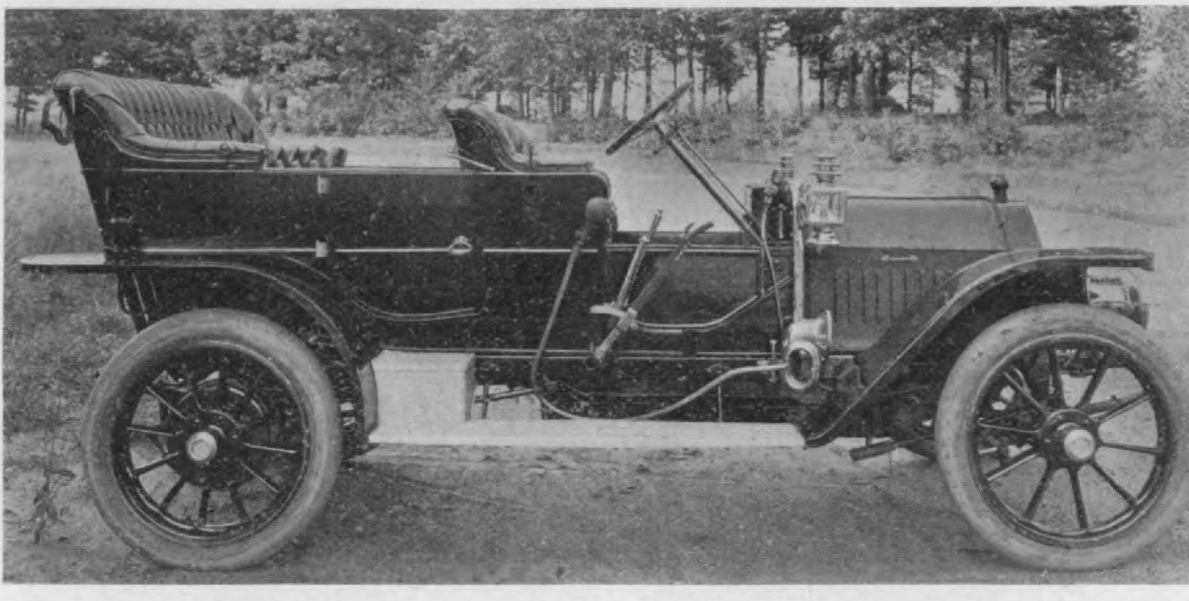

Fig. 1. The New 1908 Oldsmobile Model M. This car has a four-cylinder water-cooled
cycle motor 4¾x4¾, rated at 40 H. P., and a straight line tonneau body, suitable for five pa
sengers. The car weighs 2800 pounds, and sells for $2750, including five lamps, one gas tan
mats, horn and tools.

ldsmobile 1908 all new Model Z, 6-cylin-
er, 60 H. P., seven-passenger, tonneau-
ody. The Oldsmobile 1908 all new Model
I, 4-cylinders, 40 H. P., five-passenger,
onneau-body. The Oldsmobile 1908 three
r four passenger roadster, same Model
I chassis, and the Oldsmobile 1908 4-
ylinder Model X, 30 H. P., five-passenger,
onneau-body.

testing room and repair shops all in s
rate buildings; the total floor space,
cluding the drawing room and offices b
about 360,000 square feet. The Oldsmo
Company will build about 1400 motor
in 1908, 100 of the 6 cylinders, and
of the two 4-cylinder models.

The Oldsmobile 1908 Model Z, i
seven-passenger touring car. The w

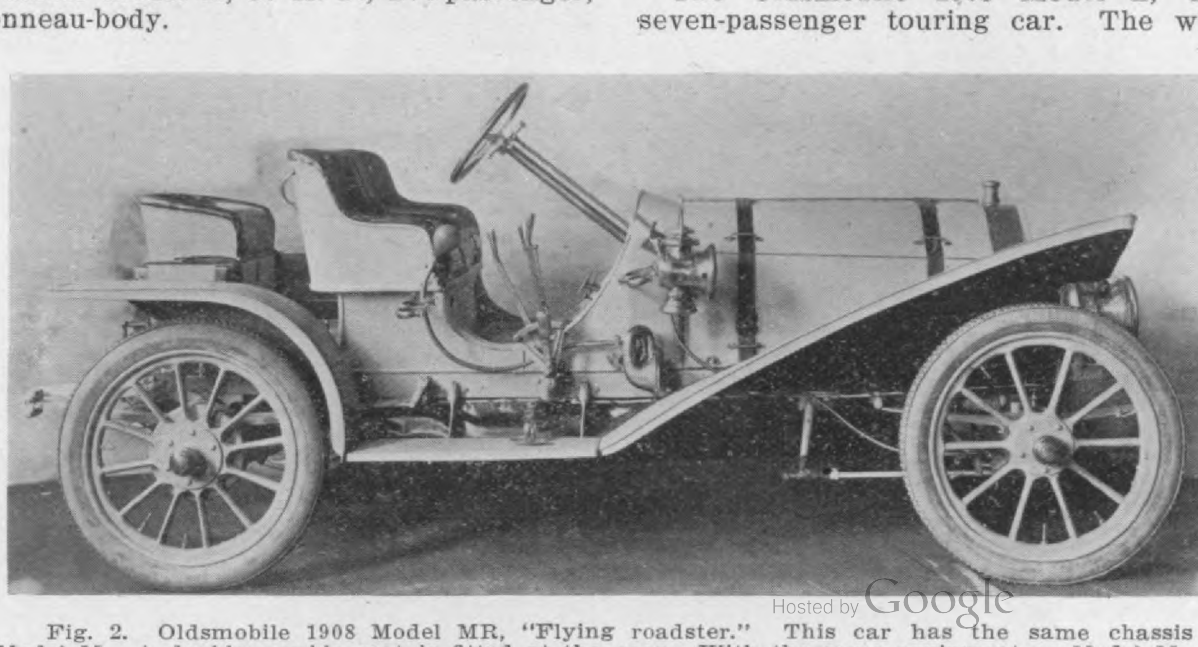

Fig. 2. Oldsmobile 1908 Model MR, "Flying roadster." This car has the same chassis
Model M. A double rumble seat is fitted at the rear. With the same equipment as Model M,

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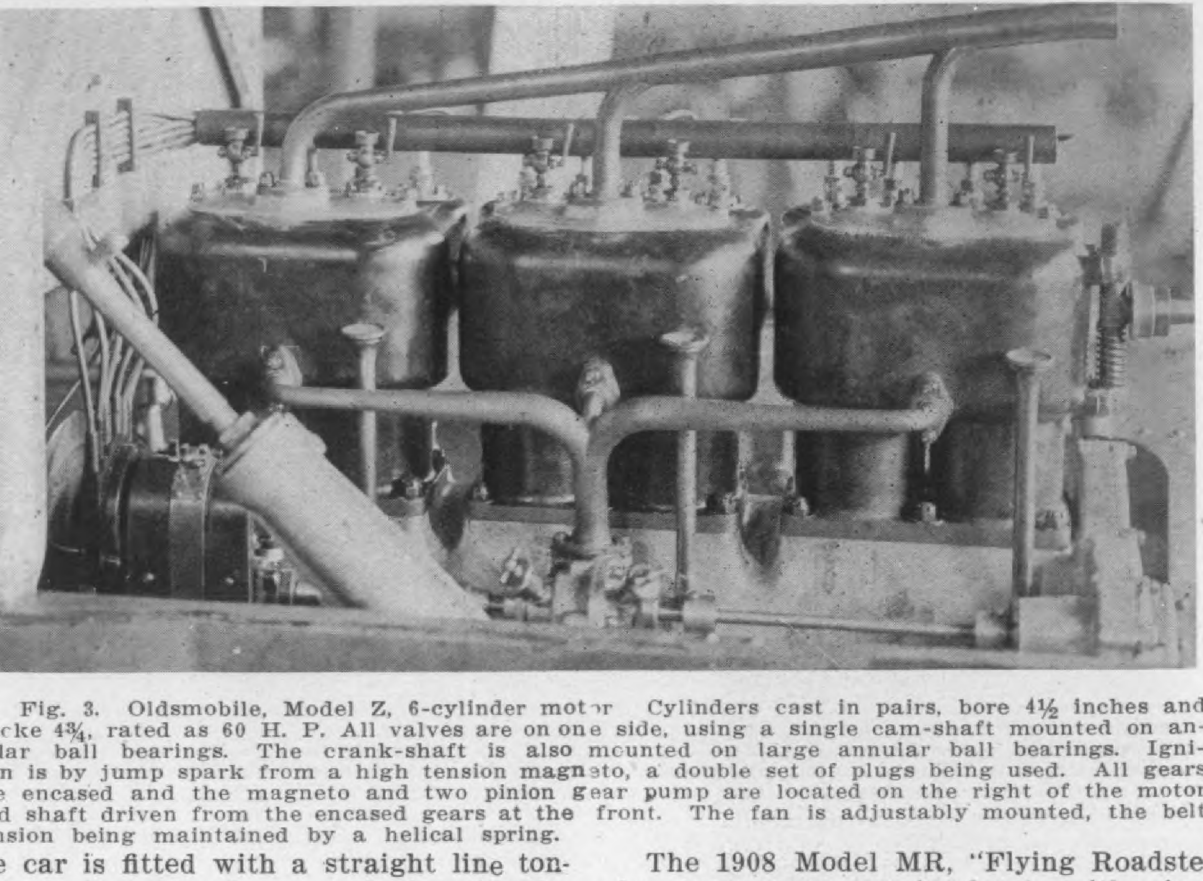

Fig. 3. Oldsmobile, Model Z, 6-cylinder motor Cylinders cast in pairs, bore 4½ inches and cke 4¾, rated as 60 H. P. All valves are on one side, using a single cam-shaft mounted on an-lar ball bearings. The crank-shaft is also mounted on large annular ball bearings. Igni-n is by jump spark from a high tension magneto, a double set of plugs being used. All gears e encased and the magneto and two pinion gear pump are located on the right of the motor d shaft driven from the encased gears at the front. The fan is adjustably mounted, the belt nsion being maintained by a helical spring.

e car is fitted with a straight line ton-u body, side doors swinging to the nt, with two folding and revolving irs on the tonneau floor, all to seat en-passengers. The machine complete ghs about 3200 pounds. The price is 00, including 5 lamps, gas tank, mats, n and tools. A cape top is extra.

The 1908 Model MR, "Flying Roadste for two-passengers in front, with sing or double rumble seat has the same chass specifications and equipment as Model I The weight is 2500 pounds and the pri is $2750. This car is also supplied wi a top.

The new Model X is a five-passeng

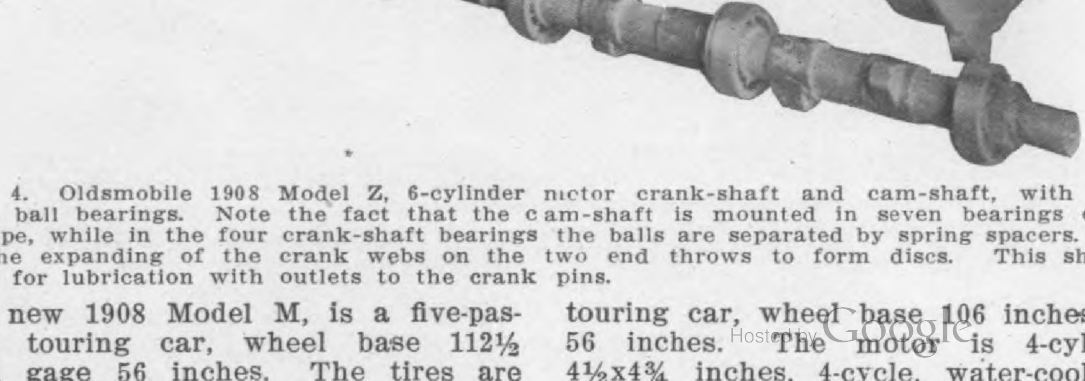

Fig. 4. Oldsmobile 1908 Model Z, 6-cylinder motor crank-shaft and cam-shaft, with Hess-ight ball bearings. Note the fact that the cam-shaft is mounted in seven bearings of the l type, while in the four crank-shaft bearings the balls are separated by spring spacers. Note o the expanding of the crank webs on the two end throws to form discs. This shaft is lled for lubrication with outlets to the crank pins.

he new 1908 Model M, is a five-pas-ger touring car, wheel base 112½ nes, gage 56 inches. The tires are

touring car, wheel base 106 inches. gag 56 inches. The motor is 4-cylinder 4½x4¾ inches, 4-cycle, water-cooled,

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The Ford Line

for 1908

AS PER USUAL—will eclipse everything else.

AGENTS ARE ANXIOUS to learn what it is to be—so are our copyist competitors, and we are not telling.

ALL THE PRESENT MODELS will be retained—every one is a world-beater in its class—not one, has a rival to-day; nothing others can bring out in 1908 can possibly compete in quality and price.

THE FORD SIX—the car that made the fame of sixes and compelled 27 unwilling makers to follow its lead, will still be made in the two types—the 40 horse power touring car and the "6-40" Gentlemen's roadster. Finish a trifle better, and price a trifle higher perhaps, but otherwise the same as '07.

MODELS "N & S" RUNABOUTS cannot be improved upon. Both are now standard products.

THERE'LL BE ONE new runabout—a light roadster that will show the way to everything else on wheels, quality, price, performance and appearance beyond compare.

TWO OTHER SURPRISES—yes, a light touring car is one of them—that will be the delight of prospective buyers, the despair of competition.

SEE THEM ALL AT THE A. C. A. SHOW: You'll say "the world is Ford's for 1908."

In line for the agency yet?

Ford Motor Company,

254 PIQUETTE AVE., DETROIT, MICH.

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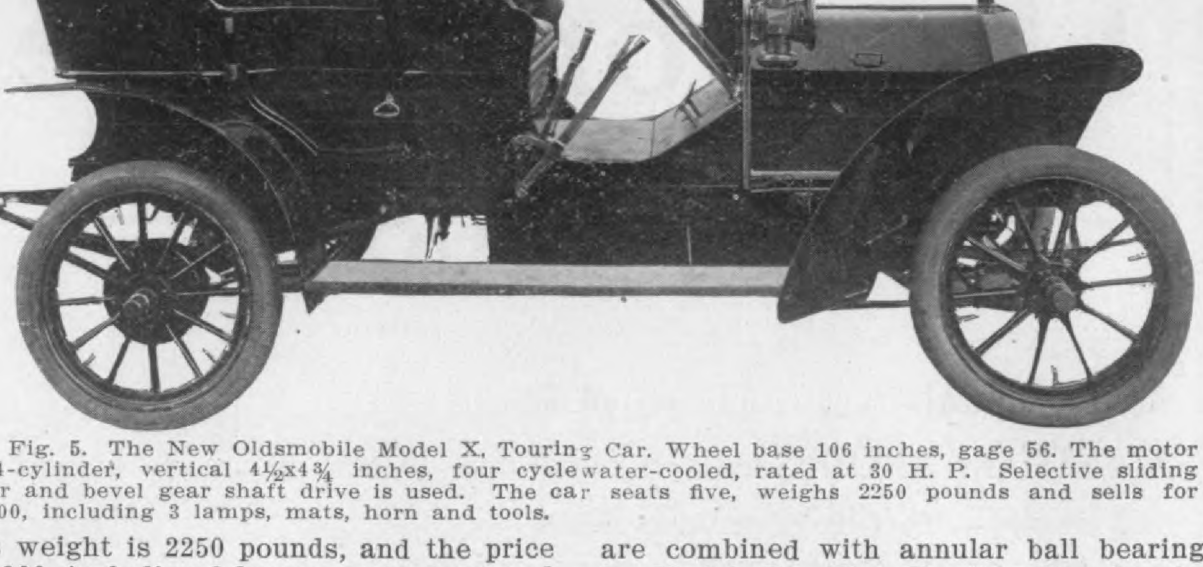

Fig. 5. The New Oldsmobile Model X, Touring Car. Wheel base 106 inches, gage 56. The motor 4-cylinder, vertical 4½x4¾ inches, four cycle water-cooled, rated at 30 H. P. Selective sliding r and bevel gear shaft drive is used. The car seats five, weighs 2250 pounds and sells for 00, including 3 lamps, mats, horn and tools.

weight is 2250 pounds, and the price 900, including 3 lamps, mats, horn and . The acetylene lamps and cape top extra.

1907 the Oldsmobile line was a single inder chassis, fitted with either a ing or a roadster body, and a single ider runabout. For 1908 the single ider chassis is finally abandoned, and el Z, a six-cylinder, and Model M, a 4-cylinder, and Model X, a new 1908 4-cylinder model constitute the Oldsile line. With the different bodies gives the Oldsmobile 6 models of cars 1908, a landulet and a limousine body g placed on the Model M chassis.

ese changes are significant, first, be- e the abandonment of the single cylin- runabout, which was once the leading ess in point of numbers sold, marks end of the usefulness of the single- ider type of motor car so far as the mobile determination of values is con- ed; second, because the number of rent models offered by this company 908 is six, as against three for 1907. also noteworthy that a new, high- ed six-cylinder car heads the 1908 mobile list, and that this 1908 line with a new light 4-cylinder car.

NOTABLE FEATURES.

to important structural changes the mobile 1907 practice included half- tic springs only, while the 1908 els Z and M, 6-cylinder and 4-cylinder ectively, are fitted with full elliptic gs in the rear. The cone clutch is d in all Oldsmobile 1908 cars, all use sliding-gear, and all are bevel-gear n.

to details, the 6-cylinder motor has crank-shaft and cam-shaft in Hess- t ball bearings. All front wheels are

are combined with annular ball bearing in Model Z. The Hyatt roller bearin which was first introduced as a motor ca component in Oldsmobile cars, is no wholly abandoned in their construction.

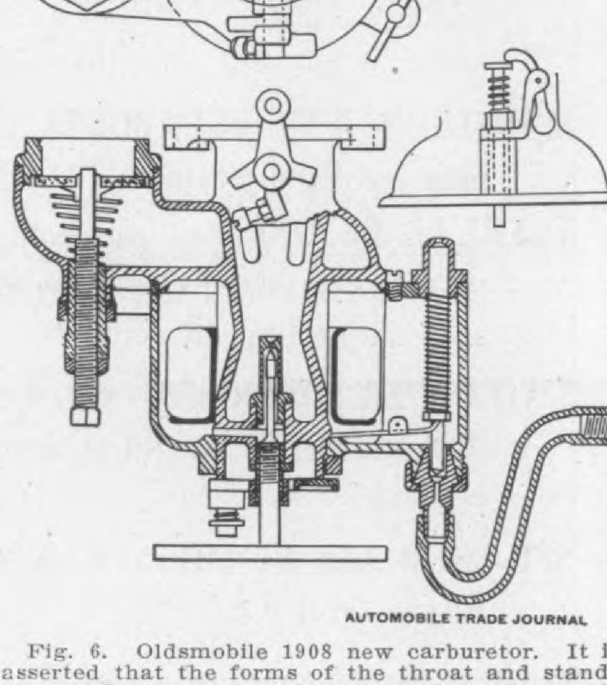

Fig. 6. Oldsmobile 1908 new carburetor. It asserted that the forms of the throat and stand pipe and the area and spring of auxiliary ai valve have been so perfectly proportioned tha the carburetor here shown gives a perfectly satis factory mixture at all motor speeds. It will b noted, however, that both the auxiliary valv spring compression and the needle valve positio are screw regulated, with cluck-nut retention.

Model Z is fitted with both magneto an storage battery current supply, with tw

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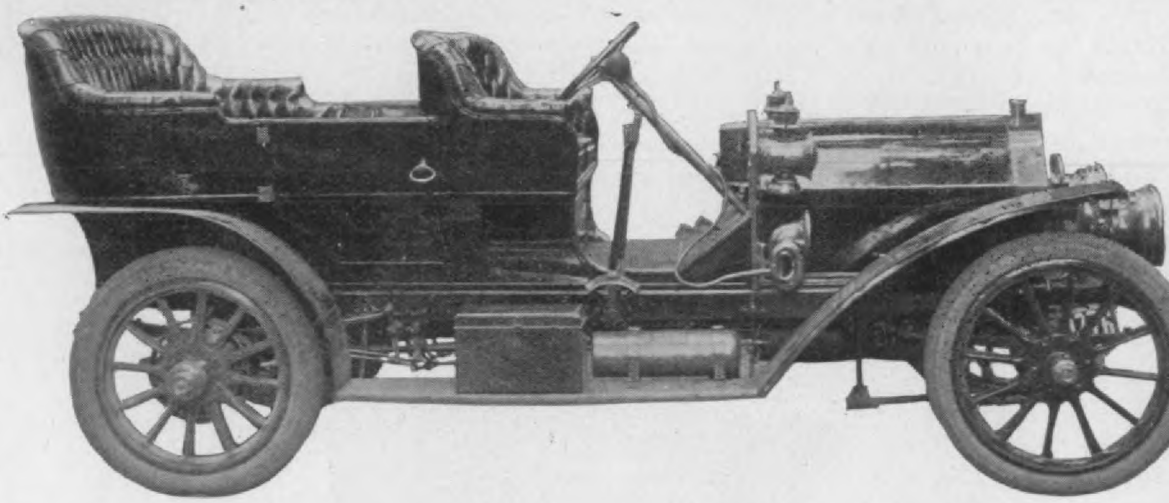
PENNSYLVANIA

50



¶ Embodying Chrome Nickel Steel, Annular Bearings, Aluminum Body. *Equal to the Best. Impossible to get better.*

$2800.00

FIFTY H. P.

¶ 4¾ x 5¼ valve in head. Hollow Crank, Eccentric Ring Oiling, Large Bearings, Perfectly Balanced.

Pennsylvania Auto Motor Co.

Bryn Mawr, Pennsylvania

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ifications.

SPRINGS.

or Model Z the front springs are semi-
tic, 40x2½ inches, and the rear, full-
tic 42x2½ inches. On Model M, the
t are semi-elliptic, 36x2¼ inches, and
rear, full-elliptic, 38x2¼ inches.
or Model X, front, semi-elliptic, 36x2
es; rear, semi-elliptic, 38x2¼ inches.
full-elliptic springs are fixt on top to
chassis frame brackets, and are
lutely mounted on the rear axles, and
length struts are fitted to the chassis
e brackets and have ball bearings at
rear and universal joints. The frames
Models Z and M are dropt and are
on top for Model X.
odels Z and M have exterior and in-
or rear-hub drum brakes, separate

STEERING AND CONTROL.

The steering gear is a multiple threa
screw on the lower end of the steerin
shaft in a trunion-nut journaled in boxe
sliding in the slotted arms of the glob
end steering bell crank, in all the 190
Oldsmobile models. The spark and thro
tle control in all cases is by ratchet r
tained hand levers on top of the steerin
wheel, with plunger accelerating peda
on the foot-board. All foot-boards hav
two large pedals, the left pedal disenga
ing the clutch only, while the right peda
applies the ordinary brake only.

There are in each model two outsid
hand-levers. The outer lever is pulle
backward to first disengage the clutch an
then apply the emergency brakes. Th
inside hand lever works the speed chang
All brakes are applied thru eveners.

1908 Holsman Limousine. This photo shows the latest model of the well known pioneer
h wheeler, No. 9, fitted with a closed body and storm curtains for winter use. The 1908
dels are similar in mechanical details to that of last year, the company stating that it finds
reason for making any change.

hitney Mfg. Co., Hartford, Conn., has
roved its facilities for 1908 and, as
chain sizes and styles are all well
blished, its 1908 improvements consist
in greater accuracy, better hardening,
roved materials, more rigid inspection

In this and the last five issues of th
Journal, about 60 1908 cars have been d
scribed, and as we have on hand a nun
ber of each of these issues, we offer t
start new subscriptions with the Jun
number, in which the first 1908 car d

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Announcement

For 1908 We Shall Have Four Distinctly GOOD Automobiles

1. The Model C Jackson, listing at $1250, a chain drive, two-cylinder touring car, 20-24 H. P.
2. The Model D Jackson, listing at $1500; a bevel-gear drive, two-cylinder touring car, 20-24 H. P.
3. The model E Jackson, listing at $2000; a bevel-gear drive, four-cylinder touring car, 35-40 H. P.
4. The Model E Jackson Runabout, listing at $2000; a bevel-gear drive, four-cylinder runabout, with rumble seat, 35 40 H P.

The Model C has a planetary transmission, the others have sliding gears, selective type; all have full elliptic springs, rear; every one of them is distinctively a leader in its class; all of them will certainly sustain the well-known reputation of Jackson cars for style, speed, power, and endurance.

"No sand too deep"
"No hill too steep"

Jackson Automobile Company

JACKSON, MICH.

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it would certainly be a serious mis- to do otherwise than follow the old- ioned advice "let well enough alone." hree distinct models of different power mechanical features are offered, els A, S and H. Model A is a 35 H. P. -cylinder car, the motor having 4½- bore and 5-inch stroke, cylinders cast airs with integral water jackets, three d and reverse sliding change speed , countershaft idle on direct 110-inch

18 H. P. The motor is 5-inch bore by inch stroke, and is located lengthwise u der the body, and drives by a two spee and reverse planetary, to a single cent chain. The wheel base is 92 inches, th body is large and will accommodate fi passengers. The same arrangement springs as on the other models is use The car is fitted with the same contro brakes and equipment, and sells for $125

On the four-cylinder models there are

1908 Moline 35 H. P. Model "A;" motor, four cylinders vertical, cylinders cast in pairs, -inch bore, 5-inch stroke, three speed and reverse, sliding gear; countershaft idle on direct ve; wheel base, 110 inches; tires, 34x4 inches; 40-inch cross semi-elliptic front spring and inch full elliptical springs at the rear, with scroll ends. The Moline sliding hood has been continued, and a folding hood of the usual type substituted in connection with a brass finished ular radiator. The equipment consists of two large acetylene gas lamps with generator, two are side oil lamps and one tail lamp, tool kit in canvas roll with oil gun and wheel puller; tire repair outfit and pump. Price, $2500.

el base, 34 by 4-inch tires, double es on the rear wheels, 40-inch cross -elliptic spring at the front, and at rear, two 42-inch full elliptics with ll ends. The car is shaft driven and ion is by jump spark. The price with equipment of two large acetylene gas s with generator, two square side oil s, one oil tail lamp, tool kit in can- roll with oil gun and wheel puller, tire ir outfit and pump, is $2500.

odel "S" has almost identically the e lines and general appearance as the er model, but is equipt with a four- nder water-cooled motor of 3⅞ by 4½ es, rated as 24 H. P., and the wheel is 100 inches, tires are 32 by 3½, and change speed gear is similar to model

few changes in the general appearanc most noticeable of which is the new hoo and radiator. For several years Moline car have had a distinguishing feature in th hood and radiator, which was after a de sign entirely original. It was so arrange that it would slide forward to uncover th motor. The construction was such tha the radiator was covered entirely by th hood, instead of standing out in front o it. For 1908 this well-known sliding hoo has been discontinued and the foldin type of hood substituted in its place. Thi construction requires the use of a differen style of radiator, which is finished in brass and stands outside the hood in front.

Another change in the four-cylinder car for 1908, which makes them decidedly mor

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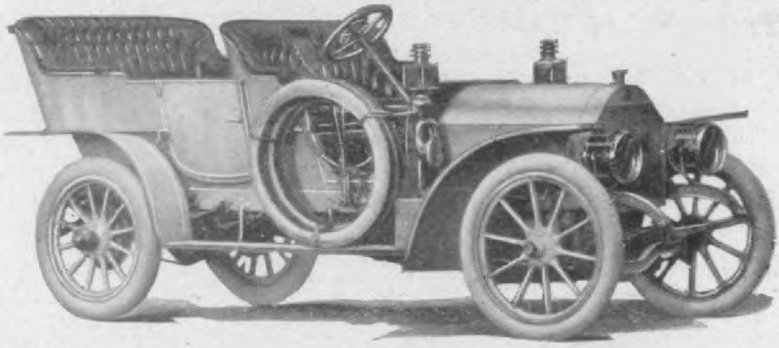
You're in Business for Big Sales--Good Profits --Delighted Patrons?

Then Get Busy With The Great

40-45 H. P. 1908

Cleveland

AT $3500!



As you value your success for the coming season and ensuing seasons as we don't fail to get next to this selling sensation of the coming year.

Be sure you learn our proposition for the coming season. Write in now. The look over this crackerjack car at the Grand Central Palace show, New York City October 24th, to October 31st,—after *that*, after you see the new Cleveland, we leave it to you whether or not you can afford not to handle this triumphant car.

We hope you read the detailed specifications of this 40-45 H. P. model in th October number of this publication. If you didn't, it is well worth your while to tu back and read them through. We again desire to call your special attention to th following features: Ignition, lubrication, transmission, brakes and ratchet-sprag.

And don't forget that the 1908 Cleveland Chassis is distinctly our own product.

Ask For Our Sales Manager, At The Cleveland Exhibit At The Grand Central Palace Show, For Agency Rig

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THE CLEVELAND MOTOR CAR CO.

e body, and as a whole they effect a decided improvement in the general ırance.

addition to the changes in the general ior appearance of the four-cylinder there are numerous changes of small ls in the construction of the motors. e are of a nature that might seem in- ficant were they to be enumerated in out the result is that the motors show power, and are very much more quiet smooth running.

e two-cylinder car for 1908 is con- d in exactly the same style, and at ame price as offered for 1907. The ss of this car has been phenomenal the start. It is exceedingly well after a design that has been proven ct. The company claims this car has e power for the weight, exceptionally riding springs, and positively the somset body in the two-cylinder field e present time.

The 1908 Iroquois Cars

e Iroquois Motor Vehicle Co., of ca Falls, N. Y., offer for 1908 two cylinder models, known as Types D C.

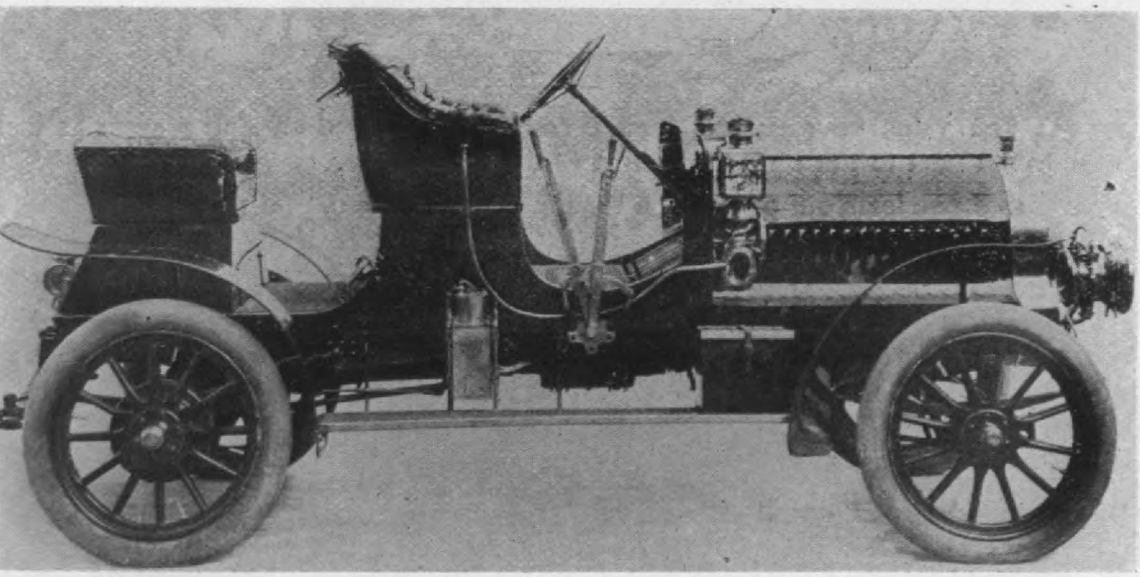
e larger model, D, has a four-cylinder cal water-cooled motor with cylinders in pairs, bore 5-inch and stroke 5- rated at 45 H. P. at 1200 r. p. m. The inside the engine are all held by channel steel. The front springs are full elliptic and the rear, platform. The body is King of Belgium type. The equipment consists of two side oil lamps, one rear oil lamp, two headlights, one generator, clock, French horn and full set of tools. The car sells with this equipment for $3000.

The 30 H. P. type C car, is fitted with a removable tonneau and a chauffeur's seat as shown in the accompanying illustration, is furnished and can be quickly attacht. The general arrangement and construction is the same as in the larger car, but the motor is 4½, instead of 5 inches bore, with the same stroke of 5 inches as the other model. This car has 32 by 4-inch tires, instead of 34 by 4-inch. The speed ratio is 3½ to 1, while on the larger car it is 3 to 1. The equipment is the same as the other model.

The New Pope-Waverly Models

The Pope Motor Car Company, of Indianapolis, Ind., has just brought out two new electric models, namely, 70-C a Victoria Phaeton with removable coupe top and model 71 Runabout.

Balance, trimness and proportion are the distinguishing features of Model 71. The old style box pattern body has been done away with. The battery is so distributed and the slight projection in front of the dash is so proportioned to that in



"Iroquois" type "C," 30 H. P. furnished with a detachable King of Belgium ton-, and a rumble seat to take its place as shown. Motor four vertical water-cooled cylinders in pairs, jump spark ignition from storage battery, expanding clutch, three speed change, full elliptic springs at the front and platform at the rear.

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nbia lock nuts. The valves are on the rear as to give an appearance of

The Wonder *of the* Palace Show

One of the Notable Surprises of the Automobile Year has been

This car has a Conservative Rating of forty-five horse-power.

Seats Seven Passengers.

Double Ignition.

36″ Wheels –126″ Wheel-base.

Chrome-nickel Gears, Hess-Bright Bearings.

Irreversible Steering Gear, Acme Special Carburetor.

Full Equipment—Including Acetylene Generator.

And Sells for Forty-Five Hundred Dollars
The Best of the Sixes

The Acme Motor Car Company

A few agencies are still open

READING, PA.

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t of the dash and so placed as to be ected by the fender from the mud dust so freely scattered about by the ard tires.

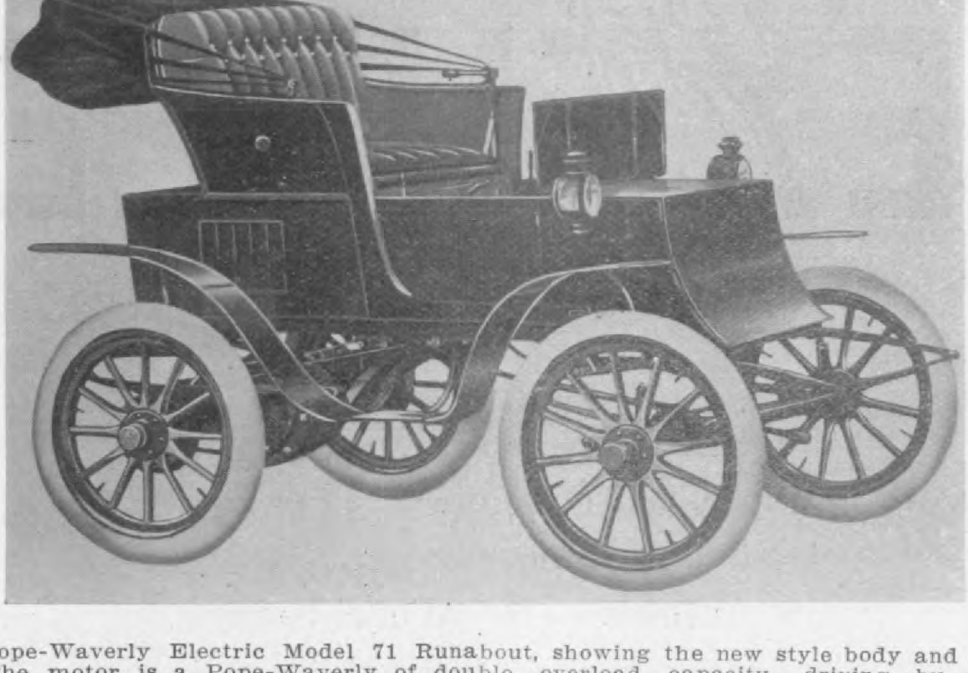
he body has a length of 6 feet 9 in-; the wheel base is 5 feet 9 inches, the width of seat, inside measurement, 3 inches; tread, 4 feet 6 inches.

he body and panels are black, while recessed panels are pale English prim-, while the gear and wheels are prim- yellow with black striping.

he upholstering is hand-buffed dark n leather. The top is straight-grained, d-buffed full leather. Leather side ains, oval windows, Brewster buttons, dust cover are also fitted.

or distinguishing feature of the origin Victoria Phaeton body has been sacr ficed in the new model, which is the r sult of this demand. The curved floo and sill of the rounded doorway give comfortable position to the feet and th best possible protection for a lady's skirt The addition of a child's seat, which ca be concealed beneath the floor board, one of those happy contrivances that ad to the comfort and usefulness of the veh cle without in any way marring its beaut

The heavy plate glass windows may b raised or lowered at will in the door and the front and rear windows swin inward, producing perfect ventilation. Th doors may be locked securely for the pr



1908 Pope-Waverly Electric Model 71 Runabout, showing the new style body and continuous ders. The motor is a Pope-Waverly of double overload capacity, driving by means of eless herring bone gearing running in oil. The battery is 30 cells, 9 P. V. Exide at 9 C. B. ional arranged with 10 cells in front and 20 in the rear. The price without top is $1425, with leather top $1500.

e wheels are wood, fitted with, front -inch, rear 30x3½-inch G and J de- able tires. A special Pope-Waverly r of double overload capacity is used. eless "herring bone" gearing, running il, and protected in dust-proof cases, used. A speed of five to seventeen s is claimed.

combination volt meter and ammeter ocated on the floor. Steering is by lever, and there are two foot brakes one electric brake. The battery con- of 30 cells 9 P. V. Exide or 9 C. B. onal arranged with 10 cells in the front partment and 20 cells in the rear. price without top is $1425 and with

tection of valuables. Finish, upholster ing, and hardware leave nothing to b desired by the most fastidious. All th features of a substantial and well-buil family coupe are preserved, while—an here is the marvel—the entire top is eas ily removable, and may be changed whe desired for a graceful leather hood an dash of the Victoria pattern; or the ca riage may be used without a top of an kind, the symmetry and completeness o each special type being in no way vio lated by its interchangeable features.

The body has a length of 7 feet 5 in ches, and a wheel base of 5 feet 8 inches width of seat, inside measurements

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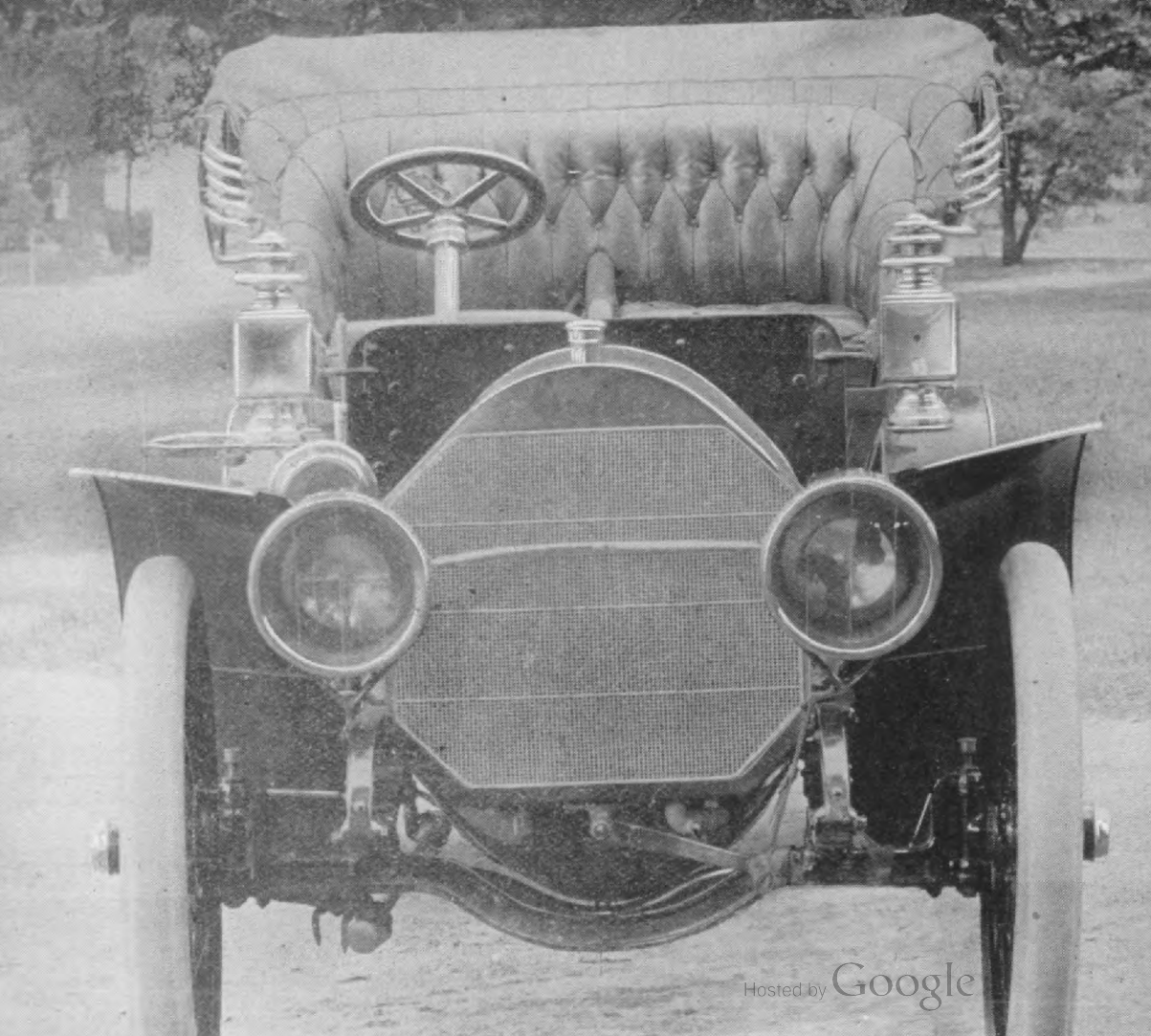
Locomobile

THE MOST RELIABLE AMERICAN CAR

The New 1908, Type "I" Car 40 H.P.
Four Speeds, Selective;
36-Inch Wheels; 7-Passenger,
$4750. - Top Extra
Other Models $2900. Up.

The *Locomobile* Co. of America, Bridgeport Conn.
A. L. A. M.



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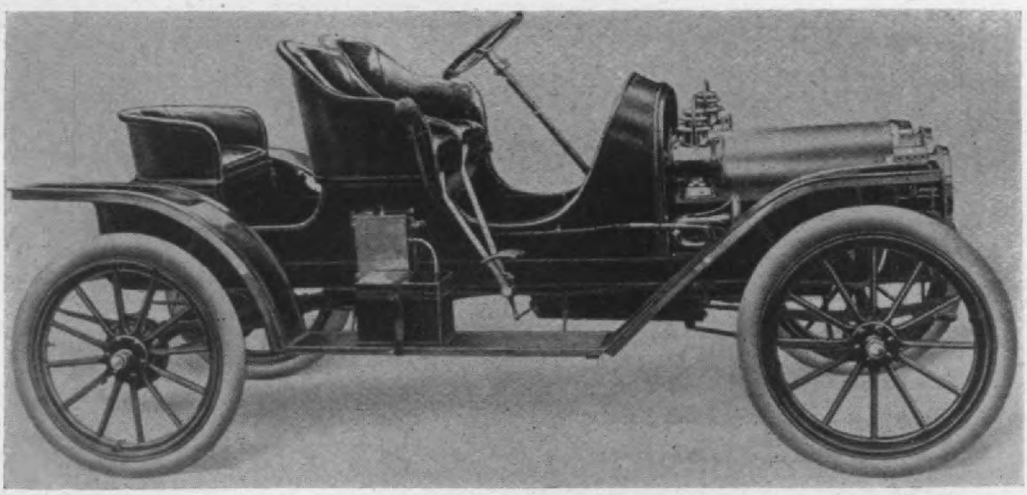
with 30x4-inch G and J detachable

.

ie motor is the same as in the other el, and the gearing is also the same.

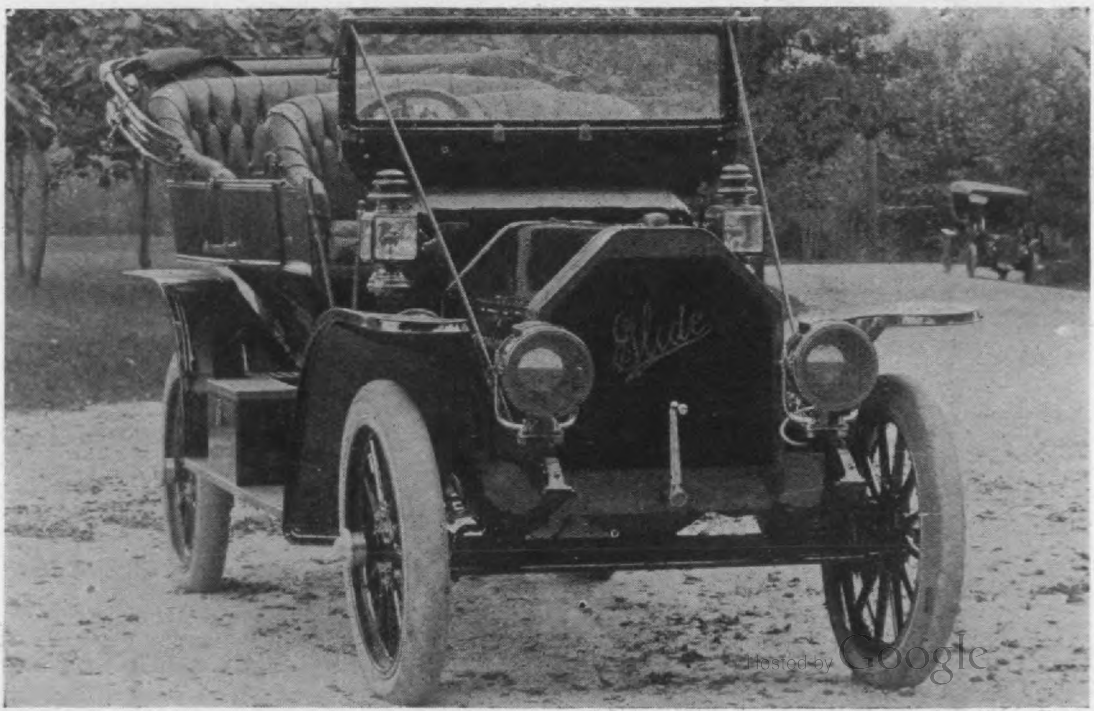
altho minor improvements have been mad no radical departure from 1907 designs wi be shown.



The 1908 Model 8 Cameron. Four-cylinder, air-cooled engine. Rear axle change speed gear peculiar design (described November, 1906, issue, page 136, gives three speeds forward, all ; direct. In coasting with the gears in neu tral the rear axle turns free.

foot brakes and one electric brake fitted. The batteries consist of 30 11 P. V. or 11 C. B. National ar- ed with 10 cells in the front com- ment and 20 cell in the rear compart- t. Continuous fenders as shown are on both models. The price with re- able coupe top is $1900, with leather $1700 with both $2000, and without $1600.

Both cars are light weight air-coole machines of the runabout type, the me chanism of which was described in ou November, 1906 issue, page 136. Mode 6 is a two-passenger car, while model herewith shown is provided with a rumbl seat. Light weight, a four-cylinder ai cooled engine and a patented rear axl transmission direct on all speeds are th important features.



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Ohio, for the season of 1908 are higher powered, larger and roomier, but are characterized by few changes as compared with previous models, the principal changes being: a larger wheel base, seven-passenger body, location of front axle further front, 36-inch wheels, flat springs and a double ignition system, including a magneto. A new 6-cylinder model has also been added. Three standard models will be marketed, Models 18, 15 and 20. The model 15 for 1908 will be precisely the same as the 1907 model 15. This seven-passenger car is rated as 45 horse-power. The motor has four cylinders cast in pairs with cylinder dimensions of 5½x5¾ inches. The wheel base is 119 inches, and the same double ignition system used on model 18 will be supplied.

easier and more certain removal of sand. The cylinders are cast in pairs offset intake and exhaust valves on o site sides. The water-jacket plates ar made in copper instead of aluminum. cylinders are carefully bored, reamed ground, then lapped out with a spe polishing preparation with piston rings in place.

CRANK CASE.

The crank case proper is a single al num casting, designed for strength non-leakage of oil. Easy access to necting rods and bearings is provided the bottom of the crank case by m of hand-hole plates. These plates fitted with a deep recess or groove, which the dirt and sediment from the deposits. By the removal of a plug i

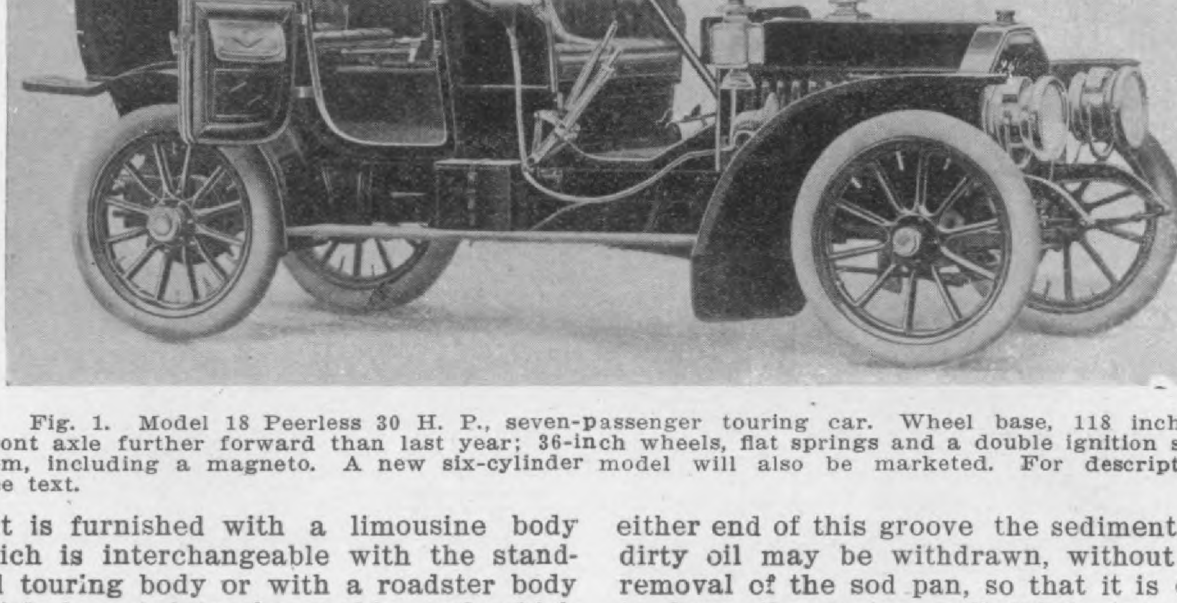

Fig. 1. Model 18 Peerless 30 H. P., seven-passenger touring car. Wheel base, 118 inch front axle further forward than last year; 36-inch wheels, flat springs and a double ignition s tem, including a magneto. A new six-cylinder model will also be marketed. For descript see text.

It is furnished with a limousine body which is interchangeable with the standard touring body or with a roadster body which is not interchangeable, and which does not fit on the chassis used for the touring car. Thirty-six inch wheels, artillery type, with dished spokes are used, and are equipt with four-inch tires on the front wheels and 4½-inch on the rear.

Model 18 is a 4-cylinder, 30 H. P. car, the cylinders being 4⅞x5½ inches. The wheel base is 118 inches. The model 20 is an entirely new 6-cylinder creation for seven passengers. The cylinder dimensions are 4⅞x5½, and the A. L. A. M. rating gives 57 H. P. This car is fitted either as a touring car or a roadster, and sells for $6000. The same general construction will be used as on the other models. The wheel base is 133 inches and tread stand-

either end of this groove the sediment dirty oil may be withdrawn, without removal of the sod pan, so that it is to keep the motor well lubricated clean oil.

THE CRANK SHAFT.

The crank shaft is a solid drop forg specially treated, hardened and gro accurately to size. The front bearin fitted with a stuffing-box to prevent l age of oil. All gears, including half-t pump and magneto gears, are housed compartment in front of the motor run in oil. This not only minimizes w but prevents noise.

Both intake and exhaust valves are seated, mechanically operated and i changeable. Made of a special alloy ported valve steel, the same as they l used for the past two years, and adj

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float feed automatic carburetor is
The throttle is controlled by hand
on steering wheel, by foot accelera-
pedal and by a governor. The Peer-
governor maintains any desired rate
otor speed, practically irrespective of
oad or grade.

IGNITION.

e ignition system includes the same
commutator and a single battery, as
on the 1907 cars. In addition to this,
entirely separate, is the Eisemann
ch type, low-tension magneto. All
s are connected with their terminals
spring attachment, so that there are
umb nuts to release. The wires can
etached and the magneto entirely re-

from the half-time gears, and no belts or pulleys are used.

Radiator has been set back five inches and is now directly over the front axle and the same design will be used on the model 18.

CLUTCH AND CHANGE SPEED GEAR.

An internal expanding clutch which engages smoothly and is very light in weight is used. It is easily adjusted to compensate for wear, the only tool necessary being a screwdriver or a pair of pliers. The clutch can be taken out complete, without removal of sod pan or disturbing either motor or transmission, as a short removable shaft with two universal joints connects the clutch with the transmission.

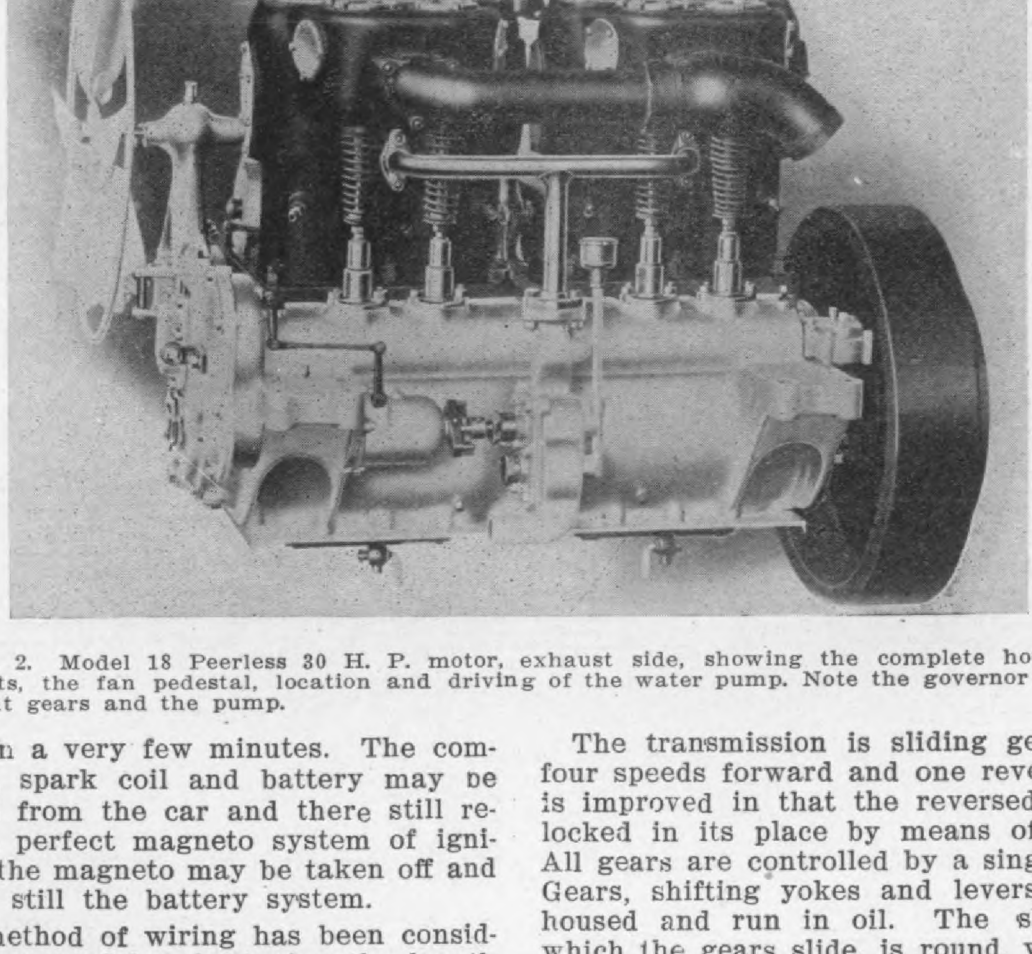

Fig. 2. Model 18 Peerless 30 H. P. motor, exhaust side, showing the complete housing of parts, the fan pedestal, location and driving of the water pump. Note the governor between front gears and the pump.

ed in a very few minutes. The com-
tor, spark coil and battery may be
oved from the car and there still re-
s a perfect magneto system of igni-
or the magneto may be taken off and
e is still the battery system.

e method of wiring has been consid-
ly improved by shortening the length
e wires.

e commutator is located on the right
of the motor on a level with the top
between the cylinders.

e oiler has been improved, so as to

The transmission is sliding gear, with four speeds forward and one reverse, and is improved in that the reversed gear is locked in its place by means of a cam. All gears are controlled by a single lever. Gears, shifting yokes and levers are all housed and run in oil. The shaft, on which the gears slide, is round, with four keys instead of square. Imported ball bearings of large diameter, oiled from the outside, instead of receiving their lubrication from the oil used in the gear case which might contain metal particles injurious to the bearings, are used. Al

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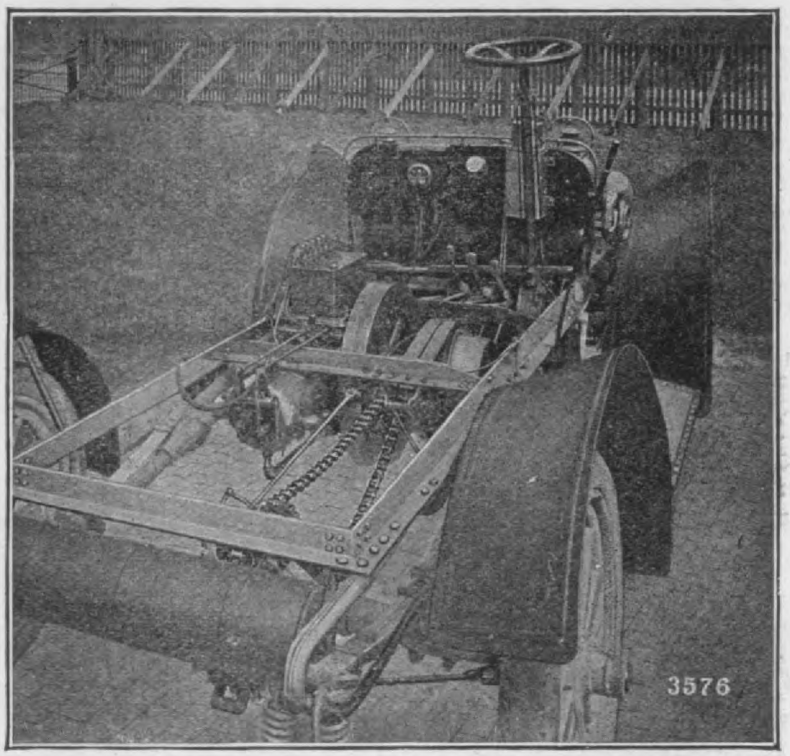
"40,000 Miles—3 Years'
Constant, Efficient Service"



Chassis of American-Made Car—Renold Chain Transmission.

Renold Roller Chain

supreme abroad—where it originated—popular here—where it duplicates the service given to thousands of foreign cars.

"If your car has a Renold it wins."

LINK BELT COMPANY

Exclusive Sales Agents

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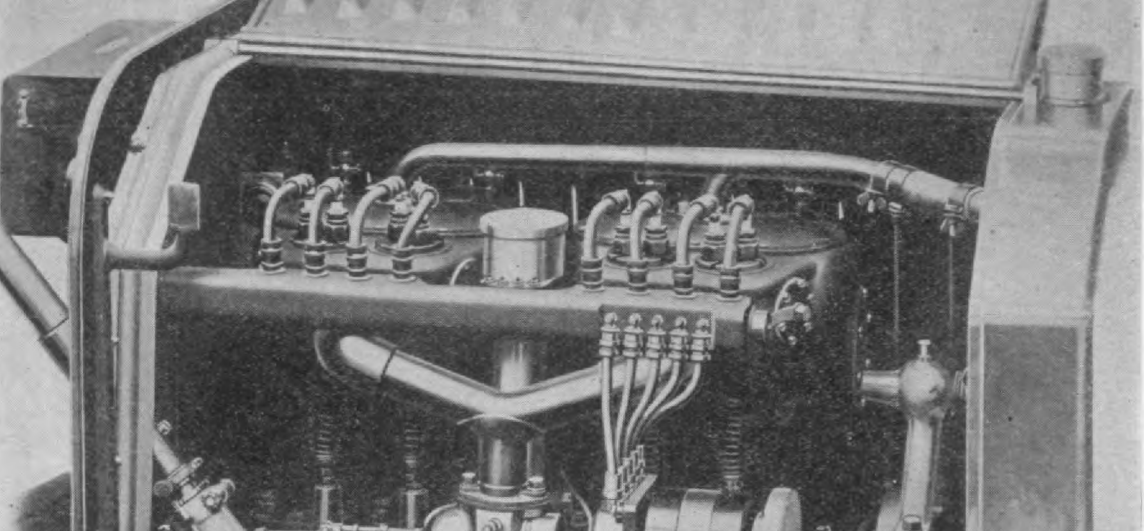
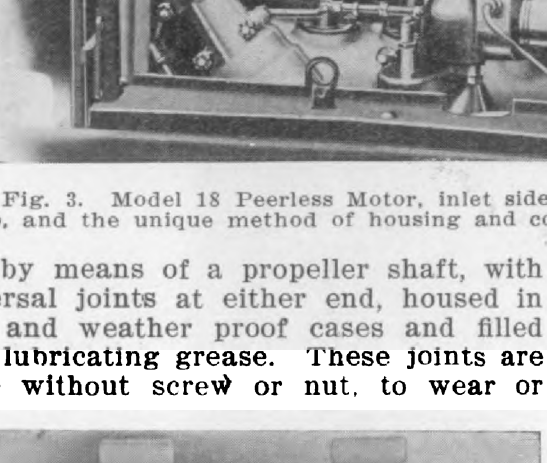


Fig. 3. Model 18 Peerless Motor, inlet side, showing the location of the carburetor and mag-, and the unique method of housing and connecting the double system of wires.

by means of a propeller shaft, with rsal joints at either end, housed in and weather proof cases and filled lubricating grease. These joints are without screw or nut, to wear or



4. New Peerless Change Gear, showing winging arm with the clash reverse gear end, which when in place can be locked. ears run in oil, but the annular ball bear- re specially lubricated with clean oil from e.

me loosened. All driving parts of the axle have been increased in dimen- and are now made from imported nanganese steel stock, which the

REAR AXLE CONSTRUCTION.

A live axle shaft operates in a 2½-inch tube, which supports the weight of the car. The bevel and differential gears are situated in the center of the axle, and housed in a grease packed cast steel casing. On each side of the driving gears and connecting with the live axle are universal joints, which take up all strain on the axle and prevent any binding of the gears. These universal joints in the live axle make a strong arched construction possible, and also permit dishing the rear wheels two degrees, the same as the front wheels. The wheels are carried on the stationary axle tubes on imported ball bearings of extra large size. The main bearing for the pinion gear is of extra large size, and is easily taken out with the pinion complete.

Distance rods which take the driving stresses run from the frame to rear axle on either side and are adjustable by means of a turn-buckle, and a torque rod is used from the differential casing to a spring bracket, attached to a cross member of the frame.

The front axle is a solid one-piece drop forging of I-beam section, the spring saddles being forged integral with the axle. The center of the front axle is the lowest part of the car. The steering knuckles in the axle yokes are fitted with special imported ball-bearings of large size and an improved oiling arrangement.

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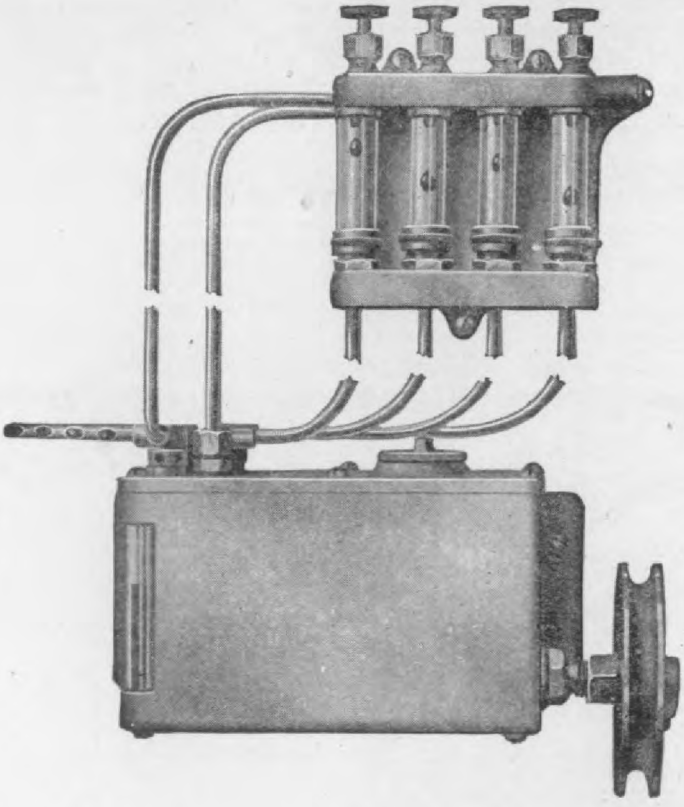
THE SHERWOOD

Force Sight Feed Mechanical Oile

The correct and most satisfactory method of lubricating

For All Style Gasoline Engines



Set of Sight Feeds and Pump Reservoir separate so that each can be located at most convenient point. Can be furnished with any number of feeds required.

Simple in construction—Feed Positive, Uniform and Reliable.

In All Respects the Best

MANUFACTURED BY

THE SHERWOOD MANUFACTURING CO., Buffalo, N.Y.

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ls.

justable bearings of imported design ⅜-inch balls are placed above and the sector. Two sets of brakes are to the rear wheels. The internal es are 12½ inches in diameter of ze, and the external contracting band es are 13 inches in diameter of l's hair belting. The internal bands 2½-inch face.

THE FRAME.

e drop trussed frame of cold rolled will be continued in use on all 1908 ls. This feature was first used on l 15 of 1906. The dropping amounts o and one-half inches, just in front e rear axle, which carries the center avity of the car and load nearer the d, without interfering with the road ance and brings the whole driving anism in alignment.

tonneau longer and more spacious than last year. The standard body is built to carry seven people comfortably. Small seats of folding type are used, which are practical and comfortable. These may be folded against the side when not required for use and are easily removable when it is desired to use the car for five passengers only.

The standard color will be maroon with light red running gear, altho other color combinations will be furnished when ordered.

MODEL 18.

Frame—Length of frame over all, 155½ in.; length of sub-frame, 79⅜ in.; length back of dash to end of side channel, 100 in.; length forward to dash to end of side channel, 35½ in.; height from ground to top of frame, 25 in.; thickness of frame

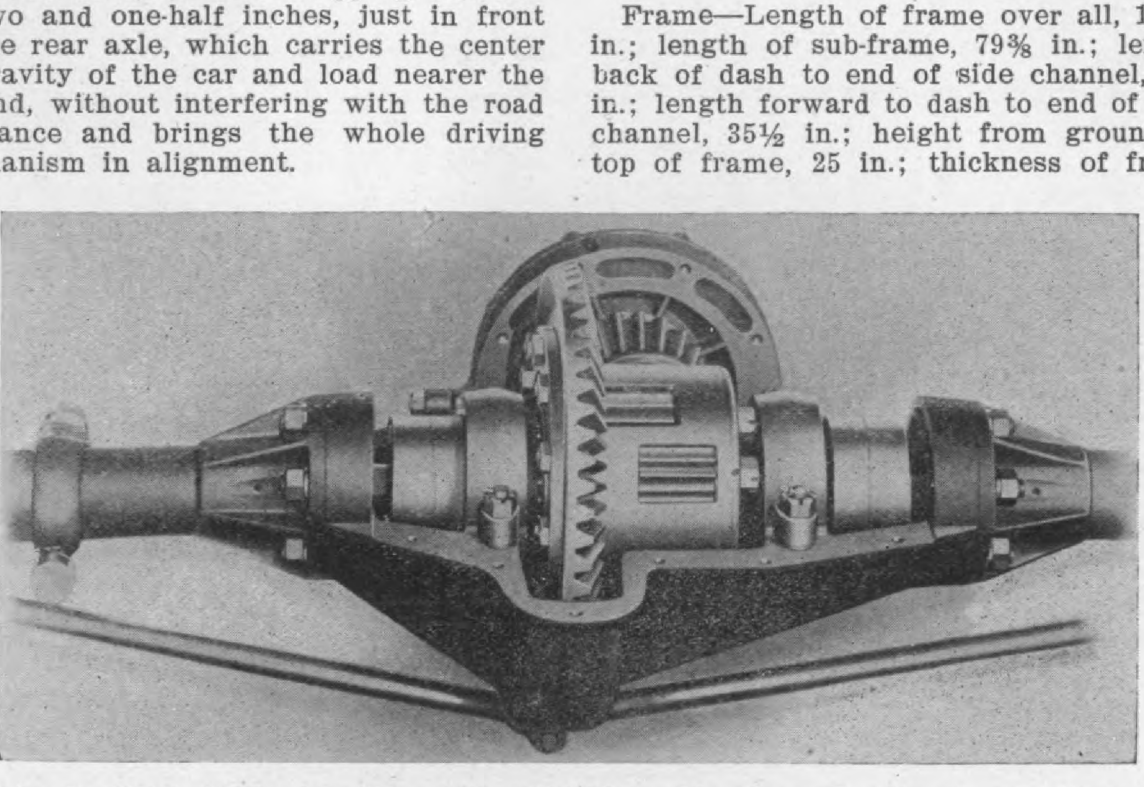

Fig. 5. Model 18 Peerless Rear Axle and Differential. On each side of the differential ected to the driving shafts are universal joints, which prevent any binding and allow an ed rear axle housing, which is very strong, and also the dishing of the rear wheels two de- s, the same as the front wheels. Imported annular ball bearings of large size are used; pinion gear and its large bearing are arranged to be removed together. The axle is further gthened by a turnbuckled truss rod.

e springs are made by Lemoine of ce of silico-manganese steel. Both front and rear platform springs are r and flatter than those used on the models. The front are 40 inches by hes wide, the side rear springs are inches by 2¼ inches, and the rear spring is 38½ inches by 2¼ inches. prings are banded and the spring eyes ushed and fitted with oil cups.

irty-six inch wheels, artillery type, dished spokes, are used, both front rear. Four-inch clincher tires are on the front wheels and four and one-inch on the rear, and the fender de-

steel, 8 U. S. S. Gauge, 11-64 in.; depth of side channel, 4½ in.; wheel base, 118 in.; clearance flywheel, 10 in.

Motor—Number of cylinders, 4; bore, 4⅞ in.; stroke, 5½ in.; valve action, mechanical; number piston rings, 4; order of firing, 1, 2, 4, 3; type of clutch, internal expanding ring; width of leather on clutch face, 3 in.; diameter of clutch drum on flywheel, 12 in.

Brakes—Number of brakes, four—2 external—2 internal; diameter of internal brake band, 12½ in. bronze; diameter of external brake band, 13 in. camel's hair; width of face internal brake band, 2½ in.

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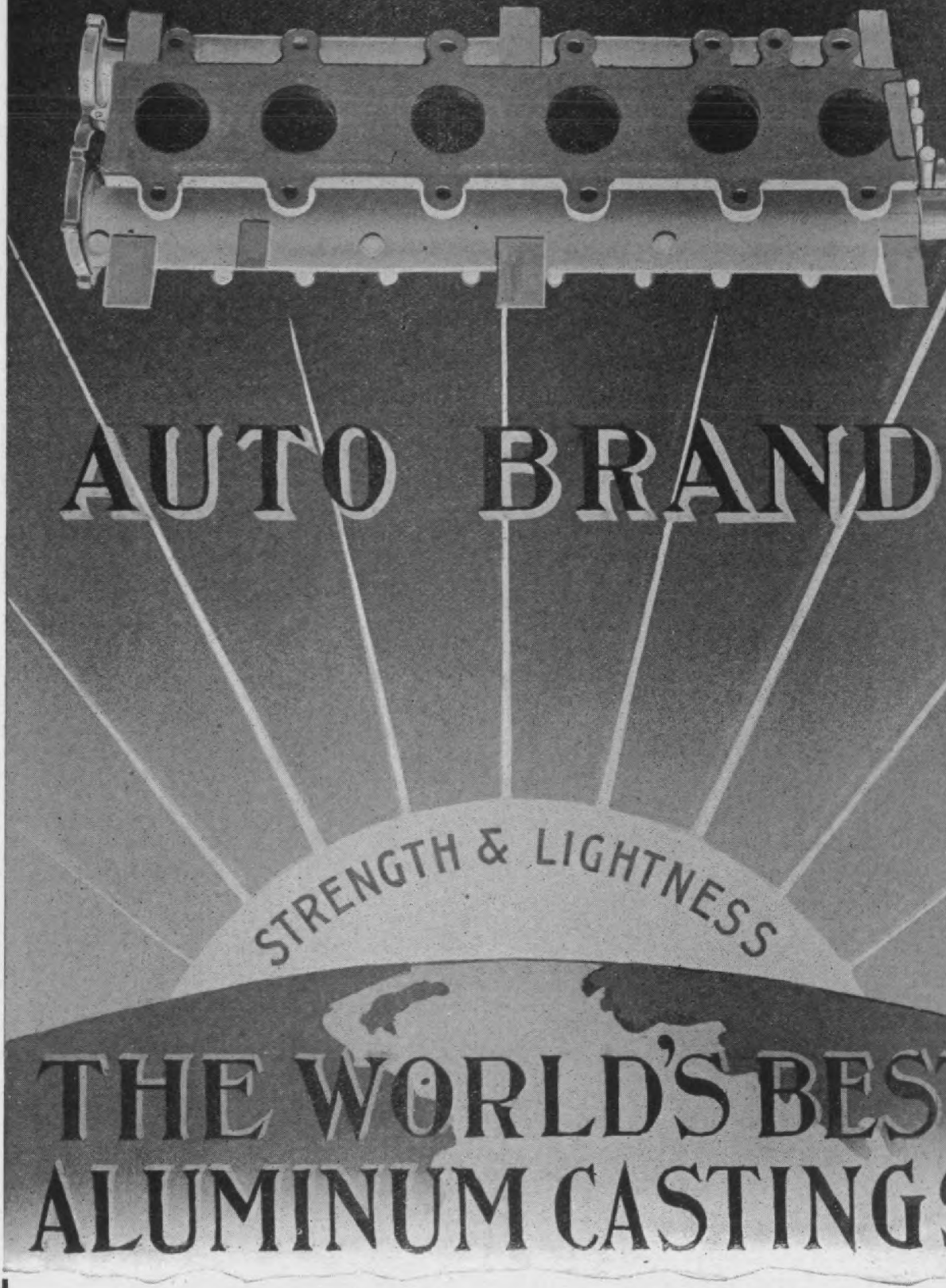

For Automobile and Motor Boat Construction they are Unsurpass

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policy of offering medium powered, erately priced cars of thoroly sound gn, fine finish and elegant appear-

the plant value and floor space being doubled in 1906, and again doubled in 1907. These 1907 Mitchell factory additions are steel beam reinforced concrete walls, with

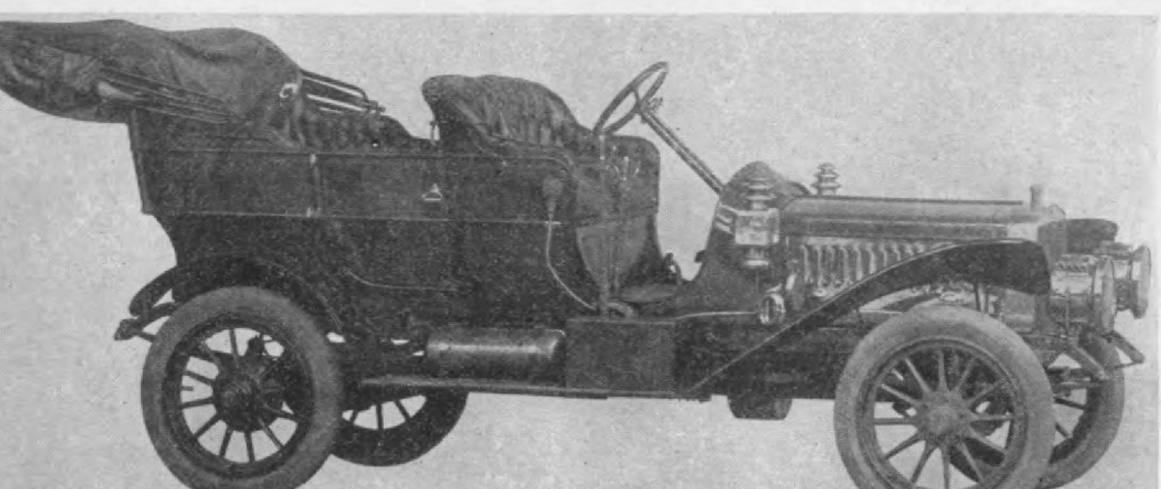

Fig. 1. Mitchell 1908, 5-passenger touring car. Wheel base, 112 inches; gage, 56 inches; , all 32x4 inches; motor, 4, 4-cycle, water-cooled, 4½x5 inch cylinders, 35 B. H. P. at 1100 P. M.; weight, 2400 pounds. This car weighs about 2280 pounds, tanks empty, smallest equipt. Price, $2000. Lamp brackets and top irons fitted. Mats and tools are included, but the ps, acetylene gas tank, horn and cape top are all extras.

e growth of the Mitchell factory and ncrease of output has been something rkable, even for the motor car indusvhich as is well known, has advanced a rapidity never excelled by any new anical production.

concrete single floors, skylighted, about 90,000 square feet of floor increase, with at least $250,000 in value of new machinery added. These increased factory facilities permit the company to work 1,000 hands to advantage, and to build the entire car,

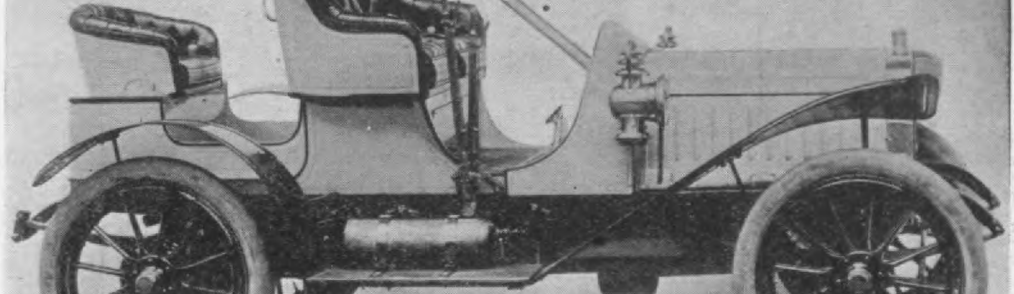

Fig. 2. Mitchell 1908, 3-passenger runabout; wheel base, 92 inches; gage, 56 inches; tires, 32x3½ inches; motor, 4, water-cooled, 4-cycle, 4x4 inch cylinders; 20 B. H. P. at 950 R. P. veight, 1700 pounds. Price, $1250, including top irons, lamp brackets, mat and tools only. ps, gas tank, horn and top are extras.

e first Mitchell car, driven by a sinylinder, 2-cycle, water-cooled motor, placed on the road in 1902, was a assenger runabout, price $850, and 18 ese cars were made and sold in that

except tires, wheels and electrical equipment, in its own shops.

THE MITCHELL 1908 LINE.

The company will offer three 1908 passenger models, all changed in important

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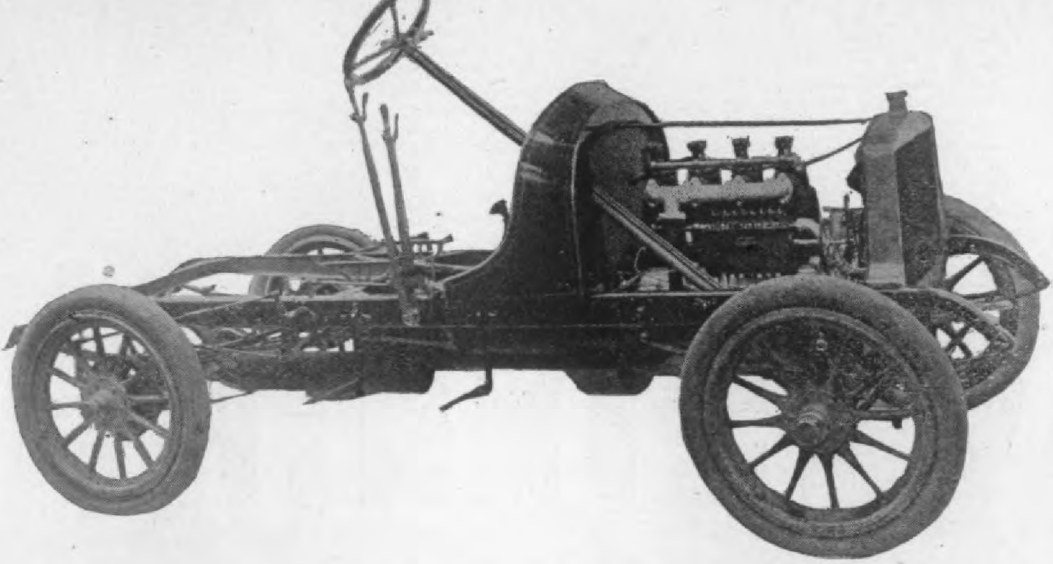
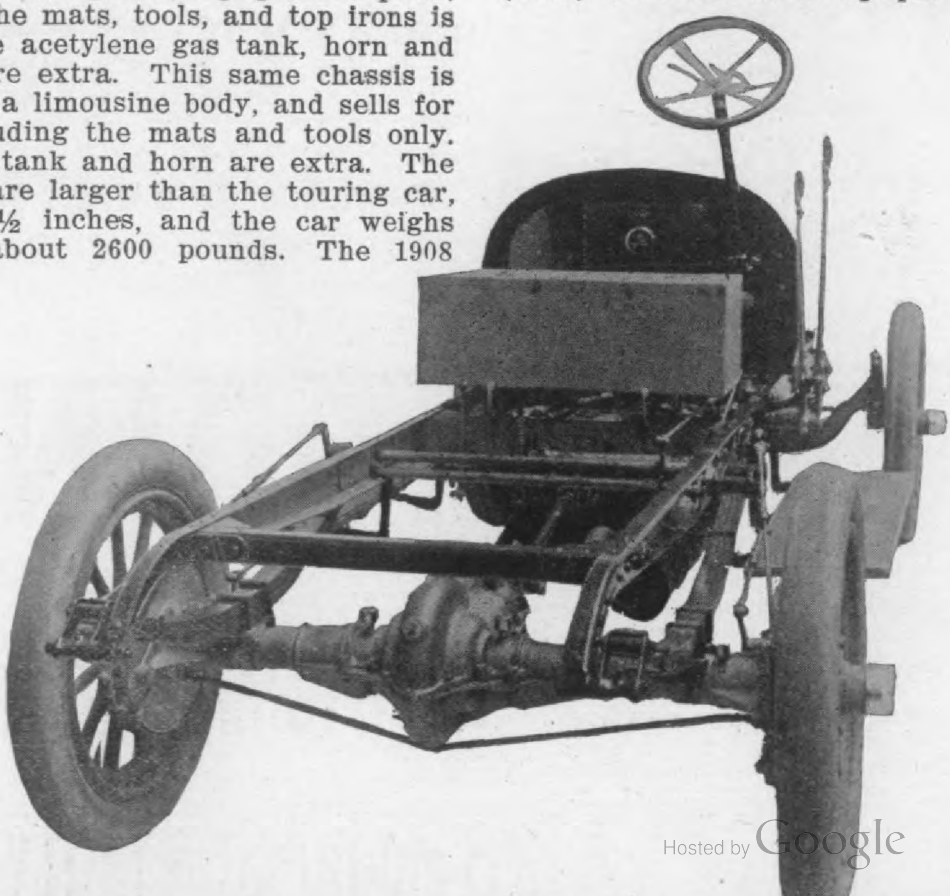


Fig. 3 Mitchell 1908 Runabout Chassis, side elevation. Note the rake of the steering post and the location of th er. All brakes are on the rear wheels, there being no line shaft brakes. Fiber facing is used and the drums whic re 9 inches in 1907 have been increased to 10½ inches for 1908.

n Fig. 1 is illustrated the 1908 five-pas- ger touring car, the wheel base of ch is 112 inches, and gage 56. The s are all 32x4 inches. The motor is r, four-cycle cylinders, water-cooled, 4½ inches, and shows 35 B. H. P. at 1100 P. M. The car empty weighs 2280 lbs., 2400 lbs. completely equipt. The price, uding the mats, tools, and top irons is 00. The acetylene gas tank, horn and e top are extra. This same chassis is ed with a limousine body, and sells for 00, including the mats and tools only. np, gas tank and horn are extra. The r tires are larger than the touring car, ng 32x4½ inches, and the car weighs plete about 2600 pounds. The 1908 developing 20 B. H. P. at 950 R. P. M. weighs 1700 pounds, and sells for $125 including top irons, lamp brackets, ma and tools. The lamps, gas tank, horn a top are extra. On this same chassis t well-known two-passenger body is fitte the car weighing the same, and selling f $1000, with the same equipment.



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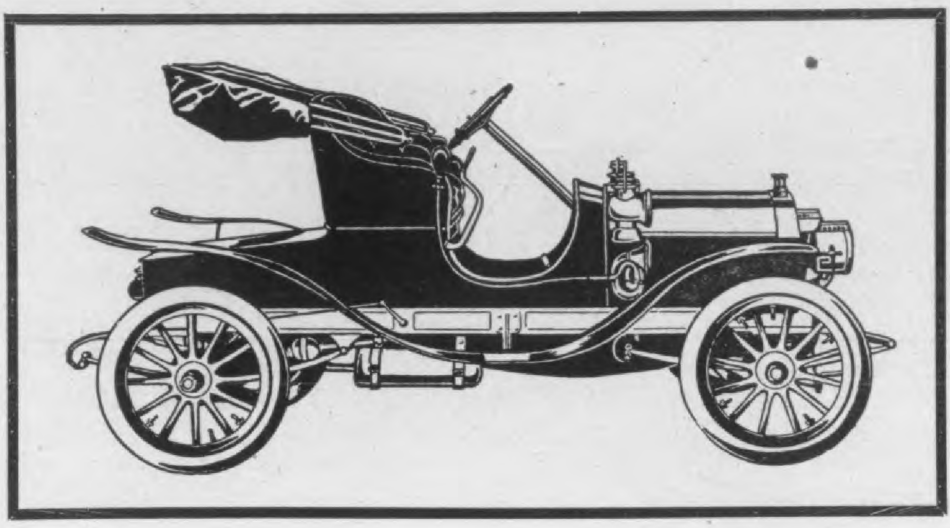
Agents .. Speak Quick!



The Atlas

Famous 20hp. Runabout.
Rumble-Seat 30hp. Runabout.
Luxurious 40hp. Touring Car.

Equipped with the motor-marvel of the age, in units of 2, 3 and 4 cylinders.

These motors embody *absolutely all* the successful and desirable features of the best 4, 6, and 8 cylinder automobile engines, with ONLY ONE-TENTH as many moving parts.

All cars equipped with finest aluminum bodies.

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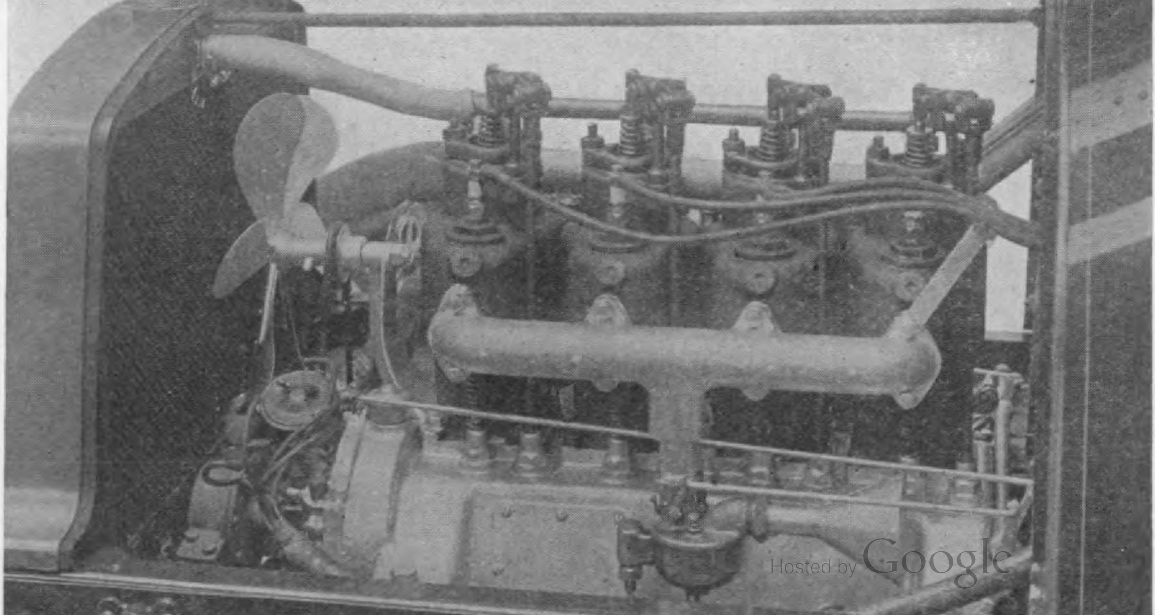
Atlas Motor Car Co.

Fig. 5. Right side of the Mitchell 1908 motor, in place in the car. The 1908 motor change e specified in the text of this story.

THE MITCHELL 1908 CHANGES.

'he Mitchell Company has now estab- ıed forms of cars which, while marked no wide or peculiar divergencies from erally sanctioned practice, yet embody ıy special features in details, and have consistent general economy of design ch insures a moderate production cost h sufficient individuality to give them nechanical distinction of their own, so t they are readily recognized and meet both the price and quality demands of large class of purchasers.

The 1908 changes take the form of be terments almost exclusively, rather tha notable changes. The principal 19 Mitchell car variations include an increa of the wheel base of each passeng chassis; the touring car, 108 inches whe base for 1907 is made 112 inches for 190 The runabout chassis, 90 inches wheel ba for 1907 is 92 inches for 1908. The whee



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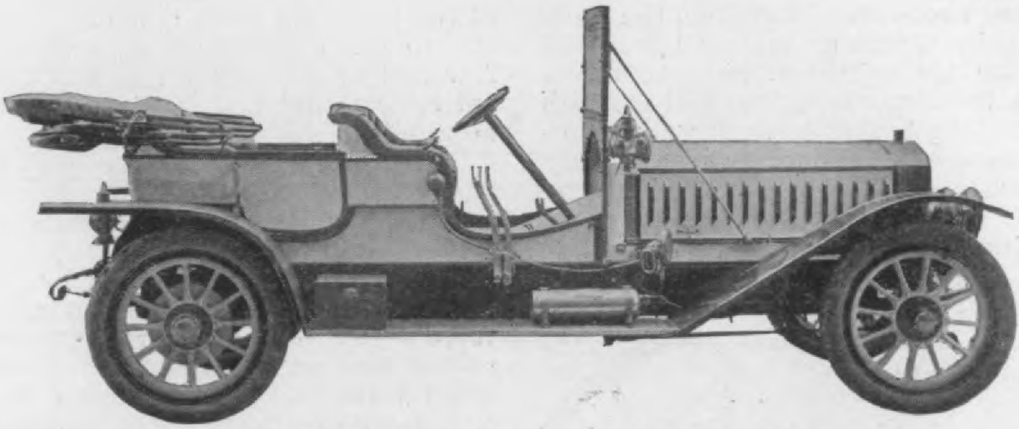
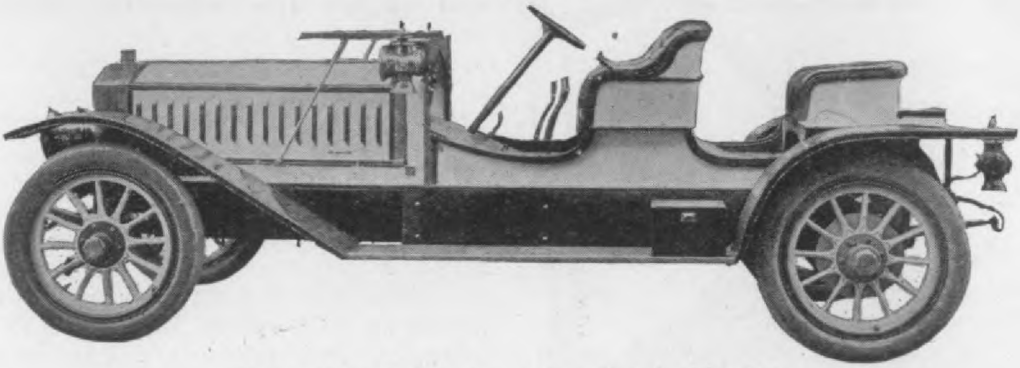
1908 Austin Models



6 Cylinder Austin, 90 H. P.



6 Cylinder Austin, 90 H. P.

The 1908 Austin Models are designed to exactly meet my own personal require ments after 6 years of building high grade cars, and to fulfill the ideas of that class o owners who want the "sportiest" kind of a car it is possible to get with *all* the powe and speed they can possibly use—a car that is either a touring car or a runabout capa ble of making a 1000 mile trip any time, and will beat anything on the road.

Our 6 cylinder 90 h. p. model is my idea of such a car—and I believe it stand today without an equal in the Automobile world at any price.

Our new combination body as a touring car has an extra folding footboar chauffeur's seat. The tonneau seat can be replaced in 3 minutes by a rumble seat thus converting the car into a runabout of the very latest design.

The equipment is complete in every respect, and includes both seats, and extensio surrey top for the touring car, and single top for the runabout. We also furnish thi new combination body on our regular 60 h. p. model in place of 7 passenger tourin body. This regular standard body, either with or without detachable limousine top will be furnished on both 60 and 90 h. p. models.

All Austin cars have the celebrated Austin Motor and are built in our own shop under my personal supervision.

Send for Catalogue and detailed information about our new models.

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WALTER S. AUSTIN Austin Automobile Co

7 are 10½ inches for 1908. The Mitchell s use external and internal rear hub m brakes only, no line-shaft brakes, all brake shoes, both external and in-nal, are fiber-faced, making the sub-ntial brake diameter increase for 1908 hly important as the fibre-faced brake e must have ample diameter to obtain ability. The brakes have sufficient sur-e to hold the cars securely with a very it pressure, and it is well known the e-faced brake shoe gives less trouble n anything else until its safe load limit exceeded.

will be used. The motor cam shaft diam ter, originally ¾, is increased to ⅞, and t cam face width has been doubled, and now 1 inch. The applied middle beari of the 1907 cam shaft is made integral wi the motor base for 1908, and its cap retained by a screw which bears on a st spring, so that no injurious pressure ca be applied.

The general form of the motor, valv and valve action remain the same for 190 The bore of the 20 H. P. motor has bee increased from 3¾ to 4 inches, the strok remaining the same, 4 inches.

Two minor changes are made in th valve action, which is direct for the intak valves, and an overhead beam for the e haust valve placed in a cage in the midd of the cylinder head. The overhead bea is worked by a long vertical push-ro screw adjusted in the top fork for lengt and having the lower end dropt into cup in the top end of the cam roller carr ing lifter. In 1907 this cup was applie to the top end of the lifter. For 1908 th lifter diameter is slightly increased, an the lifter is made longer, permitting th push-rod cup to be formed by drilling d rectly into the top end of the lifter. Th intake valve stem length, fixed in 1907, given a screw length adjustment for 190 by threading the valve stem end and a plying a threaded sleeve with a spl hexagon end projecting downward belo

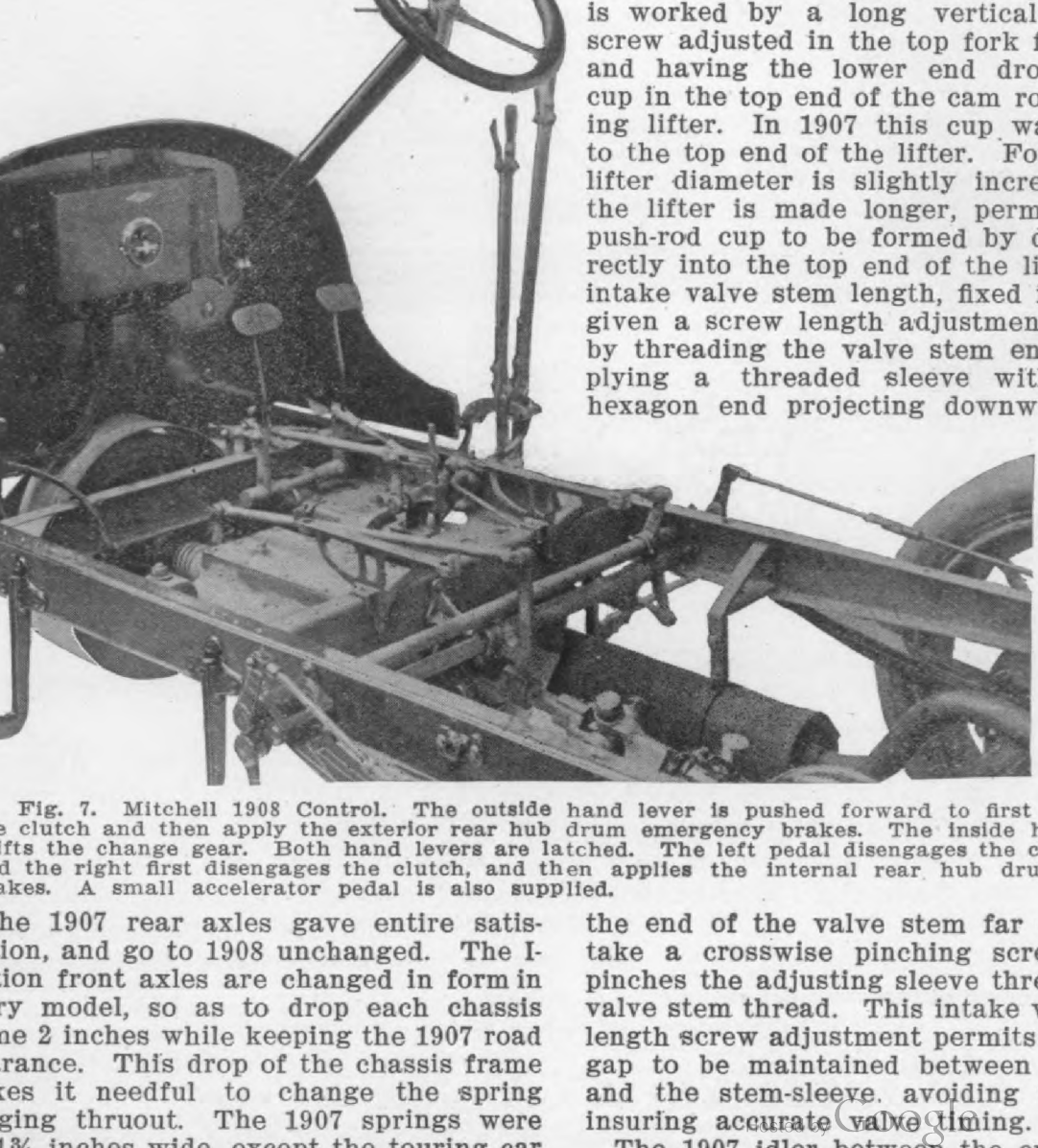

Fig. 7. Mitchell 1908 Control. The outside hand lever is pushed forward to first disengage e clutch and then apply the exterior rear hub drum emergency brakes. The inside hand lever ifts the change gear. Both hand levers are latched. The left pedal disengages the clutch only d the right first disengages the clutch, and then applies the internal rear hub drum service akes. A small accelerator pedal is also supplied.

he 1907 rear axles gave entire satis-ion, and go to 1908 unchanged. The I-ion front axles are changed in form in ry model, so as to drop each chassis ne 2 inches while keeping the 1907 road rance. This drop of the chassis frame es it needful to change the spring ging thruout. The 1907 springs were 1¾ inches wide, except the touring car

the end of the valve stem far enough take a crosswise pinching screw, whic pinches the adjusting sleeve thread on th valve stem thread. This intake valve ste length screw adjustment permits a unifor gap to be maintained between the lift and the stem-sleeve, avoiding noise an insuring accurate valve timing.

The 1907 idler between the crank sha

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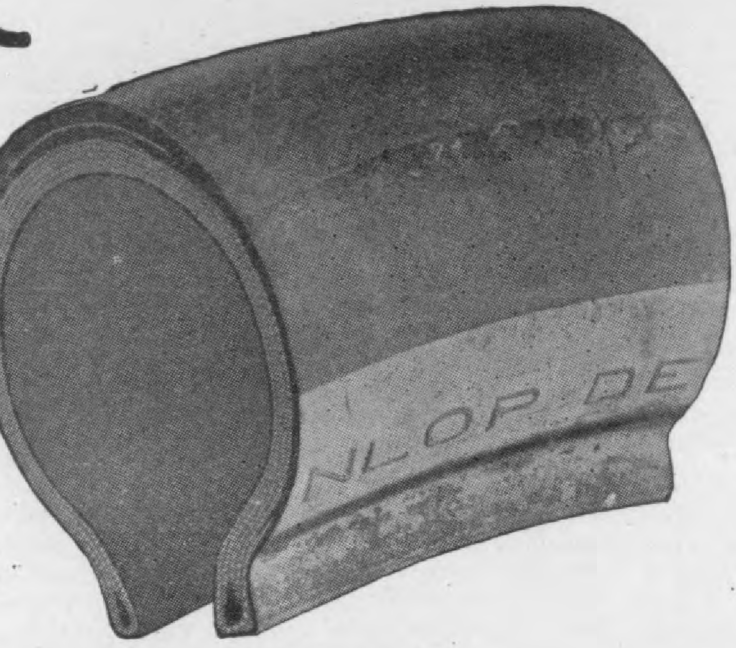
Seven Thousand Five Hundred Miles



Another Proof of Hartford Tire Quality

This cut is made from an actual photograph of a section of a

Hartford Tire

28x3 run by Dr. P. J. Ryan of Hartford, Conn., 7,509 miles by Odometer.

Note carefully that this tire is in practically perfect condition.

It pays to buy the best in tires.

You'll remember the quality a long time after you have forgotten the price.

Most manufacturers equip their cars with good tires; some are not so particular.

Protect yourself by specifying and insisting on

Hartford Dunlop or Clincher Tires

There's no secret about the widespread popularity of Hartford Tires. They're absolutely right, made of the best material by men of long experience with a determination to excel.

FREE A book that shows by pictures how to put on a Clincher or Dunlop Tire. Every Owner, every Driver, every Dealer should have it.

The Hartford Rubber Works Co. HARTFORD, CONNECTICUT

NEW YORK, 88 Chambers St. and 1769 Broadway; CHICAGO, 83 Michigan Ave.; Boston, 494 Atlantic Ave. and 1020 Boylston St.; CLEVELAND, 1831 Euclid Ave.; DETROIT, 256 Jefferson Ave.; DENVER, 1564 Broadway.; PHILADELPHIA, 138 North 10th St.; BUFFALO, 725 Main St.: ATLANTA, GA., 55 Auburn Ave.: LOS ANGELES, 1505 South Main St.; SAN FRANCISCO, 423-433 Golden Gate Ave.

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clutch, special leather faced, with six gradual engagement springs at the forward end has been improved for 1908 by the introduction of an absolutely secure spring retention. The eight-lead mechanical oiler is retained for 1908.

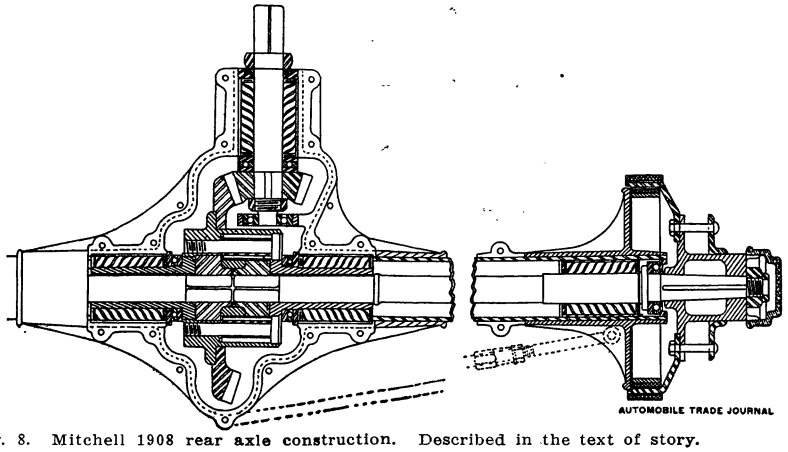

Fig. 8. Mitchell 1908 rear axle construction. Described in the text of story.

THE AXLES.

The front axle is a steel drop forging, I-section, no welds, Lemoine type of stub axle support. The 1908 touring car stub axle dimensions are reduced for the lighter cars. The balls are ½ and ¾ inch diameter, respectively, two-point bearings, adjustable. The steering arms are applied. The rear axle is on Hyatt rollers, except the inside bearing of the bevel pinion shaft, which is an annular ball-bearing. All thrusts are taken by ball disks. The balance gear is eight spur pinions.

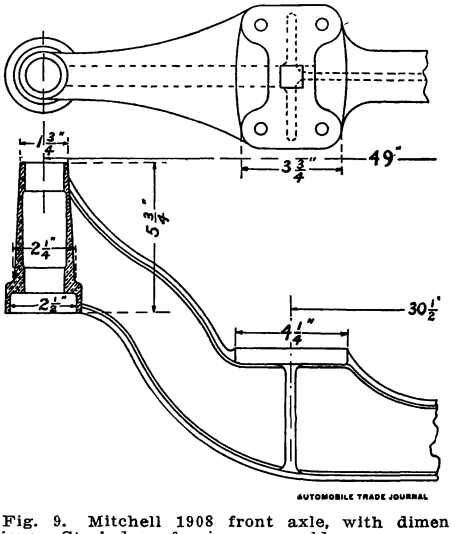

Fig. 9. Mitchell 1908 front axle, with dimensions. Steel drop forging, no welds.

The springs are 2 inches wide, tongued, grooved and banded for all cars. The exact numbers of leaves are not yet determined, and so are not here given. For the touring car the springs are 40 inches long in front and 48 inches long in the rear. For the two runabout models the front springs are 40 inches and the rear springs are 44 inches long.

THE CHANGE GEAR.

The gearing is all steel, all oil tempered, all 1⅛ inch face, 6 d. p., 8 d. p. tooth length, commonly mentioned as "pitch 6-8." The motor car sliding gear presents so many difficult problems that the motor car designers have been forced to adopt all possible betterments, and are now making the gear teeth shorter than standard lengths, saving outside diameter of gears and gaining in strength of gear teeth, and saving in surface machine work and in the amount of metal to be removed in gear cutting. The aluminum gear box lower member has integral lugs. The gear box

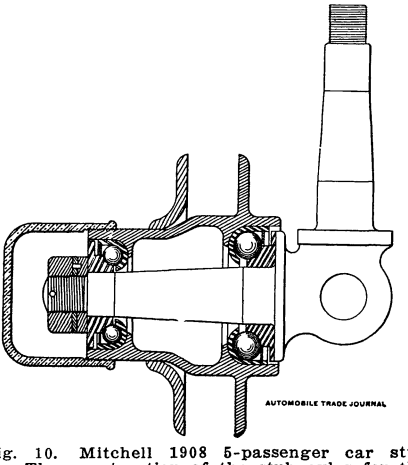

Fig. 10. Mitchell 1908 5-passenger car stub axle. The construction of the stub axles for the smaller cars is the same, with smaller dimensions.

cover deeply cupt, is a grey-iron casting held with plenty of bolts, and very greatly stiffens and strengthens the aluminum casting gear box lower member. All the shafts are in plain babbitt boxes, cast directly in rough dove-tailed seats in the gear box and cover.

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1908 MOLINE 1908

THE changes in the MOLINE line for the coming season are such as to make the Four Cylinder Cars very much more handsome in general design, more quiet running, and more powerful in action.

The same high standards of workmanship are maintained as to details of construction, upholstering, and painting so that MOLINE cars are second to none in the American market.

The Two Cylinder Car has given such unqualified satisfaction that it is being continued for 1908 in exactly the same style and at the same price. It is positively the best looking and easiest riding two cylinder in the market. . On the question of speed and power you may judge for yourself, our catalogue gives the size of the cylinders and names the actual weight, and we stand ready to make demonstrations any time.

We are open for agencies in a few good cities.

Moline Automobile Company

EAST MOLINE, ILLINOIS

:: :: :: *Member American Motor Car Manufacturers' Association, N. Y.* :: :: ::

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All crank shafts, bearings and wrists, all pistons and rings, all cam shafts, all bevel pinion shafts and all rear axles are ground true. The cylinders are finished by reaming.

CONTROL.

All control linkage members are above the gear box, in plain sight and readily accessible by removing the driver's footboard. All connecting links are forked. The interlinkages are two, both relating to the brakes only. The brake shoes are not applied thru eveners; the pressure applied to each brake shoe is regulated independently by screw adjustment, this being deemed less unsafe than the automatic brake effect equalization by the use of eveners. Steering is by a worm and worm-gear segment. The spark and throttle positions are regulated by two rock shafts, parallel to the steering column and placed in front thereof. These rockers have each a ratchet retained hand lever at the top end, under the steering hand wheel. The outside hand lever is pushed forward to first disengage the clutch, and then apply the exterior, rear hub drum, emergency brakes. The inside hand lever shifts the change gear. Both hand levers are latched. The left pedal disengages the clutch only. The right hand pedal when pushed forward first disengages the clutch and then applies the internal ordinary, rear hub drum brake shoes. A small horizontal accelerator pedal varies the throttle opening.

The Mitchell motors and the Mitchell front and rear axle construction are original designs by Mr. John W. Bate, supervising engineer of the Mitchell factory since March, 1904.

ON THE ROAD

Saturday, October 5, a Mitchell, 1908, four-cylinder, 5-passenger touring car, driven by Fred Haumerson, Hugh Dolnar passenger, left the Racine Hotel, Racine, Wisconsin, at 7.50 A. M., for a two-day tour in the beautiful Geneva Lake district 40 miles west of Racine.

The weather was perfect, the coloring of the landscape was magnificent, but the roads, ungraveled deep black soil and clay, barely dry from the deluging rains of a week before, were very rough.

The country is full of small, beautiful lakes, many of them surrounded by summer cottages. This charming lake district has many, winding, hilly roads, graveled and extremely good, which are much used by motorists during the summer season, and the run from Elkhorn to Delevan. Delevan to Geneva Lake and Geneva Lake to Elkhorn, a triangular course of about 30 miles total, is over some of the finest gravel road in this country.

The Saturday's drive was about 75 miles over almost all rutted roads, where the Mitchell four-cylinder showed to great advantage, the springs being very easy indeed, and making the drive a real pleasure in spite of the rough going.

Sunday the car was on the road all day, covering over 150 miles, including four round trips between Elkhorn and Delevan, 14 miles each, averaging about 26 minutes, and from Delevan to Geneva Lake and Elkhorn, about 22 miles, over a fine road and thru beautiful country, in 40 minutes with seven passengers.

From Burlington to Racine the road is natural black soil, barely dry from soaking rains, deeply rutted and rough. We passed everything on this dried-mud stretch, as the Mitchell 4-cylinder springs are extremely easy in fast going over rough roads, especially with a full load. We very seldom ran faster, however, than 45 miles, but our average speed was high. Most of the time the car carried six or seven passengers. The only pause made for adjustment was a stop of two minutes in Delevan to reconnect a wire to a spark-plug. This particular 14-mile Elkhorn-Delevan round trip was made in 26 minutes, elapsed time total, including 3 miles of slow pace in the speed limits of the towns.

This two day's work was a real touring run, for pleasure only, no haste, visiting and carrying full loads of women, children and men, much of the time seven passengers; the Mitchell 1908 4-cylinder takes all the hills of this district, many of them steep and long, with no slacking of pace, is very still, very easy riding indeed, and is, in short, a real touring car.

The design and character of the Gray & Davis 1908 searchlight is so distinctive that the design patent was allowed without question.

The committee of the Automobile Club of America, appointed to select some emblem suitable for attaching to members cars has adopted a neat plate which can be attached to the dashboard or radiator. The plates are about three inches square, made of brass with the words Automobile Club of America at the top. In the center is the club flag enameled in colors on a black background, while at the bottom there is a serial number.

September was another record breaking month in registrations at Albany, N. Y. Ford again leads with a total of 90, with Maxwell 49, and Cadillac 36.

The Pennsylvania license tags for 1908 will be yellow and black. The hangers will be yellow background with black figures.

With the view of increasing the funds for placing additional road signs in the vicinity of Geneva, N. Y., the Geneva Automobile Club voted at the last meeting to increase the membership dues to $4.00 per year.

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NOTICE

IT HAS BEEN BROUGHT TO OUR ATTENTION

That certain unscrupulous dealers and top makers have been offering to the trade and public Automobile tops made of cheap inferior leather substitutes, representing them as

Pantasote

The name PANTASOTE represents a particular composition, which is, and for years has been, manufactured exclusively by us. It is thoroughly protected by copyright. We do not desire to create trouble, but for the protection of our own business, as well as that of our customers, we are forced to give notice that we will follow up and

Prosecute to the full extent of the law

all such cases as come to our notice.
If your are in doubt as to the genuineness of the PANTASOTE, request your dealer to affix one of our trade mark labels to the top or send us a small sample or one of the side curtains.

TO DEALERS

We are prepared to furnish upon application, free of charge, small celluloid trade mark labels, one of which affixed to a Pantasote top stamps its genuineness.

THE PANTASOTE CO.

NEW YORK, 11 Broadway

CHICAGO, 707 Fisher Building

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A Strong Statement— but a True One about the

The distinguished successes of the present automobile season, you can name on a very few fingers. And however you name them, the Elmore must come first.

First, we mean, in point of swift sales; the quick clean-up of the entire output; the call for more cars than our big plant could build; and the magnificent satisfaction which every Elmore in use is giving its owner.

Each Elmore season has surpassed the previous one---each year has seen its prestige grow greater and greater and greater.

In 1908, we promise you that the Elmore will be the most perfect car of its class in America.

THE ELMORE MFG. CO.

1004 AMANDA ST., CLYDE, OHIO,

MEMBERS A. L. A. M

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MECHANICAL AND TECHNICAL Department

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.

Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

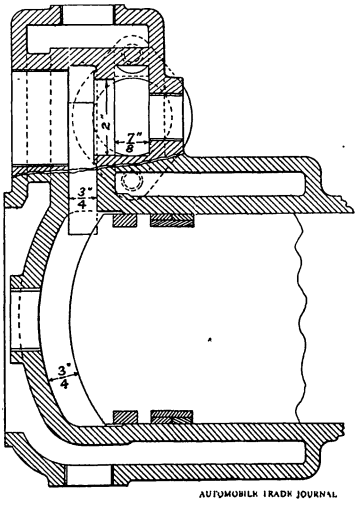
CHAS. E. DURYEA

TOO HIGH COMPRESSION.

Hampton, Va.

I would like your opinion as to the trouble I am having with a double opposed that I have designed. It is a 5½x5-inch. The valves have a 2-inch opening. Exhaust lifts 5-16 from seat, and the suction ¼-inch. Both are mechanically operated. The engine runs fine up to about 475 r. p. m., and if opened up any faster has a heavy knock. Everything is tight; the knock is not caused by any lost motion. The cylinders, rings and pistons are ground.

There is ⅜-inch clearance between piston and head of cylinder. The blue print will give you all details of cylinder. It is a marine engine, turns 22-inch wheel three blade with 22-inches pitch. I sometimes think that the compression is too high, and it fires too early on that



account. I get about 80 pounds on the gage when I turn the engine over by hand, and it jumps up to about 130 when running without firing in cylinder with gage on. I want the engine to turn the wheel up to 600 without any noise or thump. I would be pleased to hear from you through the "Journal" in regard to same.—F. J. R.

It is quite plain that your compression is too high. You evidently get the 80 lbs. when turning slowly with the engine cold, and possibly some leak, all of which keeps the gage low. Put a check valve in the pipe to the gage so the pressure can get in, but not out, and test one cylinder without firing, while the other runs. Have this tested cylinder hot before opening the gage cock, and you will get the actual compression, which will probably be found to be over 100 lbs. You can make sure that it is pre-ignition by a simple experiment. Note at what speed it knocks, and then adjust the carburetor so as to give it a lean mixture, and again note the speed. If it permits a higher speed without knocking you can feel pretty sure of the trouble. Be sure it is not a loose fly wheel. The shape of your piston head is bad. It not only leaves a small combustion space, but this space tends to heat the piston head needlessly. Piston heads are convex in vertical engines, to keep the oil out of their centers, but should be concave in horizontal or inclined engines. This shape would give you more space or you can put a spacing ring under the cylinder flange. I would use one ½-inch thick.

C. E. D.

CAUSE OF BACKFIRING.

Phoenixville, Pa.

Would like you to answer through the Mechanical and Technical Department: What is the cause of explosions in the carburetor, and how to remedy them.—A. P. B.

Carburetor explosions are usually due to a lean mixture. A slow burning mixture may continue to burn till next opening of the inlet and then ignite the charge in the supply pipe. An over-rich mixture may do the same, or a badly mixed mixture may contain drops of liquid which carry over the flame. Try adjusting the carburetor by opening the gasolene needle or tightening the auxiliary valve.

This backfiring seldom happens with suction opened valves, for the speed of the air past the valve is too fast to allow the flame to propagate thru the small space, but the mechanically operated valve opens wide and the speed may not be great enough at the early part of the piston stroke to prevent backfiring. A later opening or a less lift of the inlet valves may stop it, and this should be tried if the mixture is correct and gives bluish flame.—C. E. D.

IS THE ROPE DRIVE PATENTED?

Chicago, Ill.

Will you please inform me thru your columns if there is any patent on the rope drive.

G. E. BILLETT.

It has been some time since I read the Holsman patents, but my recollection is that the rope drive is patented. There are other methods equally good and cheap, so do not let that worry you. Find one and have a drive that you can patent for yourself.—C. E. D.

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GAS ENGINE QUESTIONS OF INTEREST.

Cleveland, O.

Please answer the following questions in your valued paper:

1. Will you please explain by diagram the piston ring construction used in the Haynes and Reliance. I believe, which you mentioned some time ago as better than the "snap ring" practice?

2. What is the minimum safe thickness for the cylinder wall of a 3¾ inch by 4 inch, 1-cylinder high speed motorcycle engine?

3. Would it be practical to use 80 pounds compression?

4. How does the most efficient compression of a gasoline motor compare with the most efficient compression of a kerosene motor?

5. How is it possible for some firms to put out a kerosene motor which does not carbonize at all—i.e., burns clean, whereas some or most gasoline motors carbonizing some?

6. Where can you buy high-grade steel magnets for magnetos?

7. Is three enough for the magneto on a single cylinder? I mean for the low tension friction driven type. I notice some have six—three inside and three outside.

8. Could one be made to spark a make and break apparatus without a spark coil? How?

9. Where can you get mica insulating washers for make and break plugs?

10. I would like to see the compound gasoline engine discussed and explained a little more fully in your columns. It seems to me that exploded gas and steam must act in a very different way, and therefore while the compound is successful for steam it might not be at all the right thing for a gas engine whose propelling force has not a gradual expansion. I should like to see figures showing the power developed by a compound over and above that developed by an engine of the same size exhausting in the open air. The testing plant of the A. C. A. ought to do something of the kind. It seems to me that at the end of the power stroke there is not enough power in the gas "to shake a stick at." To what extent am I wrong?—V. R. SCHERMERHORN.

The Haynes Company on application very kindly furnished the cut of a cylinder section showing the arrangement of the rings, and a description as follows:

"The ring is what is known as a multiple piston ring, and is composed of three parts. Two outside ones which are half the width of the inside ring, and telescope the inner ring. The width of the inside ring is about one-half inch, while the two outer rings are each about one-quarter inch width. These rings are all made large in diameter, and are placed in the cylinder under compression, so that they have a constant expansion pressure.

"Pins are placed in the outside of the inner ring at opposite positions to prevent the outer rings from changing position, and the joints are so arranged as to prevent leakage of the gas.

"Another special feature of this piston is the use of a ring around the cross head piston pin or wrist pin, there being a groove made in the center of the pin in which the ring is sandwiched between the cylinder wall and the cross head pin. The object being to prevent scoring of cylinders by the lateral working of the pin."

A slightly cheaper construction has often been used by me which consists of a ring of clock spring steel placed inside of the regular ring with joints opposite. Both these constructions have for their object a tight joint. In the usual ring with diagonal straight-cut joint the gases have a small but free path past the ring, then around the piston part way to the next ring joint, and so on. As the cylinder and ring wear away the opening and the joint gets larger and the piston wears smaller, so the gases find less obstruction and the engine loses power and heats more with age. With a lap or step joint ring there is no straight passage thru the joint, but the gas must go in at the joint on one side, then down under the lap, and up at the joint on the other side of the ring and lap, a crooked and difficult passage.

If a full width ring is inside the usual ring it is quite plain that the gas cannot get under the usual ring, and cannot get past the lap joint, so the ring is equally tight all around. A thin ring of steel pinned to the outer ring so the joints cannot get together adds stiffness to the thin worn outer ring and closes most of the passage, but being thin it is not so certain to hold the gas against passage around its edge and under it as is a thicker, better fitted ring. It is often of value to repairmen and others wishing to fit up an old engine without making new rings.

In the Haynes construction the use of two outer rings with joints staggered permits the use of any type of joint with equally good results, and is a superior construction, tho expensive.

The minimum thickness of wall depends on the iron, the probable distortion under heat and the amount of compression. If free from strains and of good quality 1-16 wall will suffice, but since you cannot be sure on these points I would advise not less than ⅛-inch, and even this may be found too thin to machine easily and profitably.

Eighty pounds is used in some engines, and will serve all right at high speed for auto work. The high compressions are more efficient than low ones, but this does not prove them best. I much prefer a low compression for auto work because such an engine more nearly behaves like a steam engine, and this is what is wanted. The average auto user is not out riding to save gasolene, and smooth running with great flexibility is what he prefers. I do not know that any kerosene motors are in use for auto service, and do not know how the compressions should be. I think about the same, or lower.

To burn clean requires a lean or weak mixture, and not too much lubricating oil. A little water injected at each explosion or at the end of each day's run will clean the walls. Most stationary engines take full charges or none, but auto engines are throttled and will miss fire with a lean mixture, so they usually run with a fat mixture. If provided with a carburetor adjustment near the operator he can make the mixture lean when great power is not needed, and let the excess of air burn out the carbon deposits.

For magnet steel inquire of the magneto makers. They will doubtless be willing to accommodate you with a small amount.

Three magnets will serve, or even two, but some folks are not willing to get along with the least possible spark, and it is not wise to save at this point. If weight is a serious object perhaps the magnet weight can be made to form part of the flywheel. A magneto will ignite a charge without a coil, but not so certainly. I tried to stop my motor recently by short-circuiting the coil with a piece of metal across the coil posts, and failed. The magneto was a Wizard. The armature serves as a coil in that case, and its core as the coil core. To employ the armature this way use a fine winding and plenty of it. The alternating current magnetos do not use a coil, and are obliged to depend on the armature discharge. Some dynamos make a beautiful spark if the contact is only an instantaneous one.

Mica in any commercial shape can be had of A. O. Schoonmaker or the Mica Manufacturing Company, both of New York City.

We were promised some test figures by the makers of the Compound last spring, but have not seen them thus far. There is considerable power in the exhaust at the end of the working stroke, but most engineers believe it costs more to use this than it is worth.

I have been using it quite successfully to introduce the new charge in a stationary engine, and will describe the method fully in the near future. It has been used to heat a thermopile and produce electricity. Also to drive a turbine or windwheel. The hot gases are much different from steam, as you suggest, for they have no latent heat and so lose their heat and pressure to the walls of the pipes, valves and cylinders very quickly; whereas steam may increase in amount as the pressure decreases by the evaporation of water drops which under pressure remained a liquid,

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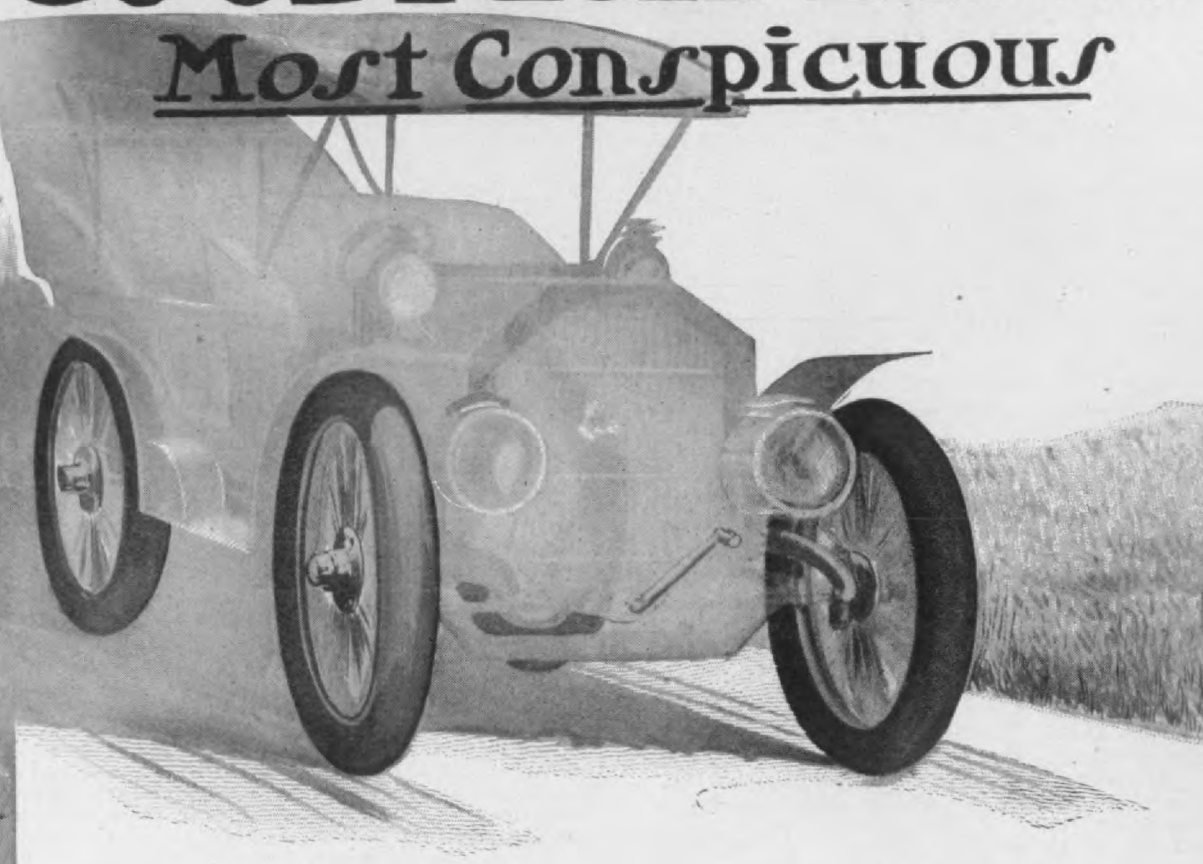
Most Conspicuous



ACTUAL count in many localities will show Goodrich tire preference—and numbers are a pretty good argument too; but, better argument and bigger evidence is found in the fact that all these Goodrich tire users have a prime good reason for their choice—they have been attracted to Goodrich Tires by

GOODRICH TIRE DOINGS

It is popularity derived from everyday occurrence of notable good work, as well as from the service given in such long distance endurance events as the Glidden Tour where *Goodrich Tires were conspicuously ahead in both numbers and final honors.*

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but turned into steam as soon as the pressure was taken off. There are several ways of using this power without much complication, and it is likely that some of them will be employed in the near future.

Mr. Victor Lougheed has recently patented an engine in which he retains only a partial charge of mixture, and has a very small compression space, but not unusually high compression. This permits him to expand to the full end of the stroke or far beyond the original charge volume, and thus utilize the pressure at the usual exhaust point.

Your suggestion that somebody ought to make tests is a good one, but who is to be the cat's-paw to do these things for the benefit of others? We are so afraid of paternalism in this country that altho we restrict our liberties by all sorts of fool laws we do not have very many institutions where experiments of this kind of untold benefit to the land can be worked out. Some of the States now maintain agricultural experiment stations, with the result that farming is making progress by leaps. Mechanical and chemical stations of a similar nature would pay just as well.—C. E. D.

WHAT TYPE OF ENGINE GIVES LEAST VIBRATION?

Hyde Park.

Please answer the following in your Mechanical and Technical Dept.

What style of gasoline engine will run with the least vibration, a four cylinder upright or a double opposed 4 cycle?

How should a double opposed engine fire to give the least vibration, and how should it be placed in the carriage for the same purpose, crank shaft crosswise or lengthwise the carriage?

Will a 4-inch dia, 4-inch stroke, 4-cycle engine be large enough for a four-passenger car?

Can such an engine be air-cooled without giving trouble, or will a water-cooled engine give better satisfaction? Is there any objection to a horizontal engine in a car? An upright engine carried in front seems to me to give the front wheels too big a load. But accessibility probably makes up for the disadvantage. I want an engine as reliable as possible, smooth running, and with power enough for fair speed, and hill climbing.

I have a modern machine shop to do the work in, and am willing to spend lots of time on the work to get a good engine and car, but am in doubt about what is most suitable, as I have looked over several cars, and they all claim to be the best.—W. O. K.

There is very little choice in the matter of vibration as to the arrangement of 4 cylinders. If only one fly wheel is used, it is probable that the opposed type will vibrate less, since all of the cylinders are close to the wheel. With cylinders lengthwise the body of the vehicle is the best way to place the motor to avoid vibration. It is about the only way a single cylinder can be placed because of the vibration, but the multiple cylinder affairs vibrate less, and so permit other placings.

A 4-cylinder 4-cycle should fire one-half revolution apart, and there are several ways possible. The cranks must be 180 degrees apart, and you can quickly bend up a piece of soft iron wire and try the various sequences possible in your mind. This will help you to grasp the problem. I would use a two throw shaft for a 4 cylinder 4 cycle opposed, and put two connecting rods on each single long crank pin. This makes less bearings, and is very compact, and uses a shorter, cheaper chank shaft. With the odd cylinders on one side and the even on the other, it may fire 1, 2, 4, 3.

Four 4-inch cylinders will suffice for a car weighing not over a ton. Air-cooling is all right if it is carried out right. If you have had no air-cooling experience, and your car is not extra light, don't attempt air-cooling. Water is a more brutal and wasteful way of cooling, but it gets there, and prevents damage. I look for a wider recognition in future of the fact that a gas engine is a heat engine, and that cooling is a loss, and hope to see engines that are able to develop their power without boiling away so much water. Horizontal engines are all right. Stationary horizontal engines bring the highest prices. If you intend to make the whole car, you can put the engine at the rear over or behind the rear axle with very short chain drive, and with passengers between the wheels and very light front. This arrangement has many advantages not yet appreciated, or at any rate not yet worked out. If you expect to buy parts, better follow conventional designs. There is no best. All designs are compromises, and all builders differ in their opinions as to what must be sacrificed. The racing man sacrifices everything to the motor and puts it in front where he can see it. The public some day will lose the crazy idea that they are all racing sports, and will awake to the fact that the front seat is the best one, i. e., between the wheels, and then the motor will be moved to the rear in short order. By that time builders will have learned how to couple up a motor to a rear axle without turning a corner or two by means of bevel gears and without needing the whole length of the vehicle to get their machinery in.

C. E. D.

WHEEL SIZES AND GEAR RATIOS.

Los Angeles, Cal., August 24, 1907.

If a car with 32-inch wheels is geared 4 to 1, what would the gear be if wheels were increased to 34 inches? Also a car geared 3½ to 1 with 36-inch wheels, changed to 34-inch wheels?—F. A. B.

You misunderstand the terms used. "4 to 1" means that the engine makes 4 turns to 1 turn of the rear wheels, and increasing the wheel size does not change this, but it makes harder work for the engine, and should be accompanied by a similar change in the size of the large bevel gear, or an inverse in the bevel pinion. Suppose the pinion to have 16 teeth and the gear 64. If the wheels are made 34-inch the gear should have 68 teeth, or the pinion be reduced to 15 teeth.

If the wheels are reduced 2 inches or 1-18 of their diameter, the big gear should be likewise reduced or the pinion increased. This matter of expressing gearing is not a definite thing as it should be and can be, since it also depends on the wheel sizes. We formerly used "miles per hour" to express the gear, but with the advent of throttled engines capable of varying from 3 to 30 miles on throttle this ceased conveying the little intelligence it formerly exprest and was dropt. The present expression makes one figure out the wheel size just as the old bicycle rating in inches of wheel diameter per turn of crank did. A better method is inches of road surface per turn of engine. Thus your 4 to 1 gear with a 32-inch wheel on direct drive will travel forward 8 times 3.146 equals 25.13 inches in one turn of the engine, while the same gear with 34-inch wheel will travel 8½ times 3.1416 equals 26.7 inches at each turn of the engine. —C. E. D.

DETERMINING THE VOLTAGE OF A COIL.

Morristown, N. J.

Will you please tell me how I can tell for what voltage a coil is wound? I have a coil made by "T. Carpentier, Paris." Any information that you will give me, I will be very thankful for.—E. LAWS.

The coil and its condenser are supposed to be wound and proportioned one to the other, and if the proper battery is used, the condenser will prevent much spark at the contacts. Test it with different voltages and use the one that gives the best spark with the least sparking at the contacts. If you increase gradually, you will notice the increased sparking before you reach a voltage high enough to hurt the coil. You can get a fair idea of the number and size of sparks by drawing a card or paper between the plug points.—C. E. D.

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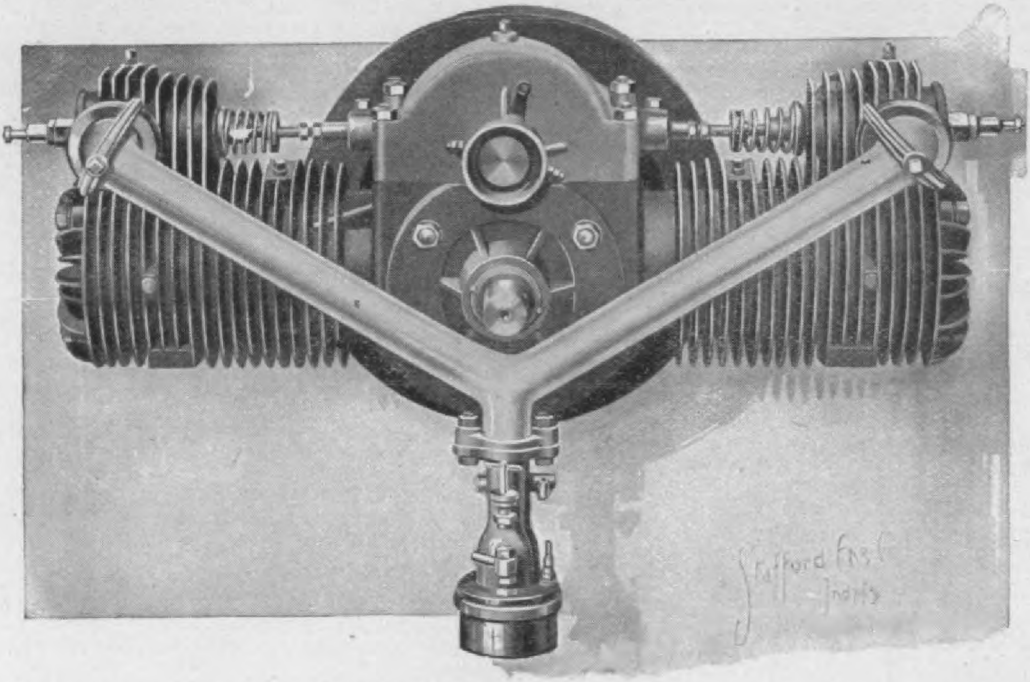
Universal Type Engine



The One Best Engine For Buggy-Type Automobiles

Suitable for any light runabout or light delivery wagons, but designed especially for buggy-type rigs.

Two cylinders, 4x4 double opposed.

Conservative power rating, 10-12 H. P.

Weight, including flywheel, 180 lbs.

Over all dimensions, including spark plugs: length, 30″; width, 16¾″; depth, 17″. Depth without flywheel, 11½″.

Perfectly balanced. Entirely free from vibration.

Air-cooled, and **cooled** beyond question. Has been run at full speed for six hours without a sign of distress. Big exhaust valves. Careful construction. Best materials.

Every engine fully guaranteed to deliver the rated power and keep cool.

Prompt delivery on any quantity to those who order promptly. Attractive prices in quantities.

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VIBRATION AND ORDER OF FIRING.

Taunton, Mass.

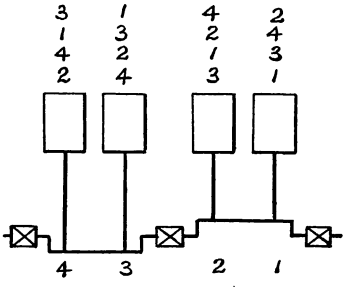
As a subscriber of the "Journal" and an appreciative reader of your many answers in the "Mech. and Tech. Dept.," the writer would like your opinion of the following:

Having found certain mechanical advantages in valve operation by having crankshaft throws as shown in the sketch, the firing to be as either row of figures indicate, the question of vibration is giving me some serious thought. The engine would be used in a heavy truck, on three point suspension, and turn not over 800 r. p. m. at full power.

The navy dept. recently resorted to spring suspended skeleton models of triple and quadruple expansion engines to prove a similar question, applying power to crankshaft and noting visible results. But before going to such an extreme I would greatly appreciate your opinion of this condition, either from experience or theory, as the vibration may be enough to offset other advantages.

CHAUNCEY C WALKER.

Your arrangement is all right. You can make a shorter engine by connecting both pitmen to a single pin and placing the cylinders in two V-shaped pairs. The vibration will be slightly more, as you have proposed, but not enough to be objectionable if you gain advantages by this placing. The vibration will be in the plane of the cylinders, one end of the engine tending to rise as the pistons go down, and the other vice versa. A fly wheel or clutch at each end will remedy this.



Your firings are all alike, in that the left end cylinder follows the right end one and the right middle comes next, followed by the left middle, and repeat. You simply begin to count in a different place in a continuous line of explosions. You can make the left middle follow the right end and the right middle next, followed by the left end and repeat. Or these two general arrangements can be reversed.

In short, without puzzling over it much, it looks to me as if 4 different cam arrangements are possible, whereas you have been considering one only. Numbering the cylinders from right to left, as shown below the diagram, two orders of firing are possible with this crankshaft, namely, 1, 4, 2, 3, or 1, 3 2, 4, or the same orders may be followed beginning at the other end if desired. C. E. D.

FUNCTION OF COMMUTATOR IN DOUBLE IGNITION SYSTEM.

I beg to acknowledge receipt of your favor of June 21 in response to my inquiry thru the "Cycle and Automobile Trade Journal." If it is not intruding too much on your good offices, I would appreciate a little further information, if you could tell me the function of the commutator when used as shown in your sketch? In other words, tell me in a few words how it works when the four posts are bonded together?

FRED G. PERRY.

The magneto distributer serves for all the sources of current. When the magneto current is used the commutator is not used, but with either battery it makes and breaks the current four times in its revolution and the distributer sends the sparks from the single coil and its wire H to the proper plug. C. E. D.

BRAKES GRIND AND RATTLE.

Milwaukee, Wis.

I have a 2-cylinder, 22 H. P. car which has been run for about 5 months. I notice when running if the brake is applied, that it gives a sort of grinding noise. It seems to work perfectly, probably expands too suddenly, and when car is standing a rattling noise can be heard when the brake is applied. Can you advise me if same ought to be adjusted?

A. S. HOFF, JR.

Inspection is the way to find your trouble. Brake bands that are nearly dry often grip and let go and repeat this in a very disagreeable and destructive chatter. If they hold too severely a little oil on them stops this, but if they are not holding dangerously harsh, a little dust, such as common chalk (not talc. French chalk) will serve to roughly lubricate and will stop the chatter without interfering with the braking ability, but will often increase the braking grip. The rattling may also be due to a loose brake rod.—C. E. D.

QUESTIONS ON 4-CYLINDER DESIGN.

Fort Wayne, Ind.

Would you please give me the information I ask for concerning a 4-cylinder 4-cycle gasoline motor, cylinders to be 3¼x3¼? What should be the diameter and lift of the intake and exhaust valves?

How much would you offset the cylinders from the center line of the crank shaft, and how much offset is correct for the cam shaft?

Will a 1-inch Schebler carburetor be sufficient?

About what compression space should be allowed? Also, what should be the compression in pounds?

How long would you make the piston and piston rod?

How should explosions take place—crank shaft made of a flat slab, cranks being opposite and not set on angles?

How much larger do they generally turn the pistons rings than the cylinder bore?

Do you think that common machine steel will be O. K. for 1¼ crank shaft?

How far from the inlet valve do they generally place the carburetor.

This engine should be air-cooled and pull a thousand-pound Runabout.

What horse-power should it give?

CHAS. F. STEPHAN.

It is not the purpose of this dept. to design engines for individuals, because the space is too limited to devote to a subject of interest only to a single reader, and because the designer to do a decent job, should have more information than a short letter of inquiry contains. Thus, if you want a high speed engine, the valve must be larger than if you prefer to run slow and get the vehicle speed by gearing. The compression should also be more than on a low speed engine.

If you will read the recent numbers of this Journal, you will find most of your questions answered, or find description of some good motor near enough to what you want for you to copy, and thus take no chances.

Briefly, make the exhaust valve one-third the piston diameter, and the inlet one-fourth, with a lift of one-fifth of their diameter. A little larger than this for air-cooled, unless you use an auxiliary exhaust part.

Set the shaft center one-third of the crank length (one-sixth of the stroke) to one side of the cylinder center The cam shaft offset depends somewhat on the size of the cam and roller. Duryea cam shafts are offset the full amount of the lift You may find a 1-inch carburetor too large.

Use about 50 lbs. compression, make the piston longer than its diameter, and the connecting rod about twice the stroke. There are several crank arrangements possible, and very little difference between them. Look at any 4 cylinder engine and select. The piston ring should open at the joint about ¼ inch, unless it is quite thick, in which event less will serve.

Put carburetor 1 to 3 feet away from valves. You ought to get 12 to 15 H. P.—C. E. D.

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The ═══ *Model*

Air-Cooled and Water-Cooled

We offer this season two strikingly beautiful models.

We offer, with increased confidence, the latest improved Marmon Air-Cooled Motor, which for many years has proven beyond question its thorough efficiency under all conditions of hard service.

One of the new features of this remarkable motor which will appeal to the expert is the Marmon One-Piece Detachable Cylinder Head, removed or replaced in a moment, dispensing with valve cages entirely, reducing engine noise to a minimum, and making the valves, pistons and cylinder walls instantly accessible.

To those who prefer water-cooling, we offer the Marmon Water-Cooled Motor of marked excellence, unusually simple, accessible and durable.

Both the air-cooled and Water-Cooled types carry the complete guaranty of this House.

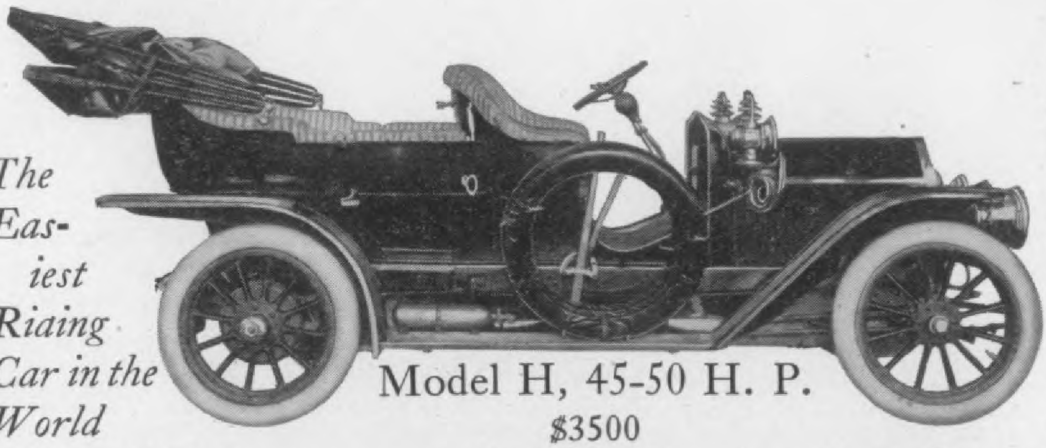
Marmon Touring Cars are much longer and roomier this year. The body hangs low and is designed in a graceful straight-line effect.

All models embody those exclusive features which have won The Marmon its fame for mechanical superiority, such as Double Three-Point Suspension, Marmon Lubrication, Roller Bearing Steering Column, Marmon Multiple Disc Clutch with Cork Inserts, and Marmon Selective Transmission.

Model G, Touring Car, 35-40 H. P., $3000. Model H, Touring Car, 45-50 H. P., $3500; Model H, Runabout, 45-50 H. P., $3500.

A full description of all models will be furnished promptly on request of Dept. 15.

The Easiest Riaing Car in the World



Model H, 45-50 H. P.
$3500

Built by one of the World Best Know Engineerin House

The Marmon account for 1908 offers a very attractive proposition. We have some open territory for first class agents.

Nordyke & Marmon Co.

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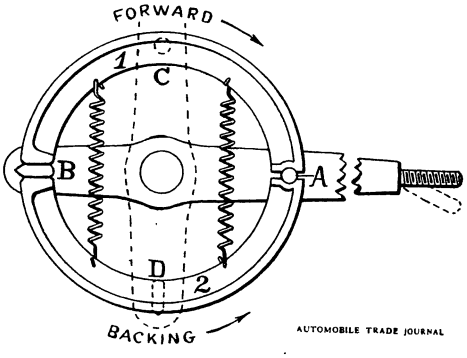
CAUSE OF BENT RADIUS ROD.

New York, N. Y., Sept. 10, 1907.

In the August issue of your journal, page 84, Mr. G. Austin Morrison, Jr., desires information in regard to bending of radius rods.

In your answer you state that without a sketch you cannot properly understand the reason for same. As I have had trouble of the same kind, on a similar car, will endeavor to explain, if the accompanying sketch does not explain itself.

When backing the car, and applying the brakes all the strain comes on brake shoe



No. 2, which being expanded at B, and pivoted at A, locks itself on the 11" dia. brake drum. and the 11" leverage is fully exerted on the threaded part of the rod and causes it to bend. The lower shoe having no support except the spring will lock on the drum, while the upper shoe always has a solid rest, by stud A, and expanding dog B.

All this trouble can be prevented by having the radius rod bent at the end as per dotted lines, and by swiveling the brake shoes at C, and expanding them at D, which greatly decreases the leverage.

HUGO VON RODECK.

QUESTION OF REDUCING FUEL USED.

Will you kindly advise me how to improve the following engine: Two cycle 4 inch bore 5-inch stroke used to run printing and job presses? The owner claims it takes as much to run the small job press as the large one; the engine runs all the time and drives a 30 or 39 foot shaft, nearly 2 inches in diameter, two counter shafts and the job press, or if the job press is cut off it runs the big press and folding machine. From 4000 to 6000 prints are made every week on the big press and folded, and something more than that on the job press. The engine consumes from 20 to 31 gallons of gasoline a month, speed 380, regulated by a butterfly valve below the mixing valve. Jump spark ignition is used. I can see no way of reducing the amount of gasoline consumed. Any suggestion will be appreciated.

I wish to experiment on a 4 cylinder air-cooled engine, the cylinders to revolve around the crank shaft, crank set at 180 degrees, so two pistons will work out and two in, the same as two double opposed auto engines, only set like an X. I think this will be as well balanced as any opposed engine with cranks set at 180, but wish to have your advice.

I wish to have the inlet valve in the piston head, and the exhaust valve in the center of the cylinder head, so the exhaust will be around the valve, and leave by two opposite ports.

What compression space would you advise as best? There will be no pocket in the cylinder, the head being half round. How deep should the fins or ribs be? If I use copper flanges 1-16-inch thick, what width would serve the best? Will copper cooling flanges brazed on the cylinder be better than integral iron ones?—I. B. A. B.

I do not see that you can greatly reduce the gasoline bill. The engine must run itself and the shafting all day, whether the presses run or not, and a gallon a day does not look extravagant. Possibly a larger pulley could be used and run slower. Be sure your spark is made at the best point, that the engine is not over-cooled, and that your exhaust gas has no odor, for odor means wasted fuel. Sometimes a little water sprayed in by a second carburetor nozzle will increase the efficiency.

Your revolving 4 cylinders will balance nicely and work all right, but the gain due to this design is questionable. The difficulty of oiling, adjustng and getting in the charges are against this type of engine.

I see no objection to having the valve in the piston head, but it must be mechanically opened or balanced, for if not, the centrifugal force will affect it variously at different rates of speed.

Make the compression space one-third to two-fifths as long as the piston movement. There is no advantage in making the cooling flanges very high if they are thin. Five to 10 times their thickness is enough. If you get good contact and have plenty of them three-eighths of an inch high and one-quarter inch apart, ought to cool. Copper is better, but not enough to pay.—C. E. D.

WANTS A CAR FOR HILLS AND MUD.

Lacona, N. Y.

I am a subscriber to your Journal, and wish to ask you, is there any car suitable for deep muddy roads and hill climbing. I do not like a horse, and as the season is advanced, it is buy a horse or another car.

DOCTOR.

My candid opinion, which may be biased by my pride, is, that no rig in the world can take the mud, hills, snow and sand like a Duryea. It is built for that purpose, and embodies a dozen or more years' experience with autos in bad roads, winter and summer, which no other rig does. The reasons why it is able to do what others cannot, are many: It has very high power in proportion to the weight, and delivers that power at the large rear wheels, on which the load is carried, so there is no slipping, no skidding, no tearing of tires, and no heavy front end to push. You can carry a load thru a muddy spot easier than you can wheel it on a barrow. It is a runabout, and yet can carry six when necessary. It is most accessible and very simple. If you prefer a more conventional design, seek large wheels, light weight and high power with simplicity. If an auto-buggy will please you, select a thoroly tried make, and not one that is on the market for the first year, or radically different from its last year form. Good things do not change a lot every year. If in doubt, inquire of a user.

C. E. D.

WHY WON'T IT RUN?

Frostburg, Md.

Being a reader of the "Cycle and Automobile Trade Journal," I would like to ask a few questions regarding a single cylinder engine that is used on a Cleveland small touring car. I think the machine was built in 1904.

1.—When cranked, it makes one explosion and stops, and acts so several times, before starting, and after starting it won't speed up any. It doesn't develop enough H. P. to run it on the level. In the high speed the engine stops and refuses to run at all. I have a good strong spark, and the carbureter on it is the Schebler.

SAMUEL GASKILL.

You do not give enough symptoms to form a good opinion. See that the valves are timed properly, and that the compression is good. Then if you have proper mixture and spark it will go. Probably you are feeding too much gasolene, but it should run some when cold. Your spark may not be strong enough to jump under compression. See if you can get a spark at the coil terminals ½-inch long. Perhaps the timer has slipt on its shaft and the spark is not taking place at the proper time. This will also cause the engine to act as described. When you locate the trouble we will be glad to hear what it was.—C. E. D.

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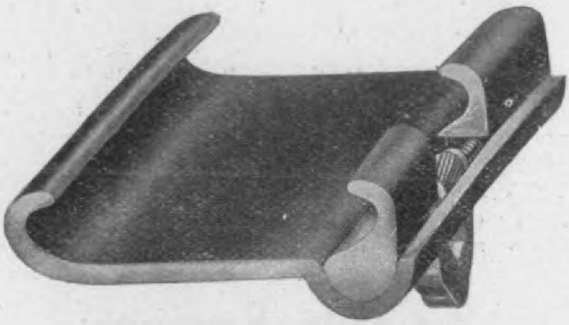
For Morgan & Wright

and all other tires.



For Clincher

For Dunlop

This unique rim is easily the most important rim achievem
ince the advent of the automobile. It simplifies the use of vari
ypes of tires as no other rim pretends to do. It is as valuable a c
ribution to the industry as are tires of the quality of Morga
Wright's.

Bear in mind that this rim will accomodate every make of Clincher or Dunlop tires, as well as every type of mechanically fastened tires but one. Standard measurements thruout, including inside diameter. Solid bead.

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New York: 214 W. 47th St. Pittsburg: 913 Liberty Ave. Kansas City: 605-607 E. 15th S

WANTS ROLLER CHAIN TO FIT BLOCK CHAIN SPROCKET

Holly Springs, Miss.

I have an automobile that is driven with a block chain, 1-inch pitch by ½-inch wide. I want to use a roller chain on it without changing sprockets. I wish you would please let me know if there is a roller chain made that will fit a block chain sprocket, and the name of the firm that makes it.

H. W. BRYANT.

I do not know of a roller chain which will fit the block chain sprockets. Possibly the maker of such, if there is any, or some of our readers seeing this, may be able to advise. You can easily write the chain makers whose advertisements appear in our columns and inquire. You may be able to get better block chains than the ones you have had in the past. Better steels are now on the market than when block chains were common and the makers now appreciate the importance of putting better material into their product.

Faulty material and inadequate design were the two faults that largely killed the block chain. In the cycle business the block chain had survived the roller and proven its right to the public's favor by its superiority over the roller chain. But when the auto arrived, it was put to a new duty far beyond its strength, and entirely foreign to the uses intended for it by its designers and builders. Its failure caused the public to demand something else, and they got it, not in larger and properly made block chains, but in roller chains much heavier and more costly, not to mention their noise and complication. But the chain as a transmission device for motor vehicles can hardly be beaten, and some day in the not far distant future, the block chain will again come to the front, and people will wonder why it was not used before. This short history may help you to understand why you are not likely to find a roller chain to fit your sprockets.—C. E. D.

WANTS ENGINE DIMENSIONS.

San Francisco, Ca..

I am a subscriber of the "Cycle and Automobile Trade Journal," and am building a gasoline traction engine. I would like for you to send (if possible) the detail dimensions of the cylinders and valves, the shaft and cams and conecting rod of a Thomas Flyer, 60 h. p, 1907, or a 30 h. p. 4 cylinder light motor boat engine of good manufacture.

J. M. JOHNSON.

You will find description of a 30 h. p. S. & M. boat motor on page 251 of this Journal for April, '06, with many details. Also a description of the Thomas 60 on page 176 of the December, '06, issue. Other descriptions in past issues will furnish many valuable and practical pointers.—C. E. D.

2 Cycle Engines

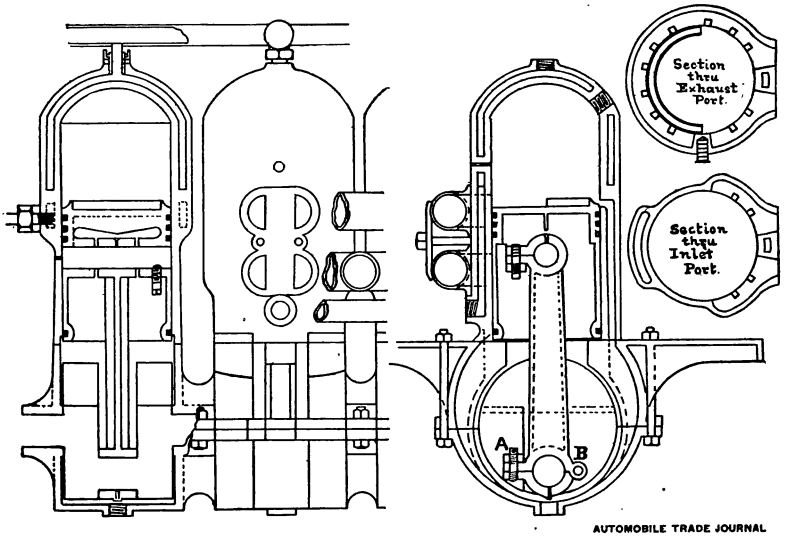
HUGH DOLNAR.

WHAT IS THE DIFFICULTY?

Stockton, Cal.

I am sending you blue print of an engine I built some time ago. I have been a close reader of the writings of Mr. Malcolm, deceased, and this engine was built fairly close to his ideas as laid down for size of parts, etc. According to figures, the engine should develop some 50 odd H. P.

The absence of section hatching and of important dotted lines and the manifestly incorrect exhaust and intake port sections, make it very difficult to tell exactly what the construction is. The intake port is 5-16 long, and extends nearly half way round the cylinder. The exhaust port is ⅝ long, same circumferential extent as the intake port. The crank-box port is 5-16 long, circumferential ex-



Cross two-cycle motor, four water-cooled 5-inch bore cylinders, 4 inches stroke, should show about 75 H. P. at 1200 R. P. M. Does show from 6 to 10 H. P. at 800 R. P. M., which is its best rate under load.

It runs light up to 1300 R. P. M. but under load, we cannot get more than 800 out of it, with about 6 to 10 H. P.

Am using 1908 Holley Carburetor, with 100 lb. fly wheel and ordinary rope lined brake for testing. Can you give any idea why we cannot get more power out of it? I hope this may enlighten some others as well as myself.

H. N. CROSS, M. D.

tent not shown. The side-pipe from the crank-box to the intake port is far too small in cross-section area. The deflector, integral with piston, which directs the entering charge upward in the cylinder is ⅜ high. The crank box is filled with pieces of wood fixed to the crank-arms, as much as is possible, but the long lug on the left side of the rod-box on the crank-wrist, at A and the rod-cap hinge

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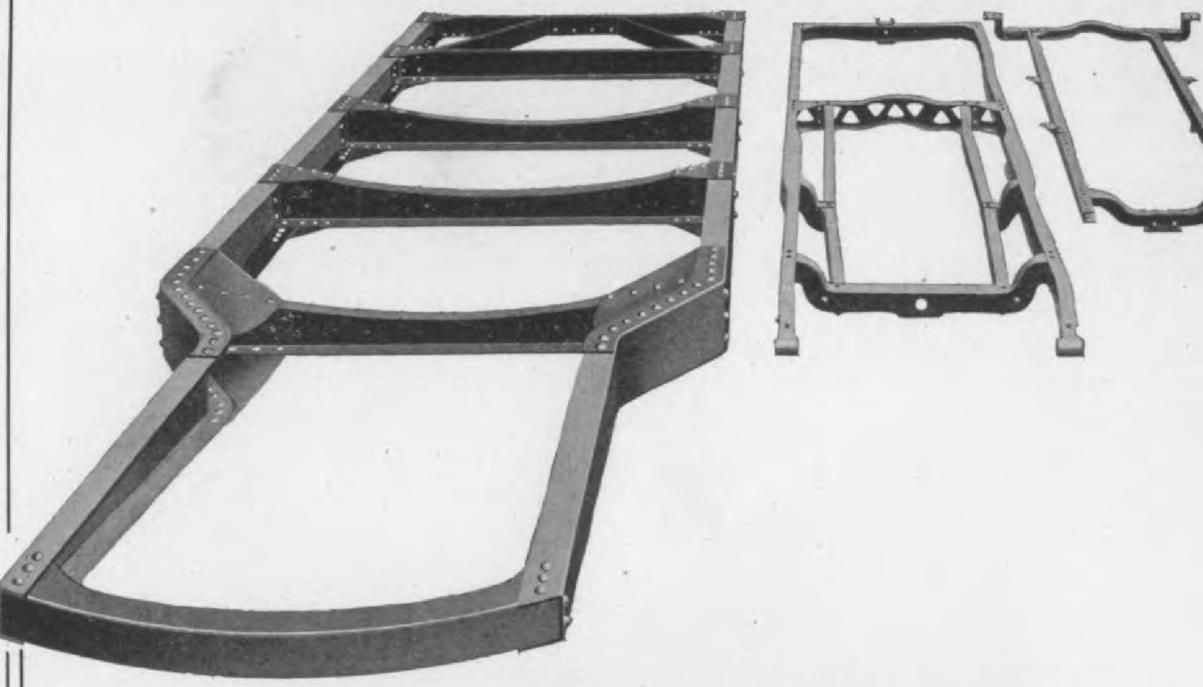
From Smallest to Largest Pressed Steel Automobile Frames

High Carbon, Nickel or Chrome Nickel Stee



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at B. demand a large clearance in the crank-box and taken in connection with 5-16 crank-box intake-port, which has not nearly enough area, and the extremely long pistons, 6⅛ ins. for only 4 ins. stroke, probably reduce the crank-box pressure to 1¾ lbs. or thereabout. For the 2-cycle rod the cap should be held with screws, one or two, on each side of the wrist, and placed as close to the wrist as is possible. The screw bodies need not clear the crank-wrist by more than a sixteenth of an inch: this construction keeps the wrist end of the rod small as possible, and greatly reduces the crank-box clearance. The 2-cycle piston length can well be much less than the piston stroke, instead of more than 1½ times the piston stroke as in this example.

One and a half inch diameter carbureter and exhaust pipes are used, the exhaust pipe over the carburetor pipe, but the ports are bridged and the passage is greatly impeded by the bridge, as the exhaust pipe is not enlarged at this point.

There is no gain at all in very short ports up and down for the 2-cycle motor, and all the ports are far too small in this example. When crank-box pressure is used all clearances should be as small as possible. The unloaded maximum R. P. M. of this motor is given at 1300; it should have been at least 2200. With everything as it should be four 2-cycle cylinders 5x4 ins. should show at least 75 B. H. P. This is simply a case of restricted respiration; the motor cannot breathe. With two 2-cycle cylinders Gulick showed 51 B. H. P., cylinders, 5½ ins. dia., if I remember rightly, and 5 ins. stroke, crank-box pressure.

In my opinion the 4-cylinder 2-cycle motor is altogether a mistake; 3 cylinders, 2-cycle give same torques as the 6-cylinder 4-cycle, and the 4-cylinder 2-cycle is as much of an error as the 8-cylinder 4-cycle motor.—H. D.

Difficulties Successfully Overcome by Users

Under the above heading we will be pleased to publish how *you* solved *your* automobile difficulties. Many troubles have been successfully overcome by means of the answers in these columns. We earnestly urge those who have been thus benefited or any who have overcome such difficulties to send a brief account of the same to the Editorial Department of the Cycle and Automobile Trade Journal.

HOW TO REMEDY KEROSENE BURNER TROUBLES.

Reading Mr. C. S. Lawton's troubles with a kerosene burner, I wish to say I use the same make of burner, only 18 inch, and after about 3 months' fooling with it, trying to make it steam and pilot stay lighted, and spending quite a little on pilot rods, I set out to improve it or unprove it, as it might come out.

I first took a fine saw and sawed the slots larger. This saw would nearly go into the slots, but not quite, so I cut it down as far as slots went, put it on the car, and, to my surprise the old thing steamed very well, and has not troubled me much since. I find, however, where kerosene is used it soon gums up the regulator and valve tips, and the slow steaming is blamed on the burner, when it ought not to be. After using kerosene for about two weeks, fill a tank with ½ gasolene and the rest with kerosene. This will clean the system out nicely, and your car will steam well, or if you put one gallon of gasolene into the tank each time, this will do away with the gum which is the cause of so much trouble in kerosene burners, and the pilots will work much better.

I carry 400 lbs. on a large touring car, with 6 aboard, and have no trouble as a rule to hold steam, and carry only 50 to 60 lbs. of air on the main tank and pilot.

Speaking of the roaring noise which I have heard a great many users of this burner kick against, I can say it never has troubled me any, except if turned on the hard before good and hot it will roar badly for about two minutes, and then stop.

As for carbon, I never have seen any since my burner was put on the car. My gas is so dry it cannot be seen after the burner has been going a few minutes.

My pilot, which troubled me considerably by going out, I remedied by making the hole in the end large enough to let the carbon dust pass through, and since then have never had it go out.

I put under the seat an old Mobile muffler tank, and use a very fine copper tube to the pilot, using a Tee with this, connected to the Tee with valve, and connected to the kerosene line. To start the pilot I use a gasolene torch and just warm the outside pilot, which takes about two minutes, then let on the gasolene and warm the main nozzles, and in three minutes after I have started to heat the pilot the full burner is going with no oil at all. This pilot I let run until ready to start out, then close the gasolene and let on kerosene. In this way I never have had any trouble whatever, not even in starting, as the gasolene seems to clean it out thoroly. If the pilot has been going all day, when I put it out I open the gasolene line and close the kerosene, and let it burn gasolene for a half-minute or so, then put it out.

I fill the small two-quart tank ½ full of gasolene and pump up 45 lbs. I have not used two quarts all summer for starting. I do not trouble at all with the pilot tank; in fact, hardly ever look at it, as long as it fires.

This will do the work perfectly, and is not such a tiresome job as Mr. L. makes of it, which would discourage me so I would never use a car. I lighted my car one evening, and was out of my garage with 400 lbs. in less than ten minutes, and have done it in six, with 300 lbs., to see what I could do.

Be sure your pilot rod is hot, or it will smoke and flood badly. If it is thoroly hot, you will have no trouble, or, at least, that has been by experience.

I know one party who had three of these burners and could not use them, and he filled up the slots and it did no good. That is not the trouble; the noise is due to such a high air pressure, and will never be overcome until the burner is made with more slots or larger openings, and 50 to 60 lbs. are used. I have run my car on good state roads on 30 lbs., and had no trouble whatever to hold steam at a speed of 15 miles per hour, as long as the road was good, but on 60 lbs. it will make any old road or hill with ease, without falling off of steam to speak of.—J. A. W.

The Seitz Automobile and Transportation Company has been presented with three acres of land and $1,000 in municipal bonds by the Common Council of Monroe, Mich. The company in return will erect a factory costing $8,000.

The Hess-Bright Mfg. Co., Nineteenth and Hamilton streets, Philadelphia, maker of H-B ball bearings, has opened a New York office at 131 West Street Building, West and Cedar streets, with R. D. MacDonald in charge.

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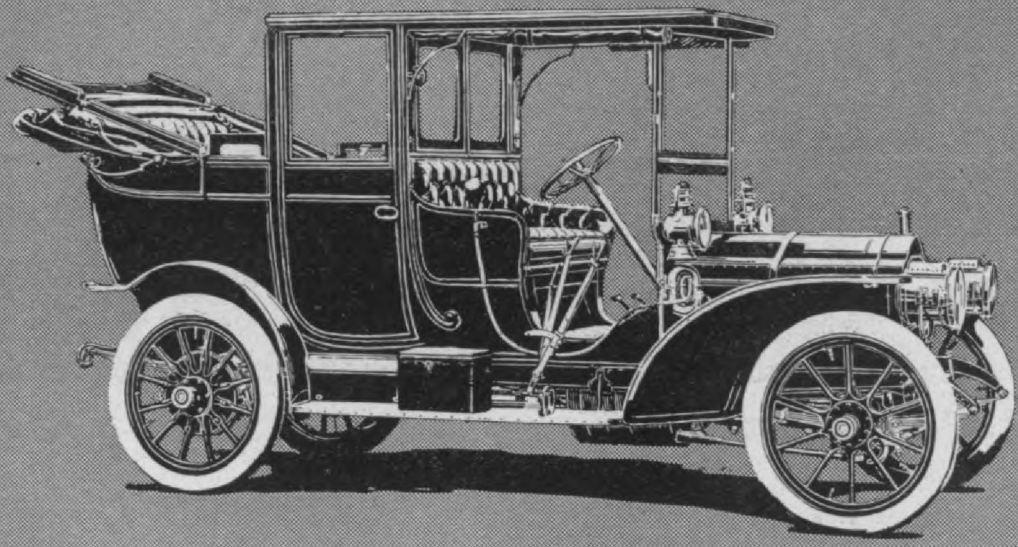
Packard

"THIRTY"
1908



"Ask the man that owns one"

PACKARD MOTOR CAR COMPANY
DETROIT, MICHIGAN

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to Motor Co. factory at Bryn Mawr, Pa.

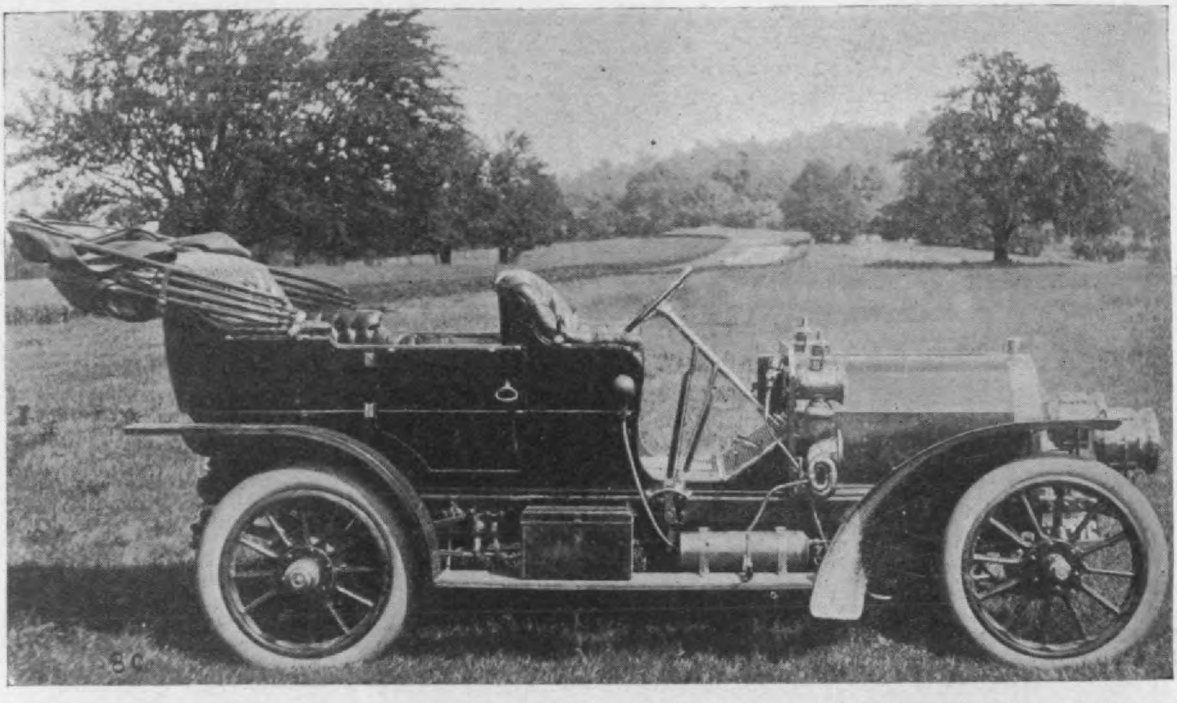

Fig. 1. 1908 "Type C" Pennsylvania Car. The motor is four-cylinder, vertical, cylinders ca n pairs, 4¾x5¼ inches, valves in the head, 40 to 45 H. P. Transmission and rear axle form unit. Three speeds forward and one reverse are provided. Annular bearings are used thruou The rear axle is clutch driven and floating. The body is hammered aluminum, tires 34x3½ fro 34x4½ rear. The weight is 2800 pounds; price, $2800. In addition to this model the compa offer a Type "C" Roadster of the same construction as above, only with a specially design body, and greater angularity to the steering column.

Two models, Type C Touring Car and Runabout on the same chassis, are of- red. A feature is the valve arrangement the cylinder heads and the unit con-

take and exhaust valves operated fr

one rocker arm and one cam shaft, a those with two cam shafts and roc arms for each valve. This latter type used, as it is believed to possess ma

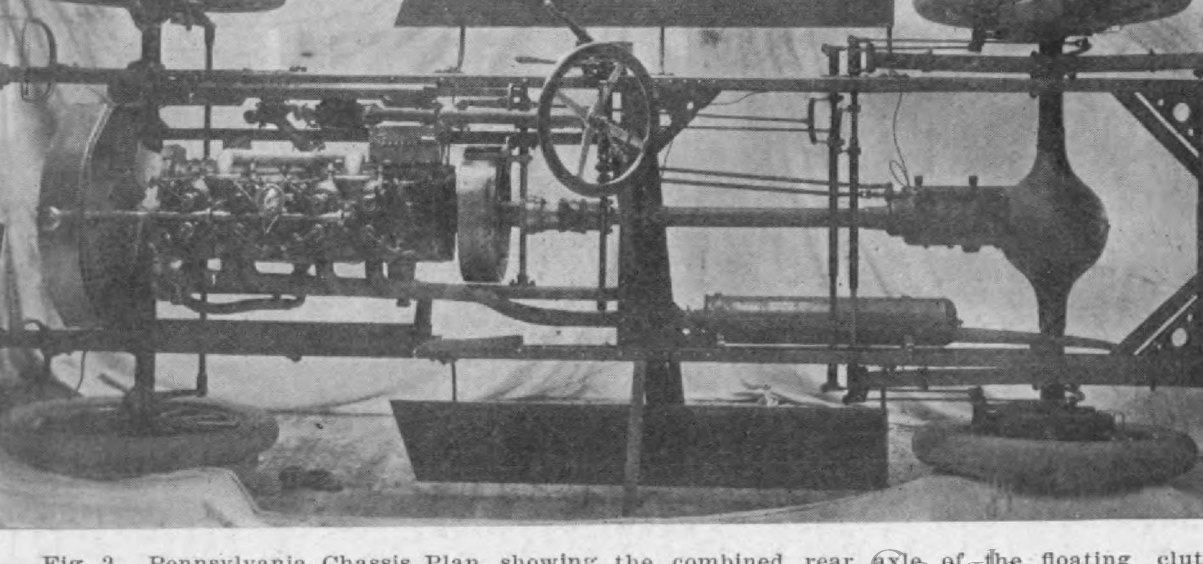

Fig. 2. Pennsylvania Chassis Plan, showing the combined rear axle of the floating clut driven type and the annular bearing chrome nickel steel, three speed and reverse change spe gear. The frame is of prest steel with large gussets. The wheel base is 114 inches, and inch clearance is provided.

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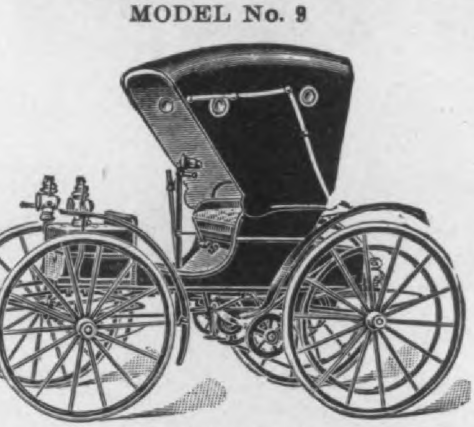
MODEL No. 8

MODEL No. 9



MODEL No. 10

MODEL No. 11

The Car With
REPUTATION

Five Years of Succes

The records of the participation
the **Holsman Automobile** in public conte
date back to 1902, when it won a bl
ribbon in the Chicago 100 mile Rel
bility Run of that year.

Some of the more recent recor
are:

Chicago 100 mile Reliability Run,
July 26, '06:

**Perfect Score in runabout class a
first place in touring cars in our cla**

Algonquin Hill Climbing Contest,
September 6, '06:

**Making better time than machines
nearly double the price.**

Algonquin Hill Climbing Contest,
August 9, '07:

Fastest time in its class.

Chicago 150 mile Reliability
non-motor-stop Run,
June 28, 07:

Perfect score.

Chicago 95 mile Fuel Economy conte
September 13, '07:

**Smallest gasoline consumption, wi
one exception; 29 miles per gallo**

he Holsman Automobile Compan

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The oldest and largest manufacturers of high wheeled automobi

ch cam shaft is carried in four bronze
arings of an aggregate surface of 8½
ches. The cam shafts together with the
ms and bearings can be drawn thru
e end of the crank case, and the gears
e indext for the proper replacement of
e cam shafts. The valves are mounted
cages and placed in the cylinder heads.
e valves, springs, and washers are all
ntained, and are locked in position by
ans of a ring whose inner surface is
xagonal. This permits of the instant
moval of the valve cage. A combination
bestos and copper gasket is interposed
tween the valve cage and the seat,
ich insures the absolute confinement

gear pump, and has a capacity of 8 g
lons of water per minute at six hundr
revolutions. A valuable feature of
motor is the liberal water space, b
around the pistons and around the va
cages. This absolutely prevents
valves from over-heating and valve ca
warping. All water connections are br
brazed and attached to the cylinders w
intervening fibre gaskets. Combinat
copper and asbestos gaskets are used
all exhaust connections. The commuta
is openly and freely located on an alu
num column between and above the cy
der bearings. The commutator is driv

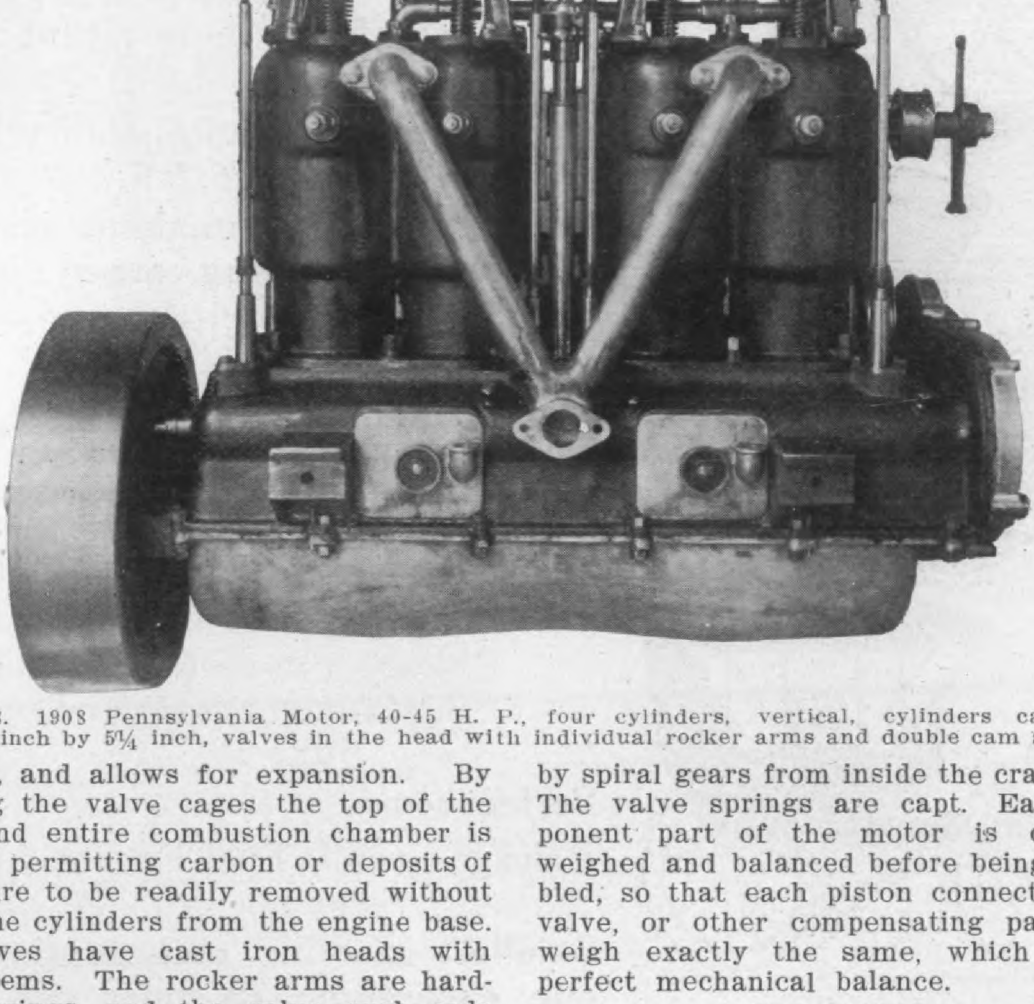

Fig. 3. 1908 Pennsylvania Motor, 40-45 H. P., four cylinders, vertical, cylinders cast in
irs, 4¾ inch by 5¼ inch, valves in the head with individual rocker arms and double cam shaft.

gases, and allows for expansion. By
moving the valve cages the top of the
ston and entire combustion chamber is
posed, permitting carbon or deposits of
y nature to be readily removed without
king the cylinders from the engine base.
e valves have cast iron heads with
ckel stems. The rocker arms are hard-
ed forgings, and the valve push rods
e tubular with accurately machined ad-
sting ends. All fulcrum pins are hard-
ed and ground, insuring long life.
The pistons are of the four ring type.
e piston pins are hardened and ground
d securely locked in the piston boxes.
The crank shaft is an accurately ma-

by spiral gears from inside the crank ca
The valve springs are capt. Each co
ponent part of the motor is carefu
weighed and balanced before being asse
bled, so that each piston connecting r
valve, or other compensating part m
weigh exactly the same, which insu
perfect mechanical balance.

THE CLUTCH.

The clutch is a self-contained inter
cone broad faced, of such a degree t
it will readily engage without jerking. T
cone is fitted with ball spring thrust, a
ball thrust for the extracting. It is lu
cated from the hollow crank shaft and
quires no attention. Hardened and gro

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Helmet Oil Ends Your Oil Worries

Helmet Oil gives the same amount of lubrication on a cold day as on a hot day. Temperature does not affect it. You do not have to watch the lubrication of your car when the days change in temperature.

If you use common liquid oil, the bearings require constant watching. If the day is hot, liquid oil becomes thin, flows too readily, the bearings are flooded and the supply is exhausted. On the other hand, if the day is cold, the liquid oil congeals, flows slowly and is very slow acting. Helmet Oil is not affected by heat or cold. It is not a liquid oil. On account of its "body" or density, the temperature of any day does not affect it. Helmet Oil does not contain an atom of pitch, gum or acid. It will give you perfect satisfaction on every bearing in your automobile.

The merits of Helmet Oil can be thoroughly demonstrated on *your* car *free* of expense to you.

Try It Free—Write for Booklet

Send us the name of your dealer and we will have him give you a free sample to try. Put it on the bearing that is giving you the most trouble and you will find that it will give perfect satisfaction.

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transmission is contained in an ex-
ion of the manganese bronze differ-
al housing, and is of the selective type.
gears are one-inch face of chrome
el steel. The gear shafts are also
me nickel steel, and all fitted with an-
r bearings. Two sets of annular bear-
with spacer are placed adjacent to the
el pinion, insuring alignment at all
es. The main shaft is fitted with a
of roller bearings on the round end
rotates in the pocket gear. The
ing thrust between the main bevels is
n up by a one-inch steel ball inserted
he pocket gear. A positive interlock-
system is used, preventing gears from

ferential housing, the differential with a
bearings contained can be readily remove
without jack or pit.

The main driving shaft, the axle halve
axle and torsion tube are made of chrom
nickel steel. This tube is supported a
its forward end by a steel hanger firml
attached to the frame, and is fitted wit
a spherical bronze ring permitting the to
sion tube to travel longitudinally or ci
cumferentially, thus removing a large pa
of the strains from the springs, frame, an
axle. The torsion tube hanger is supplie
with oil from the lubricator at regular i
tervals. The rear axle is securely ancho
ed to the frame by means of adjustabl

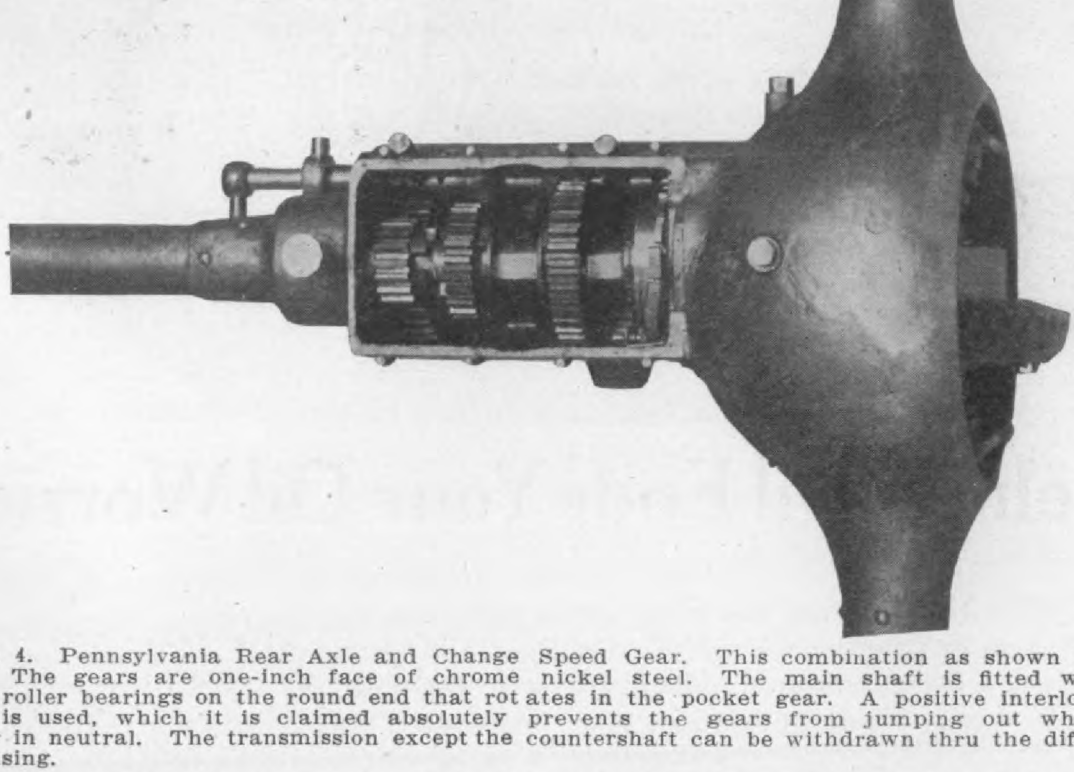

Fig. 4. Pennsylvania Rear Axle and Change Speed Gear. This combination as shown forms
nit. The gears are one-inch face of chrome nickel steel. The main shaft is fitted with a
of roller bearings on the round end that rotates in the pocket gear. A positive interlocking
em is used, which it is claimed absolutely prevents the gears from jumping out while in
h or in neutral. The transmission except the countershaft can be withdrawn thru the differen-
housing.

ping out while in mesh, or in neutral.
ubricator tube delivers oil to the
smission at regular intervals. The
shift lever travels in an H slote con-
ently located at the driver's right,
each speed position at each end of the
e makes the speed indication absolute.
transmission, excepting the counter
t can be withdrawn thru the differ-
al housing. The differential housing is
erical Parson's Manganese bronze cast-
The differential and axle halves are
contained and of the floating type. A
jawed clutch is fitted on each squared
of the axle halves and engages simi-
jaws in the rear wheel hubs. The
ght of the car and burden of the load

tubular reach rods. The front axle is
one-piece drop forging with spring seat
integral. The yokes and spindles are e
tremely large and calculated to withstan
an excessive overload.

STEERING GEAR AND BRAKES.

The weight of the car and pivot actio
is carried on one inch steel balls locate
in the dome of the yoke and held in p
sition by a bronze bushing. The steerin
arms are attached to the spindles b
means of a tapered broached hole an
are securely locked with nut washer an
pawl. The main tie rod is to the rea
of the axle and all nuts and pins a
hardened and ground. The wheels a
fitted with annular bearings set again

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The Silent Northern 24.2 H. P. (A. L. A. M. rating) $1600

f. o. b. factory—includes full gas and oil lamp equipment.

For 1908 the Silent Northern embodies the same strong, enduring construction that has given it supremacy for five successive years, plus *MORE POWER,* due to large cylinders, larger valves and other refinements. Five years experience manufacturing this one type insures perfection in every detail.

¶ Style, efficiency, reliability, quietness the conspicuous features. As you are in search of these qualities any comparison you may make ***must*** confirm the fact that this is the greatest value the automobile world affords.

¶ Perfectly balanced motor — *the quietest, smoothest-operating,* simplest automobile engine made—supported at three points—the "Northern way." The mechanism cannot get out of alignment no matter how difficult the roads.

¶ Every part accessible and every part protected. Full control on steering column.

¶ Each detail of construction thoroughly tested out and successful. No guess work—no experiments. This car will prove for ***you*** as it has for others—a genuine money-saver—and give you every comfort and pleasure possible to get from any machine regardless of price. Investigate. Find out for yourself. Send for the Catalogue.

NORTHERN

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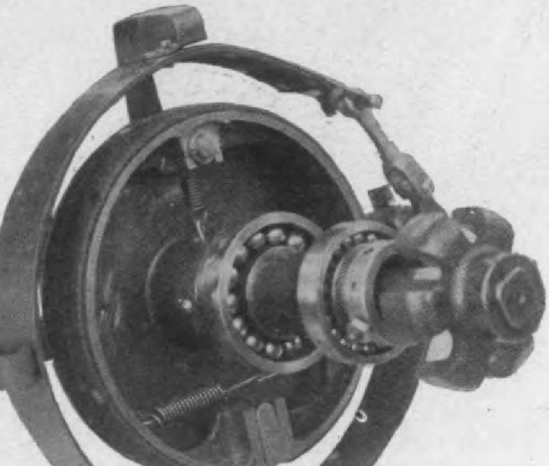
el drums. The emergency brakes, ac-



ig. 5. Pennsylvania Hub Brake. The kes are of large surface and provided with ositive device to prevent dragging. Camel's r lining is used on all brakes.

ed by a lever traveling in the change ed guide, are of the expanding type. nels' hair lining is used on all brakes, special attention has been given the gn to insure the complete disengage-t of the bands. The steering de- is an external and internal worm nut type, irreversible and fitted a spring socket tie rod end. housing is securely fastened between main frame and the sub-frame. The mn passes thru a base attached to dash and toe board, which further ens it. The spark and throttle con-s are conveniently located on top of wheel on a stationary sector, and con-y to the usual practice are placed for ration by the left hand, leaving the t hand free for manipulation of the el.

FRAME AND SPRINGS.

ne prest steel frame is exception-heavy and is reinforced with large ets to properly care for the power weight and overcome vibration. The t springs are 2 inches wide and 38 es long. The rear longitudinal springs 46 inches long and carried from for-l shackled ends to a transverse spring nored to the frame by means of a l bracket. All spring bolts, shackle s, and shackles are ground and hard-l, all frame brackets are steel, and all ds are bearing bronze.

ne body is made of aluminum. It is olstered with the best hair, leather, springs, and fitted with numerous

the main engine bearings, and to t connecting rod bearings by means of c pillary grooves and eccentric oil ring The motor is in no manner depende upon splash lubrication. One lubricato tube leads into the commutator, one tub to the torsion hanger and ring, and on tube to the transmission and axle. I addition to the six lubricator leads, a moving parts are supplied with oil o grease cups. The clutch spring an thrust are self lubricated from the hollo crank shaft. The wheels are packed i hard grease and require little attentio Such other moving parts as the spring shackles, brake rods, and tubes requi small quantities of oil at regular interval

Realizing the demand for a high-powe ed roadster, the company is prepared t furnish a car of the same general co struction as the regular touring car, e cepting that it is fitted with a speci aluminum body. The angle of the stee ing column has been increased to prese a racy appearance. This car is made fo a touring roadster, and is equipt wit a rear seat holding two persons. The ca weighs 2800 pounds, and lists at $280

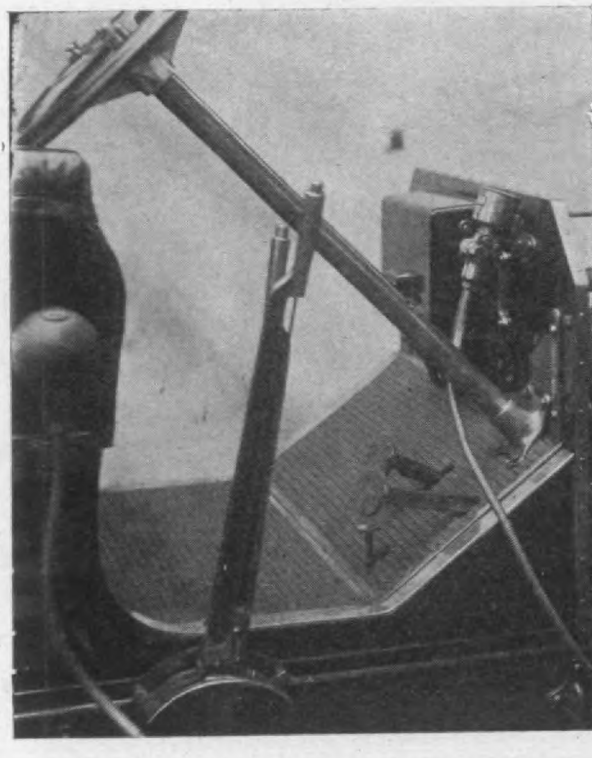


Fig. 6. 1908 Pennsylvania Control. The foo brakes are contracting bands on the rear whee hub drums. The emergency brakes are als on the hub drums, and are operated by a leve traveling in the change speed quadrant. Th steering gear is an internal and external screw and nut device. The change speed lever act in an H quadrant. The usual spark and throt tle control levers are on the hand wheel, ar

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Rambler Automobiles

For the year 1908 the entire facilities of the Rambler factory will be devoted to the production of two Models, 34 and 31.

Model 34, a five-passenger touring car with four-cylinder vertical motor, 32 horse power, has selective type transmission with shaft drive. The wheel base is 112 in., wheels 36 in., with 4 in. tires. Price, fully equipped, $2,250. The same chassis, however, with appropriate changes in detail, will be equipped with a roadster body with rumble seat, at the same price.

Model 31 is a five-passenger touring car with detachable tonneau, equipped with the Rambler unit power plant, comprising double opposed motor, multiple disc clutch and planetary transmission entirely enclosed. Price, fully equipped, $1,400. This model can be furnished with torpedo deck in lieu of the tonneau, at $1,300.

Both models have been brought to the highest possible degree of perfection in every detail that insures

Service, Economy and Comfort

A complete line of 1908 Ramblers will be shown at a private exhibit at the salesrooms of the Homan & Schulz Company, 38-40 West 62nd Street, New York City, during both New York Automobile shows.

You cannot afford to miss making a critical inspection of these 1908 models of

The Car of Steady Service.

Advance catalog now ready; write for a copy today.

Thomas B. Jeffery & Company
Main Office and Factory, Kenosha, Wis.

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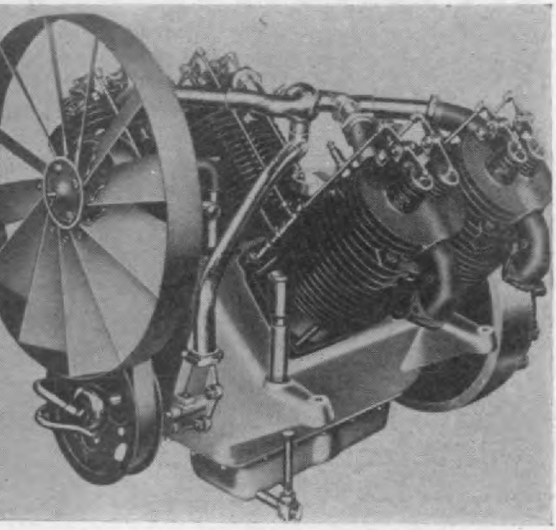
wo touring cars, Model "G" listing at 00.00, and Model "H" at $3500.00. Both e four-cylinder, air-cooled, 90 degree ors with improved detachable head nders.

odel "G" is a five-passenger car of 104- wheel base, equipt with a handsome ight line aluminum body. It has 4½-inch rear, and 34x4-inch front



he new Marmon 1908 detachable head, air-ed motor.

els, quick detachable rims and tires; clutch; selective transmission; shaft e; roller bearing steering column, and osed fenders.

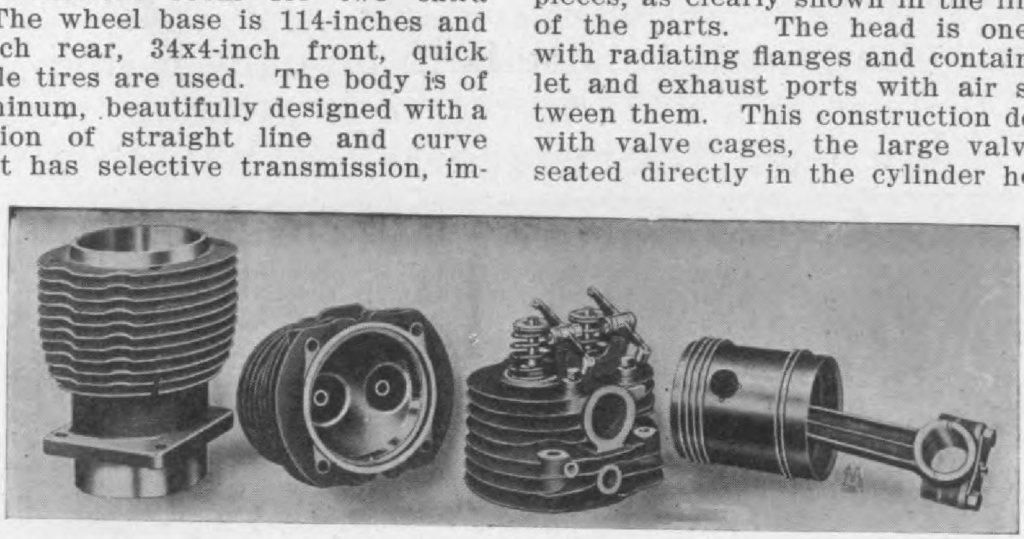
ne Model "H" is also a five-passenger with sufficient room for two extra s. The wheel base is 114-inches and 4½-inch rear, 34x4-inch front, quick chable tires are used. The body is of aluminum, beautifully designed with a bination of straight line and curve t. It has selective transmission, im-

provement. A head with radiating flange containing the exhaust and inlet ports an valves is held securely to the cylinder b four long studs passing thru the flange to the crank case. This construction doe away with separate valve cages, reduce the number of joints, makes the moto quiet and gives easy access to the valve cylinder walls and pistons for grindin the valves and cleaning out carbon de posit. It is only a moment's task to re move a head, and it is they say as quickl replaced without disturbing adjustment

The Model "H" car will also be fu nished with a 5-inch by 5-inch four-cylin der water-cooled motor to those who prefe it, and a Runabout using the Model "H chassis will complete the line; both o these being listed at $3500.00. The wate cooled motor is of the Company's own de sign and construction. It is of regulatio pattern, four vertical cylinders with larg shaft and bearings, long connecting rod large valves, intake on one side and ex haust on the other, Marmon oiling systen magneto, etc.

1908 "MARMON" AIR-COOLED MOTOR.

The principal improvement in the Ma mon 1908 Air-Cooled Motor is the type o cylinder used. Heretofore the cylinder were in one piece and secured at the base to the crank case and the valve were in separate cages held to the cylinde heads by studs. The improved cylinde 5-inch bore, 4½-inch stroke, is made in tw pieces, as clearly shown in the illustratio of the parts. The head is one castin with radiating flanges and contains the in let and exhaust ports with air space be tween them. This construction does awa with valve cages, the large valves bein seated directly in the cylinder head.



Parts of the Marmon 1908 motor, showing the detachable head in two positions. The head held by four long studs which pass thru the flanges to the crank case. The head is a sin- separate casting, containing the inlet and exhaust ports with an air space between them.

ed multiple disc clutch, shaft drive, r bearing steering column, and a ely set of fenders enclosed front and

The head joins the cylinder just abov the piston stroke, and is seated on a larg copper asbestos gasket. It is secured t

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SCHWARZ PATENT SPOKE

SCHWARZ WHEEL

FINISHED WOOD WHEEL

The tenons of the spoke are grooved and mortised for interlocking.

They are put together at one time, under pressure.

WHEEL COMPLETE

The wheel can be made complete and shipped without the hub.

For Automobiles and Heavy Vehicles. The best and strongest artillery wheel made. Spokes can never loosen. Wheel will stand where every other fails.

APPROVED AND ADOPTED BY LEADING AUTOMOBILE MANUFACTURERS

Send for illustrated booklet.

THE SCHWARZ WHEEL COMPANY

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hru bolts to the elbows, and the cop-
ntake pipe is secured to the intake
by a large brass union, a tight joint
easily obtained. The intake manifold
improved form arranged to give uni-
mixture of the gas to the four cylin-
The manifold can easily be de-
d from the cylinders and replaced
ut liability of causing any of the
to leak.

disconnecting the intake union and
xhaust pipe and removing four nuts
d may be taken off of a cylinder and
ylinder also may then be slipt off.
gives easy access to the parts for
ing, grinding the valves or for any
ion the piston may require. With
rrangement the difficulty of seating
cages tightly and danger of spring-
e cages, thus causing leaky valves,
one away with. The valve seats will
arp and the detachable head is not
ly subject to the abuse that can be
valve cages.

re is but one joint—on the large
r asbestos gasket between the head
ylinder, and with the four nuts on
ng studs this joint is easily made
nently tight. More uniform and bet-
mpression is secured the makers ad-
s, than with valve cages, and greater
thus developed. The head has a
radiating surface resulting in a bet-
oled cylinder, and valve noise is re-
to a minimum. The engine runs
quietly, than was thought possible
this improvement was made.

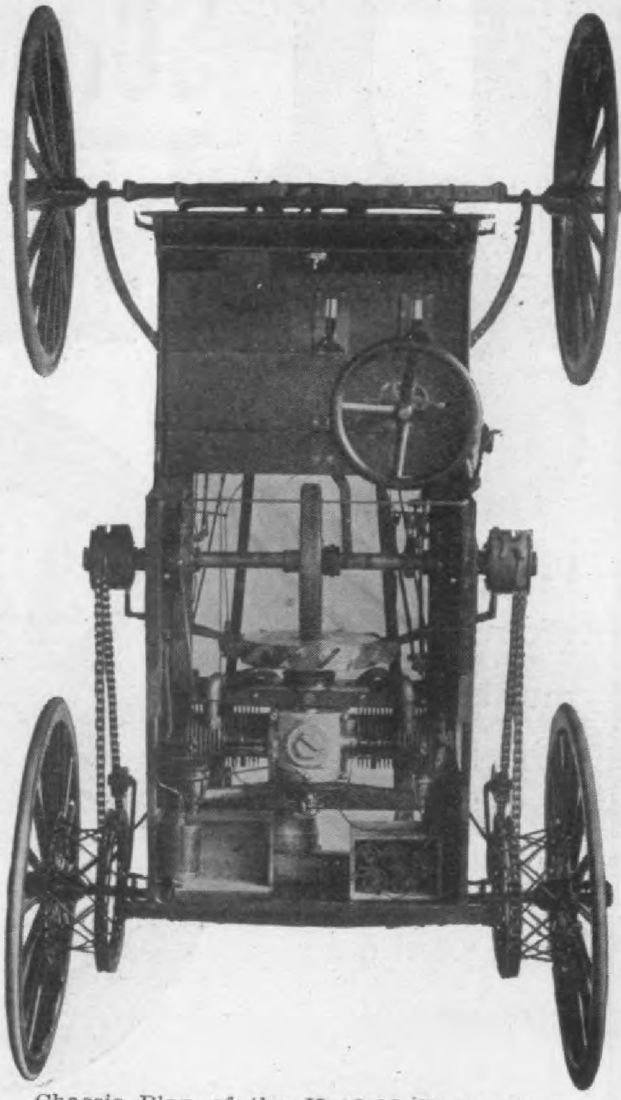
---

he Hatfield "Buggyabout" for 1908.

1908 Hatfield Buggyabout

eld Motor Vehicle Co., Miamisburg,
made but few changes in its popu-

powerful enough to take the car any place



Chassis Plan of the Hatfield Buggyabout.

at a moderate speed. Its road clearance of eighteen inches is very advantageous in traveling rocky or stumpy roads or in crossing small streams. Solid tires are used, reducing tire up-keep expense to a minimum, but the vehicle rides easily on account of its having large wheels and long flexible springs. The makers lay particular stress upon the quality of this car. The buggy part is built just as well as it can possibly be made. All sills, reaches, etc., are heavily ironed and it is claimed will stand hard usage for years, with practically no expense outside of tire renewals, say once a season.

The mechanical parts are in accordance with the buggy part, in that the engine is especially designed for this service, and every part is thoroly tested before it is put in place.

Finally, when the car is ready to ship

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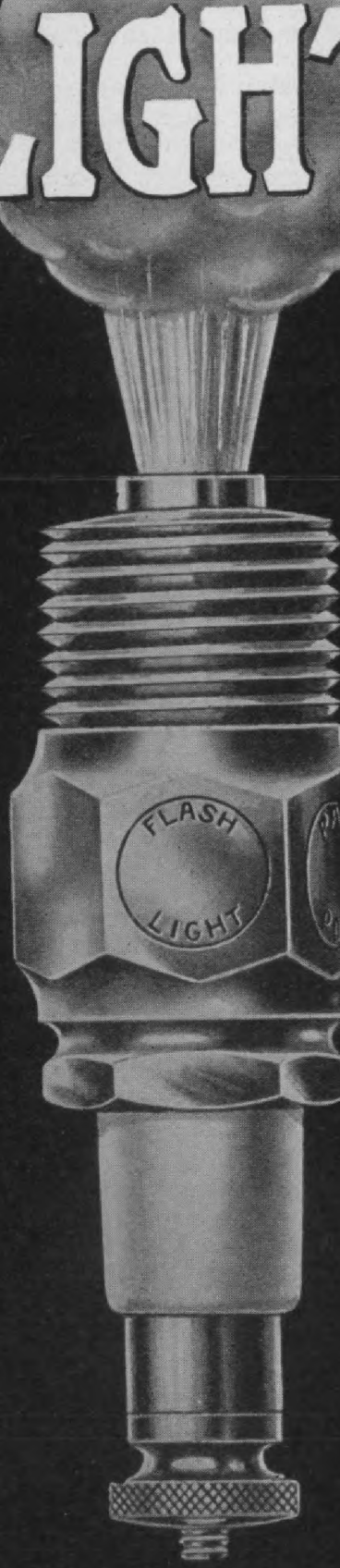
FLASH-LIGH



,000 MILES
Vithout Cleaning

ıt is what users of **Flashlight Plugs** tell If the spark plug was the only part of the ine to go wrong every car fitted with **Flash-ıts** would have successful sealed bonnet con-ts. Strong statements these, but facts are k of the claims and the proofs which we offer convince you are the record of users through-the country. Every mail brings us letters of ise. Do you want to see copies of these? ¶ If ı are not using the **Flashlight Plug** it is dent that you have not tried it and not having ed it is due to the fact that you have heard of many "world beaters" that you have been aid to make the test. Don't let this prevent ır enjoying a great improvement. Remember, are willing to show you that the **Flashlight ıg** is superior and that the words of praise are m those who have purchased plugs and not ose who sell them.

Write for particulars and put an end to your ırk plug troubles.

ANNEY, STEINMETZ & CO.
PHILADELPHIA

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rate this car and, as some changes e been made, an up-to-date description given below.

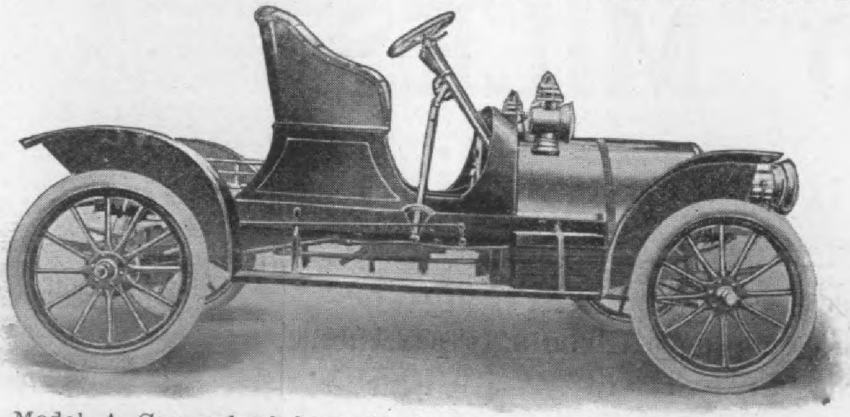
ince previously described, the piston oke has been increased ¼-inch, the nder dimensions now being 3¼x3¼ in-s. The motor consists of four sepa-e air-cooled cylinders and develops 12 sepower. The heads, which are cast arately, contain the valve chambers and rk plugs and can be removed without urbing the rest of the engine. Both es are mechanically operated. An liary exhaust valve is provided which

tegral with the flywheel; is adjustab and has a large friction surface, whi enables the car to start without a jer It operates by a foot lever.

The oiler is of the force feed type, be driven, with a sight feed on the dash.

The front axle is of heavy steel tubin The rear axle housing is a steel castin and contains the bevel and differenti gears, with steel tubing sleeves carryin the live axle on annular ball bearings.

The wheel base is now 96 inches ar the gage 56. Wheels are all 32 inches diameter and shod with 3-inch tires.



The "U. S." Model A Car; wheel base, 96 inches; gage, 56 inches; 32x2-inch tires, front and ; four full elliptic, 40-inch springs; hickory frame; tubular front axle; live, divided, rear axle ing on ball bearings; ball bearings wheels; 3¼ by 3¼, 4-cylinder, air-cooled, 12 H. P. or; two contracting band brakes, foot operated; force feed oiler, splash in crank case; weight, pounds; price, $900, with full kit of tools, tire repair outfit and pump.

s automatically and permits the es-of the larger portion of the burned . It is easily accessible for regrind-which can be done without removing om the cylinder. Further provision ooling the engine is made by placing t driven fan in front of it.

e crankshaft is provided with five ad-ble, genuine babbitt bearings. These arried in the upper half of the crank-as are also the cam shaft bearings, ame shaft and gears. The lower half e crank-case is removable, permitting access to the crankshaft bearing, the haft, gears and cams, without dis-g any of these parts, and it is so ructed as to contain an even level at all times.

pistons are of good length and n four rings each. The connecting nd crankshaft are drop forgings.

engine is supplied with one Scheb-rburetor. There is provided on the side of the engine a cold air valve, is operated by the throttle lever the supply of gas has been shut a further movement of the throttle ld air valve is opened, thus permit-stream of cold air to enter the

speed of from 5 to 35 miles per hour car be maintained.

The body is dark green in color, and has very beautiful lines, with curved shield over the dash and a long hood, giving the machine a very stylish appearance. It is ironed for a top. Seats are of the individual type, are large and roomy, and are fitted with soft edged cushions. Trimmings are of the best leather. Price is $900. The "U. S." car is the product of the United States Motor Car Co., Upper Sandusky, Ohio.

The American Motor League is getting busy, having already organized divisions in the following States: Vermont, New Jersey, Missouri, Alabama, Wisconsin, Minnesota, Georgia, California, Iowa, Ohio, Massachusetts, Indiana, Michigan, Maine, Pennsylvania, New Hampshire, Mississippi and Connecticut.

The first number of the "American Magazine of Aeronautics" published at 142 West Sixty-fifth street, New York City, appeared in July. It is a monthly, edited by Mr. Ernest La Rue Jones, secretary of

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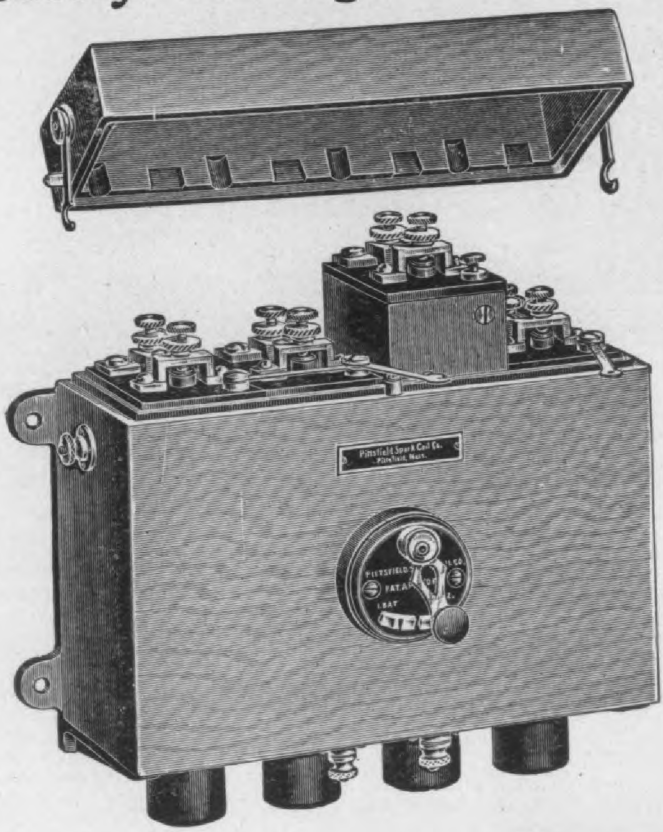
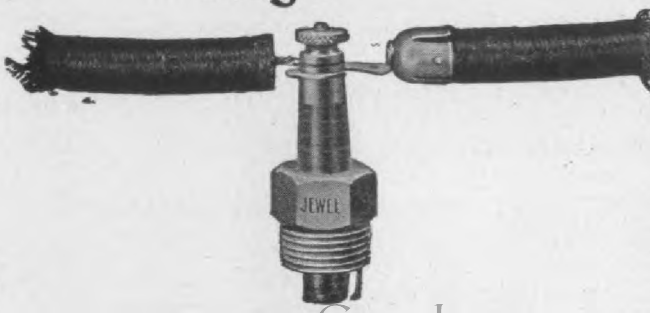


If you heed the experience of others, you will have your car equipped with

Pittsfield Magnetos, or Pittsfield Spark Coils Pittsfield Timers and Jewel Mica Spark Plugs.



They will never fail you in any emergency.

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600 cars in 1907, about 500 of which
e five-passenger touring cars, and 100
e three-passenger runabouts, same
e, $2500 for each.

1 1906 the company adopted the I-sec-
steel drop forging axle in place of
tubular front axle before used, and
ut 100 of the 1907 Wayne cars had I-
ion, drop forged front axles.

o date the company has put out near-
500 tubular front axles with not even
single instance of failure of the body
tubular front axle. The Wayne Com-
y sold in 1906-7 about 200 I-section,
l, drop forged front axles, all drop
ed in two pieces and electric welded
ne middle. Up to August, 1906, seven
ne electric welded axles had failed at

steel, stub axle yokes and applied ste
casting spring pads.

For 1907 the Wayne cars had the slidi
gear box combined in an integral, alun
num alloy casting with the bevel ge
housing of the rear axle. This gear, 6-
chrome nickel steel, tempered, selecti
change, has given satisfaction, and is r
tained for 1908.

The Wayne 1907 motor, four, 4-cycl
water-cooled, 4½x5¼-inch cylinders.
retained, with only a few changes of d
tails.

The 1907 wheel base, 107 inches, is r
tained for 1908, and the same wheels, wit
tires 34x3½ inches front and 34x4 inche
rear, are also continued. The fron
wheels are on ball bearings, and the rea
axles are on Hyatt roller bearings, rea

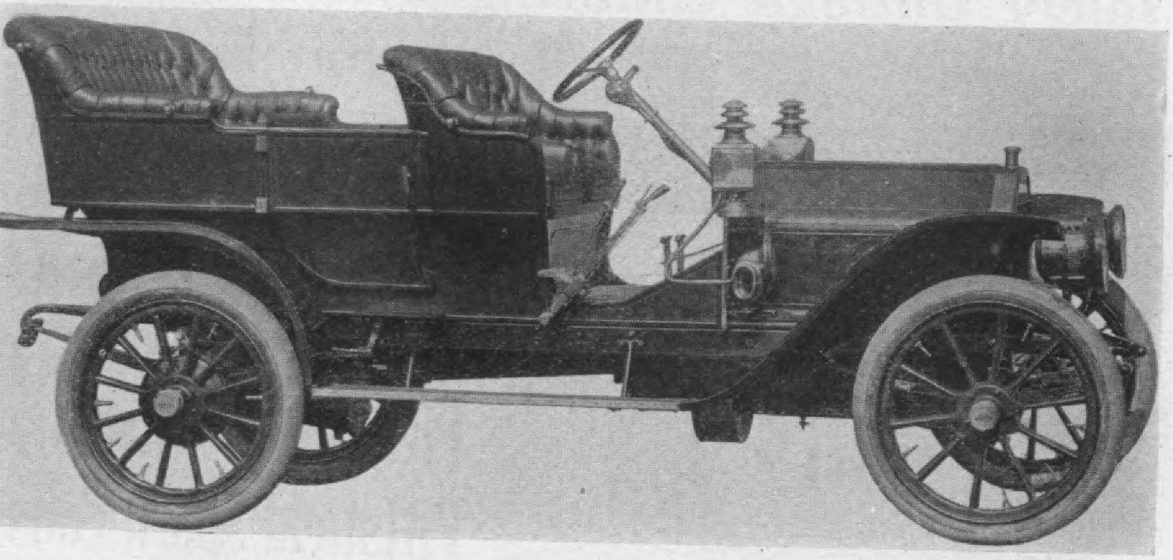

Fig. 1. Wayne 1908 5-passenger touring car. Wheel base, 107 inches; gage, 56 inches; tires, ½ inches front, 34x4 inches rear; motor, 4-cycle, water-cooled, 4½x5¼ inches cylinders; nom-35 H. P. at 1100 R. P. M. Selective, sliding gear speed change in box integral with bevel housing, 3 forward speeds and a reverse. The wheel base is 107 inches, prest steel frame, inches spring eye to spring eye, 4 inches greatest depth, half-elliptic springs, torsion arm no struts, with two outside hand levers, two large pedals and a small accelerator pedal, exterior and interior rear hub-drum brakes, all fiber-faced, applied thru eveners. The board is of mahogany, flat, open for the touring car and cowled for the runabout; so far thing is about in the middle of 1908 practice. The two Wayne features making pretence vergence from the beaten path are, combining the bevel gear housing and the change gear nd the placing of the internal expanding clutch shoe inside the clutch internal drum, inte-with the fly wheel. Neither of these thoroly tested variations from the more ordinary ice cam make any pretence to novelty. The tonneau body side doors swing to the rear. The au seats three passengers, and the usual two seats are in front. Weight, about 2400 s. Price, $2500, including 5 lamps, mats, horn, tools, gas generator and cape top, all for extended touring.

eld, and at that time electric weld-
as abandoned, and all forged axles
hereafter were hand welded in the
, with no more axle failures re-

the fact that no steel tube Wayne
ver failed, and the consideration
e I-section axle is stronger up and
than it is sidewise, while the steel
as equal strength to resist stresses

wheels retained on the tapered axle ends with keys and nuts, all the same for 1908 as in 1907, these important details having proved wholly satisfactory.

The springs and chassis frames are continued unchanged, as are the Blood Brothers universal joints, and the right and left screw thread steering gear.

The Wayne factory, of which the rear portion only was erected in 1906, [illegible]

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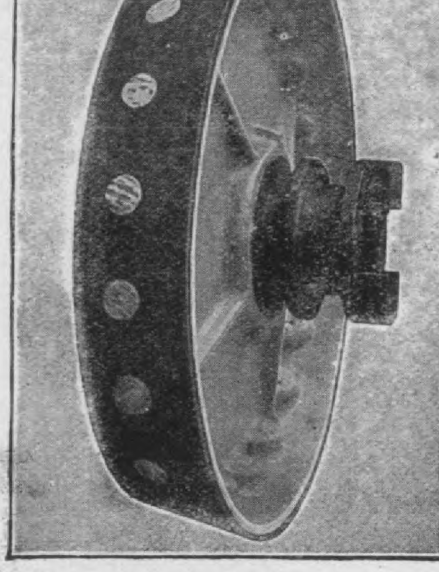
CORK INSERT

(PATENTED)

Clutches and Brakes



PIERCE GREAT ARROW

Cork Insert Clutches, give a gradually increasing contac until full torque is reached, *absence of slip when engaged*, an transmit all the power the engine develops.

Cork Insert Brakes mean much to you and your car. I crowded city streets and many other tight places, these quick *sure to hold* brakes meet every requirement of safety.

Used in thousands of cars by the thirty-four manufacturers here given

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Brakes.

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American Machine Mfg. Co.
Dolson Automobile Co.
Queen Motor Car Co.
Frontenac Motor Co.
Deere-Clark Motor Car Co.
Model Automobile Co.

Expanding Ring Clutches.

Coppock Motor Car Co.

Metal-to-Metal Cone Clutches.

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Ignition Devices

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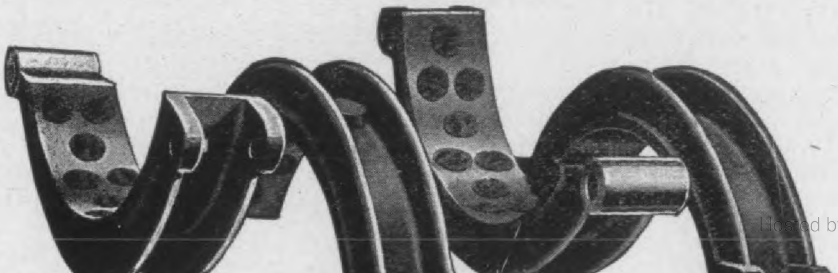
National Brake & Clutch Co., Owner and Patente 16 State St., Bostor



Standard Brake Co

Representativ

101 West 66th St

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y will be placed on the one single form hassis. The proportionate numbers of touring cars and runabouts may be nged after the early show, the Wayne agement highly approving the ad- cement of the show date, which will ble the production of cars in time to early orders with certainty.

he 1908 5-passenger touring car has inch wheel base and 56-inch gage. tires are 34x3½ inches front and inches rear. The motor is four, four- e, water-cooled, 4½x5¼-inch cylinders, d at 35 H. P. at 1100 R. P. M.. The e speed forward and one reverse slid- gear change speed is in a box integral the bevel gear housing on the rear . The tonneau doors swing to the . The car weighs about 2400 pounds, sells for $2500, including an equip-

change gears are chrome nickel steel, ti tempered. The bevel gears are of th same material, pinion tempered, beve gear thrusts taken on ball bearings. Th balance gear is spur, 12 pinions. Th front wheels are on two circles of ball ⅝-inch diameter inside and ½-inch diame ter outside. The rear axles are on Hya rollers.

The chassis frame is of prest steel 3-1 thick, 4 inches greatest side frame depth The whole chassis is designed with a vie of obtaining the most reliable constru tion thruout, at a comparatively moderat cost, and to this end no component no of indisputable value appears in this co struction. Whatever is essential an necessary is present, and is good, we finished and durable. What is of doubtf utility is simply left out.

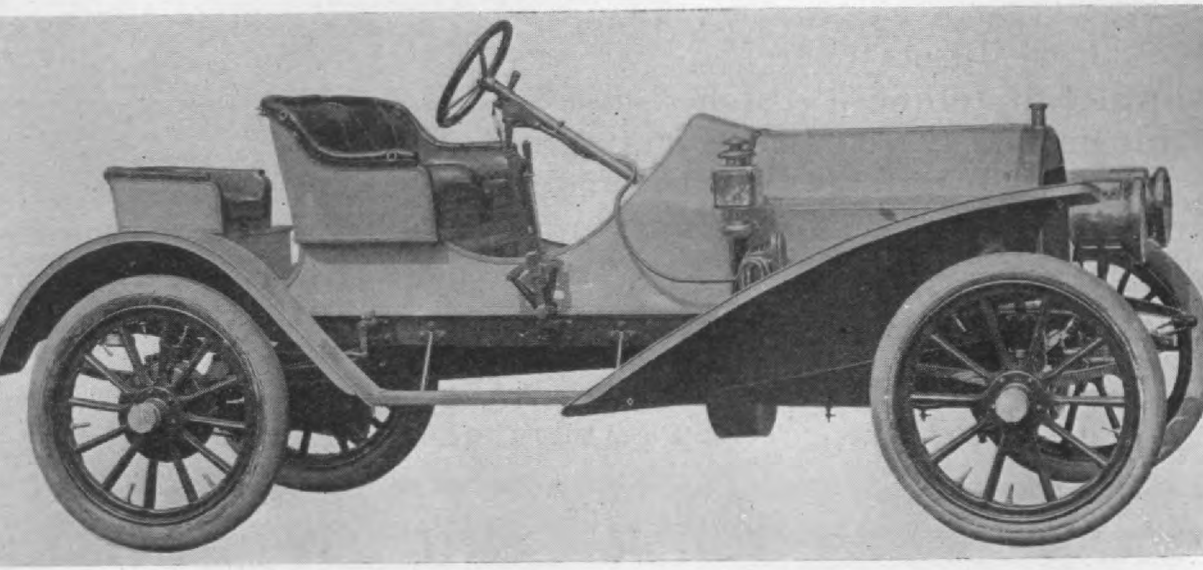

Fig. 2. Wayne 1908 three-passenger Runabout; same chassis specifications thruout as Fig Wayne 1908 five-passenger touring car, which see. Weight, about 2200 pounds. Price, includ 5 lamps, mat, horn, tools and top, all ready for the road, $2500.

t of 5 lamps, mats, horn, tools, gas erator and cape top.

he 3-passenger runabout has the same ssis specifications, weighs about 2200 nds, and sells fully equipt for $2500, same as the touring car.

NOTABLE FEATURES.

he Wayne cars from the first have n well upholstered, finely finished and sented a good appearance, and yet were red at a fairly moderate price. The ssis design has a very clean appear- e, owing to the placing of the change rs in the bevel gear housing, and this ssion of the gear box between the ch and the rear axle gives a low car- shaft angle. The universal joints are

THE FRAME AND BRAKES.

The frame is prest steel 3-16 inch thick, 4 inches greatest depth, 1½ inch wide, 148½ inches spring eye to spri eye. All one width, 32 inches. The radi tor is carried on a heavy, channel-sectio front cross-girt, dropped 4 inches belo the chassis frame top. The brakes a exterior and interior on and in a pre steel drum, 12 inches outside diamete The exterior band, 3-hole lever applied, 2 inches wide, lined with camel's hair fe The internal expanding brake shoe is tw members, jointed, toggle expanded a faced with camel's hair felt. Both brak give the same action, running forward backward.

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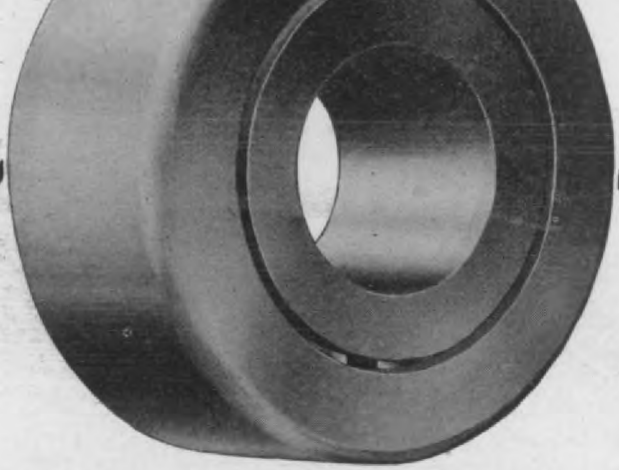
THE MOTOR.



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Two qualifications — radial load and end thrust
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Two sets of ball races
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Two times the load capacity
Two years guarantee

Demonstrated at Madison Square Garden Show, Space 226, Basement

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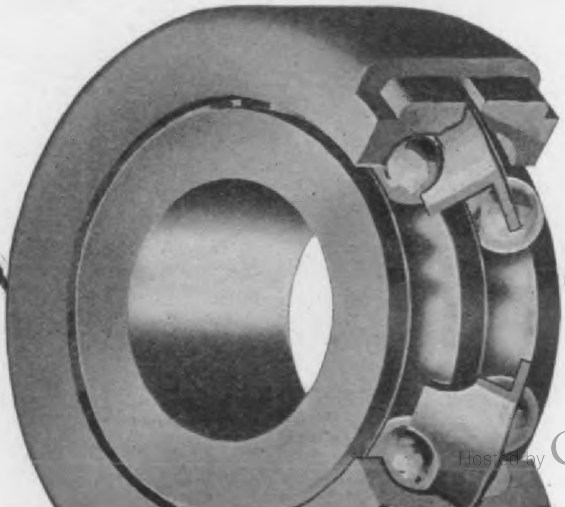

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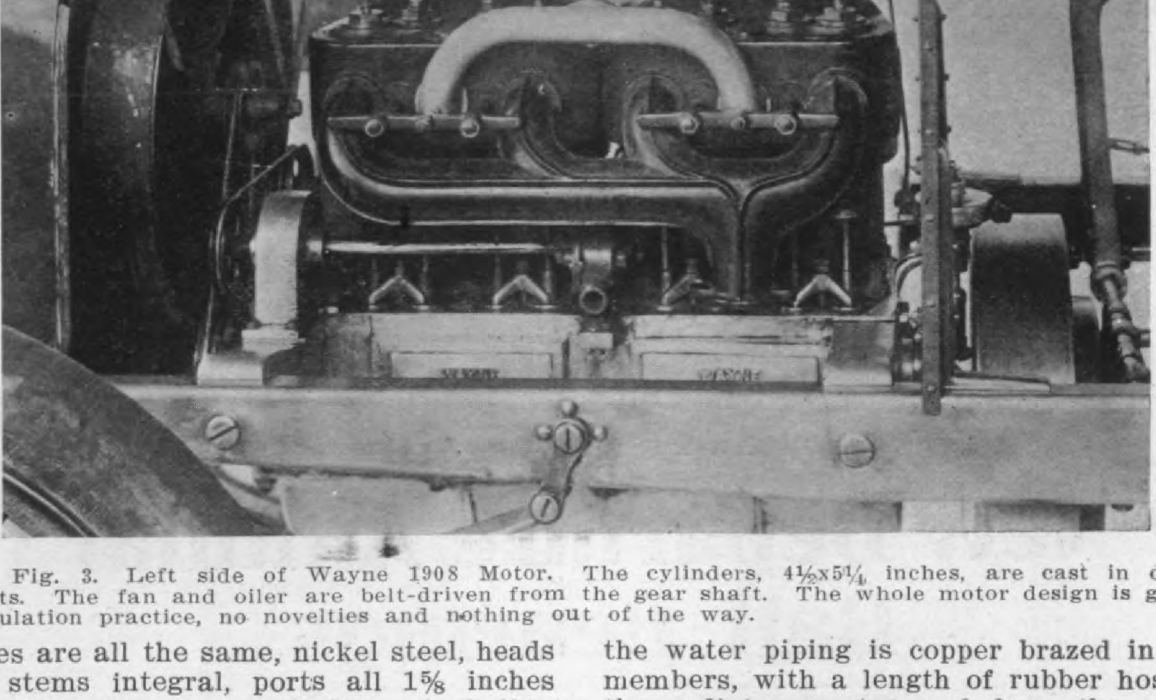
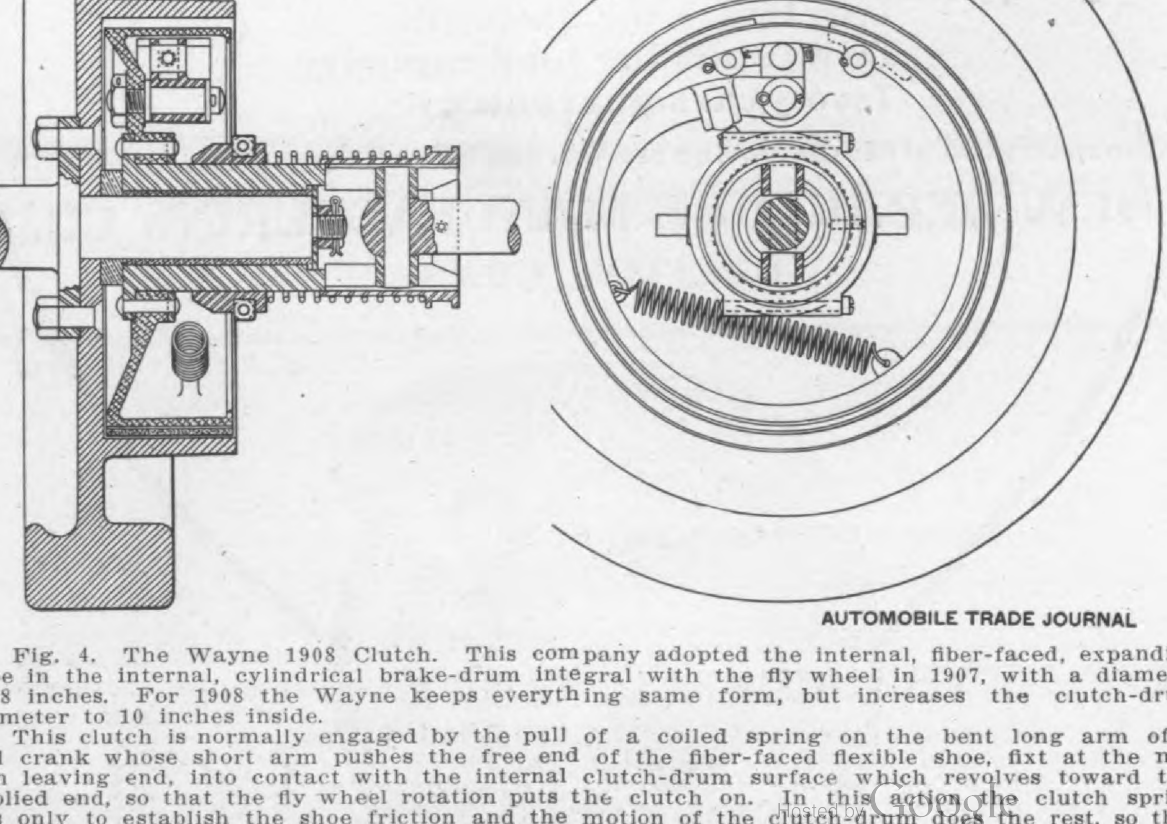


Fig. 3. Left side of Wayne 1908 Motor. The cylinders, 4½x5¼ inches, are cast in dual ts. The fan and oiler are belt-driven from the gear shaft. The whole motor design is good ulation practice, no novelties and nothing out of the way.

es are all the same, nickel steel, heads stems integral, ports all 1⅝ inches eter. The water jackets, including are integral with the cylinders, and the water piping is copper brazed in tw members, with a length of rubber hose t the radiator on top and from the radia tor to the gear-driven, two-pinion, wate



AUTOMOBILE TRADE JOURNAL

Fig. 4. The Wayne 1908 Clutch. This company adopted the internal, fiber-faced, expanding e in the internal, cylindrical brake-drum integral with the fly wheel in 1907, with a diameter 8 inches. For 1908 the Wayne keeps everything same form, but increases the clutch-drum meter to 10 inches inside.

This clutch is normally engaged by the pull of a coiled spring on the bent long arm of a l crank whose short arm pushes the free end of the fiber-faced flexible shoe, fixt at the mo- n leaving end, into contact with the internal clutch-drum surface which revolves toward this plied end, so that the fly wheel rotation puts the clutch on. In this action the clutch spring only to establish the shoe friction and the motion of the clutch-drum does the rest, so that 0 pound spring tension is ample. The curved bell crank arm carries the disengaging roller fork. This roller is pushed outward by advancement of the pedal actuated clutch cone

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"PREMIER" Sight-feed Lubricator

Maintain the highest reputation for durability and practicability. They are easily filled and can be regulated to feed any quantity of oil.

The sight-feeds are large and the oil can be clearly seen feeding at all times.

Impossible for the back pressure from the cylinder to interfere with the proper formation of oil drops and cause the sight-feed glass to become oil-splashed.

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Sight-fe
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the front board. The five lead me-
nical oiler is carried on the right hand
t lug of the motor base. The motor-
e and oil basin are aluminum alloy
ings with base lugs reaching across
chassis frame to hook over the chassis
ne sides, each lug fixt to the chassis
ne with a single bolt passed thru a
e distance block placed in the frame
channel. The five oil leads are car-
, one each, to the 3 crank-shaft bear-
, one to the crank pits and one to the
nge gear line shaft in the gear box
the rear axle. The piston and rod lu-
ation is by splash.

applies the external, emergency, rear hu
drum brake shoes. The inside lever is i
an H-slot and works the gear shift.

There are two large pedals, the lef
pedal being pushed forward to release th
clutch only. The right pedal is pushe
forward to apply the rear hub-drum, in
terior, ordinary brake only, and is no
interlinked with the clutch. A horizonta
accelerator pedal regulates the throttl
position. There is no muffler cut-ou
fitted.

THE FRONT AXLE.

The front axle body is a 2-inch diamete
steel tube, walls 5-16 thick, dropt 3 inche

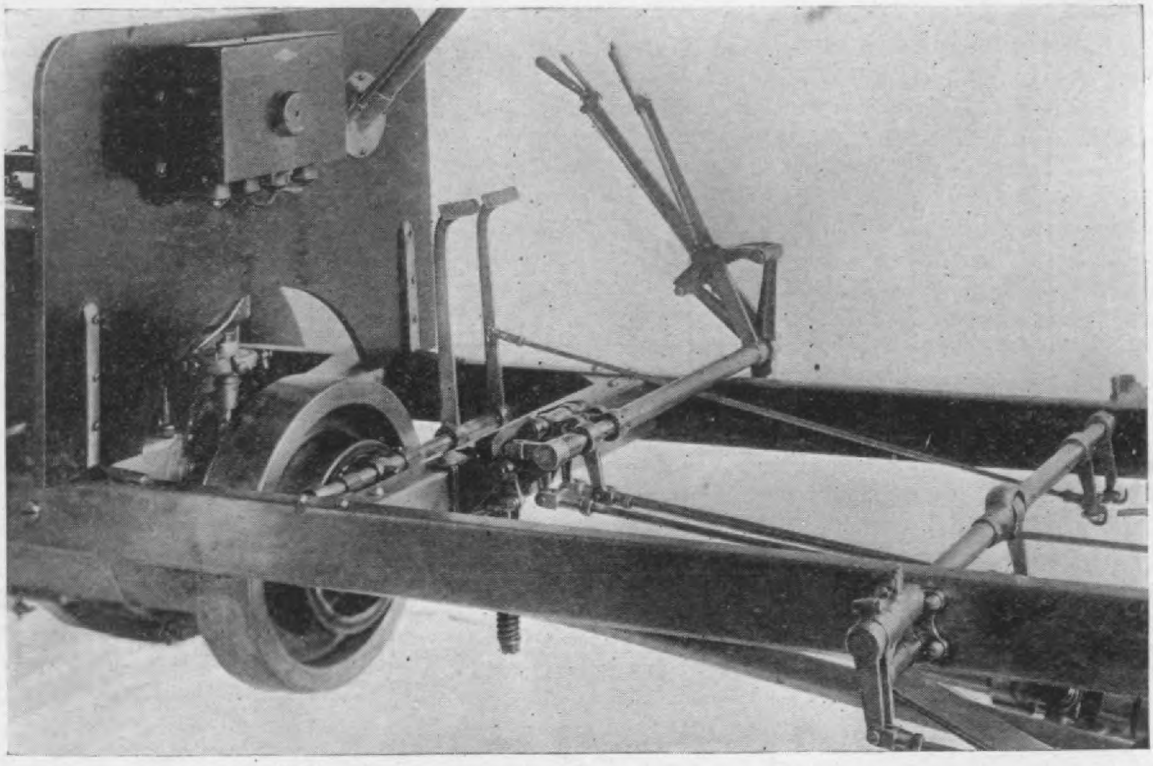

Fig. 6. Wayne 1908 chassis, front board and control. Everything is so fully shown as t
ed very little description. The three rockers are well placed and well supported, and th
nnections are all forked, with screw adjusted rod lengths. The absence of the gear box fron
is assembly makes a very clean, open and readily reached construction all thru.

THE CLUTCH.

he clutch is an internal cylindri-
drum, 10 inches diameter by 3 inches
. The internal bell-crank-and-spring-ex-
ded brake shoe is leather faced. The
ng, 20 pounds tension only, takes hold
he long arm of the bell crank and is
ted to the "meeting" end of the ex-
ding shoe, so that the clutch "bite" is
d by the direction of fly wheel revolu-
.

THE CONTROL.

he steering is by right and left screw
ads and nuts actuating a double bell
ch globe ended steering gear. The hand

in the middle. The steel casting sprin
pads are fixt in place by pinning an
brazing. The stub axle yokes, steel dro
forgings, 6¼ inches opening, slip 3 inche
onto the steel tube ends, and are retaine
by pinning and brazing. The front axle
are 1½ inches large diameter, and th
front wheels are on circles of ⅝-inch ste
balls inside and ½ inch diameter outsid
all 3-point adjustable bearings. The stu
axle pins are ⅝ inch diameter, hardene
and ground, in hardened and groun
bushes, and the load is carried on har
ened and ground bush flanges.

THE REAR AXLE.

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IMPROVED BARRETT AUTOMOBILE JACKS

The improvements incorporated in the 1908 "BARRETT" JACK place it as far ahead of former models as the "BARRETT" has always been in advance of ordinary jacks. To its numerous superiorities of operation and construction has been added still another—the new reversing lever, which controls the direction of the jack's movement, up or down.

Working at the front of the jack and displacing the side eccentric or thumb screw formerly used, the reversing lever is always accessible with greatest ease, no matter in what position the jack may be placed under the car. It is in ready reach without groping between the spokes of a wheel or crawling beneath the car. It is not even necessary to reach under the car with the hand to operate the lever—a slight blow with the jack handle will set it as desired in a second. That this clever appliance adds greatly to the efficiency and convenience of the "BARRETT," increasing its speed and making it far more handy to apply and remove, is not to be doubted.

The "BARRETT" is the only automobile jack on the market possessing this new and requisite aid to safe, speedy, accurate operation; and patents fully covering it are pending. The improved "BARRETT" is made in sizes with heights of 8, 10 and 11 inches, and raises only on the downward stroke of the operating handle. It is perfectly adapted to use on any motor car, irrespective of size or make.

Another new and worthy characteristic of the "BARRETT" is the tube steel handle, so strong it cannot break or bend under the heaviest motor car, yet so light it can be used with greatest ease.

CAUTION

Motor car buyers should insist on having the genuine BARRETT AUTOMOBILE JACK supplied. Inferior jacks patterned after the 1908 improvements here described are worthless imitations. Refuse any jack but the "BARRETT."

With these added features of utility and convenience, increasing immeasurably its effectiveness and facilitating service under all circumstances, the "BARRETT" is now, more than ever, the best and safest jack for your car's equipment.

The "BARRETT" is supplied by leading automobile manufacturers, and may be had of responsible dealers everywhere, or direct from us.

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DUFF MANUFACTURING COMPANY

Exclusive Makers of "BARRETT" Jacks

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gear housing and gear box members

The springs are all half-elliptic, all join

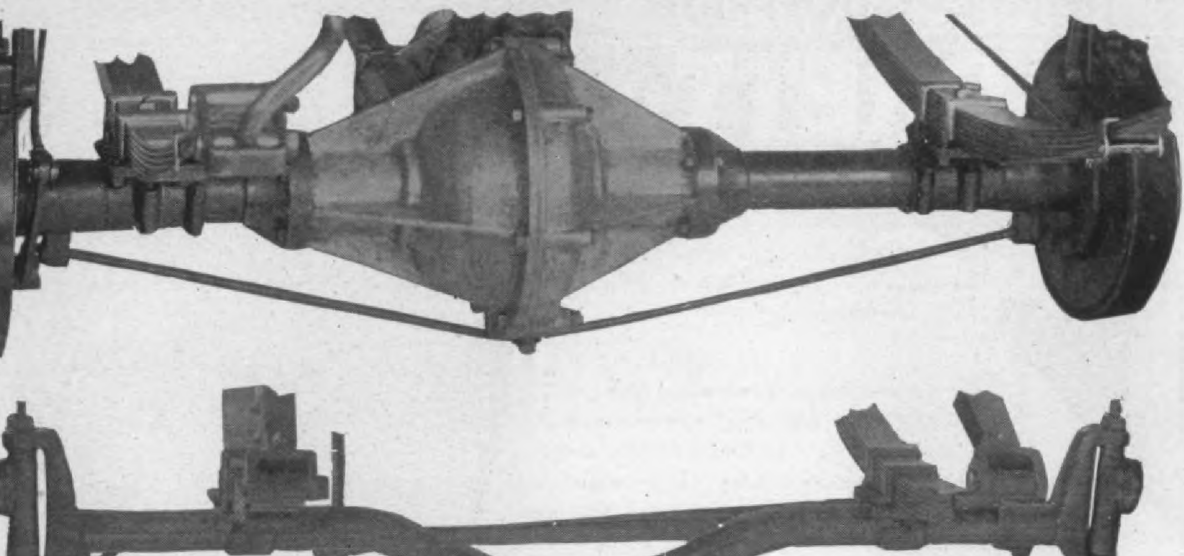


Fig. 5. The Wayne front and rear axles. The Wayne had some failures of I-section front es in 1906-7, and has gone back to the tubular steel form. This throw-back stands on solid soning, and seems likely to have plenty of company. The tubular axle is best suited to re- stresses in all directions, and will probably continue in large and increasing favor. The front eels are on ball bearings.

fixt by bolting. The side and line ts are in Parson's white bronze bear-, and the bevel pinion is on Timken rs. The spur balance gear has 12

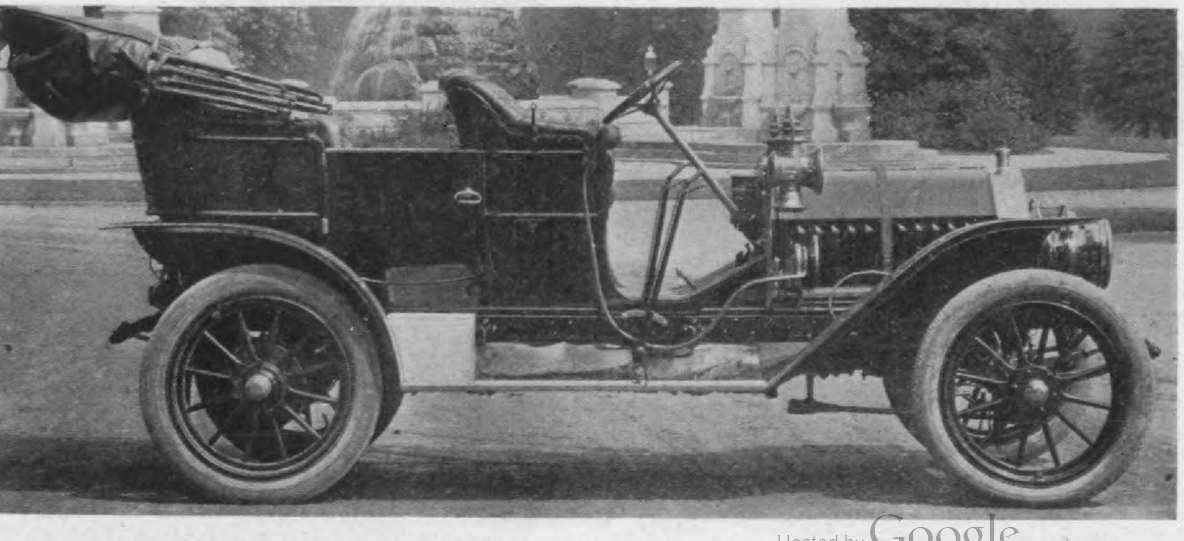
ed to the chassis frame in front and linke in the rear. The front spring is 38 inche long by 2 inches wide, 7 leaves, tongue grooved and banded.

1908 Autocar Changes

ne Autocar Company, of Ardmore, Pa., made practically no changes in the hanism of the 1908 models, the ges which have been made being in ection with body design and equip- t. An entirely new model, the Type

112-inch wheel base, standard gage, an are powered with the same four-cylinde 4¼x4 inch, 30-35 H. P. engine, as used las year. The price for each is $2750.

The popular Type 15, two-cylinder o posed 4x4 inch 12 H. P. runabout, know as the "Doctor's Car," has been continue without change except for equipment.



1908 Type 14 Autocar, showing the general body lines; the patent leather shield between the ning board and body, and the aluminum box at the rear end, which acts as a step. The

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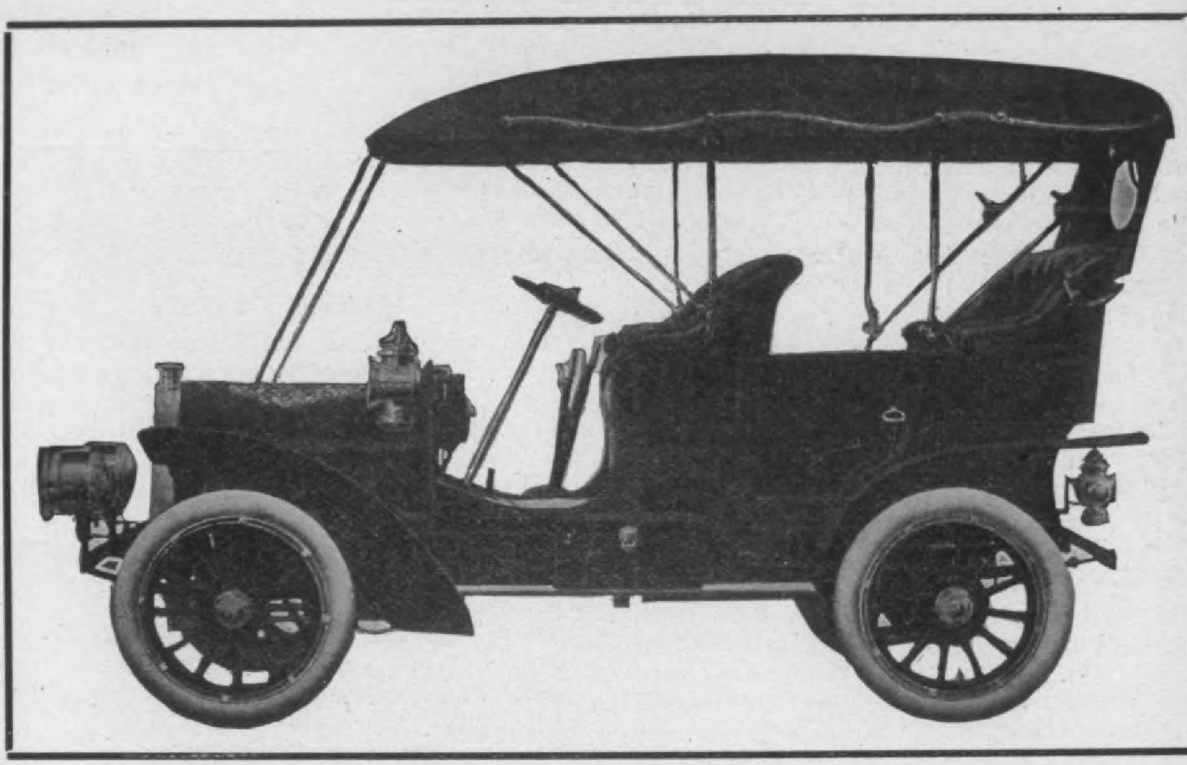
The Springfield Metal Body Co.



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We will be pleased to correspond with manufacturers as to their requirements.

We are now closing contracts for 1908 delivery.

Write for information and prices.

SPRINGFIELD METAL BODY COMPANY.

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lowing the latest fashion of a clean dash. The McCord oiler is carried on the front of the dash under the hood, and a hole or window in the dash enables the driver to see the oil supply. There is 30 inches foot room between the dash and front seat, which is an increase over the touring car. The steering post has been given more rake, and all the brackets and step hangers have been moved to suit the new type of body. Tires are carried racing fashion at the rear in special combination holders, which also form the tail lamp bracket.

The foot pedals have large hinged tops, which fit the bottom of the foot, and a muffler cut out, pedal actuated, is provided. The steering wheel is 18 inches in diameter instead of 15, as on the touring car. The tools instead of being in a box on the running board are in a leather roll, which can be carried to the point where needed. A brass toe rail has been fitted on the floor of the left front seat for the use of lady passengers. A Prest-O-Lite gas tank and Warner auto meter are furnished as part of the regular equipment on this model. The car has a clean-cut "get-there" look, and is apparently a great favorite at the factory. The body is finished in cirilean blue, striped with three adjacent pin lines of Autocar red, giving a very unique decorative effect.

NEW BRAKE FACING.

On the contracting band brakes on the rear hubs a combination of camel's hair belting and manganese bronze has been adopted. On the upper band alternating segments of belting and bronze are used with a small crack or space between. This combination, it is claimed, gives several advantages. The belting prevents rattling, and the bronze prevents burning out, while the edges of the blocks and the spaces between act as scrapers to clean the drum and dispose of the dirt laterally. It is also said that the combination has never been known to squeak.

TOURING CAR CHANGES.

Thruout the entire construction there has been an increase in the amount of nickel steel used. On the running boards pyramid rubber is used with a new hook type of brass moulding, which gives the effect of a half round on top and fastens on the edge, giving a much neater smoother finish than the flat screwed on strip formerly used. A patent leather shield has been placed between the running board and body, and at the rear an aluminum box similar in appearance to that over the driving sprockets of side chain cars, acts as a step to the tonneau.

The distinctive hand grip control of the spark and throttle in the steering wheel is still used, but the grips are now of hard rubber. The right or spark control grip is red, and the left or throttle grip is black. The front fenders are not so flaring, are flatter on top, and are now provided with a splash shield between them and the body. The radiator will be polished brass instead of enameled, as in all previous models. The distance between the front gas lamps has been increased, giving more room for the starting crank swing. A new and decorative hand rail type of brass dash moulding is used. An Atwood generator is this year supplied as part of the regular equipment.

THE DOCTOR'S RUNABOUT.

The water circulation system in the small runabout has been slightly altered, some of the shorter bends in the piping having been straightened out, and a brass frame has been placed around the radiator at the front. All parts which have at any time shown the least sign of weakness have been replaced by nickel steel parts. A Solar generator, gas lamps and top are now included as part of the regular equipment. The unit power plant which proved so satisfactory last year has been continued. The car sells for $1200.

Ignition Pointers

The question of electrical ignition is a subject of interest to amateur and professional alike. The following suggestions are from Mr. J. D. Maxwell, of the Maxwell-Briscoe Motor Co., who, in speaking on this subject, gives the following dont's:

Don't forget to test the batteries and note that they are strong; don't guess.

Don't screw down battery connections with your fingers, use pliers.

Don't let the various electrical connections become corroded, but keep them clean. You cannot get a good connection with dirty terminals.

Don't run an accumulator or storage battery till exhausted.

Don't make electrical connections by using simply a stript wire, always use a regular battery terminal and see that the wire is securely fastened to the terminal. It pays to keep your ignition system up.

Don't allow your electrical wires to become oil soaked.

Don't use a coarse file to true the vibrators; platinum is expensive. Use only a dead smooth file and use that sparingly.

The American Motor League is distributing to its members, free of charge, Duryea's practical little hand-book entitled, Roadside Troubles."

Mr. E. R. Thomas, of Buffalo, has been appointed chairman of a committee of the Automobile Club of Buffalo to give life to the proposition of constructing a boulevard for automobiles between Buffalo and Niagara Falls, a distance of a little over twenty miles. Mr. Thomas's plan is to have a wide dirt road, coated with some suitable preparation that will keep dust and prevent damage by rain, and also restrict the road to the use of motor vehicles.

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A Little Talk on Lamp Efficiencies

Regardless of advertising, and getting down simply to optical principles, what really is the most efficient auto lamp? That is, what form of reflector, lens, or mirror actually projects the greatest amount of light from the acetylene flame?

The parabolic reflector comes nearest to surrounding the flame, and therefore receives the greatest amount of light on the surface. If it reflected all the light it receives, it would be by far the most efficient.

But no metal reflector can be kept bright in the presence of burning acetylene. It absorbs nearly all the light, and reflects only a trivial percentage.

The bullseye lens absorbs but little light, but its form is not mathematically correct. It scatters the light passing through it, and only the central rays are so nearly parallel as to carry far. The rest give near-by illumination only.

The plain spherical mirror likewise scatters the rays, as it has no true focus. This scattering is avoided in the Lens Mirror, whose thickness is graduated from center to periphery to compensate for the tendency to scatter, and thereby produce a true parallel beam.

A lens mirror cannot "surround" the flame, but it may be—for a given diameter—close to it, or not so close, according to the focal distance. The closer the flame, the more light the lens mirror will intercept and project. A short focus lens mirror is deeply curved, and is therefore expensive to grind.

The intensity of the projected beam bears a mathematical relation to the shortness of the focal distance. A larger flame does not make a stronger beam, only a broader one. For high speed at night, the long-range beam given by a short focus lens mirror is essential to secure safety.

RUSHMORE DYNAMO WORKS, Plainfield, N. J.

LONDON PARIS CHICAGO

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The "Pontiac" high-wheel car, driven by two opposed, 4 3-8 x 4 inch water-cooled cylinders; weight, 1000 lbs.; has a frictional differential on the ends of the jack shaft.

The "Pontiac" High Wheel Car

ontiac Spring & Wagon Works, of Pon-, Mich., are now ready to fill orders their high wheel runabout which has n in process of development for some e past. The makers call attention to fact that automobile construction has n adhered to thruout, not carriage ding practice. The car weighs 1000 nds, and is driven by a 4⅜x4-inch, 2-nder opposed, water-cooled gasoline or, developing 12 horse power. The ling water is circulated thru a flat tube ator with 20 per cent. excess radiating ace. A gear circulation pump is di- driven from the cam shaft.

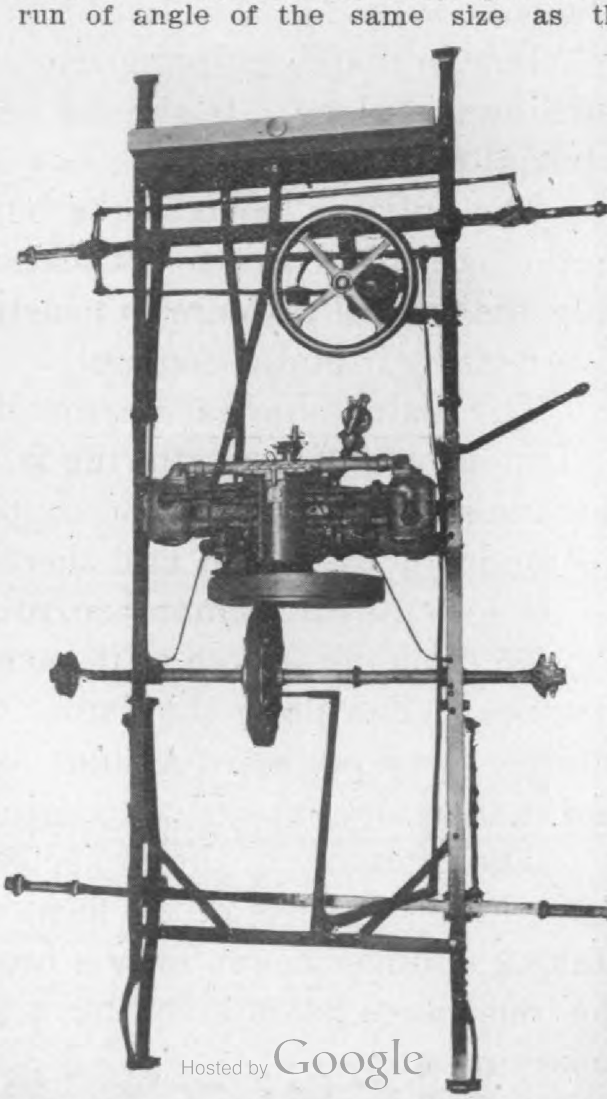
peculiar feature of the car is the ab-ce of roller or ball bearings in the els and axles, North's magazine self-icating axle being used thruout. One rge of lubricant is sufficient for 800 1000 miles travel, and can be applied nout removal of the wheels.

he car is side chain driven with fric- transmission, and is also equipt with iction differential on the ends of the shaft, the invention of the designer, J. Wells. This differential dispenses the use of gears and commends it- they claim, for simplicity, efficiency durability.

he sprockets and brake drums are se-ed to the rear wheels with clips sur-nding the spokes, thereby retaining the re strength of the spoke. Brakes are he latest internal expansion type, and positive and effective.

ealizing the necessity of minimum ght the makers have used the highest

inch by 3-16 inch steel, reinforced by 1 inch by 2 inch ash sills, carrying a secon run of angle of the same size as t



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NEW 1908 CARS

EIGHT-CYLINDER 50-60 H. P. TOURING CAR

Motor, four cylinders each side 90° apart.

Chassis, $4000.00.

TOWN CAR

Elegantly finished Landaulet or Limousine body.

Complete, $1800.00.

LITTLE TOURING CAR

Especially for professional use.

Substantially built throughout of the highest grade materials.

Price, $1000.00.

THE ONLY AMERICAN CAR TAKEN UP AND MANUFACTURED IN EUROPE.

FIVE-TON GASOLINE TRUCK

Best design of any commercial car in America.

Only the highest grade of materials and the best class of workmanship enter into its construction.

Chassis, $4500.00.

1000-POUND LIGHT DELIVERY

The only LIGHT DELIVERY properly geared for city and suburban service.

Price, complete, $1600.00.

HEWITT MOTOR CO.

6-8-10 E. 31ST ST. NEW YORK CITY

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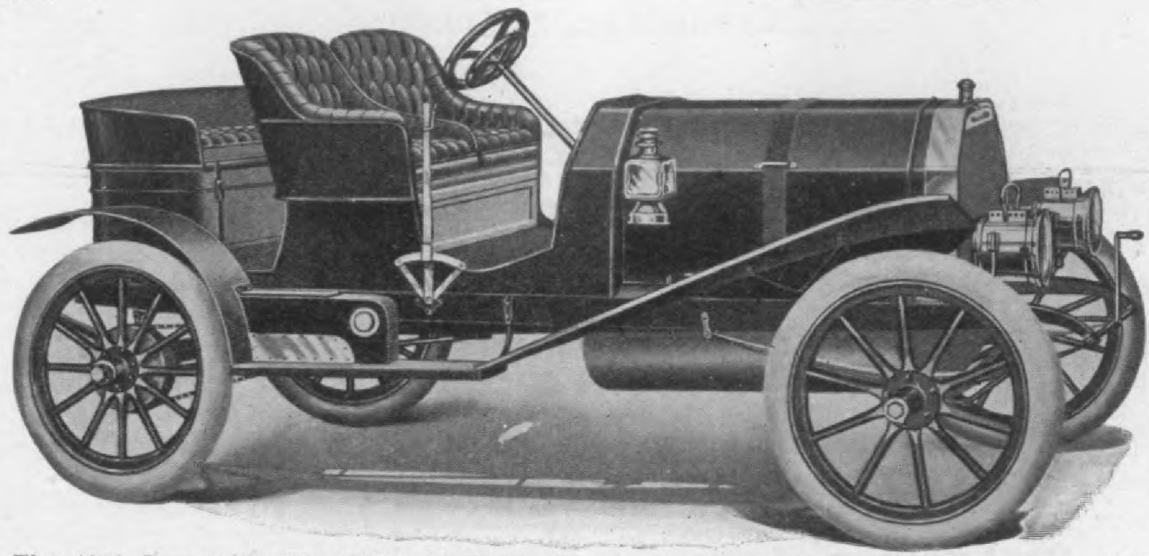
ne load is carried on four arched ngs which are 37 inches in length with nches camber, which with an equal ribution of load on all four secures riding, and the makers claim that Pontiac on rough roads with its com- tion of high wheels, solid tires, re- nt springs and correct distribution of equals the pneumatic tired car for fort.

ith leather quarter top and curtains, ps, horn, etc., complete, the cars sell $650.

anges in Simplicity Cars for 1908

hile the lines of the 1908 Simplicity s, built by the Evansville Automobile of Evansville, Ind., remain the same, have made improvements in a few de- , the most notable being in the trans- ion.

use of the straight short rod from t throttle to the governor arm. The stee ing gear has also undergone a change, an the controlling levers are placed directl above the wheel on a stationary secto and do not rotate with the steering whee Rods with a special equalizing device ar now used on the brakes instead of cabl The same original method of supportin the engine on the large swinging bar still employed, but the engine power ha been increased by changes in the cams an valve openings. The shape of the radiato and hood have also been changed, deci edly improving the looks of the car. Bot the front and rear axles have been mad heavier. The rear axle consists of a roun solid steel bar with spindle machine thereon, no brazing being employed wha ever. 34x4 inch tires are employed on a four wheels.



The 1908 Evansville Simplicity 40 H. P. Roadster. Wheel base, 105 inches; tires, 34x4 in- s. Friction change speed gear to countershaft with side chains to the rear wheels. Standard ipment with auto chime, 5 lamps and generator, complete $2500.

specially prepared fiber is now used ne friction wheels, making contact with two large driving discs. These large ing discs are simply cast iron machined smooth. This the company find after ustive tests to be far superior to any r friction metal they have tried. While revious years mineral tanned leather used on these large driving discs and steel surfaces on the small driven els, the present change from leather to composition has been made chiefly on unt of the greater ease in replacing new friction material on the discs. Be- it was necessary to take down the ne shaft, but now the change can be e by the removal of only two bolts. half of the jack shaft may be pulled

Four more concerns have been electe to membership in the American Motor Ca Manufacturers' Association, making total of forty-nine members. The lates concerns admitted are Reliance Moto Truck Company, Detroit; Gaeth Automo bile Works, Cleveland; the Imperial Moto Car Company, of Williamsport, and th Kingston Motor Car Company, of Kings ton, N. Y.

The new White factory at Cleveland i a one-story structure with saw-tooth roo and contains many novelties in factor construction. A great central corrido 60 feet long by 30 feet wide, is used sol ly as an avenue of communication betwee the other units of the plant. There is

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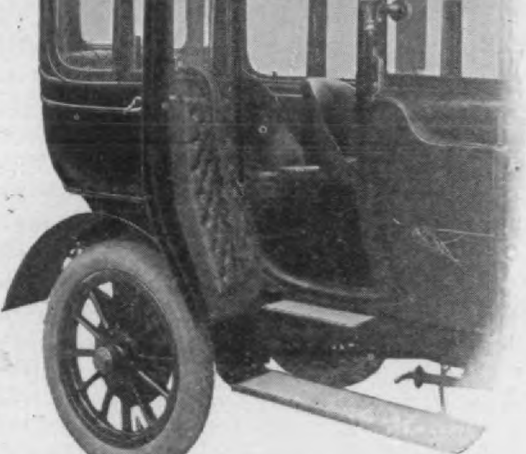

LUXURY

as expressed in

Pierce Great Arrow Enclosed Ca

THE FIRST REQUISITE of an enclosed car is comfort; second is elegance. The Pierce Great Arrow Suburban is last word in the appointment of a car for city use. It is b ıpon the Great Arrow Chassis, which means perfection in runni The body is built in our own factory—that new factory which a o much to our facility to produce good cars. Most of the bod luminum, which is far better han wood, not only in looks nd wear, but also in resistance o shocks. The inside of this car has every appointment that good taste, convenience and ngenuity can suggest. It offers the advantages of a well-equipped city carriage combined with a long-distance touring car, each perfect in tself, each doubly perfect in combination.

All Pierce dealers are now able to supply the latest models of enclosed cars at the following prices:

The 30 H. P. Pierce Great Arrow Enclosed Car, $5,000.00

PIERCE DEALERS

J. W. Maguire Co. ..... 745 Boylston St., Boston
Harrolds Motor Car Co. ..... B'way, 58th-59th St., New York,
H. Paulman & Co. ..... 1430 Michigan Ave., Chica
Banker Brothers Co. ..... Baum and Beatty Sts., Pittsbu
Foss-Hughes Motor Car Co. ..... 201 N. Broad St., Philadelph
Ellis Motor Car Co. ..... 222 Halsey St., Newark
Bush & Shields ..... 953 South Main St., Los Angele
Mobile Carriage Co. ..... 762 Gough St., San Francisc
Broadway Auto Co. ..... Madison St., Seattle,
Tom Botterill ..... 1643 California St., Denver
Pence Automobile Co. ..... 717 Hennepin Ave., Minneapolis,
J. P. Schneider. ..... 187 Jefferson Ave., Detroit,
Metropolitan Motor Car Co ..... 1841 Euclid Ave., N. E., Clevel
Citizen Motor Car Co. ..... 904 Broadway, Cincin
The Zorn-Strauss Co. ..... 518 Third Ave., Louisvil
Western Auto Co. ..... 4701 Washington Blvd., St. Lou
Palace Auto Co. ..... 1408 Walnut St., Kansas Cit
The Cook & Stoddard Co. ..... 22d and P Sts., Washington,
Southern Auto Co. ..... Mt. Royal and Maryland Aves., Baltimo
Central Auto Station Co. ..... 92 Renne Ave., Pittsfield,
E. R. Clark Auto Co. ..... 117 Lyman St., Springfield
Miner Garage Co. ..... High and Allyn Sts., Hartford,
Wilson & Co. ..... 117 Craid St., West, Montreal, C
Wilson & Co. ..... 142 Bank St., Ottawa, C
Automobile & Supply Co., Ltd. ..... 24 Temperance St., Toront
Hibbard Auto Co. ..... 187 Wisconsin St., Milwaukee
U. S. Auto Co. ..... 21 Plymouth Ave., Rochester
Utica Motor Car Co. ..... Utica
Troy Auto Exchange ..... 22 Fourth St., Troy
Standard Motor Car Co. ..... Scrant
A. E. Lambert ..... Titusvil

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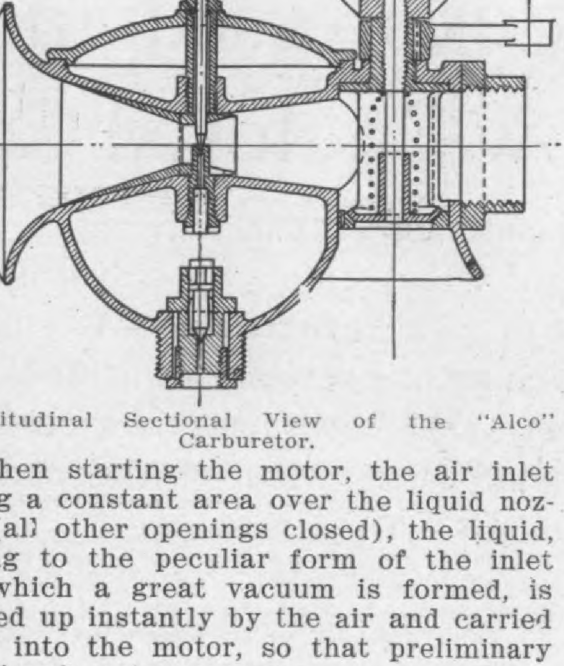
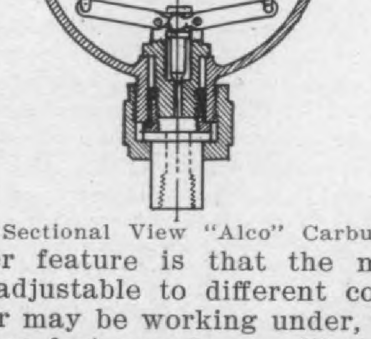
Mass., and one of its main features
ne fact that the plane of the liquid is
the outlet of the spraying nozzle, no
ter what the angle of the liquid cham-
body may be in relation to a horizon-
line, so that with double independent
s the liquid is kept at a constant
l, thereby allowing the boat or car to
n or tip to any angle without loss of
l.



itudinal Sectional View of the "Alco" Carburetor.

hen starting the motor, the air inlet
g a constant area over the liquid noz-
all other openings closed), the liquid,
g to the peculiar form of the inlet
which a great vacuum is formed, is
ed up instantly by the air and carried
into the motor, so that preliminary
ing is not necessary.



ross Sectional View "Alco" Carburetor.

other feature is that the main air
is adjustable to different conditions
notor may be working under, whether
ow or fast speed, or with heavy or

the carburetor, and directly above it
the needle valve which is connected wit
double floats which control the amount
fuel admitted. The air is drawn thru th
funnel-shaped opening shown at the le
of the longitudinal section herewith. Thi
opening has a removable inner tub
which opens into another conical passag
way to the right of the nozzle, this for
of air passage, of course, producing th
maximum air velocity at the nozzle, pic
ing up and vaporizing the liquid thorol
and delivering it directly into the suctio
pipe of the motor. The opening of th
gasoline nozzle is controlled by a valv
stem situated at the top of the carburetor

As the mixture of the liquid with th
air increases, due to the speeding of th

Exterior View of the "Alco" Carburetor.

motor, the proper amount of air is ad
mitted thru an air valve situated adjacen
to the float chamber, and in a straigh
line with the mixing tube of the car
buretor. This air valve is controlled b
an adjustable spring, and is situated in
rotating throttle connected with a handle.

The height of the liquid in the float
chamber is adjusted by thumb screws, s
that the level can be changed at will. Al
the controling parts of the carburetor ar
on top.

The Puritan Gas Tanks, which are made
by the Old Colony Light Company, of Bos
ton, will hereafter be represented thru
out New York State, New Jersey and

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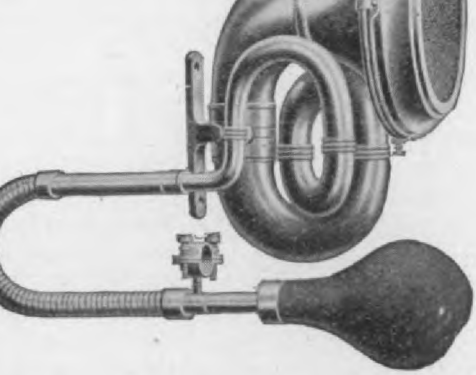
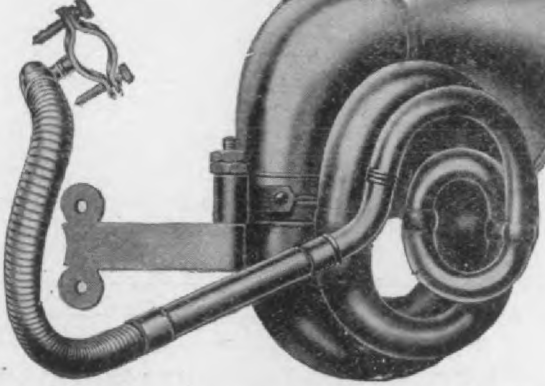




NONPAREIL

Ten Styles of Horns.

We do not consider Importers as competitors any longer, for t
ct that we enjoy the patronage of two-thirds of the Automob
anufacturers and all the leading Jobbers.

Our success is due to the absolute perfection of our Horns, whi
r tone, quality and finish are unsurpassed.

Beware of Cheap Imitation

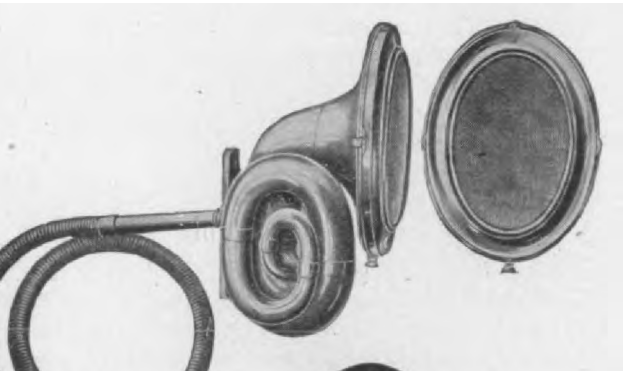
Don't be fooled by getting Horns offered as **"JUST AS GOO**

GET THE BEST.

Ask for NONPAREIL HORNS.

SEND FOR CATALOGUE.

UTOMOBILE SUPPLY MFG. CO., 139 to 147 Emerson Place, Brooklyn, N.



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s company has produced during the two years over twelve hundred sses. The present Garford plant, an rely new one, has been in use only months. It is filled with modern and ensive automatic machinery, the con- n being in no sense assemblers, but nly specialized producers of complete sses.

he new models are known as A and B. s of thirty H. P. and B of forty, both dels being of the four-cylinder, water- led type, fitted with Simms-Bosch low sion make-and-break magneto and ft drive. The single horse-powers are posely unhyphenated because the mo- produce these powers under low rage conditions, their maximum power, vever, being far above the stated fig- s.

pocket scoop pump is also located on th left side, a new type of wavy, hone comb radiator, holding five gallons water, being used. The two large hal time gears are of shrouded fiber whic drive in addition to the cam shafts extr shafts on each side for the pump an magneto. The oiling device, which is l cated on the straight front mahogan dash under the slanting footboard, driven by gears from the end of the rig hand cam shaft. The fan is driven by s endless belt off the third shaft, an ecce tric adjustment being provided on th hanger, which is fitted to the front of th first cylinder.

The carburetor takes warm air betwee the cylinders thru a copper tube, and also warmed by the circulation of h water from the bottom of the radiator thr

Fig. 1. Garford Chassis plan view. Note the make-and-break ignition mechanism on the gine, the peculiar tapered torsion rod and large rear platform springs. All spring eyes are ovided with oilers. A new selective four speed and reverse sliding gear direct on the third used. Chassis complete weighs something less than 2000 pounds.

s public interest will largely center in higher powered model, and because he fact that many of the features are mon to both, Model B only is here de- bed in detail.

he forty horse-power motor of the del B chassis has the cylinders cast in s with the water jackets integral. wing a symmetrical, well-balanced or in which simplicity is the keynote. valves are offset on opposite sides, mechanically operated and inter- ngeable, the inlet valves being on the t side and the exhaust valves on the side of the motor. On the right side be found also the Simms-Bosch low sion make-and-break magneto, strapt to base of the motor for ready removal, necessary. The concentric carburetor

the shell of the carburetor to one of th rear water jackets of the motor, a shu off cock being provided at each en Aluminum water jacket plates of genero size are fitted to the top and sides of th motor castings. The crank shaft bea ings in the motor are of a liberal si fitted with Parson's white brass. Four pi ton rings are fitted, and these are alte nately stept and pinned so as to insu good compression.

The oiling device under the footboard of the sight-feed type, having six feed four to the motor and two to the gear s

IGNITION.

The ignition system is of the simple form, being mechanically provided wi a hammer and anvil device interconnect with a complete self-contained electr

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ATWOOD

QUALITY LAMPS

Skill in the building, care in selection of material, and practicability as well as beauty in designs have made the Atwood Lamps and Generators the foremost product of their kind in the world. Constant improvements, the most severe tests upon completion, and careful and minute inspection through every process of construction have conserved the reputation for quality so consistently earned during 35 years in the building of lamps.

Write for Catalogue

ATWOOD MANUFACTURING CO.
Amesbury, Mass.

We exhibit at Madison Square Garden, Nov. 2nd to 9th.

LAMPS

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ich trips the contact arm or hammer, l completes the electrical contact with anvil. The spark occurs at the in- nt of the breaking of this electrical con- t. The eccentric is held in position one clamp screw, so that the timing the ignition is very easily regulated by position of the adjustable eccentric the vertical shaft. The periphery of eccentric is notched, as will be seen in cuts illustrating this mechanism. The iter contact arms or hammers and the tact points or anvils are of iridium, ich offers great heat resistance, and therefore not readily burned away by

circuit cut-out button is fitted on the da board, so the electrical circuit may cut out when the motor is cranked for i spection purposes.

The Garford engineers were pioneers the use of the low tension make-and-bre system of magneto ignition, being the fi to use it in this country. The system do away entirely with the use of batteri coils, sparks, plugs, intricate high tensi wiring, commutators, etc. A double s of ignition with its necessary duplicati is not necessitated for actual runni service, its sole advantage, if any, bei for starting purposes only.

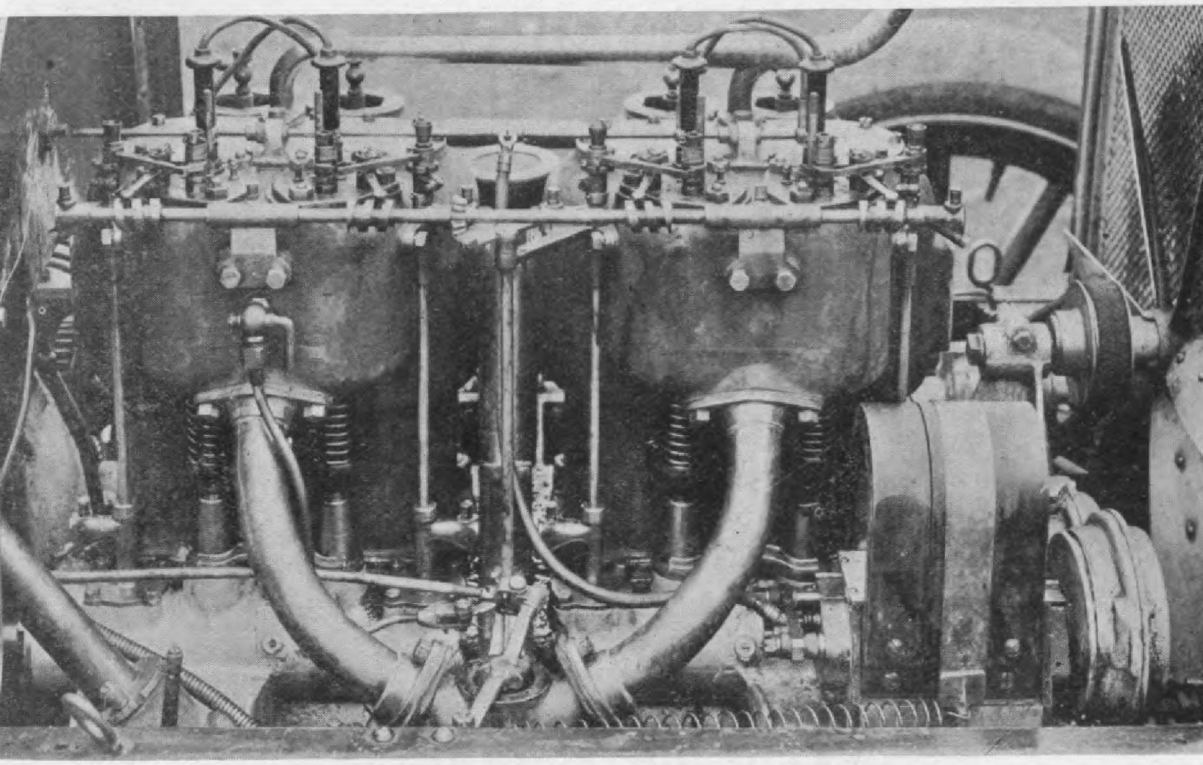

Fig. 2. Right side of Garford Model B, 40 H. P. Engine. For details of the construction ignition system see text.

sparking. The whole system is con- lled by the spark lever on the steer- wheel in connection with the single ating shaft having four worm gears, rotation of this shaft is in turn con- lled thru beveled gears mounted on of a vertical shaft set between the ond and third cylinders.

All the bearings on the four vertical ifts which operate the make-and-break chanism are equipt with automatic ck-feed reservoir oilers. To protect the ving parts of the ignitors from the d, grit and dust, which is sucked in by rapid movement of the car thru the , and the added influence of the fans

The starting crank instead of having t usual single tooth has four teeth as aid to easy starting. The graceful shap hood of the three hinged type is lined w asbestos cloth to keep the motor h from penetrating thru the hood, and a prevents the motor from getting too c in the winter when standing. Cleanline noiselessness and freedom from rattle a provided for by fitting raw hide lacing der the hood ledges and the ledges the radiator and dashboard. The gasol capacity is twenty gallons, the fuel bei carried in a tank under the operato seat.

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CONTROL.

WHITE

THE CAR FOR SERVICE

A SEASON OF WHITE VICTORIES

White Bulletin No. 14 which has just been issued, gives a resumé of the victories of the White in the important contests of the year. The various chapters of the Bulletin bear the following headings:

The White in World-Wide Use
The President at the Wheel
Continued Government Favor
First Place in London Town Carriage Contest
Perfect Score in Harrisburg Endurance Run
Fastest Time in Wilkes-Barre Hill-Climb
Fastest Time in Cleveland Hill-Climb
Fastest Time in California Hill-Climb
Perfect Scores in Sealed Bonnet Contest
Officially Observed Non-Stop Run of 1871 Miles
Only Perfect Score in Quaker City Regularity Run
Fastest Time of the Season on the Track
Perfect Score in California Endurance Run
Officially Declared Most Efficient Car
Wins Third "Desirability Contest"
The Glidden Tour—A Clean Sweep for the White

Write for a copy of this interesting publication.

THE WHITE COMPANY

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ering wheel itself consists of an alumi-
n spider having four arms and four
s of mahogany veneer, the aluminum
showing thru the center of the plies
veneer It is held on top of the well-
ed steering column by being double-
ed on the tapering spider and secured
a lock nut. A thumb latch on the gear
er prevents the operator from acci-
tally going into the reverse, while a
fe latch locks the emergency brake
er into place on the rachet. The oper-
g shaft of the emergency brake lever
ses thru the hollow center of the gear
t shaft, and out thru the center of the
of the gear set case, to an adjustable
, which connects in turn with what
ht be called a whiffletree, which

gear set case, and so fitted that no grea
can enter upon the clutch leather. Tw
double universal joints are provided b
tween the clutch and the gear case. Th
fly wheel is seventeen inches in diamete
the aluminum clutch wheel being fiftee
inches in diameter with a one and seve
eighths inch face. A ball thrust beari
is provided on the trunnion carriage
the clutch, which makes it easy for th
operator who usually drives with the fo
on the clutch pedal.

FRAME CONSTRUCTION.

The frame is of cold rolled steel
channel section four-sixteenths of an in
wide in the center. Every bracket on
is reinforced. A notable feature in th
regard being the front spring horn for

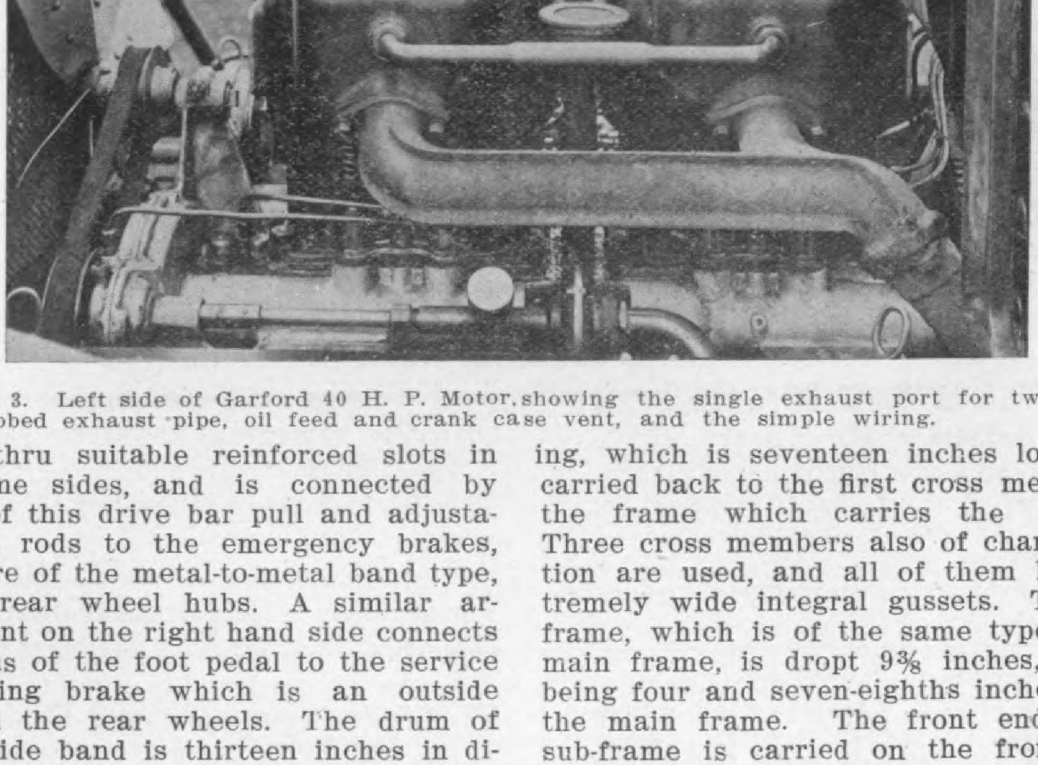

Fig. 3. Left side of Garford 40 H. P. Motor, showing the single exhaust port for two cylin
ers, ribbed exhaust pipe, oil feed and crank case vent, and the simple wiring.

sses thru suitable reinforced slots in
frame sides, and is connected by
ans of this drive bar pull and adjusta-
side rods to the emergency brakes,
ich are of the metal-to-metal band type,
the rear wheel hubs. A similar ar-
gement on the right hand side connects
means of the foot pedal to the service
running brake which is an outside
nd on the rear wheels. The drum of
outside band is thirteen inches in di-
eter and two and one-fourth inches in
dth. The internal band is twelve and
e-half inches in diameter and two in-
es in width, both bands being faced with
estos.

ing, which is seventeen inches long, a
carried back to the first cross member
the frame which carries the radiat
Three cross members also of channel s
tion are used, and all of them have
tremely wide integral gussets. The s
frame, which is of the same type as t
main frame, is dropt 9⅜ inches, its t
being four and seven-eighths inches bel
the main frame. The front end of t
sub-frame is carried on the front cr
bar of the main frame and the c
ter by hangers suspended by brack
from the intermediate cross bar. T
spring hangers are made of reinforc
steel. The wheel base is 115 inches, w

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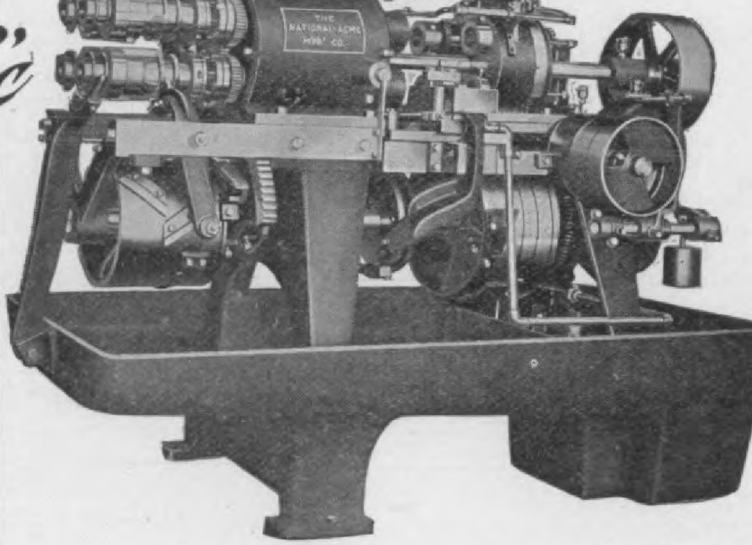
"Acme Automatic"



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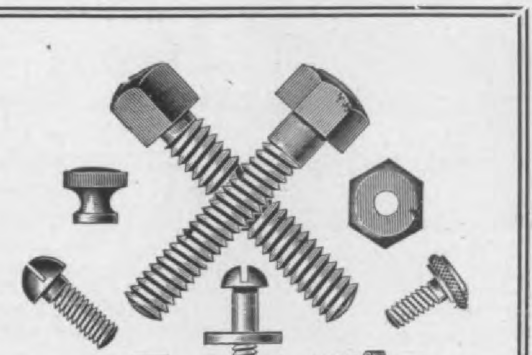

OUR PRODUCT DEPARTMENT

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ig. 4. Rear cross spring and member of the ford 40 H. P. car. Note the integral gusset es and depth of this member, and the ex- ne camber of the spring and its method of ening.

ved so as to allow for plenty of mo- n. The rear platform spring well bolt- to the rear cross member of the frame, of course fitted with universal double

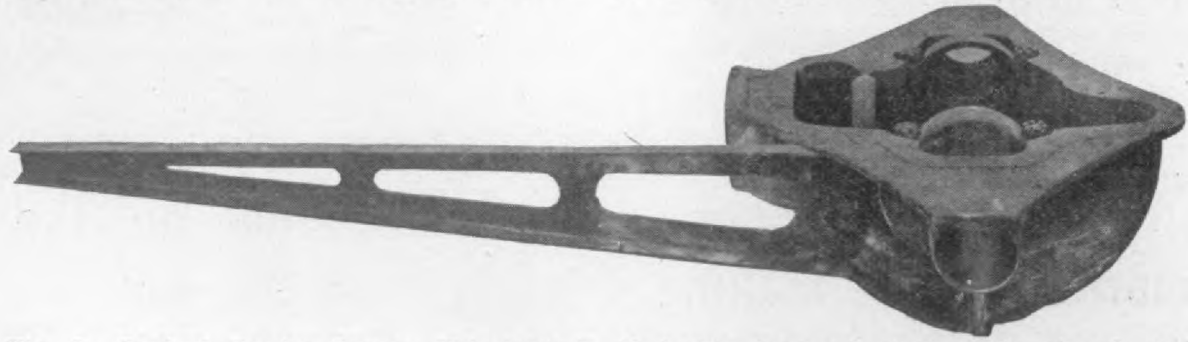

Fig. 5. Garford Torsion Lever. This lever is 42 inches long, of prest steel, pinned and zed to the differential housing. It is tapered, as shown, to about 1½ inches at the forward , where it is held by an adjustable shackle from the center of the middle cross member of frame.

ckles, the lower links of which are ra short so as to limit to a minimum side sway.

'he final drive is thru a propeller shaft m the gear box, the shaft being fitted h two double universal joints. The ve being also taken by two adjustable l ended struts or jack bolts. A prest et steel torsion lever forty-two inches g tapering from its extreme width of inches, where it is pinned and brazed the massive differential case by four- n 5-16 rivets down to one and one- rd inches in width, as shown by the stration. It is held at the front end an adjustable shackle from the center the middle cross bar so as to allow ne up and down play between a pair of rt, heavy, helical springs. The rear e, which is of the well-known floating e, is covered with a large tubular type aged axle sleeve, its diameter at the erential case being two and five- hths inches. The rear axle and differ- ial case are split horizontally, so that y can be readily taken apart by re- ving half a dozen bolts and without king up the car.

Annular two-point bearings of the con- tional foreign type are used in the

and thirteen ¾ balls in the inside be ing, the whole rear axle being firm braced by a truss. All the spring hange are fitted with oilers, and the rear si spring front hanger is combined with t stud of the running board hanger, th obviating an extra frame bracket. T front springs are without the usual cent bolt, which causes breakages, being cli by an outside hanger onto the front ax

THE CHANGE SPEED GEAR.

A new type of selective sliding gear used, giving four speeds and one rever with a direct drive by means of a fo tooth clutch on the third speed, the four

speed being geared higher than the spe of the motor. Any set of gears can meshed without cutting thru the oth

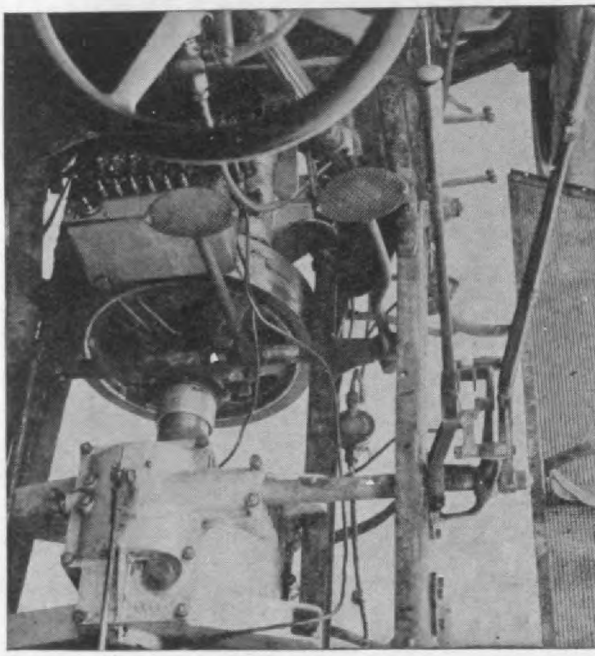

Fig. 6. Plan of part of Garford Chassis, sh ing the clutch brake and accelerator pedals, oiler, change speed gear case and selective c trol levers. For complete description see te

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The compact gear set case is made of aluminum in three pieces, and is firmly anchored to the sub-frame by four feet. All the shafts are arranged vertically, and run in F. & S. imported German two-point annular bearings, and not set into the aluminum cases, but in separate bronze housings. The gears are of exceptionally wide face, having six pitch teeth, and are bolted to the flanges, so that no dependence is placed upon keys or set-screws to hold them in place. The main shaft on which the gears slide is made round instead of square, and is fitted with four longitudinal keys set at equal distances around the circumference. By rocking in the reverse gear on ball crank levers by means of a cam motion and a slide roller on an inclined plane, the shafts are shortened, which makes them naturally stronger. All the gear shift rods are entirely enclosed in the case, so they will operate under the worst conditions of mud and water, something that cannot be said of all selective gears. The gear shifts are also splash lubricated from the gears. When one set of gears is in mesh the other sets of gears are positively locked, so that there is no possibility of two sets of gears getting into mesh at once. The ball bearings on the gear set are oiled by a mechanical lubricator operated by the motor, so that they do not have to depend upon the splash from the case, and the possibility of dirt and sediment from the gear case working into the bearing is avoided.

The complete chassis weighs a little less than 2000 pounds. It is the intention of the Garford Company not to fit this chassis with factory-made bodies; hence nothing is said about their construction here, the idea being to fit them with specially constructed bodies from the hands of the most celebrated coach body makers in the West, in the East and in New York City, leaving the selection to the buyer.

The Garford chasses will be distributed directly to the trade and the public from their offices in Elyria and Cleveland, O., and in New York City by the Garford Motor Car Company, 1540-1542 Broadway.

News Notes

Cedrino, driving a 35 horse-power Fiat car, won the second twenty-four-hour race at Morris Park track, New York City, September 27 and 28, covering 984 miles.

March 21 to 28 is the date announced by Manager R. M. Jaffray for the holding of Toronto's automobile show, to be held in the St. Lawrence Rink, and April 5 to 12 for Montreal's exhibition in the Arena.

Buffalo's sixth annual automobile show, under the auspices of the Automobile Club of Buffalo, will take place in Convention Hall during the week of March 9 to 14, 1908. Dai H. Lewis, secretary of the club, will have charge of the show.

Upon the return from Europe of R. E. Olds, president of the Reo Motor Car Company, Lansing, Mich., the directors voted to give every employe in the Reo factory who had been there a year a bonus of 5 per cent. on his salary in recognition of faithful service.

Joseph W. Parkin, Jr., driving a 30 horse-power Packard car, won three of the events of the automobile races held on the half-mile track in the Fair Grounds at the opening of the Inter-State Fair at Trenton, N. J. The best event of the day was the ten-mile handicap with six cars contesting.

Two more motor car manufacturing concerns have been admitted to membership in the American Motor Car Manufacturers' Association, making a total membership of 51. The new members are the Continental Auto Manufacturing Co., of New Haven, Conn., and the Brush Runabout Company, of Detroit, Mich.

A seven-passenger, four-cylinder, Stearns touring car, owned by J. D. Hollingshead, of Chicago, and carrying its full quota of passengers, was driven to the top of Pike's Peak, Col., on September 6 by Frank Leland.

Secretary Robert O. Brockway, of the American Motor League requests that all automobilists who favor the building up of strong national, state and local organizations, send him their names and addresses at the League headquarters, Vanderbilt Building, New York City.

In order to lessen accidents to motorists caused by unseen ditches, gullies and railroad crossings, the American Motor League has called upon its members and proprietors of official stations and hotels along popular touring routes, to take up the work of erecting danger signs and guide boards to forewarn tourists. Several hundred of these danger signs have already been put up, and the League, received a new supply during October.

Mr. Pardington, in speaking of the Parkway, says that there has been many excellent reasons for delay, most prominent among which has been a number of hold-ups by real estate speculators whose work has had to be overcome. From reports which have been received from other sources it seems that men trusted with the secrets of the promoters of the venture, took advantage of these secrets to enrich themselves and so compelled a considerable change in the plans and in the routing, in particular, on the Speedway. The great roadway will be completed next year when the Vanderbilt and many other great annual contests will be promoted along the new course.

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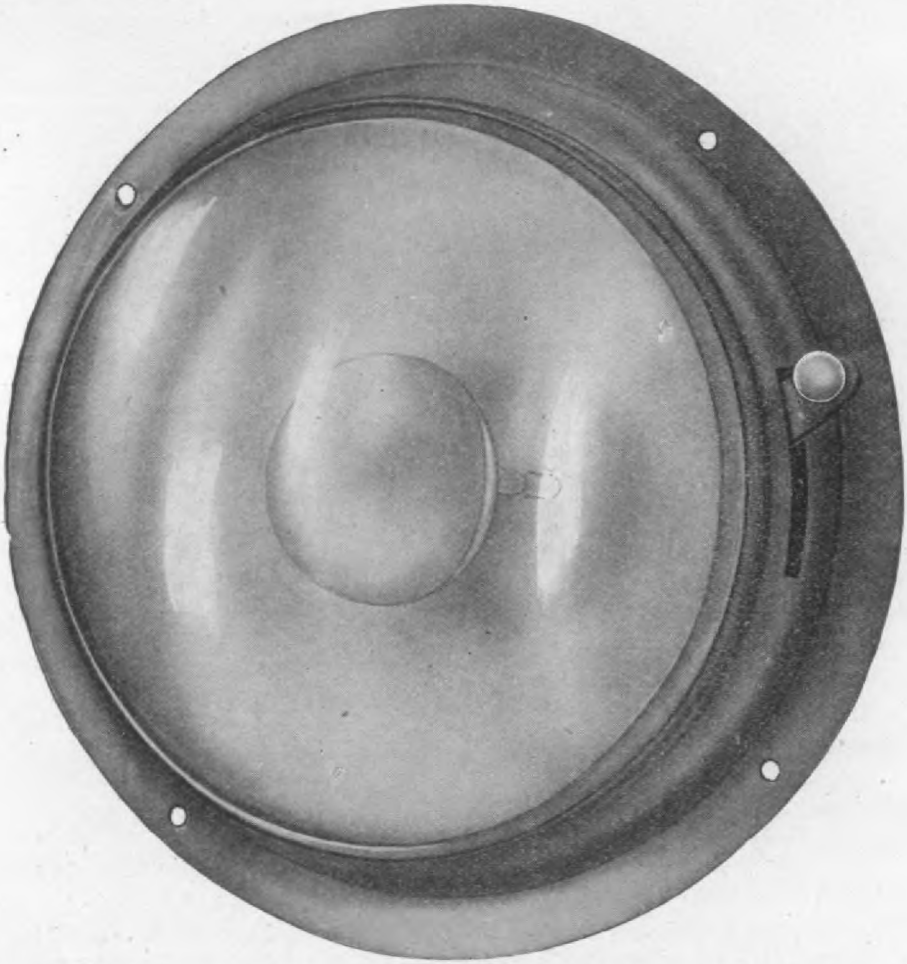
In 1892 we made the first Dome Lamp for Carriage Lighting.

We now have the most complete line of these goods for automobiles.



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Not Born Yesterday

We give you the results of 16 years' experience in the manufacture of Storage Batteries.

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We do not claim to put a quart in a pint measure, but we give the best combination of *Capacity, Durability, Efficiency* and *Finish* and we live up to what we claim.

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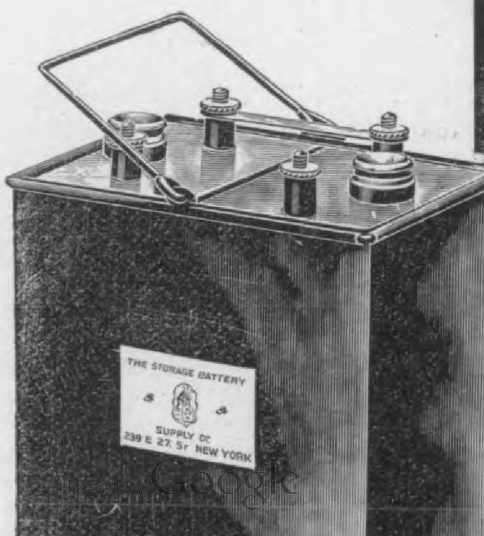
HARD RUBBER JARS



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ine of cars with all the old and satis-
tory construction retained, and very
' changes. The principal models are
' 2-cylinder 18-20 H. P. five passenger
ring car; "B" 10 H. P. $650 four pas-
ger runabout, and "C" 2-cylinder 18-20
P. roadster.

'his 1908 18-20 horse-power 2-cylinder
) Model "C" Roadster is a handsome,
pely, attractive looking car. Its chassis
f the same complete design, simple and
stantial construction as of the touring
with higher gear, and backed by its
verful engine, gives the speed and effi-
ncy of many cars of higher price. The
ght is evenly distributed; the engine
seats are placed further back, insuring
nfort and making it an exceptionally
y rider. It is beautifully finished and

of the wheel has been increased from
to 28 inches, and they are equipt wi
three inch Michelin tires with Goodye
detachable rims. The price is now $650.(
the quotations being f. o. b. the factory.

DETAIL CHANGES.

The body of the touring car is roomi
and handsomer in every line; the back
higher; the engine develops more pow
while the motor and transmission a
more quiet. The diameter of the whee
has been increased from 30 to 32 inche
and they are equipt with 3½-inch Michel
tires with Goodyear detachable rims, i
stead of the 30-inch by 3-inch standa
equipment as heretofore. This insures o
inch more clearance for rutty and mud
roads, easier riding and longer life to t
tires, besides greater economy in gener

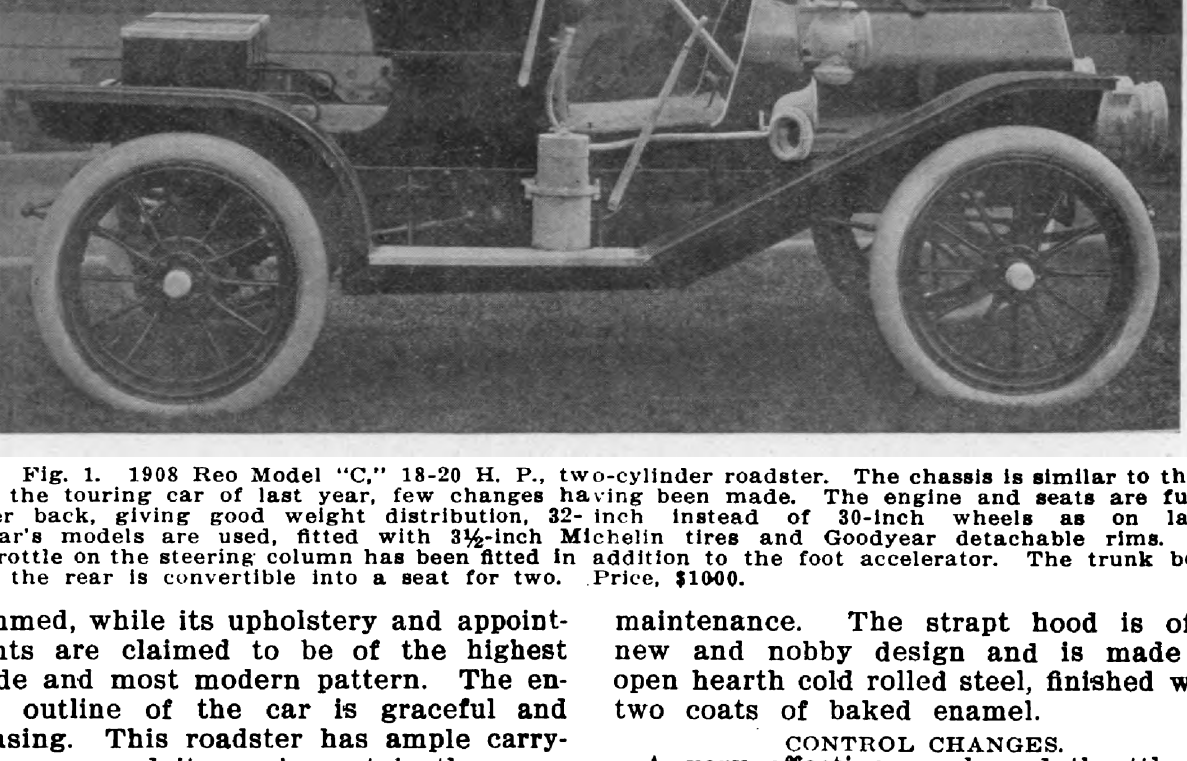

Fig. 1. 1908 Reo Model "C," 18-20 H. P., two-cylinder roadster. The chassis is similar to tha
the touring car of last year, few changes having been made. The engine and seats are fur
r back, giving good weight distribution, 32- inch instead of 30-inch wheels as on las
ar's models are used, fitted with 3½-inch Michelin tires and Goodyear detachable rims. A
rottle on the steering column has been fitted in addition to the foot accelerator. The trunk bo
the rear is convertible into a seat for two. Price, $1000.

nmed, while its upholstery and appoint-
nts are claimed to be of the highest
de and most modern pattern. The en-
outline of the car is graceful and
asing. This roadster has ample carry-
space and its equipment is the same
furnished on the model "A" touring car.
car is regularly equipped with trunk
, which is convertible into an emer-
cy seat for two extra passengers. The
sh, lamp, tire and tool equipment is
same as furnished on the touring car.
speed is 40-45 miles an hour. Price
00.00.

maintenance. The strapt hood is of
new and nobby design and is made
open hearth cold rolled steel, finished wi
two coats of baked enamel.

CONTROL CHANGES.

A very effective spark and throttle a
rangement now appears on the steeri
post in addition to the foot accelerator f
throttle, the latter having proven so pop
lar and successful in former models. Th
unique arrangement affords the added a
vantage of acceleration by the foot throtl
where both hands might be busy with t
horn, spark, or speed levers.

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Why You Should Specif
The Jones Speedomete
For Your 1908 Ca

The **Jones** is the **pioneer speed** dicator.

The **Jones** is the accepted **standard** speed indicator.

The **Jones** is used in this country and abroad by the Police partments as a means for timing motor vehicles for reason of **accuracy.**

The **Jones** won the Gold Medal **Reliability** award in the Re Automobile Club's Contest. All American and Foreign manu tured speed indicators sufficiently practical to enter were in Contest.

S. F. Edge had the **Jones** on his Napier Cars when he made World's most remarkable record, 1,588 miles, 1,310 yards in hours, averaging 66 miles per hour, on the Brooklands Tra London, England.

The Speedometer cable revolutions per hour at a 66 mile sp total 168,300 or 4,039,200 in 24 hours, demonstrating the J **"staying" qualities.**

Compare this to what other indicators have done—then yo specify the **Jones.**

1908 **Jones Speedometer** with its added refinements is wit question the best speed indicator ever produced in this countr abroad.

We will send you upon request, without charge, a catalog Speedometer Bulletin. Write Department No. 12.

JONES SPEEDOMETER

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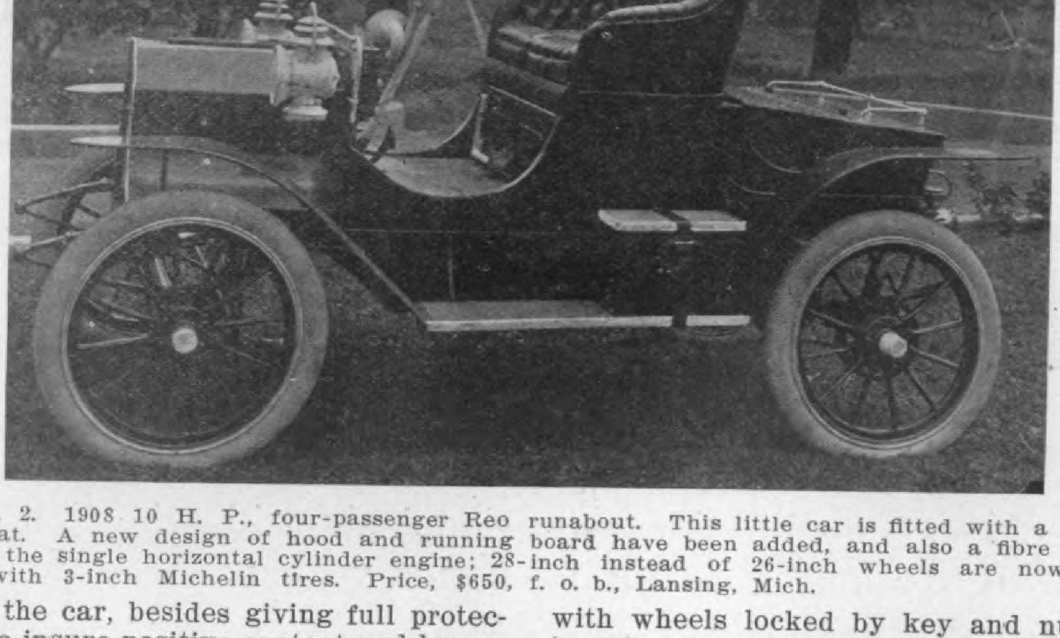


Fig. 2. 1908 10 H. P., four-passenger Reo runabout. This little car is fitted with a folding r seat. A new design of hood and running board have been added, and also a fibre pan to tect the single horizontal cylinder engine; 28-inch instead of 26-inch wheels are now used, ed with 3-inch Michelin tires. Price, $650, f. o. b., Lansing, Mich.

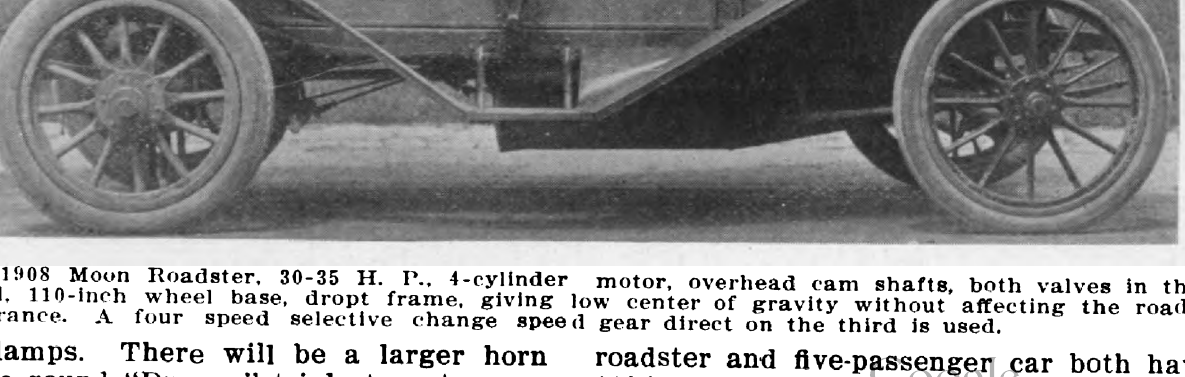
to the car, besides giving full protec- To insure positive contact and longer an improved commutator with roller acts now forms a part of the new pment.

erfect and absolutely safe as the 1907 es proved on the long steep and rough Ridge and Allegheny Mountain roads e Glidden Tour, the brake system has improved by an emergency rear wheel e with improved brake lever fitted in outside quadrant ratchet with hand se. The full oil and gas lamp equip- t will be of the Gray and Davis make Bausch and Lomb mirror lenses in

with wheels locked by key and nut, thu insuring positive reliability and safety o rough and dangerous roads. All in all, th 1908 model presents a more durable an efficient equipment with better appearanc thruout. The price is $1250.

Moon 1908 Changes

Few changes have been made in th 1908 Moon cars, manufactured by th Moon Motor Car Company, of St. Louis Mo. A five-passenger car, a roadster an a new seven-passenger car with 121-inc wheel base are offered for 1908. Th



1908 Moon Roadster, 30-35 H. P., 4-cylinder motor, overhead cam shafts, both valves in the l. 110-inch wheel base, dropt frame, giving low center of gravity without affecting the road rance. A four speed selective change speed gear direct on the third is used.

amps. There will be a larger horn e round "Dragon" triple turn type; a ry box conveniently placed on the run-

roadster and five-passenger car both have 110-inch wheel base. The roadster as shown in the photo sets very low, and is

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"Won't Slip" Tread Tires

1

They hold their own; they ho
the road,
And at no curve need they
slowed;
Upon the earth they keep th
grip—
And Bailey Tread Tires wo
slip.

2

They're Tires that hold t
Right O' Way,
They've come to go—and co
to "stay,"
And while you go the merri
clip
The Bailey Tread Tires wo
slip.

3

They're "knobby" Tires t
stand all strain,
The "Rubber Studs" are s
and sane;
The stretch of ice you need
skip
For Bailey Tread Tires wo
slip.

4

For Auto, Auto-Bi or Bike
They lead in speed on tr
and pike,
They neither ravel, rend
rip,
And Bailey Tread Tires w
slip.

5

They "corner" all the turns
with ease;
No "Heart in mouth" if you
have these;
No sudden short-turn brings a
tip
For Bailey Tread Tires won't
slip.

6

They are not skidders that
skidoo;
All roads are pleasure roads to
you;
The "Won't Slip" Tread, says
every lip,
Is rightly named "Won't
Slip." (A. W. B.)

The **world wide** popularity of the Bailey "Won't Slip" Tread Tire
been made entirely on its merits. The "mouth to mouth" advertising
those who **ride** them and who have found in them a tire which proves
reliability, durability and **superiority** over **any** and all anti-skid
tread constructions has made it impossible for **8** of the largest tire ma
facturers in the United States to supply the demand for Automobi
motor cycles and bicycle tires with Bailey Tread. There is no **metal** in
Bailey Tread to **heat** the tire, **pull** loose from the rubber or tear
road bed. The **rubber studs** of the Bailey Tread are the **true** princ
that give **perfect traction** and prevent **skidding**. They are to
Automobile what the **rudder** is to the **ship.**

N. B.—The extra cost of the Bailey Tread Tires on the List more t
smooth of same make, is 2½ and 3 in., $1.50 each; 3½ in., $2.00 eac
in., $2.50 4½ in., $3.00 each; 5 in., $3.75 each.

N. B.—Now ready: Bailey's "Won't Slip" Tread Bands for cove
all makes and sizes of smooth, new or partly worn tires at nominal cos
Bailey Tire Manufacturers. Write us for descriptive booklet.

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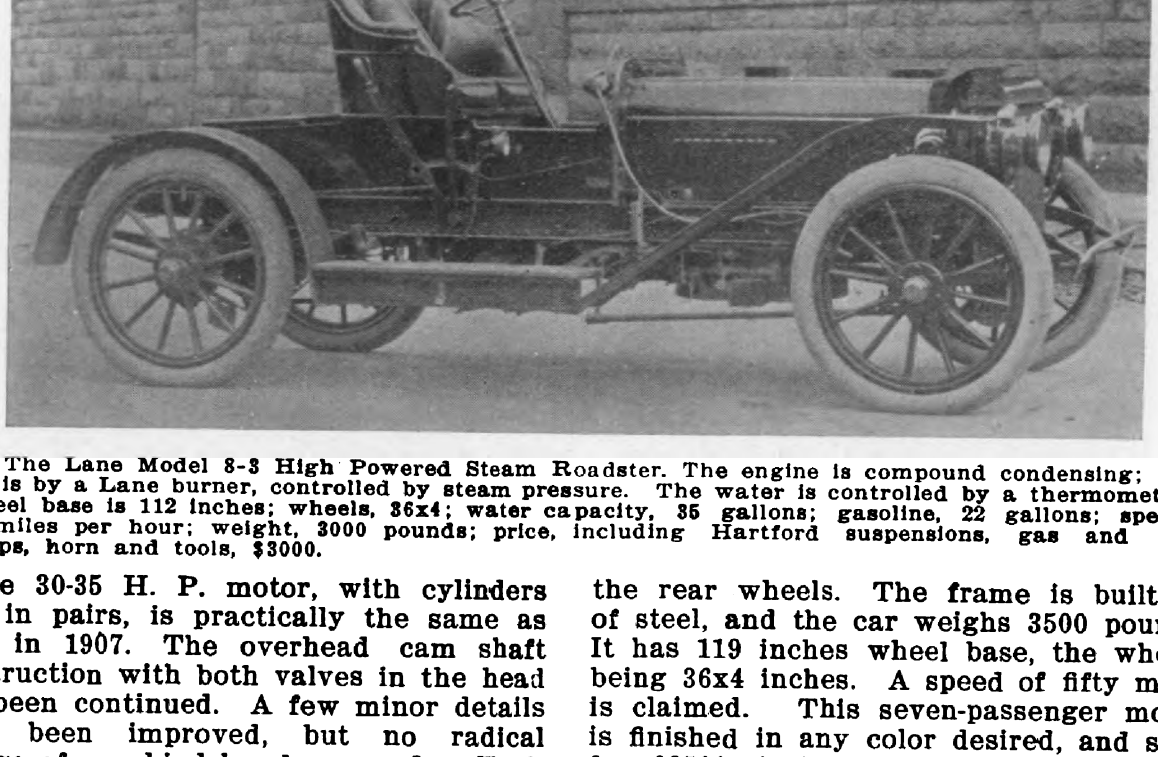
sisted of two storage batteries of large acity and induction coil. All the cars l be equipt with four speed sliding r selective type transmissions, all er the single lever control. The nes are of prest cold rolled steel of usual channel section, but truss rods used, making sagging absolutely im- sible. There is a drop of 3½ inches forward of the rear axle, which al- s of a lower center of gravity without rfering with the road clearance, and ces the tendency of side sway. The pany still continue the use of the mul- e disc clutch, which, it is claimed, has n excellent satisfaction this past sea-

senger touring car similar to that of la year; a high powered roadster of ru about type as shown in the accompanyi illustration, and a small runabout on t same chassis as the five-passenger car.

No radical changes have been made. T large touring car, known as Model 8-7, rated as 30 H. P., the engine being co pound and condensing. The boiler is t bular, and is claimed to be indestructibl A Lane special burner is used, and the fi control is by steam pressure. The mot is controlled by a thermostat. The engi is oiled by splash. A condenser is use and the water tank has a capacity of gallons. The gasoline tank carries gallons. The brakes are on the hubs



The Lane Model 8-3 High Powered Steam Roadster. The engine is compound condensing; fir- is by a Lane burner, controlled by steam pressure. The water is controlled by a thermometer. eel base is 112 inches; wheels, 36x4; water capacity, 35 gallons; gasoline, 22 gallons; speed, miles per hour; weight, 3000 pounds; price, including Hartford suspensions, gas and oil ps, horn and tools, $3000.

e 30-35 H. P. motor, with cylinders in pairs, is practically the same as in 1907. The overhead cam shaft truction with both valves in the head been continued. A few minor details been improved, but no radical ge of any kind has been made. Each k plug is fitted with a switch cut-out, all the gears for driving the magneto pump have been tightly enclosed. honeycomb type of radiator, which ed very efficient and satisfactory last is continued without change in the nt models.

1908 Lane Steam Cars

e Lane Motor Vehicle Company, of

the rear wheels. The frame is built u of steel, and the car weighs 3500 pounds It has 119 inches wheel base, the wheel being 36x4 inches. A speed of fifty mile is claimed. This seven-passenger mode is finished in any color desired, and sell for $3500, including as equipment tools horn, gas and oil lamps, and Hartford sus pensions.

The high powered roadster has practi cally the same chassis, but the wheel base is 112 instead of 119 inches, and the ca weighs 3000 pounds. It is furnished wit the same equipment as the touring car fo $3000.

The five-passenger car and the smal roadster are similar. The wheel base is 97 inches, and the motor is rated as 20 H. P. The wheels are 32x4 inches, and the

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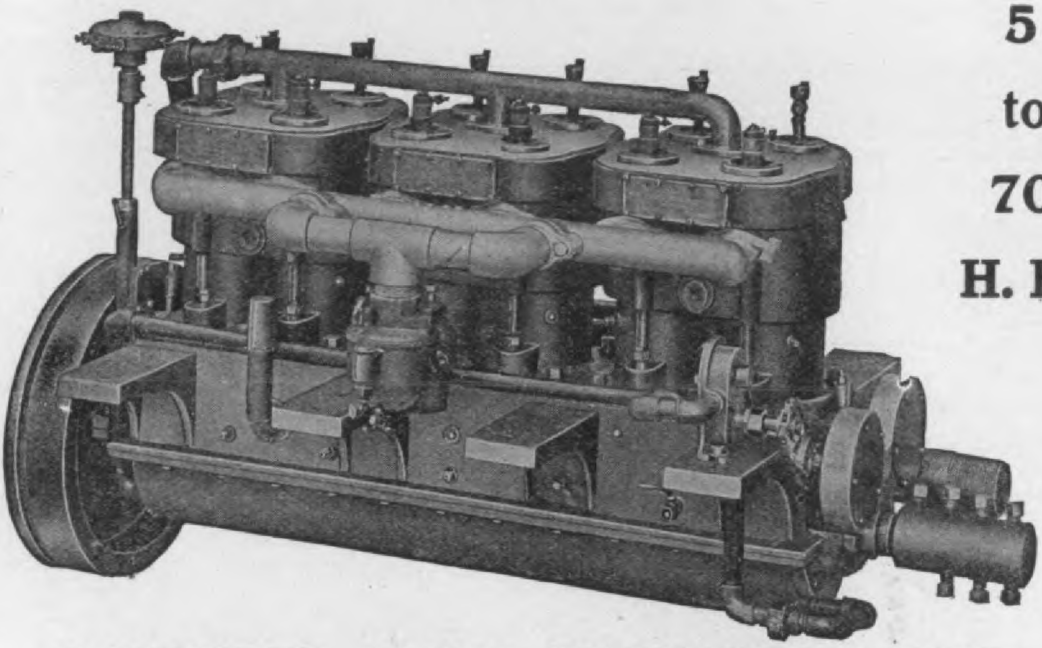
Motors

TRANSMISSIONS and CLUTCHES for AUTOMOBILES and MOTOR BOATS

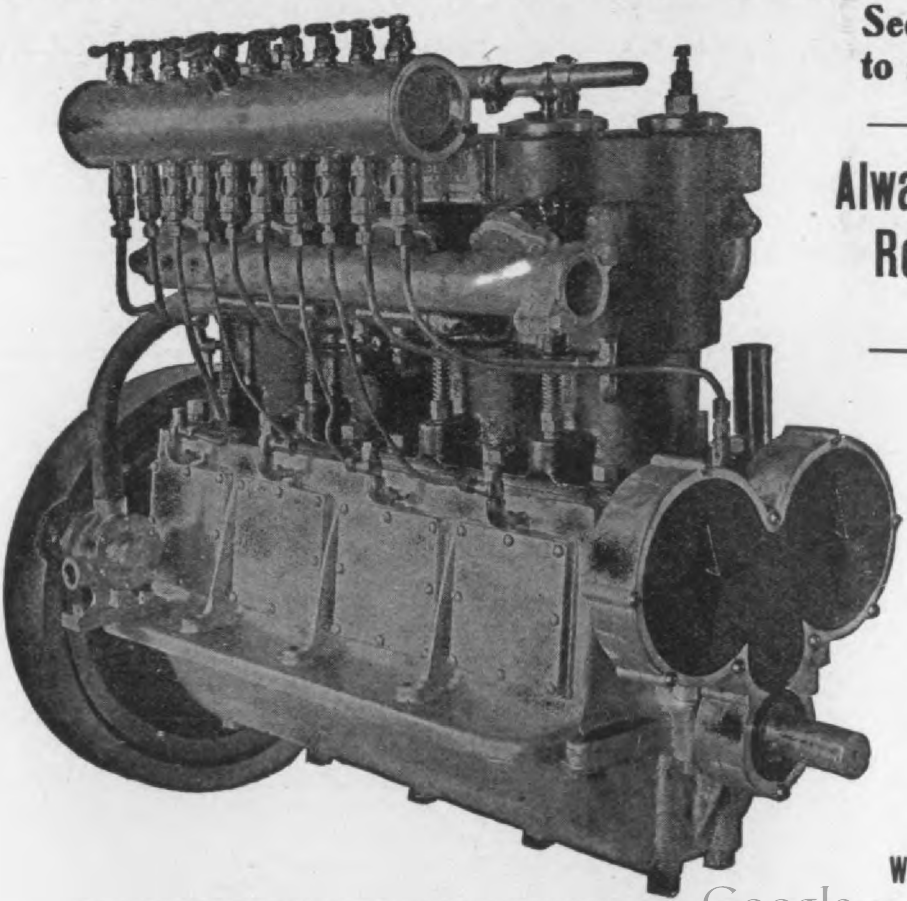
5 to 70 H. P.



6 CYLINDER, 45 H. P. AUTOMOBILE MOTOR.

Second to none.

Always Reliable



Write for Catalog and Prices.

Air and Water Cooled

4 CYLINDER, 35 H. P. MARINE MOTOR.

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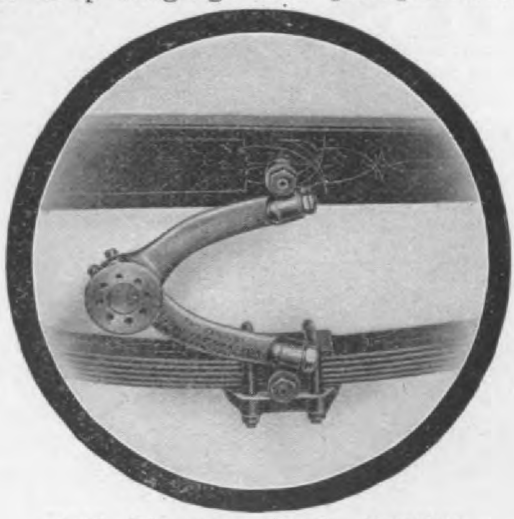
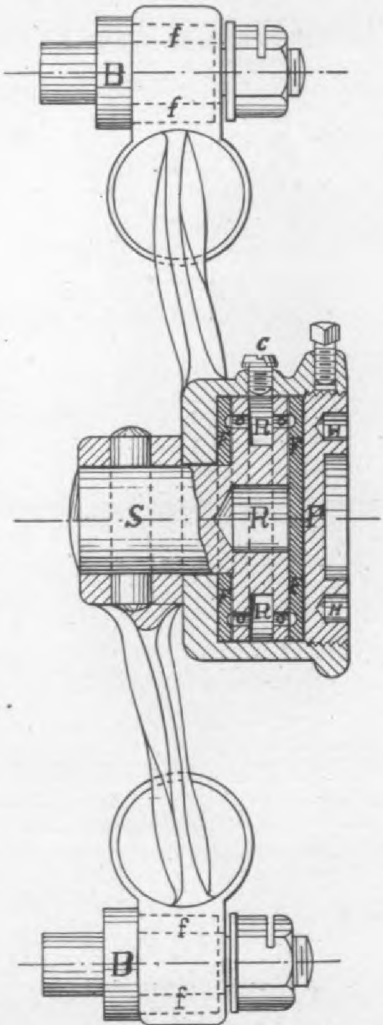
ly of steel drop forgings, instead of el drop forgings and phosphor-bronze.



1908 Diezeman Shock Absorber.

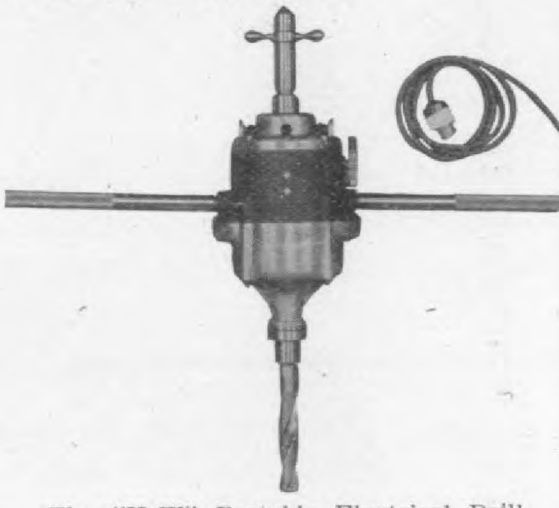
e arms are provided with universal nts to allow for side play of the frame, se universal joints being fiber bushed prevent wear and rattling. In the 1908 vice a groove is cut on one side of the



sectional view, V is a steel stud which riveted to the fitting; C screw for cappi hole for refilling with grease; f fibre bus ings for universal joints; F non-abrasi fibre discs; O holes in spindle for lub cating purposes; P adjusting plug wi holes (H) for wrench; (this plug is held a copper seated set screw); R reservoi for grease; S steel spindle. The sho absorbers are worked in under pressu by means of a special machine in ord to give the fibre discs the proper seatin They are then adjusted to the proper te sion and will retain this tension duri 15,000 to 25,000 miles of running.

"H-W" Portable Screw-Feed Drill

We herewith show a new type of el trical drill just added to the line of p table drills made by the Hisey-Wolf M chine Company, 2850-52 Spring Gro avenue, Cincinnati, Ohio. This new d is made in two sizes, ⅞-inch capac weight 27 pounds, and 1¼-inch capac weight 38 pounds. These capacities given are for steel; larger size holes c be drilled in softer material. The dr ing power is obtained from the ordina incandescent lamp socket.



The "H-W" Portable Electrical Drill.

The motor is fully enclosed at the sp dle end, preventing borings or chippi entering in any way. The switch is cated on the body of the motor wit immediate reach of the operator. T two side handles are detachable. "Old Man" is furnished as an extra, if sired.

The gears and working parts are ha ened. All parts are easily accessible adjustment, and at the same time p tected in every way. The drill is dura

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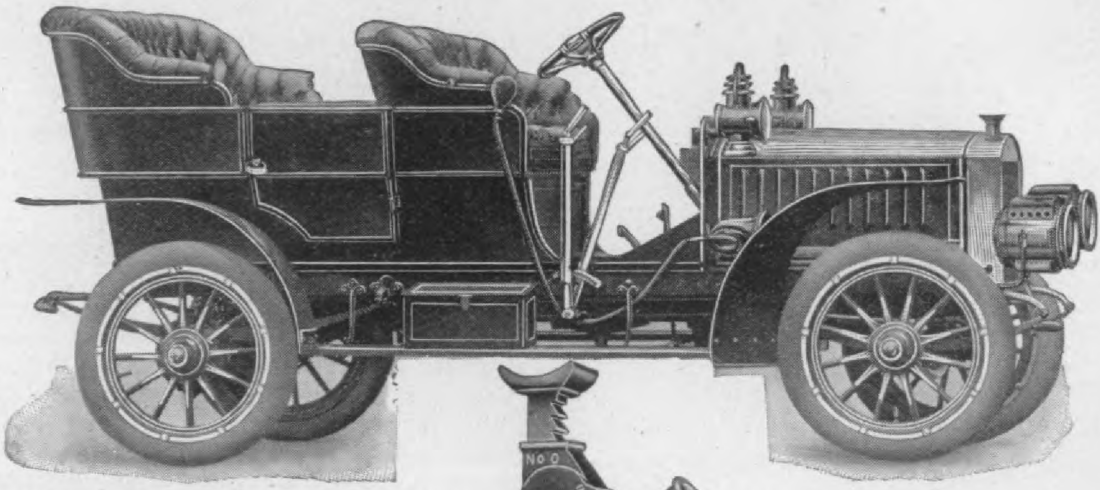
The Greatest Automobile Troubles

Are tire troubles, the most important tool to have on han in such troubles is a GOOD JACK especially when you have heavy car. A cheap Jack is liable to break down and do mor damage than a number of GOOD JACKS will cost.

THEREFORE A SHREWD MAN WILL BUY A GOOD JACK.

The HIGHEST GRADE AUTOMOBILE JACK ON THE MARKET is th

BUCKEYE



NONE EVER BROKE DOWN UNDER the LOAD IT WAS REQUIRED TO LIFT. BUCKEYE Jacks are THE ONLY Jacks on the market having HIGH CARBON CRUCIBLE STEEL DROP - FORGED RACKS AND PAWLS.

WE HAVE 20 YEARS EX PERIENCE BUILDING JACKS OF THIS TYPE.

BUCKEYE Jacks are made only by

The Buckeye Jack Mfg. Co

LOUISVILLE, OHIO

THE POST & LESTER CO., Hartford, Conn., Distributing Agents for New England States.
M. G. WEST & CO., San Francisco, Cal., Distributing Agents for Western Coast.

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useful in automobile factories, garages, repair shops, etc. They can be carried anywhere, as any length lamp cord can be attached. This concern also makes hand drills in smaller capacities, and Scotch drills up to 2-inch capacities.

The Winton Self-Starting Device

The Winton Motor Carriage Company, Cleveland, O., is fitting its Winton Sixteen Six car, described in our September, 1907, issue, page 132, with a self-starting de-

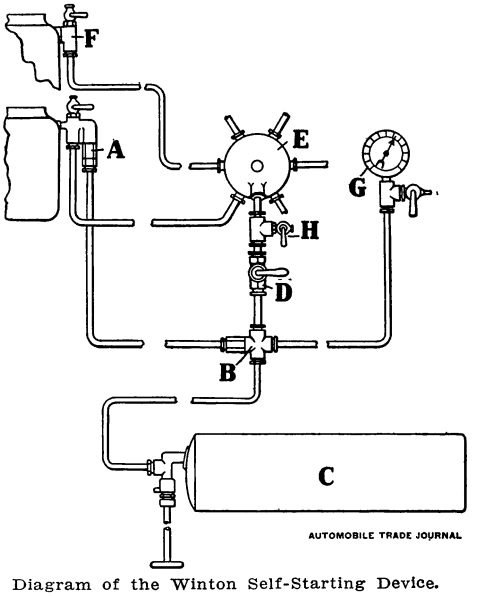
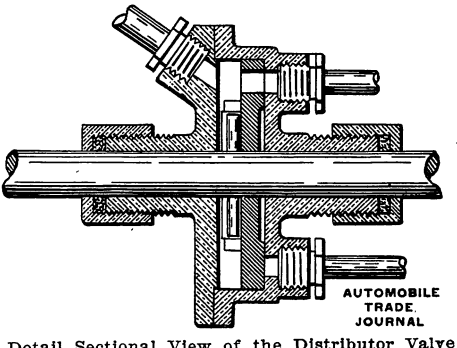


Diagram of the Winton Self-Starting Device.

vice, which is a special feature of the car, but which was not at that time ready.

This device operates by taking a quantity of comprest gas from one cylinder at each compression, and storing the same in



Detail Sectional View of the Distributor Valve of the Winton Self-Starting Device.

a tank until needed. Part of the compression of the forward cylinder only is piped thru check valves (A and B) to the storage tank (C), which is located between the driving shaft and the left frame rail under the rear seat. Check valve (A) has spring pressure equal to compression, so that only combustion is taken. To operate the device with motor not in operation, the valve (D) on the dash is opened. This permits pressure to flow from the tank (C) thru the distributor valve (E), which is driven by the cam shaft, and is timed so that all the pressure contained in the tank enters the one cylinder ready to fire, each cylinder except No. 1 being equipt with the check valve (F), to which is attached the usual compression cock. Pressure entering the cylinder about to fire forces the piston past the firing point, which should at once place the motor in operation. However, should this cylinder fail to fire, pressure then enters the cylinder next to fire, and forces this piston past the firing point, and so on thru the series of cylinders until combustion puts the motor into operation.

A pressure gage (G) is placed on the dash, and has attached to it a release cock. The cock (H) is used for oiling the distributor valve.

The accompanying sectional drawing is an enlarged view of the distributor valve (E). That portion of the valve to which are attached the six outlets to their respective cylinders is stationary, while that portion thru which air passes from the tank to the outlet pipes revolves, being timed as before stated.

"Mason" Trunks, Tool Boxes, Etc.

John B. Mason Company, 318 Washington street, Boston, Mass., manufactures an attractive line of trunks and similar automobile fittings, and its line includes a cleverly combined tool receptacle and foot rest. The latter device is made of bass wood and covered with enameled duck. It is hand riveted and lined with tin. This combination style tool box and foot rest is for use in the tonneau, but they also make a tool box of similar construction for the running board, and a mahogany tool box for the running board.

They offer several styles of trunks made in both leather and enameled duck. They put out one type of leather trunk which can readily be carried in pairs, one on top of the other and firmly strapt together. They also have a double trunk—two trunks in one—made to fit any car. It has an inside tray, is all handstitched, and is made up in either patent leather or black harness leather.

This company also furnishes baggage racks made of tire steel, riveted together and practically indestructible. Robe racks of polished brass is another feature of the Mason line. These are adjustable for different thicknesses of robes and can be closed up when not in use.

Baseler & Lawrence inform us that they have formed a partnership and located at 1011 Chestnut street, Philadelphia, where they act as sales agents for electrical manufacturers.

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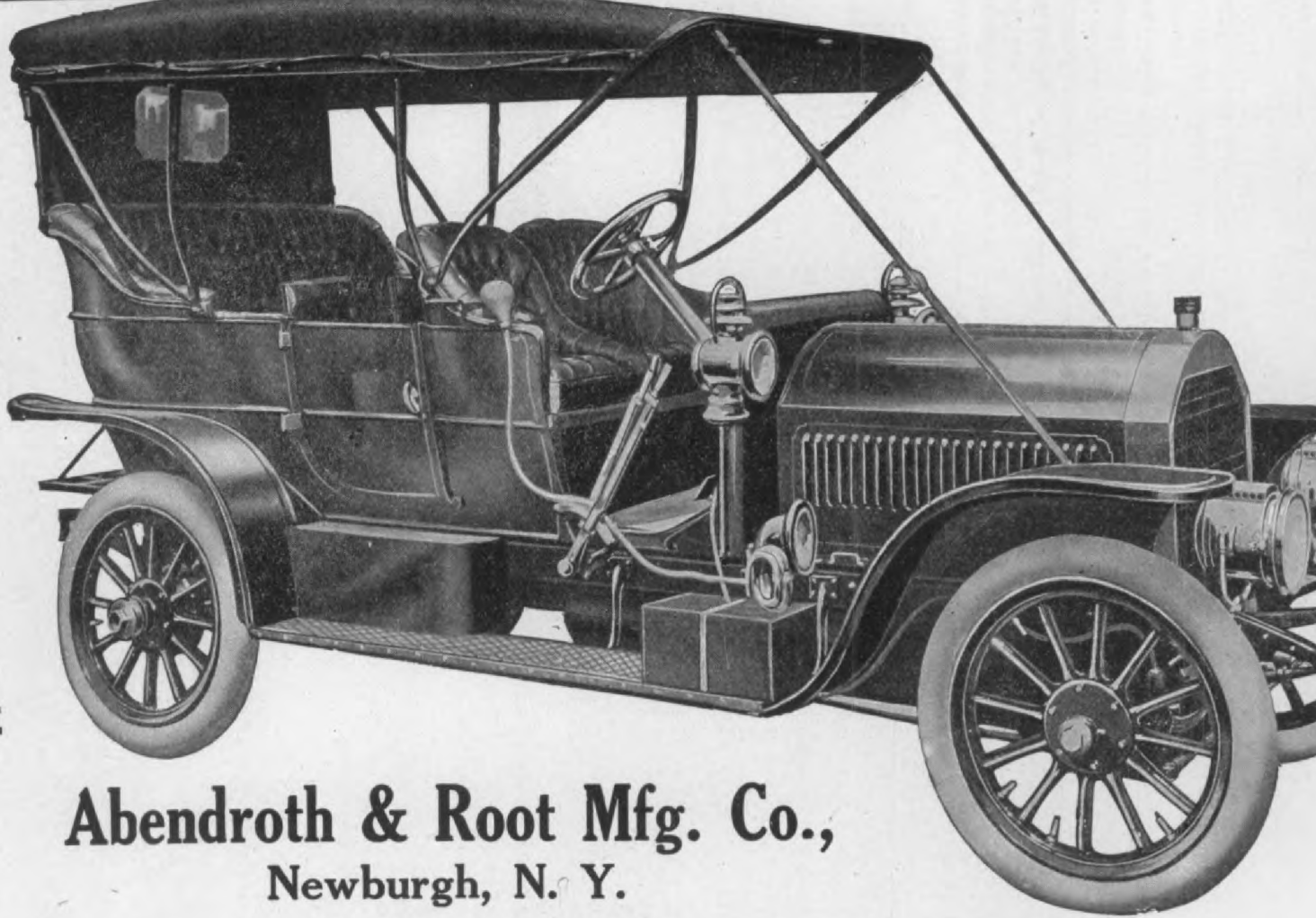
ONTENAC
CARS

appeal to the
through the
s.

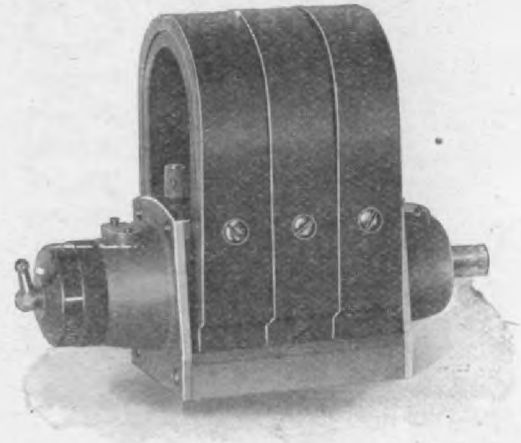
ch are you?
E SURE
ALL AND SEE US
AT THE
CENTRAL PALACE
ctober 24-31
Floor, Section D.
NE
ABOUT



Abendroth & Root Mfg. Co.,
Newburgh, N. Y.

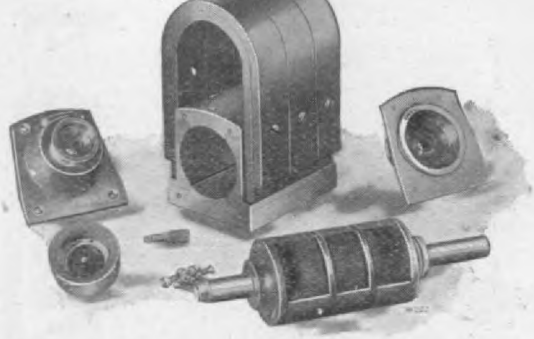
Frontenac 40-45 H. P. TOURING CAR

d and placed on the market a low ten
n magneto which they claim embodies
most desirable features of construc-
n as determined from its past experi-
ces in other lines of work. The gen-
l construction is most substantial and
hout superfluous trimmings.



The New G-E Low Tension Magneto.

Lubrication is effected by the use of
ste packing in the same manner as has
n successfully applied in connection
h "G-E" automobile motors. Generous
wells are provided with overflow holes
prevent excessive lubrication. The oil
ls are readily accessible, and when
ers are in place, are dust-proof and
l operate for months without attention.
baffles are provided on both ends of
armature to prevent oil from work-



Disassembled Parts of the G-E Magneto.

into the armature and interior parts
the magneto. Ample bearing surfaces
provided, as well as a shaft of large
meter to ensure strength, rigidity, and
minimum amount of wear.
he base and bearings are of bronze,
ch possesses the merits of being dura-
and of looking clean after extended
.
ne end of the armature winding is
ught out thru the hollow shafting by

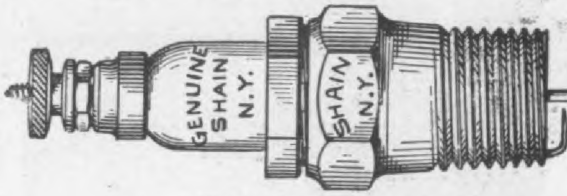
cover is provided with a knurled exter
The grounded side of the armature wi
ing is firmly fastened to the core, and
carbon brush insures good contact
tween armature winding and frame
ground.

The magnets are of the double ty
sprung on the frame and secured by o
screw on each side; this minimizes dr
ing the magnets. The bearings bei
screwed to the top and base of the fran
rather than to the poles, also reduc
drilling of the pole pieces to a minimu
thus further increasing the efficiency
the magnets. The demagnetizing of t
field magnets is prevented by avoiding
complete breakage of the permanent fl
by making the armature core sligh
overlap the pole gap when it is in a v
tical position.

The design of the armature allows g
erous insulation, and also permits t
other important advantages. With t
magneto an open circuit voltage of ov
100 volts is easily obtained, the make
say, while a short circuit current of a
proximately 0.4 of an ampere is availab
In order to secure this high short circ
current, the resistance of the armatu
winding is as low as possible, while t
number of turns is sufficiently high
give an adequate open circuit voltage.

The "Shain" Spark Plug

We show herewith the Shain spark pl
recently brought out by Charles D. Sha
70 Murray street, New York. The spec
feature of this plug is that it can be eas
cleaned, all that is necessary being to wa
it in kerosene. The porcelain is not
moved for this purpose. The sparki



The "Shain" Spark Plug.

points are cleaned with emery cloth. A
other feature of the plug is that the porc
lain does not extend to the end of t
plug, thereby preventing it from getti
too hot.

The plug is made in half-inch, metr
and A. L. A. M. sizes, and lists at $1.
for either type. Porcelains completely a
sembled list at 35 cents each.

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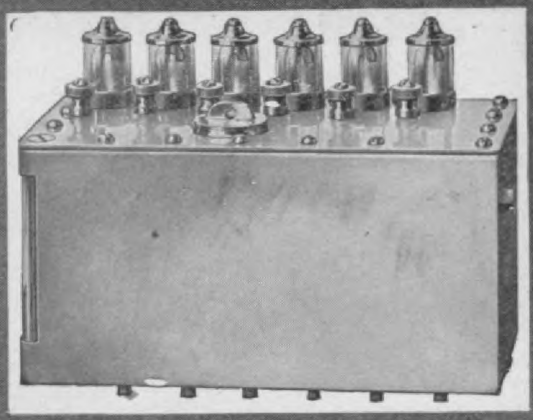
Mr. Charles G. McCutcheon has be

McCORD & COMPANY

1412 OLD COLONY BLDG.,

CHICAGO, U.S.A.

NEW YORK OFFICE, 24 BROAD ST.



McCORD

FORCE FEED LUBRICATORS

RADIATORS

CARBURETORS

WIRE BELTING

SPARK PLUGS

CIRCULATING PUMPS

McKIM COPPER ASBESTOS GASKETS

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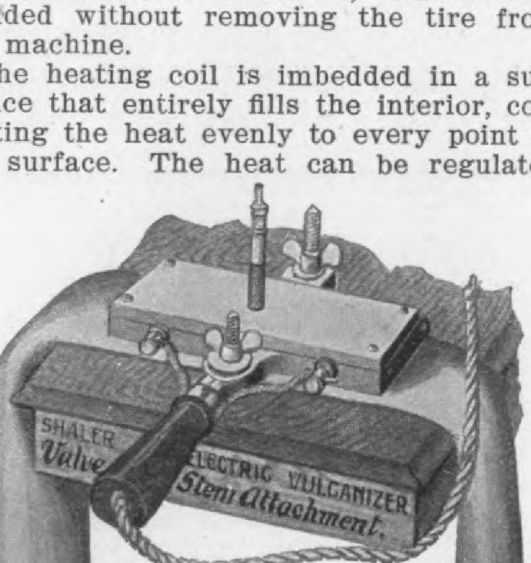
nging out a new vulcanizer, Type C, for nding blow-outs in casings; also an at-hment (Type BV) for vulcanizing valve ms.

he vulcanizer, Type B, can be at-hed to any electric light socket, and furnished with about twenty feet of ible cord, so that it can be carried to

e "Shaler" Type B, Portable Electric Vul-ngs, in operation.

convenient place. With it is also fur-ed a small shelf which can be clamped table or bench, on which to hang the while working on the same. Or the anizer can be attached directly to the while on the machine, and all cuts ded without removing the tire from machine.

he heating coil is imbedded in a sub-ce that entirely fills the interior, con-ting the heat evenly to every point of surface. The heat can be regulated



e "Shaler" Type BV, Valve Stem Attach-.

Wright tires, or any tire using a rubb valve stem. It can also be used for men ing a tire in which the metal valve h begun to leak around its base. It is fu nished complete with cord attachmen plug and thermometer. The list price Type BV is $8.50.

The "Shaler" Type C Vulcanizer, for Out Casings, in operation.

The Type C vulcanizer is exclusive for outer casings, and will mend any blo out or tear to outer casing that it is pra tical to mend in any size tire from 2½ 5 inches in diameter. The vulcanizer 14 inches long and designed to fit insid the case, thus making it possible to vu canize a new canvas directly to the i side. It lists at $20.00.

"Preservative" Tire Paste and "Sterling" Auto Body Polish

"Preservative" tire paste is the produ of the Tire Preservative Company, Onawa, Iowa, and is used to lengthen th life of automobile tires. The preparatio comes in the nature of a smooth past which is compounded from the best know rubber preservatives, and when applie and well rubbed into the surface and a lowed to dry forms a perfect coatin which is claimed to exclude the air an preserve the rubber. It is recommende for use on both old and new tires, inclu ing tires in stock.

This company also manufactures Ste ling Auto Body Polish, a new oil polis which they guarantee will remove all san scratches and varnish blemishes and t restore the lustre to the varnish.

On October 1 Mr. Frank C. Riggs joine the Packard Motor Car Company, of De troit, taking charge of the Commercia Vehicle and Enclosed Body Department.

The Keyless Lock Company, Indian apolis, Ind., make special parts to orde for automobiles, such as hinges, lam irons, door handles, keyhole covers, an escutcheons.

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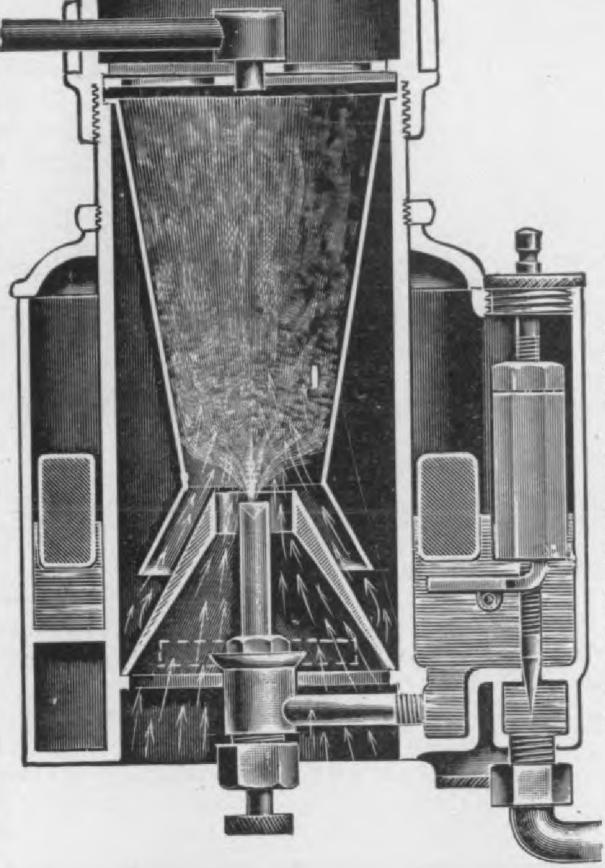

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THIS INSTRUMENT PRODUCES THE

MAXIMUM EFFICIENCY

FROM INTERNAL COMBUSTION MOTORS

INCREASING THE

POWER, SPEED,

AND FLEXIBILITY ON A MINIMUM FUEL CONSUMPTION

It functions on correct scientific princ pals and is greatly superior in its method gas formation, workmanship and finish, any carburetor ever brought out.

Our modern new factory, allows us make prompt deliveries. We will be pleas to forward sample instruments to manufa turers who are interested for this season's a next requirements, and believe you c hardly over-look this opportunity of increa ing the popularity of your cars, by securi absolute perfection in carburation.

Owners of cars, who have ideas of larg motors are advised to try a Bowers Carb retor first, it makes giants of the weakling

CATALOG FOR THE ASKING

The F. E. BOWERS COMPANY

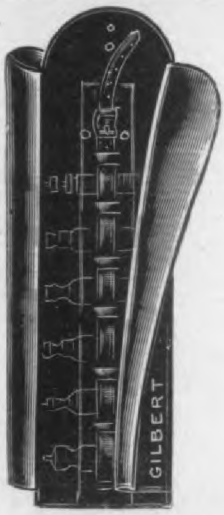
New Haven, Conn.

GILBERT AUTOMOBILE

THE ONLY ONES WORTH YOUR MONEY

FABRIC SUPPLIE

QUALITY . . . . SUPERIORIT



TIRE CASE

STORM HELMET

WE MAKE EVERYTHING IN RUBBER FABRIC

Sold

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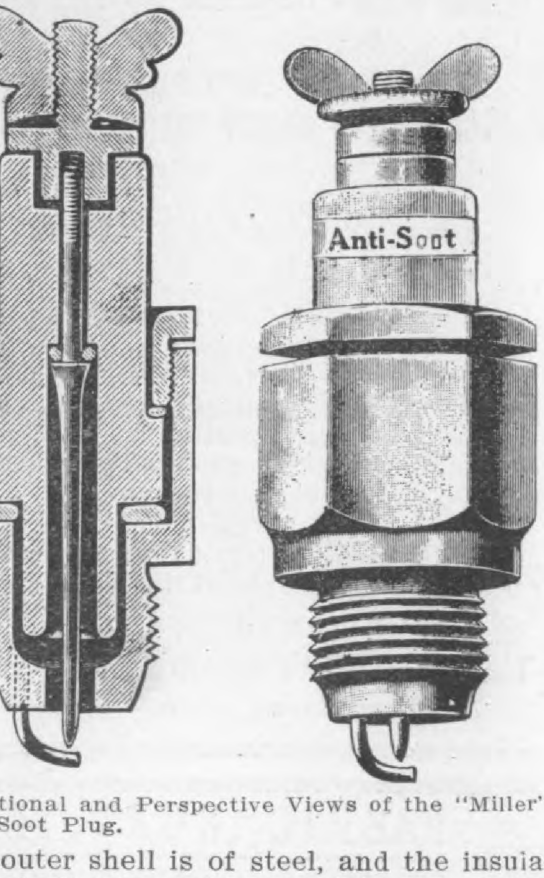
is plug is a French product, and is constructed that gas may pass on r side of the porcelain, thereby preing carbonizing and short-circuiting.



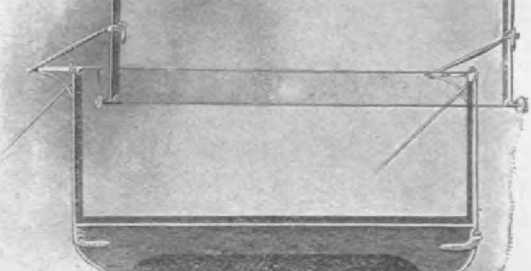
tional and Perspective Views of the "Miller" Soot Plug.

outer shell is of steel, and the insula- of finest grade porcelain. A heavy l pin extends the entire length of the and forms the central electrode.

e plug is made in ½-inch I. P. and ic sizes, and lists at $1.00, either ad. Extra porcelains are furnished at ents each.

Col. Sprague's 1908 Auto Front

l. James H. Sprague, president of the gue Umbrella Company. Norwalk, O., brought out an entirely new auto



and the 1908 fronts will be the unique and simple locking device which the Colonel has patented.

The 1907 device was a very good one but the 1908 lock is absolutely direct in its action and cannot rattle, and its movements are simple and positive. The new fronts also have a more elegant finish and appearance, and the number of parts has been reduced to a minimum, making the fronts simple in operation and not liable to get out of order.

"Troy" Combination Folding Glass Front and Bug Screen

The Troy Vehicle Sun Shade Company of Troy, O., have just brought out something new in the line of wind shields, the feature of the device being that protection can be had instantly with either a glass plate or a bug screen. The operation of the device is such that not only can the change from screen to glass and vice versa be easily and quickly made, but when desired both glass and screen can be folded down—the screen dropping in front and the glass to the rear of the stationary section.

The "Troy" Front with the Bug Screen Up.

The frame of this shield is made of highly polished brass, which with a little polishing will always keep it bright and new. In the stationary frame rubber bumpers are set, against which the folding sections strike. The sections are fastened by hooks at each end, which hold them securely in place. The device is claimed not to rattle, and is made to fit any dash.

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Kant-Skid

TRADE MARK

TIRE GRIP

For Pneumatic or Solid Tires. Safe, Soft, Noiseless. Easily attached and Easily Removed. Ca
not Possibly Injure the Tire. Simple, Strong, Dependable and Cannot be Excelled for Durabil
will outwear any other anti-skid device. The Tires that are equipped with "KANT-SKID" Can't Sl
The most Reliable and Best of All Inexpensive Devices to Prevent Skidding. Responds Instan
Grips the Road with a Broad Tread Quickly and Effectively, Lasts Twice as Long and Gives Grea
and More Satisfactory Service. No Metal Contrivance for the Same Purpose can Compare wit
Barred by No Road Laws, Local, State or National; Can be Used Anywhere. Weigh but lit
When not in use can be Carried in small space in tool box. Every pair guaranteed.

SIZES AND PRICES AS FOLLOWS:

26 x 2½ or 3	$9.00	30 x 2½ or 3	$10.00	26 x 3½ or 4	$12.
28 x 2½ or 3		32 x 2½ or 3			
28 x 3½ or 4	$10.50				
30 x 3½ or 4					
30 x 4½ or 5	$12.00	32 x 3½ or 4	$11.50	34 x 4¼ or 5	$13.
28 x 4½ or 5		34 x 3½ or 4		36 x 4½ or 5	

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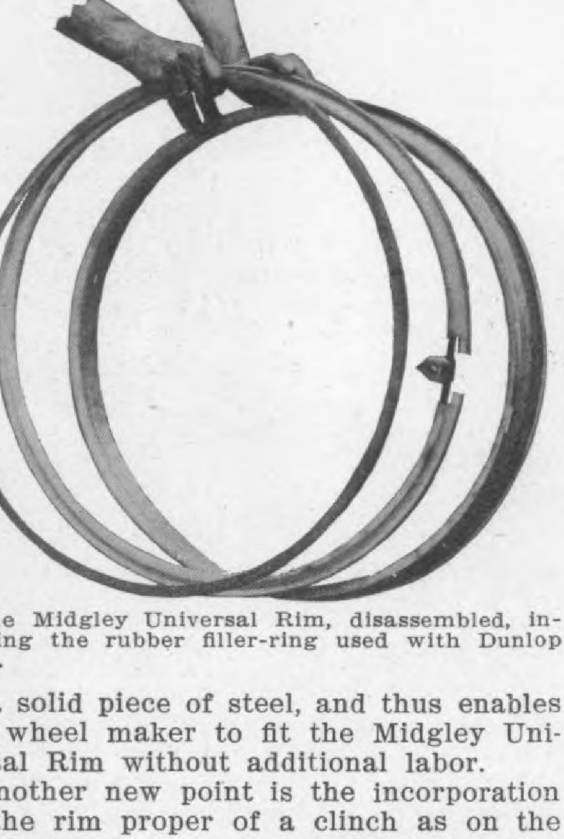
been improved in detail, and is a ch more efficient device because of se detail changes.

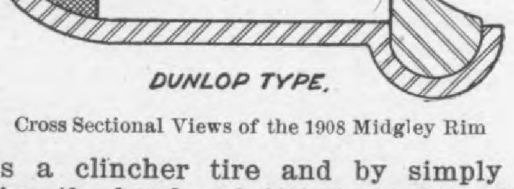
he most radical departure from the rim is an improvement essential to wheel maker, viz.: The rim instead of ng hollow as heretofore is rolled out



e Midgley Universal Rim, disassembled, in-ing the rubber filler-ring used with Dunlop

solid piece of steel, and thus enables wheel maker to fit the Midgley Uni-al Rim without additional labor.

nother new point is the incorporation he rim proper of a clinch as on the dard clincher rim, necessitating the of but one detachable bead, which fits he groove on the outer edge of the as in the past. When this bead is d with the clincher side in, the rim



Cross Sectional Views of the 1908 Midgley Rim

s a clincher tire and by simply re-ing the bead and fitting a rubber filler

means of the turnbuckle, which has been employed since the first Midgley detachable rim was placed on the market in 1904.

The "Mandeville" Steering Wheel Auto Muff

The purpose of the "Mandeville" muff is seen at a glance at the accompanying cut. The muff is manufactured by the Mandeville Auto Steering Wheel Muff Company, of Bluffton, Ind. It is shaped something like a bag. The top comes over the wheel and close to the body. The bottom fits around the post, having a suitably located ring which opens and snaps around the post. The top and bottom are fastened together by an adjustable strap. This arrangement holds them close enough to keep out the cold, yet free enough to give all the working room needed. The wheel turns freely inside this covering, as it is made wide enough to allow for the arm action in turning corners.

One style of this muff which is here illustrated is made with a celluloid wi

The "Mandeville" Steering Wheel Auto Muff. This picture shows the style with celluloid window.

dow in the top over the center of the wheel, which enables the driver to see all controls, and have the same freedom as an uncovered wheel would give him. They are made for winter and summer use. The summer style is of light weight rubber, and is rain and wind proof. The style for winter use is made of leather lined with fur, and lists at $15.00, or with celluloid window at $16.50. They make also another grade with better lining at $20.00 plain, and with window at $21.50. These muffs can be furnished in leather to match the upholstery of the car, if desired.

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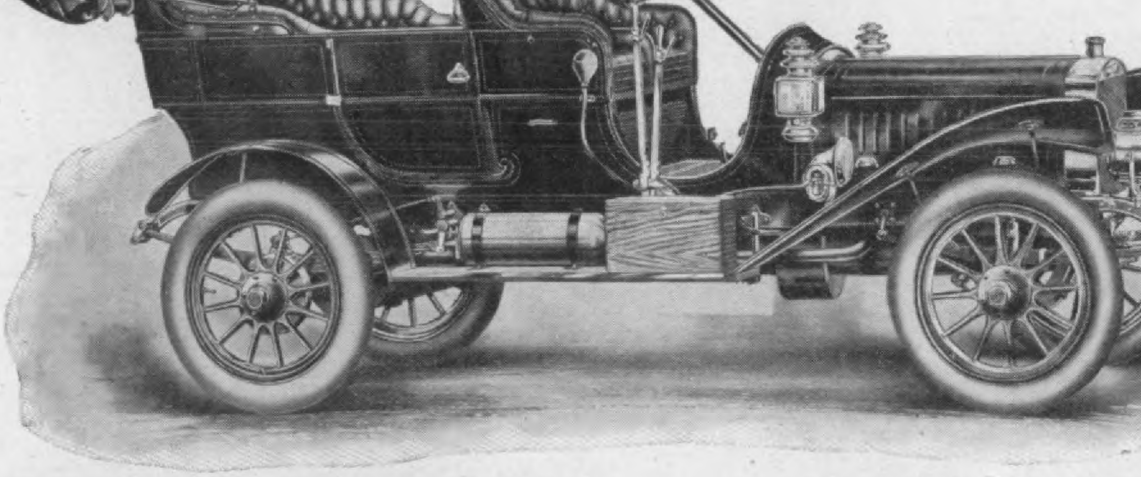

THE $2000

THE STANDARD OF AMERICAN AUTOMOBILE VALUE

Mitchell

Perhaps you've noticed that most cars cost more than the Mitchell.

Did you ever notice that they were any better in finish or in material—or any better in **performance**—on the road?

Ride in a $2000 Mitchell and **see.**

Have any Mitchell agent "show you" a Mitchell.

Look it over—go out into the country and test it on the toughest hill you know of—through some particularly bad stretch of sandy or muddy road. Notice your power—notice speed—notice the sweet running motor—the tranquil action of **all** moving parts—ease of control—notice general efficiency, Mr. Prospective Owner.

Then if you can see how you'll get two or three thousand dollars more automobile value out of any other car—**buy** the other car, we won't say a word.

But you won't **find** more value in any other car.

Present day automobile value is **standardized in** the **Mitchell** at **$2000.**

A demonstration will prove this to **you.**

You are under no **obligation** to buy when you ask for a demonstration.

If you are considering the purchase of a car we want you to **know** the Mitchell, and we want **to show** you what you get in a Mitchell at $2000 and that you can't get any **more** in **any other** car, **regardless** of the price.

Call up the Mitchell agent.

The Right Price for the Right Car

$2000

WRITE US FOR CATALOGUE No. 18

MITCHELL MOTOR CAR CO.

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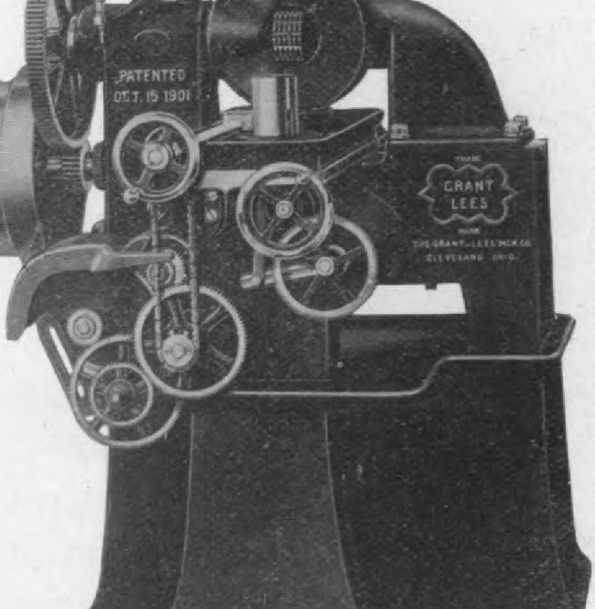
cutter manufactured by the Grant-s Machine Co., Quincy avenue and Sixty-ninth street, Cleveland, O., claim it to be a new departure from rotary, reciprocal cutting and inter-ant indexing machines for spur and al gears now in general use.

his machine is the result of the com-d effort of Mr. B. J. Lees, well known ne of the originators and designer of successful multiple spindle, heavy milling machine, and Mr. John J. t, recognized as one of the foremost hine tool designers of the United es.

this machine the work is set on a ened and ground tool steel arbor in rtical traveling spindle, which rotates has a horizontal movement as well, rolled for diameter of gear and depth oth by micrometer adjustment.

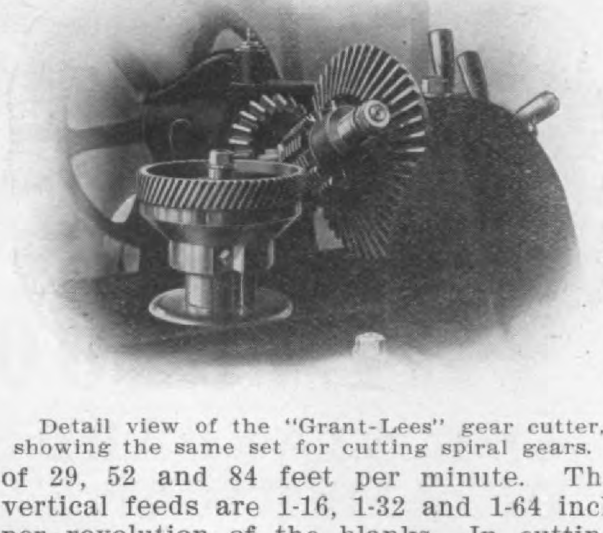
e power comes from the cone pulley pinion to main spindle gear, thence main spindle bevel pinion to trans-ing idler bevel gear, and from that wivel arbor bevel pinion, which in drives the cutter. By this arrange-



"Grant-Lees" 20-inch Automatic Gear Cutter.

t of gearing the cutter may be set and en at any angle, for spur gears the e being the same as lead of the thread tter. The machine is designed to au-tically cut gears with a hob up to 20 es outside diameter. It will cut spur

tion, and a gong summons the operator refill with blanks. The arbor will accom modate a gang of gears or gear with si inch face. The cone gives cutting speed



Detail view of the "Grant-Lees" gear cutter, showing the same set for cutting spiral gears.

of 29, 52 and 84 feet per minute. Th vertical feeds are 1-16, 1-32 and 1-64 inc per revolution of the blanks. In cuttin spiral gears the hob is set at the angl desired, and the blanks are rotated to giv the correct increase or decrease per rev lution to generate the correct angle. (Se detail view.) No indexing is required and the process is one of continuous cu The hob used is a patent diametra pitch hob, the same as used for cuttin spur gears. The machine is automatic and a battery of three or four machine can be handled by one person. Great sav ing is made in machining blanks to b cut on this machine. It is only neces sary to machine the face of the blank u to 1-32 inch of the exact size, as the bo tom of the tooth of the hob will cut th blank to the exact diameter.

Hobs can be furnished of any pitch bot circular and diametral up to 15 inc lead. Weight of machine is 1750 pounds The cutter is furnished with full set o change gears, wrenches and counter-shaft

---

R. E. Ingersoll, for the past two year special representative for the Reo an Premier cars in the Middle States, ha been appointed manager of sales for th New York branch of R. M. Owen & Co.

On account of its increased business i Michigan and Ohio, the Warner Instrumen Co., has found it necessary to open separat branch offices for each State. Mr. O. C Foster, who had charge of this territory, ha been transferred to Cleveland and will loo after the Company's business in the Ohi

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Chicago Cleveland

The Auto-Meter Won in the Glidden Tour

New York

Won in 1906 Won in 1907 in the Glidden Tour

Last year 38 out of 62 Cars entered in the Glidden Tour were equipped with Warner Auto-Meters, as compared with 55 out of 74 this year. At the finish last year 10 Cars out of 13 with perfect scores had Auto-Meters, and this year 36 out of 48 Cars that finished had Auto-Meters.

Won in the Sealed Bonnet Contest

Out of 68 Cars in the Chicago Sealed Bonnet Contest, 26 had Auto-Meters—the nearest competitor of the Auto-Meter had only 16 and the next 14, the next 7 and the rest—"nowhere" with 2 and 1 each.

Practically all Route Books Are Compiled by Auto-Meter

including *Motor Guide, The White Route Book,* Sidney J. King's Book, and the Routes issued by the *Automobile Club of America.*

From start to finish in the far-famed Glidden Tour this year the **Warner Auto-Meter** helped to win most of the perfect scores for the contesting cars. The **Auto-Meter** was installed

On 55 Out of 74 Cars AT THE START

in Cleveland. In this awful endurance test of keeping absolutely accurate figures on "How Fast" and "How Far" to Chicago, and then on to New York under some of the fiercest road conditions, there were **36 Auto-Meters on the 48 Cars that finished** at New York—**75 per cent** of the **Winners.**

Victory for The Warner Auto-Meter

On 36 Out of 48 Cars AT THE FINISH

That's going some. It's a victory for the **Auto-Meter** which might have been anticipated, because—

The magnetic principle which makes the **Auto-Meter** as reliable as a mariner's compass makes it unnecessary for the shaft to run at such a *wearing* high rate of speed, as on other speed instruments.

Consequently, experienced Motorists, like the Glidden Tourists, know that the **Auto-Meter** is the instrument that can be *depended* upon to stand hard endurance runs and *accurately tell* the *speed* and distance made by a car *from* start *to* finish without wearing out or being put out of commission like others.

That is also the practical reason why you'll see the **Auto-Meter** on the *Cream of all Cars* on any road.

Watch any line of Motor Cars anywhere—you'll see the handsome little **Auto-Meter** on the dashboard of the best of them and the most of them—then you'll decide that

You ought to have an Auto-Meter on Your Car.

Agencies in All the Principal Cities

Won in Almost Every Contest

The Auto-Meter is so immensely popular with motorists everywhere, and it is so universally used and depended upon to tell speed and distance figures, that it is only natural that it should be used by experts in all great contests and win the most victories.

Won the Chicago Reliability Run and Boston Endurance Race

In both of these hard tests the **Auto-Meter** was used by the majority of the entrants, and proved absolutely dependable under all trying conditions.

The Warner Instrument Co., 760 Roosevelt St., Beloit, Wis.

Write Us the Model or Power of Your Car for Price Ready to Install.

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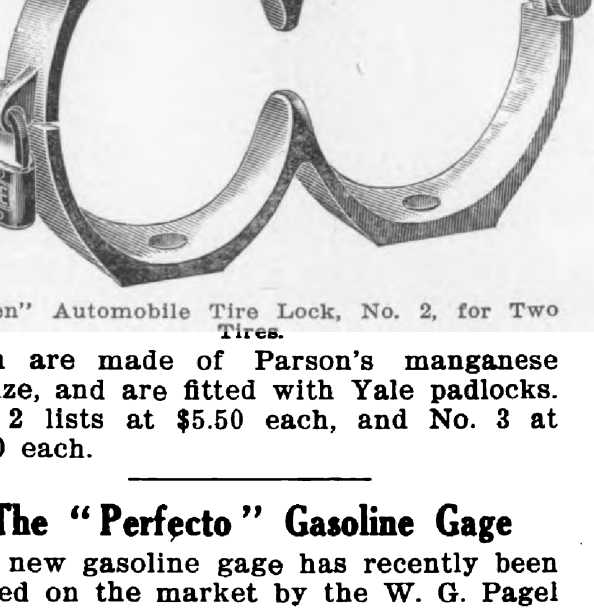
York City, manufacturers of auto

n" Automobile Tire Lock, No. 3, for Single Tire.

ialties, have designed and placed on market a new form of tire lock, which llustrated herewith. Two sizes are e: No. 2, which holds two 5-inch tires, No. 3, which holds one 4½-inch tire.



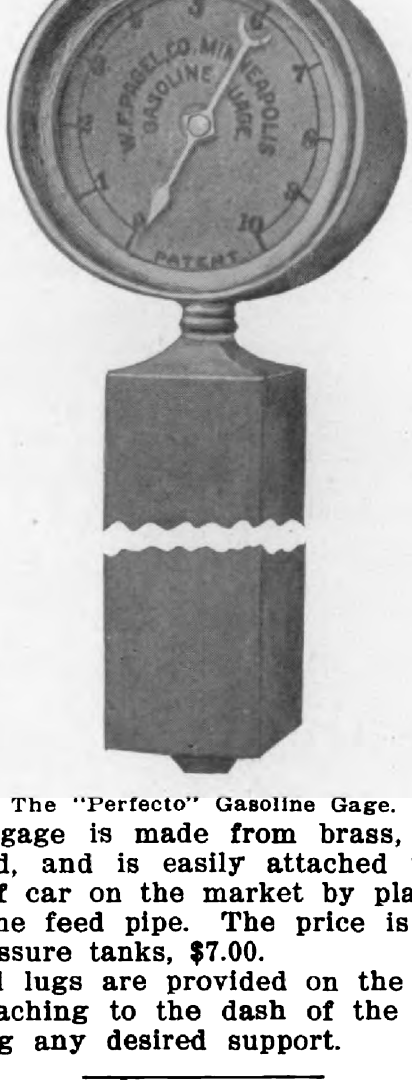
n" Automobile Tire Lock, No. 2, for Two Tires.

are made of Parson's manganese ze, and are fitted with Yale padlocks. 2 lists at $5.50 each, and No. 3 at each.

The "Perfecto" Gasoline Gage

new gasoline gage has recently been ed on the market by the W. G. Pagel pany, Inc., 240-244 Temple Court, neapolis, Minn., and is known as the fecto."

this gage the principle of gravitation nployed. The dial or upper casing has nted in it a shaft carrying a pulley. which a cord is wound. This cord es down thru the neck of the gage a square tube, where its end is fast- to a hollow metal float which travels nd down in said tube. A second shaft ted centrally in the dial casing carries one end an indicator, and on its other a gear and a clock spring. The gear point on the dial, indicating the amoun of gasoline in the tank. As the hole i the bottom of the square casing is ver small, the gasoline flows into and out c this casing very slowly, and the float an indicator, it is claimed, are not affecte by any sudden jolting to which the ca may be subjected.



The "Perfecto" Gasoline Gage.

The gage is made from brass, highl polished, and is easily attached to an style of car on the market by placing T in the feed pipe. The price is $6.00 for pressure tanks, $7.00.

Small lugs are provided on the casin for attaching to the dash of the car c securing any desired support.

R. M. Owen & Co., Lansing, Mich., hav called our attention to the fact that i our account of the Glidden Tour on pag 49 of the August "Journal" we listed N 33 Reo car as 40 H. P. instead of 16-2 H. P.

At the annual meeting of the stockhol ers of the Royal Motor Car Company, hel September 10th, the old Board of Directo was increased by the election of Mr. Ge H. Worthington, President of the Clev land Stone Company and Mr. F. L. A cott, Vice President of the Diamond Ro

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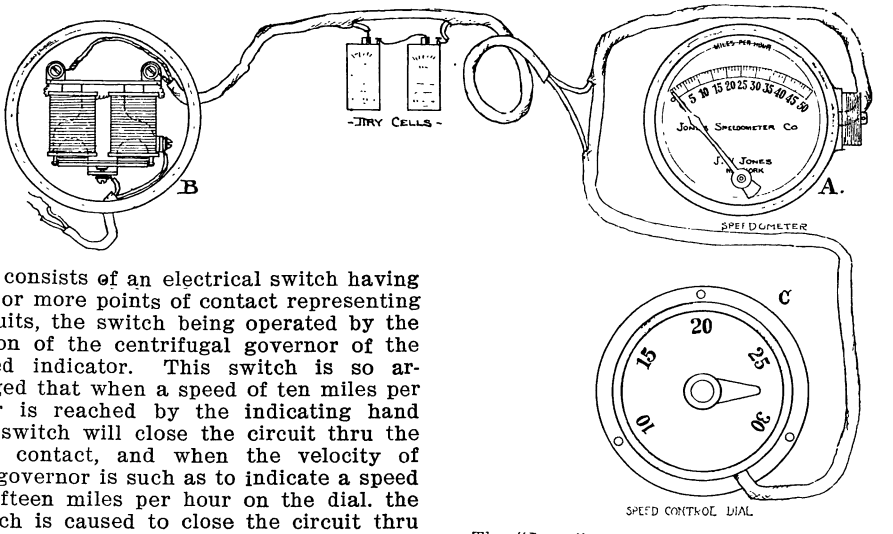
The "Jones" Automatic Speed Control Governor

The object of this device is to govern the speed of an automobile, the arrangement being such that the occupant of the tonneau or limousine may control the speed at which he wishes the vehicle to be operated and therby eliminate a great deal of the danger and uneasiness felt from reckless driving by the chauffeur. This device is the product of the Jones Speedometer Co., 76th and Broadway, New York City.



The "Jones" automatic speed control governor; A, speed indicator; B, automatic circuit breaker; C, controller.

It consists of an electrical switch having five or more points of contact representing circuits, the switch being operated by the action of the centrifugal governor of the speed indicator. This switch is so arranged that when a speed of ten miles per hour is reached by the indicating hand the switch will close the circuit thru the first contact, and when the velocity of the governor is such as to indicate a speed of fifteen miles per hour on the dial. the switch is caused to close the circuit thru a second contact point, and so on up to any desired number of speeds or contacts.

The controlling switch (C) is so arranged as to cause the circuit to be formed thru any one of these contacts controlled by the speed mechanism, as may be selected by the pointer on the switch dial, which closes only the circuit for that one particular speed. When this circuit is closed, say thru the ten mile contact, it actuates the circuit breaker (B), thru which passes the current to the primary of the induction coil, causing the cutting off of the spark on the engine, or by closing the circuit instead of breaking it, to operate an electrically controlled air valve, shutting off the air or gas from the engine, thereby shutting off the power and preventing the speed of the automobile from increasing the ten mile speed at which the controlling switch is set to indicate. When the controlling switch is set to read at fifteen miles, then the switch, when it reaches the fifteen miles contact, will cut off the power when that speed has been reached; but as soon as the speed is reduced to, say, fourteen miles, the contact cuts out and the engine gets its power again, and so on at the various points of contact.

If the pointer on the controlling switch is set at an intermediate position, then, of course, this device has no action whatever on the speed of the car any more than as if it were not there.

American Made Michelin Tires

The new Michelin tire factory at Milltown, N. J., is about completed and comprises eight new buildings, erected after plains of the Michelin branch factory in Italy. The plant is located on an 80 acre tract purchased from the International Auto & Vehicle Tire Co., but the buildings used by the International Company are not to be used for manufacturing purposes, only as storehouses and offices. The completed plant will have 8½ acres of floor space and the machinery will be operated by means of two 1000 K. W. turbines made by the Westinghouse Company, and developing 2440 horse-power. An auxiliary 700 H. P. plant is also installed.

It is Michelin's intention to establish branches in all the important cities in the United States, where large stocks will be carried, thus enabling the trade to get prompt deliveries at all times. Michelin will supply quick detachable, as well as clincher tires. The detachable tires can be used on any of the well known American quick detachable rims. In addition the Michelin demountable rim and tires will be made in American sizes. This demountable rim is the one which has been used in all the great racing events of 1907. With it has been used the Michelin anti-skid, leather tread, steel studded tire.

The Ritter Mfg. Co., manufacturers of automobile bodies, cushions, trimmings, etc., has recently moved into larger quarters at 63-69 Amsterdam St., Detroit, Mich.

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principally of the use of better ma-
als. The company is now using Egyp-
cotton instead of Sea Island cotton,
the fabric in its tires, having found
while the tensile strength of the
ptian fabric is no greater than the
Island fabric, the former has greater
ticity and therefore a tire shoe with
Egyptian cotton fabric will resist a
ter bursting strain without giving way.
fabric is thoroly impregnated and
ed with pure para rubber. The tread
ion of the tire is composed of a white
per compound, specially designed to
st wear and abrasion.

he tread of the tire is applied to the
y separately under a heavy pressure of
ghtly-wound wrapping which causes the
d to adhere inseparably to the casing,
that there is no tendency toward
tering and separation of the tread from
tire body.

his company has given special atten-
to the manufacture of Non-Skid Tires
is now marketing one having a tread
d with hardened steel rivets extending
a strip of leather into the rubber of
tire. The rivets are held firmly in
tion by several layers of fabric, in
ch their bases are imbedded, as well
by the special process leather strip
ch holds the heads of the rivets. Par-
lar attention is called to the fact that
Pennsylvania Non-Skid Tire is not
d with a separate steel-studded leather
d, but the steel studs are imbedded
he tread of the tire as well as in the
her so that they cannot become de-
ed nor inflict the slightest abrasion
njury to the tire material.

esides this non-skid tread tire the

The Royal Rear Light Alarm

The Royal Battery Company, of 10
Duane street, New York City, has jus
placed on the market a new specialty i
the form of an alarm device which i
stantly warns the driver when the electri
tail light goes out for any reason. Th
outfit consists of an electric tail ligh
operated from the ignition battery an
a signal device (a bell or whistle), whic
is also operated from the battery as soo
as the light goes out. If the bulb shake
loose and thus loses contact with the cu
rent wires, or if the wires become de
tached for any reason the current is i
stantly shunted to the bell or the whistl
and the alarm given. An option is give
in the alarm device, as some prefer
whistle to a bell. This alarm sounds als
when the battery current gets too low t
maintain the light.

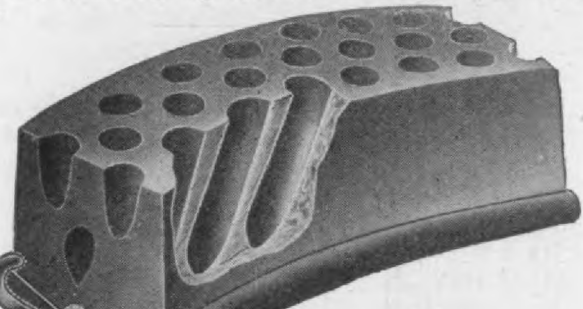
The 1908 "Hill" Wind Shield

In addition to its well known line o
automobile tops, bodies and seats, the Hi
Mfg. Co., 25-27 Fuller street, Buffalo, N. Y
has recently placed a new folding win
shield on the market for 1908.

This shield folds directly in half. Th
rods are of brass tubing, with solid bras
castings on each end, making very stron
stay rods, yet light in weight. The bo
that takes the stay rod at the top is ca
solid on the hinge fixture, and the hing
and bolt taking the stay rods are both o
one casting. The frame is of dar
mahogany and is fitted with heavy polishe
plate glass. All of the fixtures are o
polished brass.

e cellular.

The feature of this tire is its peculiar m construction, which consists of mould- g the rim with holes all the way round. he holes are mouldered on a slant to oid picking up gravel stones. The tire



The "Swinehart" Cellular Tire.

practically self-inflating as the holes ose in contact with the road surface st before the tire compresses under load. he same cross wire system of fastening clincher rims as used in the Swinhart lid motor car tire is also used in this re. The price is the same as for the vinehart concave.

The 1908 Healy Leather Tire

The Healy leather tire made by the ealy Leather Tire Co., 88-90 Gold street, ew York City, is a distinct improvement er last season's model

steel, thoroly tempered. These are only tool steel rivets, we know of m for auto purposes, and the Healy Leat Tire Co., claims to control all rights the same. All the other features of 1907 model are retained.

The Rushmore 1908 Lamps an Generators

The Rushmore Dynamo Works, South Ave., Plainfield, N. J., has m no material change in its lamps and g erators for 1908 and no change whate in exterior appearances. The only cha in the searchlight is the use of a dee and shorter focus lens mirror which made of a composition which this c pany has lately discovered and which wonderful heat resisting properties well as great mechanical strength.

The Rushmore Company is also o ing the 1908 automobile trade the Ru more high power marine type projec in suitable form for use on high powe runabouts. This lamp has come into tensive use on Western railroads and said to be a very powerful light produ suitable for use on these fast runabout

The 1908 Rushmore Generator has been changed materially, but the shak grate has been improved so as to eli nate a little difficulty which has been perienced heretofore.

The "King" No. 2 Gogglette

Julius King Optical Co., 2 Maiden La New York, has brought out a new mo of the "Gogglette" which is here il trated. In the Gogglette No. 2, the cups are made of aluminum and are ceedingly light. The cups are fitted w inflated rubber cushions, which make th fit snugly around the eyes, protecting eye from insects and foreign partic

The "King" No. 2 Gogglette.

It is so arranged that white, amber smoke lenses can be used; the chang of lenses being only a moment's wo Lenses ground to suit the eyes of wearer can also be easily inserted.

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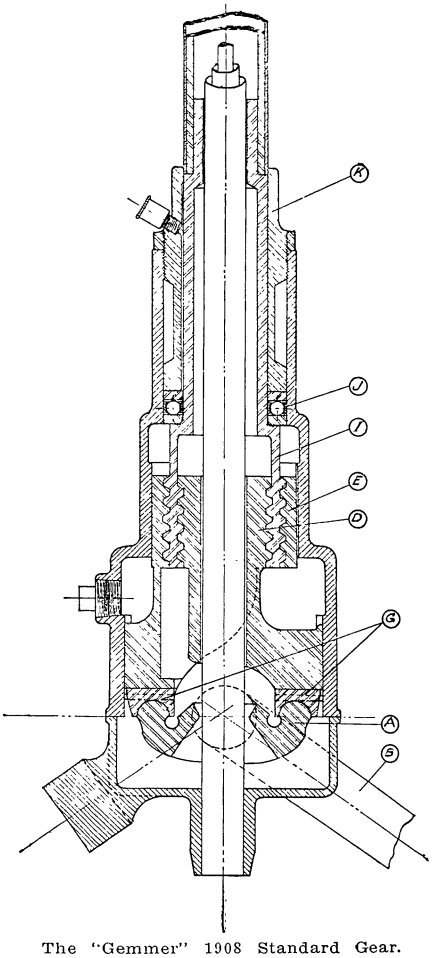
The "Gemmer" 1908 Standard Gear

The Gemmer Mfg. Co., Detroit, Mich., is ready with its 1908 steering gear which has been thoroly improved and refined thruout.

Referring to the cut the adjusting nut K, has been lengthened to provide a very long bearing for the main nut I, which is brazed to the column of the gear. The rocker blocks G, which take care of the angular lateral movement of the rocker bearing are dove-tailed into the nuts D and E, so that it is impossible for them



The "Gemmer" 1908 Standard Gear.

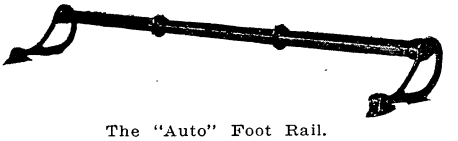
to get out of place. The balls of the ball thrust J are held in a retainer. The bearings thruout are ground very accurately to size, there being practically no lathe finish on the gear. The threads are all perfectly formed on special automatic threading machines, and are case hardened and carefully ground before being assembled.

Special high grade steel is used in the construction of the 1908 gear. The lubrication has also been perfected thru the addition of oil cups and grooves.

The Gemmer Co. is now located in its new factory, planned especially for production of work of this kind. The concern has a foundry of its own for the production of steel castings, which enables it to give prompt service on rush orders and also insures it against being held up for material. Every part of the gear is finished in the Gemmer's own factory which has a capacity of at least 10,000 steering gears per year.

The "Auto" Foot Rail

In addition to the automobile robe rail described in our June, 1907 issue, page 184, the Auto Rail & Equipment Co., 113 Michigan Trust Building, Grand Rapids, Mich., are offering an improved folding foot rail to the trade.



The "Auto" Foot Rail.

The feature of this foot rail consists of two solid cast collars brazed to the tubing to prevent the side slipping of the feet of the occupants of the tonneau. When the rail is not in use it can be swung back out of the way.

Miller's New Lubricants

Wm. P. Miller's Sons, Long Island City, New York, are including in their 1908 line of automobile lubricants a new oil called "Excelsior Fiberous Oil." This is a solidified mineral oil of fiberous nature which causes it to cling to bearings and gears to which it is applied, forming an excellent friction allaying surface. The manufacturers claim this oil will not change in consistency because of temperature changes, and will therefore, not drip from bearings or gear cases. Excelsior Fiberous Oil is furnished in three different consistencies—2X being recommended for sliding gear transmissions; 3X for ball and roller bearings and for planetary and differential gears; and 4X for compression cups or for bearings and gears, that require a lubricant with a very heavy body.

This concern is also now putting out a cylinder oil, especially prepared for Packard cars, which is of course suitable for any use where a light oil is desired. This special oil for the Packard is called "Excelsior Pale Light Gas Engine Cylinder Oil."

The Delta Mfg. Co., Bloomfield, N. J., is now putting up each "Delta" spark plug in a round, metal-bound cardboard box with metal screw top, this box prevents damage to the plug while knocking around in the tool box or in the store before being sold.

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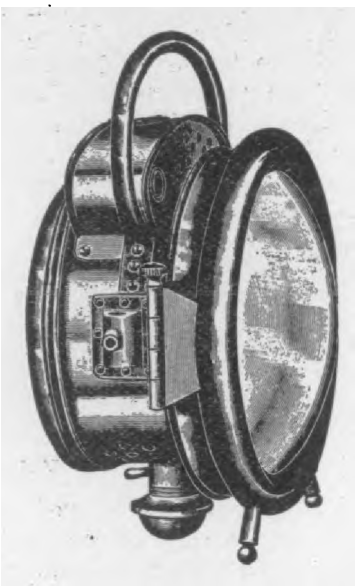
e market for 1908 a new "Saxon" lamp, hich was thoroly tried out in the recent -hour race at Morris Park at which ent it was used on one of the contest-g cars. The most noticeable feature of is lamp is its neatness and compact-ss, that is, superficially speaking, but it s been made exceptionally strong, and



1908 Saxon Lamp, No. 400.

gh grade construction has been adhered thruout, the lamp being intended for e on the highest grade cars. An optical ound and polished bull's-eye lens, prop-ly focused, is used. Wherever rivets are eeded reinforcements are introduced to tirely prevent weakening of the con-ruction, as might be the case where vets were used alone. This lamp is eing listed as No. 400.

Improvements in the 1908 Loring Speed Gage

The Loring Speed Gage has been placed n the market for the 1908 season with w material changes in the instrument self, the main improvement being in the ethod of carrying the pinion and shaft the wheel.

New Spring Gear Release and Fixture used in nnection with the Loring Speed Gage, shown ranged for Spindle Clamp on a 1908 Packard r.

rod. The arm acts as a stop for bearing, which is prest against it by spring encircling the rod. The rod its in this case is carried by an arm extend from the attaching clamp, having a join connection to permit the pinion to properly centered with the wheel ge the two always acting together as a be gear drive. By this construction pinion may be moved into closer me with the wheel gear or moved across face, as may be necessary for adjustme both adjustments being made at one pla and at the same time the gears are f to separate against the spring pressu The carrying extension of the rod may on the pinion side of the bearing as sho or on the shaft side if the device clamped to the steering arm.

The maker of the Loring Speed Ga Loring Speed Gage Co., 91 Marshall str Somerville, Mass., also makes an elect light attachment for night driving, wh can be easily attached to the speed ga

A Financial Bulletin

The Henry W. Brooks, Jr., & Co. P lic Accountants and Auditors, 15 W street, New York, in view of the numer requests by their clients, for informat pertaining to business and financial c ditions in the automobile industry, now publishing a "Financial Bulletin." these the subjects of financial reorgan tion and adjustments, and the partic financial condition of manufacturers, tr conditions, and industry in general discussed. Errors in corporate adminis tion are clearly and fearlessly spoken Methods of factory organization are dealt with.

The bulletins are punched for filing it is believed they are of permanent practical value, and suitable binders supplied for $1.00.

The December Journal will be the cago Show number, containing a fore of the Chicago Show, and descriptio all new things on the market that h not heretofore been described. The uary will be the great Eighth An Buyers' Guide Special; the February n ber the Boston Show number, and March number will contain the Eig Annual Complete Vehicle Review. F no other source can you obtain all valuable information which will be tained in these special issues. To m sure that you will not miss any of

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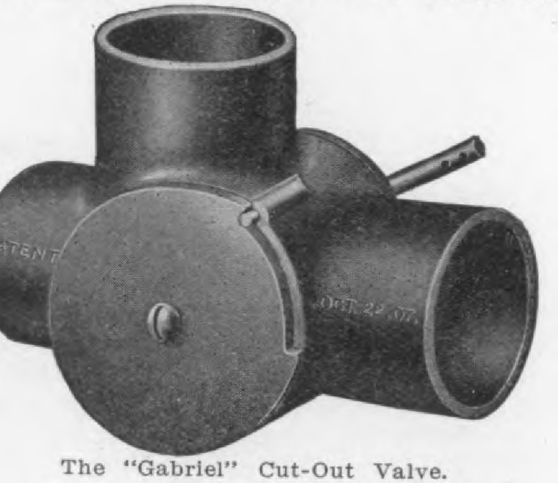
the Gabriel Horn Mfg. Co., 1407 E. tieth street, N. E. Cleveland, Ohio.

he outlet of this new cut-out valve is the same size as the inlet which fits



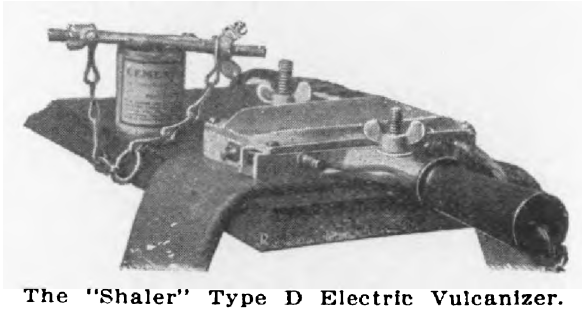
The "Gabriel" Cut-Out Valve.

exhaust pipe, thus permitting the free unobstructed escape of the exhaust es. If necessary, a pipe may be at- ed to the outlet to lead the exhaust e away from the frame of the car. cut-out is furnished for steel exhaust s from 1½-inch to 2½-inch, outside neter, also for 1½-inch to 2-inch iron . The price of the valve only, is $5.00; $7.00 with foot pedal, cable and spring.

instrument. The price of this horn $1000. This concern also makes an 8-tu horn listing at $200. These horns a manufactured only upon special order.

Schaler Type D Electric Vulcanizer

To meet the demand for an electric vu canizer somewhat cheaper than its Typ B, the C. A. Shaler Co., Waupun, Wis has designed the Type D, here illustrate which is of the same general shape an design as Model B, with the exception o the heat control.



The "Shaler" Type D Electric Vulcanizer.

The heat in Type D is regulated b an automatic patented control, instead o by a rheostat. The outfit includes a chai clamp for outer casing repairs, bindin bolts, unique veneered table for inner tub work, 25 cent can of cement and par rubber for several small repairs.

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ng the automobile trade a form of multi-le disk clutch which has some new feat-res that have by actual test proved of reat value, eliminating, they say, all ob-ections to the disk clutch. The principal eature of this clutch is the circumferen-ial corrugation of the plates which forms ircumferential wedge grooves that pro-ide the frictional area when the disks re in engagement. These grooves also dd greatly to the strength of the disks, fact well known and applied in the man-facture of tin can ends. On account of he angular form of the engaging surface t is claimed that much less pressure is re-uired to apply this clutch than one of the lat disk type, and a very slight pedal ressure suffices to disengage it.

It is also claimed that as the engage-nent of these clutch plates is in the rooves only, the greater part of the late is separated from adjoining plates ufficiently to allow a free circulation of ubricant. Holes are provided in the cor-ugated surface of the disk to permit the ree flow of oil onto the engaging urfaces, and prevent the generation of ndue heat.

This form of clutch has been well tried ut in England, and is said to have proved mooth in action and gentle in picking up ts load.

Powell Evans, president and the active pirit of the Merchant & Evans Co., has reatly improved the English pattern of his clutch, and the type that is now of-ered the American trade is even more fficient than the original Hele-Shaw clutch.

Mr. Evans has also developed a new hange speed gear for motor cars, and a tion with the "Hele-Shaw" clutch ma superior driving unit for automobile w

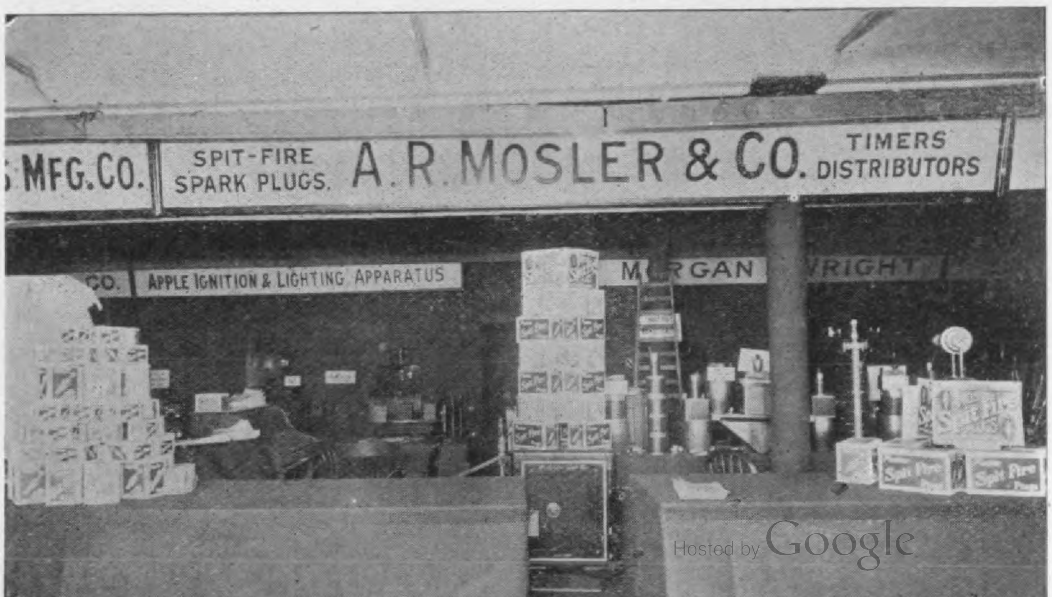
The company will also market the "S Metal Tire Case, also designed by Evans, in which simplicity, appeara strength, lightness and comparatively cost are features.

He is also importing steel, having in various trips abroad made a deep thoro study of the sources of suppl automobile parts in their rough finished forms. He has negotiated the producers from the foundry up of best known steel products employed the leading foreign makers of cars.

Merchant & Evans Co., therefore, in inquiries for the entire range of grade foreign steels, needed for the automobile construction for every for gear and shaft forging and drop for either rough or finished exactly to pl likewise for chassis, front and rear a of every form.

Their foreign connections have pl offices and warehouses established in land and France, where these purch will be made to the same advantage the home constructors in these coun make them, inspected on the ground shipt direct to this firm for distribu here.

In order to push the Pacific coast ness the Warner Instrument Compan Beloit, Wis., has secured Clarence A. fle, formerly with the Underwood T writer Company, to manage the coast iness. Mr. Saffle will locate in San F cisco to operate in California, Oregon Washington.



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top of limousine cars, and, therefore, vided with buckles and straps, one on h side for strapping securely to the

Nathan Tire Case.

nk rail. This trunk is called the "Car-ll" tire trunk and it is circular in form, nprising two compartments formed by center division of circular form; the s encircling this central compartment. akes two tires and there is ample room the middle compartment for inner es, tire tools, etc. This trunk consists a frame of steel covered with enameled k. The lid is held on by two brass ps and padlocks and fits down over trunk proper in the same manner as in box cover, making the trunk en-ly water proof.

The Nathan line also includes the Na-n tire cover, which has not heretofore n described in the Journal. This cov-

chance for the rain to get in at the t

The prices of the tire holder follow Black enameled duck, $3; in colors, $3.5 fabric leather, all colors, $4.50. A ne bag for holding an extra inner tube is fu nished with each tire cover.

The 1908 Nathan line also includes ner tube bags, grease bags, storm cove automobile covers and trunks of vario shapes and sizes. The tire covers a other fabric specialties are furnished various colors to match the upholstery different cars.

The "India" Automobile Oil Stone

This is an oil stone put up specially f the automobilist's use by the Morton C Worcester, Mass., an marketed by t Pike Mfg. Co., Pike, N. H.

This stone is to take the place of t file so often used for filing the ends the contact points. It is well known th with the use of a fill the result is th the contact points are usually left in rough state, thereby causing addition "pitting" instead of preventing it, a also wasting too much platinum. Wi the use of this stone the contact poin are left in a smooth and polished con tion thereby giving a very smooth co tact. The stone can also be used f sharpening pocket knives and any sm edge tools. The price of this stone is cents; in a handsome leather case cents.

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ber of interesting improvements, the main feature of the battery lying in the arrangement of the plates, which is such as to eliminate all lead burning.

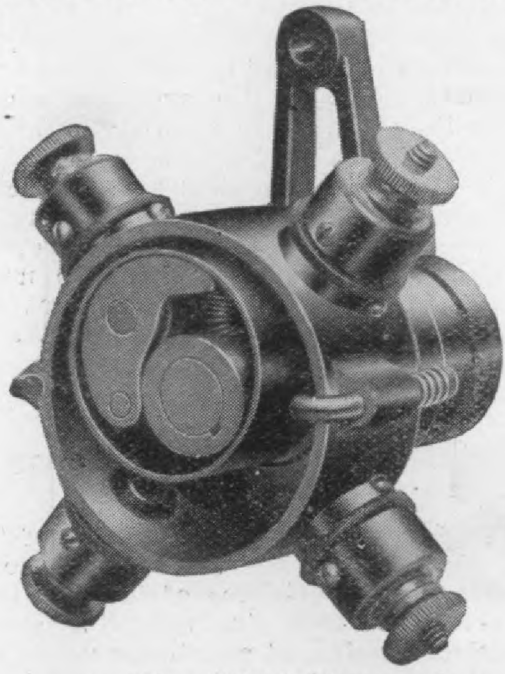
The construction of the positive plate is of such a nature that it delivers a very high capacity and maintains it almost to the life limit. It is made from a sheet of pure lead, which is "spun" out into ribs increasing the surface of the original lead blank twenty times. A coating is formed on the surface of these "ribs" by an electro-chemical process.

The material which might be said to store the electricity does not fall away to any extent, and whatever loss does occur is made up from the pure lead by means of recharging the battery, thereby keeping the output of the battery nearly the same thruout its life.

Latest "Wico" Products

The Witherbee Igniter Co., 541 West Forty-third street, New York, has brought out for the 1908 season a number of new products all of which are marketed under the trade name Wico.

The Wico compact trouble lamp con- new departure in the roller type of timer. A loose ring is provided which at all times allows a perfectly smooth path of the roller and exposes a constantly chang-



The "Wico" Timer.

ing surface at the breaking or contact point. This timer operates metal to metal. It is very compact, and provides a direct ground for each contact of about ⅜ of an

net, etc.

A line of plug switches is offere single and in gangs up to four, for ing of tail lamps, gage lights, side li dome lights, etc. These plugs are re able, working on the "touch the bu principle. The Wico 3 way switch sparking circuits presents a new for plug switch which is self-indicating that one can tell which battery is o noting the position of the plug. switch turns on either one of the two teries or both together, or, with ha a battery and generator or magneto. entirely original feature of this lin switches, is that they can be wire to the job and the cover of switch p put in place, thus eliminating the annoyance of trying to make a wire to a screw down in a hole.

The Wico spark coil is designed w view to accessibility and quick re Many original features are incorporat the construction of the vibrators, co tions, case construction and methods sulation. Each coil is provided wit extra contact screw and vibrator to i against the possibility of unexp breakage. The coil tops are mad porcelain.

National India Rubber Co., Bristol, manufacture acetylene gas bags, ru gloves, carriage cloth and rubber t for the automobile trade, in additio the collapsible pails, tire tape, etc., we have previously mentioned in columns.

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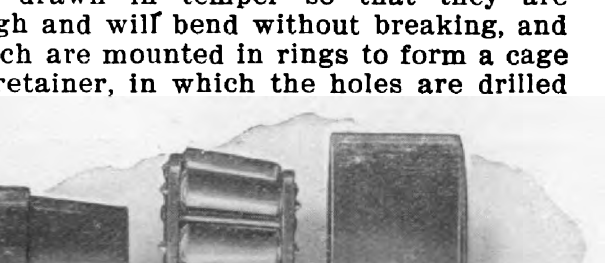
Grand Central Palace Show—Exhibit of Charles E. Miller, 97 Reade Street, New York.

New Grant Roller Bearing

he Standard Roller Bearing Co., Fif-
h and Lancaster avenue, Philadelphia,
is putting the Grant roller bearing on
market for 1908, with a number of
improvements, details and illustration
the same being given herewith.

n the new bearing the rollers are made
d instead of hollow, and are reduced
he ends to form shafts or pins, which
drawn in temper so that they are
gh and will bend without breaking, and
ch are mounted in rings to form a cage
etainer, in which the holes are drilled



isassembled view of the Improved Grant Roll-
Bearing.

tead of being punched, which holds the
ers true and parallel with the axis of
shaft, thereby preventing any slipping
sliding motion. The bearing is made
special Standard alloy steel, of high
sile strength and toughness, and the
ers are drawn so that no chipping or

form of conical or tapered roller beari
used for this purpose.

Seitz Reed Baskets, Etc.

C. G. Seitz, 605-609 Third avenue, Ne
York City, is including in his 1908 li
of reed work, baskets with compartmen
for holding "Thermos" bottles. As t
reed is pliable the bottles fit in snugly
the holder inside the basket. Reed baske
have many special advantages such
lightness and durability which make the
especially suitable for automobile use.

Besides the baskets referred to, and t
ordinary forms of baskets used on au
mobiles, Mr. Seitz makes a reed tire ca
and a reed holder for the cup-covers us
on Thermos bottles. These covers a
used as a cup, but are hard to use,
they have no handles and will not sta
alone; so these reed cup holders have be
brought out, the holder being provid
with a handle.

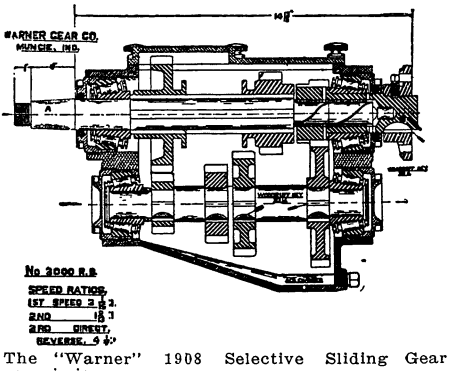
Stokes Hard Rubber Steering Wheels, Etc.

The Joseph Stokes Rubber Co., of Tre
ton N. J., are on the market with seve
hard rubber specialties of interest to t
automobile trade, including a steeri
wheel consisting of an aluminum or oth
metal web with a rim composed of
steel tube covered with hard rubb
These wheels are furnished in differe
styles to meet the requirements of va
ous car makers; some with solid rin

"Warner" 1908 Products

The Warner Gear Co., of Muncie, Ind., is offering for 1908 a new transmission, gear set and steering gear.

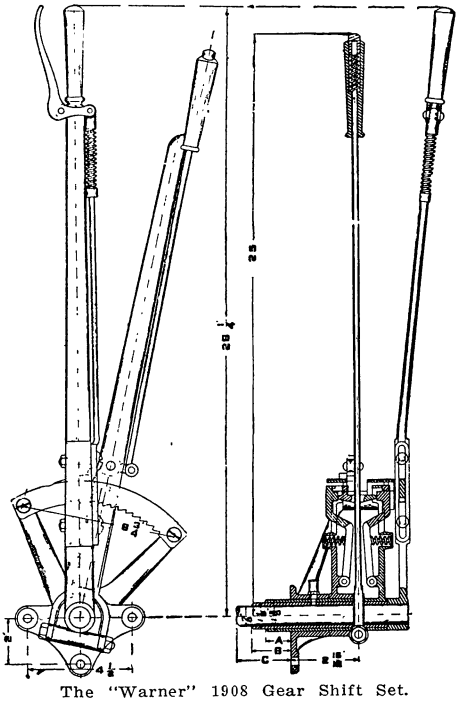
The transmission which is of the selective type is shown herewith in section. The driving shaft is splined and is mounted



The "Warner" 1908 Selective Sliding Gear Transmission.

over the counter shaft, which makes it easily accessible. The transmission is made for all standard widths of frames.

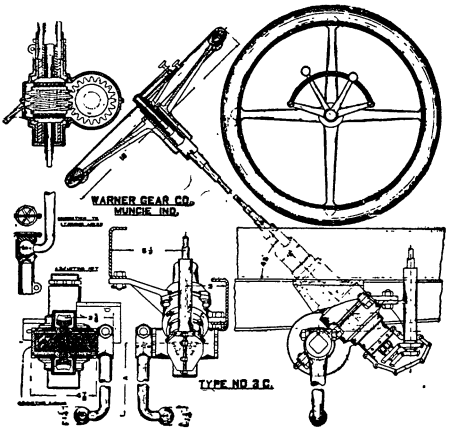
Special attention is called to the method by which the Warner gear set is operated.



The "Warner" 1908 Gear Shift Set.

Fingers operated by a coil spring are mounted into each sub-lever, which in turn is controlled by a hand lever. Either shifting tube can be operated independently of the other. It will be noted that there is no plunger to be operated except when the reverse is wanted. At that time only is the plunger operated by the thumb which throws a little dog, usually known as a "lock out" or reverse.

The Warner 1908 steering gear is of the worm and sector type, the sector being of the continuous ring pattern. Both sector and worm are hardened and ground to a perfect fit. The worm is adjustable and is equipt with ball thrust bearings. The sector is also adjustable into the worm. This steering gear is furnished in both touring car and runabout types. The



The "Warner" 1908 Steering Gear.

spark and throttle control is mounted on top of the wheel, running to bevel gears underneath the steering check to vertical control levers, leading to carburetor and spark control. The Warner Co. is equipping these steering gears with friction control levers in the wheel, which is a novelty of this season.

Trenton Brake Lining

Trenton Rubber Mfg. Co., of Trenton, N. J., have placed on the market a new kind of lining for automobile brakes, and similar frictional service. This lining is claimed to possess three very important advantages, namely: It will not absorb oil or water, and will not burn; and that it grips instantly while it wears indefinitely. It consists of a combination of specially prepared rubber with fine strands of brass wire woven into it, and this combination is said to give not only the necessary strength but the required resiliency. Quite a number of car manufacturers have lately given this material a thoro trial with pleasing results. The material is sold at a price per pound which makes the cost of the material used in equipping a set of brakes a very small item.

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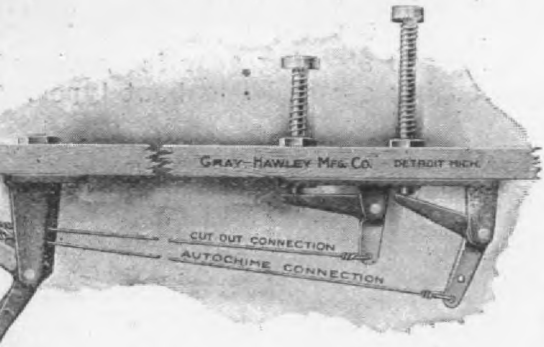
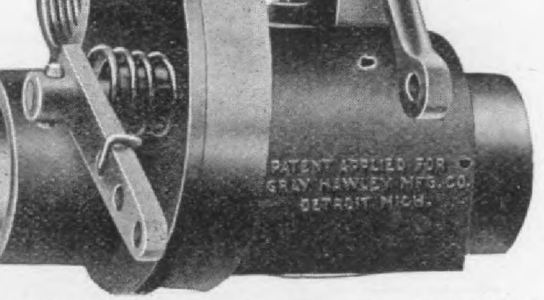
ley Mfg. Co., 607-609 Fort Street, West oit, Mich., has placed on the market 908 a new autochime called the "Mid- " a combination autochime, cut-out safety relief valve, and a combination chime cut-out pedal.



"Gray-Hawley" Combination Autochime Cut-Out Pedal.

e Midget autochime is especially de- ed for small launches, and can also sed on motor cycles. It is blown by exhaust. On account of its internal truction, it has a very low pitched cal tone. The Midget measures 5 inches.

e combination autochime, cut-out and y relief valve is placed on the ex- t pipe close to the engine. The left ear lever operates the autochime, h is attached to the threaded boss.



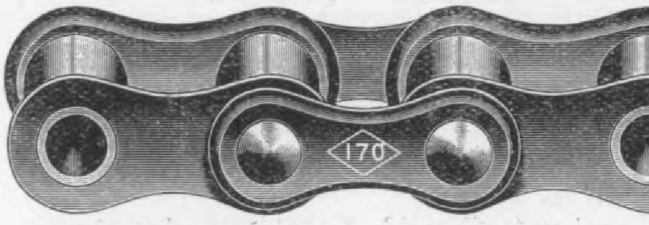
"Gray-Hawley" Combination Autochime, ut and Safety Relief Valve.

right or forward lever operates the ut. The bracket, lever and tension adjustable.

special description of the combina- autochime and cut-out pedal is neces- as the accompanying cut shows the

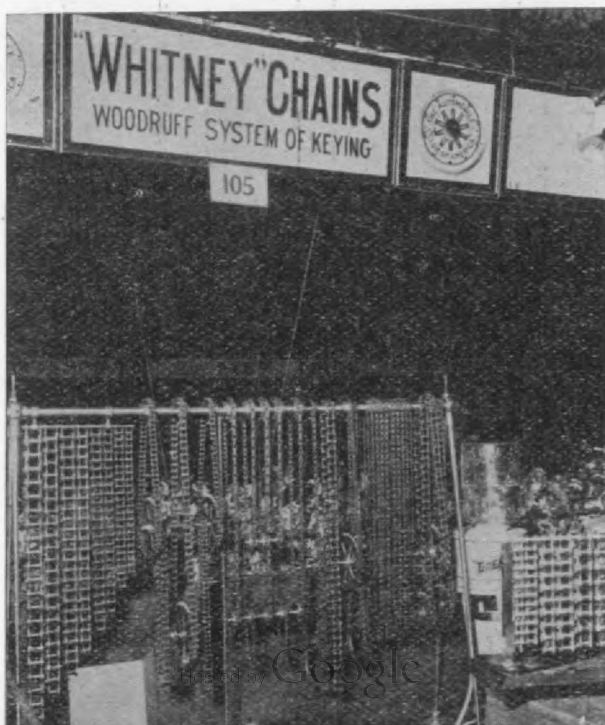
ing for 1908 two new lines of chains in addition to their well known standard types and sizes. The first is distinguished by the use of chrome nickel steel for the side bars, which gives the chain high tensile strength and great elasticity.

The other known as the "built-up block chain" is specially adapted for medium and slow speeds and under heavy loads. This chain is similar in appearance to the roller chain, but the roller and bushing are supplanted by a hardened bushing of



"Diamond" Chrome-Nickle Steel Chain No. 170

outside diameter equal to that of the roller. The absence of the roller permits the rivet to be made very large in proportion to the pitch of the chain. The added bearing surface thus secured, makes the chain practical where a roller chain of the next larger pitch would be required. The built up block chain therefore effects a saving over the roller chain in cost and weight of chain, and in size, weight and cost of sprockets for the same duty and speed ratio.



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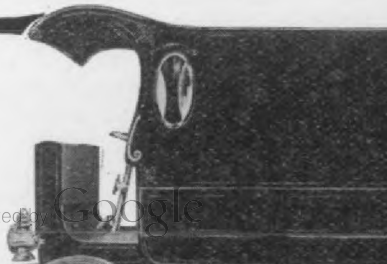
is the commercial car's future, and you know what that is. If you are capable of managing a rapidly developing, permanent agency for the best commercial cars in the world, write me for our new catalog, and state your facilities for an energetic selling campaign to back up our steady national advertising. We are not interested in the "one season" class, but we do solicit correspondence from responsible agents of ability.

Sight Seeing Cars, 12 to 25 passenger
Any Style of Delivery Car
Several Models of Trucks
Anything desired for special service

Our exhibits at the NEW YORK an CHICAGO SHOWS are the largest ever given by any commercial car manufacturer. We "do things" in one way only.

I. HENRY, Sales Mgr.

RAPID MOTOR VEHICLE CO.



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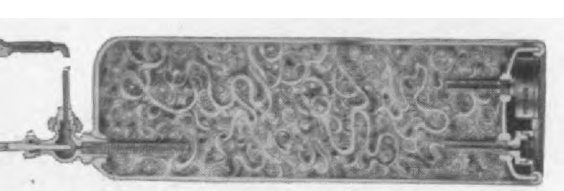
been available, and we therefore take
sure in publishing a complete descrip-
of the "Prest-O-Lite" tank made by
Prest-O-Lite Co., of Indianapolis, Ind.,
ch has kindly furnished use with de-
ed data for this purpose. Prest-O-Lite
tanks are seamless cylinders, made of
l of such tensile strength that they
ld stand a pressure of 2500 pounds to
square inch, if required. They are,
reality, a storage battery for gas, and
in any sense, empty cylinders filled
gas under pressure.



ctional view of a "Prest-O-Lite gas tank,
ing the filling of asbestos wool.

ach tank is completely filled with
estos wool, to which is added chemical-
ure acetone, which is immediately ab-
ed by the asbestos. The acetone has
peculiar property of absorbing many
mes of acetylene gas for each degree
ressure added, and to give back this
when the pressure is released, with-
any deterioration of the contents of
cylinder. Under moderate pressure a
gives light for 40 or 70 hours (with
foot burners) according to the size of
tank.

one end of each tank is a supply
e by which the gas is turned on or
and the pressure regulated. At the
osite end of each tank, set so as to
rotected from all injury is a pressure
which shows at all times how much
is contained in the tank. At the
t where this gage is connected with
tank, there is a metal which would
in a temperature of 200 degrees
renheit and release the gas. As
nary combustion does not commence
a temperature of 286 degrees Fahren-
is reached, the gas would, in case of
be released and out of the tank long
re there could be any danger of igni-
Acetylene gas will not explode in a
perature under 1,400 degrees Fahren-
Thus, all danger from accidents is
away with. The gas in the tank is
r condensed to a pressure exceeding
tenth of what the walls of the tank
built to withstand.

here are three things that will prevent
Prest-O-Lite tank from working per-
y. The first is: The valve of the
tate opening the valve more and more
order to keep the lights burning. Thir
gas tanks should invariably be "r
charged" by the concern possessing th
required knowledge and experience.

RECHARGING.

Before recharging "Prest-O-Lite" tank
each cylinder is first numbered, packe
with asbestos wool and weighed. A co
rect record of numbers and weights
kept, and a copy is sent to each of th
company's pumping station. A certai
amount of acetone is put into each cylinde
and charged with acetylene gas. The cy
inder is then packed in ice and left the
for three hours. It is then taken out an
the pressure again applied, which add
about ten additional cubic feet to the ga
already in the cylinder which is packed i
ice a second and third time, after whic
it is ready for delivery.

When a tank is empty and ready for r
charge it is necessary to weigh it, in orde
to determine whether or not it contain
the proper amount of acetone. If it
found to be below the required weigh
sufficient acetone is put into the tank t
bring it up to the necessary weight

Mile board sold to dealers by "Prest-O-Lite C

"Prest-O-Lite" gas is made by the mos
modern and up-to-date process of genera
ing acetylene gas. After generation, th
gas is filtered until perfectly clean an
pure, and then it is thoroly dried an
cooled before being comprest into tanks
It will keep for an indefinite time.

The "Prest-O-Lite" Co., are furnishin
to their dealers at nominal cost, mil

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as recently moved into its new factory, photographic reproduction of which is ere given.

The building is four stories high, and as a complete floor space of about 115,000 quare feet. The power plant consists a 250 H. P. Corliss steam engine, driving vo dynamos with a combined capacity 2200 lights. The first floor is occupied

in no way affects the sealing compou forming an absolute unit. After the has been vulcanized, the sealing c pound, owing to its peculiar qualities not affected by heat but remains a tou viscid mass. In case of a puncture compound immediately fills the hole, repair being permanent and not detr ing from the resiliency of the tire.

The Kinsey Manufacturing Company's New Plant at Dayton, Ohio.

the general offices, Prest Steel Frame epartment; Polishing, Testing Crating nd Packing Departments. On the second oor are located the Fender, Hood and ank Departments, Machine Room and e general assembly room for Oilers, ufflers, Fans, etc. The third floor is ven over to the radiator department, nd the fourth floor to the finished stock nd paint shop. This concern employs out 250 hands, and its goods are all anufactured under the trade name Kinood.

The "Shaw" Self-Healing Inner Tube

The Automobile Utility Tire Co., 9-11 otor Mart, Boston, Mass., has placed on e market a self-healing inner tube for tomobile tires.

This tube is constructed in the followg manner: Over the tread of an air-

Auto Igniter

This is a unique device for the auto bilist's use for lighting cigars while t eling in the car without stopping or mounting to find shelter for a ma flame, as would be necessary without s device of this kind. It consists of tubes with suitable covers, one of covers containing an extension consis of a brass hooked wire carrying a pl num sponge. Ordinarily this sponge inclosed in the smaller of the two tu and the larger tube contains a lining sisting of a wick which is saturated w deodorized wood alcohol, obtainable at drug store. To obtain a flame the spo is withdrawn from its tube and thro into the larger tube containing the s rated wick lining, then slowly withdra the gas thrown off from the wick li

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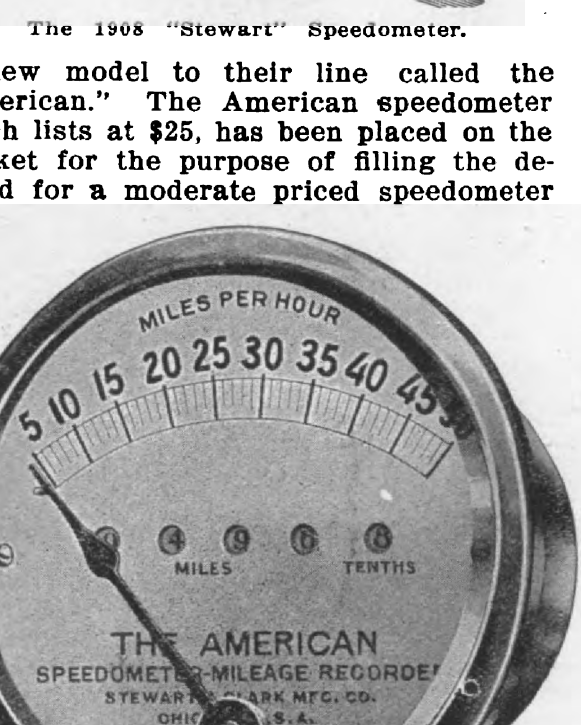
dometer for 1908, and has also added

The 1908 "Stewart" Speedometer.

ew model to their line called the erican." The American speedometer h lists at $25, has been placed on the ket for the purpose of filling the de- d for a moderate priced speedometer



The "American" $25 Speedometer.

igh grade construction. The company n that they have accomplished their ose of producing a moderate high e instrument by the use of simpler

made with the odometer enclosed and furnished in two models, one registerin up to 60 miles per hour, list price $4 and the other registering up to 90 mile per hour, list price $75. All three model have 5-inch dials and are operated, as be fore, by centrifugal force. The over-a diameter of the these instruments 4½-inch, and the depth is 2½. The are finished in highly polished brass Scales are evenly divided making readin easy. The flexible shaft used in connec tion with the Stewart speedometer con prises a core consisting of a number o file hard units hooked together into chain. This core revolves in a tub formed by coiling a flat hardened an tempered steel ribbon, the inside surfac of which presents a hard smooth bearin for the core. The core and ribbon ar finally enclosed with a protecting casin of brass, which is also highly ornamenta It is said that this construction avoid binding in the shaft and all tendency to ward crystalization when the shaft is as sembled. It is filled with lubricant con posed of graphite and cosmoline an sufficient quantity for one year's con tinuous use being put in.

"C. O. T." Gum Gum

C. O. Tingley & Co., Rahway, N. J have just placed on the market a new preparation called "C. O. T. Gum Gum for filling cuts in the outer shoes of auto mobile tires. It is said to perfectly hea any cut and thus prevent the entrance o water, sand, etc., to cause damage to th tire. It can be applied instantly, and drie in a few minutes, requiring no vulcaniza tion. Where a cut goes all the way thr it is of course necessary to first place backing of canvas on the inside of th shoe. It is put up in 3-oz. tubes, listin at 50 cents each.

Lustre Chemical Co., 1303 Michiga avenue, Chicago, have improved th "Gavelek" carburetor by fitting it with device for holding the notched thum disk for regulating the needle valve i the position it is set so that the joltin of the car cannot alter the adjustment

Hotchkin Mfg. Co., 1265 Michiga Avenue Boulevard, manufacturer of th Hotchkin anti-jolt device, is now furnish ing free of charge with each set, suitabl irons for attaching the device to all make of cars. The 1908 Hotchkin device Mode

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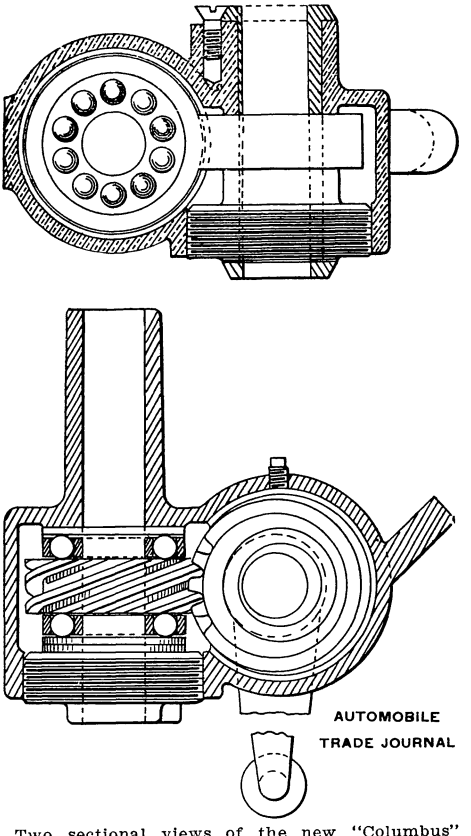
The "Columbus" Steering Gear

The Columbus Screw and Machine Co., 244 Kaiser street, Columbus, Ohio, manufacturers of the Columbus automobile and motor boat engines have recently brought out a new steering gear, which on account of its improved construction is expected to eliminate the end wear on the worm and housing.

The wear is overcome by putting in ball thrust bearings, running between hardened plates. The worm and gear are both of hardened steel and the wear on these is almost nothing, but adjustments are provided in case any wear does occur. The worm gear which is integral with the shaft is provided with eccentric bronze bushings and the thrust on both the worm and gear is taken up by the plug nut shown. The plug is held in place by a locking device that allows the very slightest turn of the adjusting nuts, and is a positive lock. All the worm gears are furnished with 20 teeth and the worm with either 4 or 5 teeth. Either a 6 or 9-inch arm is furnished.



Two sectional views of the new "Columbus" steering gear, plainly showing the ball bearings to take the end wear on the worm and housing.

The post is made of Shelby tubing 1-inch in diameter and ¼-inch thick with the quadrant tube running thru this and locking on the housing at the bottom.

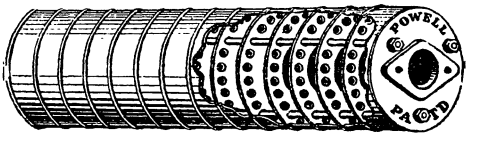
The control tubes and rod for throttle and spark run thru these and are furnished with bell cranks at the bottom.

The fastening plate is made in such shape that the gear can be fastened at any angle to the sub-frame of any standard car, or if ordered in quantities of a hundred or more, the fastening plate will be made to suit the purchaser. The list price of the gear complete is $25.00; for check only, $12.50. A discount is given when ordered in quantities.

The 1908 "Powell" Prest Steel Muffler

The Powell Muffler and Timer Co,. Inc., 42 La Fayette street, Utica, N. Y., is continuing the manufacture of the Powell prest steel muffler for the 1908 season without material change in its construction from the former model described in our January, 1906 issue, page 372, at which time only an outside view of the muffler was shown.

We are now able to give a view of its interior, showing the peculiar construction of its baffle plates. The shell of the muffler consists of a succession of prest steel cups drawn from sheet metal, of No. 16 gage. Each cup is shouldered so that it overlaps the bottom of the succeeding one by one-fourth of an inch; the number of cups used varying with the size of the engine to be muffled.



The 1908 "Powell" Prest Steel Muffler.

These cups are held together by three tie rods made of 5-16 inch steel, and surrounded thru the center with iron pipe to protect and strengthen them. The perforations of the baffling plate are around the outer edge of each one with an additional one in the center of the first few. The area of these holes vary with the size of the engine to be muffled. The mufflers are made with from 10 to 16 sections, listing at $5.00 to $8.00.

Every dealer, every owner, every maker of cars wants to know of all the new features of all the new cars and the source from which to obtain this information in the most concise and readable form is the Cycle & Automobile Trade Journal, published at Forty-ninth and Market streets, Philadelphia; 1908 models are being described in every issue; the first 1908 description appeared in the June issue. To enable new subscribers to obtain descriptions of all the 1908 cars we offer to start subscriptions with the June number if the $2 for a year's subscription is received before our stock of back numbers is exhausted.

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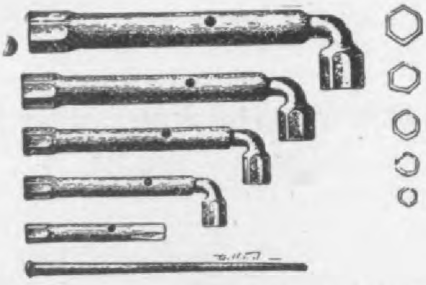
A Few of Our Imported and

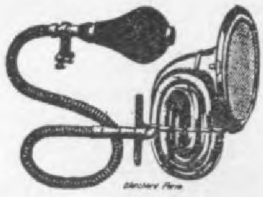
Socket Wrenches



Import d telescoping ocket wrenches. Their o el cons ruction especially adapts hem for utomobile use

Set C, four pieces and lever handle, $5.00
" D, five " " " " 6.00

Blanchard Horns



THEY HAVE THE SOUND that made Imported horns famous. Made in 21 different styles. Our line of horns is very complete and we are prepared to meet the most exacting taste.

Copper Gaskets

We carry a large line of copper a bes o gaskets in izes rangi g from one-half o three and one- alf inches nside measurement, a d re in a position to quote nteresting prices to the rade.

Spark Plugs

Bougie A. V.

An indestructible plug which can be easily taken part No. 159 Metric or a.f-inch.

Price $2.00.

Pirrelli Cable

A well tested and tried cab e which is used by near . all leading European Automobile Manufacturers.

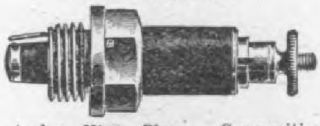
154 light primary rubber.
174 heavy " "
194 ight secondary "
214 medium " "
234 heavy " "
154 bis cambric cover
194 " " "
214 " " "
234 " " "

Goggles

We carry in stock a complete line of the hi hest rade of i ipo ted goggles.

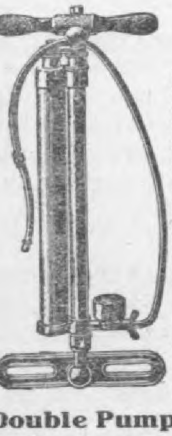
Spark Plugs

French M ca.



Amber Mica Plug. Composition platinum points ensure positive spark. Suitable for autos or motorcycles.
No. 160 ½ in. and metric price 90c.

English Compound Pumps

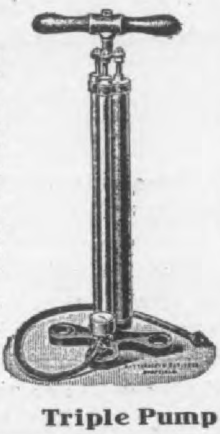


Reduce Your Tire Bills

Pumps your tire up in less time and with less exertion than any other pump made. Air is forced into the tire on both the up and down stroke. Pumps are equipped with gauges indicating amount of pressure being pumped into the tire.

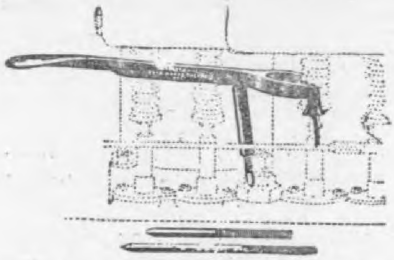
Price of Double Compound Pump, $12.00.

Price of Triple Expansion Pump, $18.00.



Double Pump **Triple Pump**

Valve Spring Remover



Designed to facilitate the removal and replacement of Valve -prin s and is fitt d with three fulcrum screws of various lengths, so as to fit all makes of engines.

Price including thre screws, $1.50.

The dealer who desires to handle the BEST line of Automobile Specialties would do well to investiga our line of splendid and profitable goods. Our 128 page catalog will be sent upon request.

THE MOTOR CAR EQUIPMENT CO.

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Domestic Auto Specialties

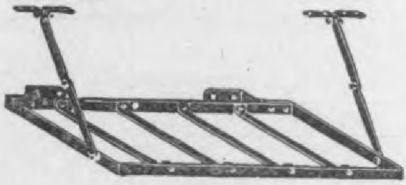
Adjustable Tire Holders

Will fit any car and any size tire.

Made of a fine quality of brass. Will hold either one or two tires. Set consists of two long and one short piece.

Price per set, $7.00

Luggage Carriers



Made in stationary and folding styles. T braces on the folding carrie are rovided w knuckle joints so hat when rack is ot in it can be folded away.

Price stationary - - - - $9.00
" folding - - - - 16.00

Robe Rail

Useful to hang robes or clothing on. Ready to attach to tonneau. Made of heavy brass.

Price 24 in., $1 50.
" 30 in., 1.75.
" 36 in., 2.00.

Foot Rest

Neat and seful adjustable foot rest 32 in. long Made of solid brass, each part being finely finished and polished Price $5 00.

Gasoline Separator

A simple device to eliminate the trouble of autoists and boat owners. Gasoline is filtered through a fine gauze net which allows nothing but pure gasoline to enter the carburetor. Furnished in ⅛ in. and ¼ in. size. Price $2.50.

Oil Guns

Good substantial oil well made with curved spout. Heavy grip handle No. 125, length 16″.
Price 50c.

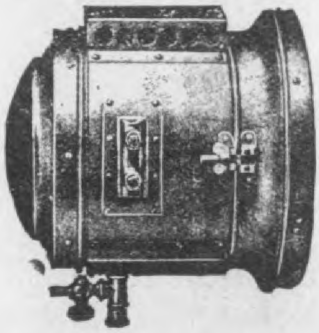
Royal Screw Jack

Especially adapted for heavy American and foreign cars. Is indespensable for garage use. Capacity 5000 pounds.

Price $4.75

The Phare Continental

Flare Front Search Light.



Made entirely of extra heavy brass. The mirror lense has great projecting power and a focusing attachment enables the adjustment of the range of light as desired. Made also with swivel attachment.

Prices from $15.00 to $25.00.

The Royal Single Tire Holder

Consists of two long and one sh piece. Will hold one tire. All parts made of extra heavy highly polish brass and equipped with strong str for holding tire.

Price, complete set, $6.00.

The dealer who desires to handle the BEST line of Automobile Specialties would do well to investigate our line of splendid and profitable goods. Our 128 page catalog will be sent upon request.

THE MOTOR CAR EQUIPMENT CO.

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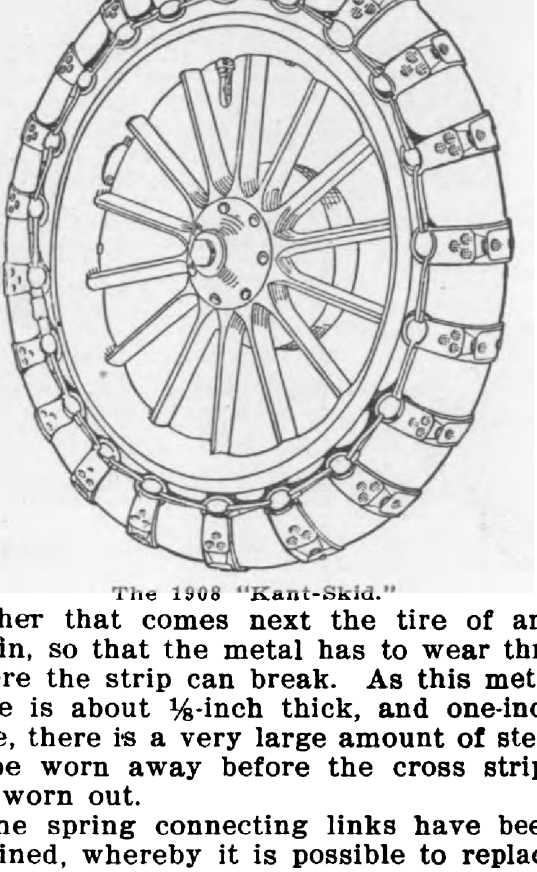
Leather Tire Goods Co., of Newton
er Falls, Mass., are here shown.
the 1908 Kant-Skids, the metal plate
ch takes the wear in the middle of the
s strips has linked into it at each end
er small plates, that are riveted to the
her cross strips. These plates hold
larger middle plate, and relieve the



The 1908 "Kant-Skid."

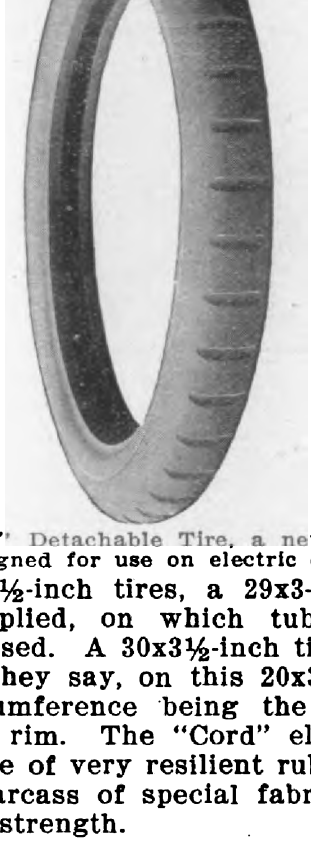
her that comes next the tire of any
in, so that the metal has to wear thru
re the strip can break. As this metal
e is about ⅛-inch thick, and one-inch
e, there is a very large amount of steel
e worn away before the cross strips
worn out.
ne spring connecting links have been
ined, whereby it is possible to replace
n cross strips in a moment without
s, or to add or remove strips to make
Kant-Skid fit larger or smaller wheels.
Kant-Skids are also made single, with
rap and buckle on each end to buckle
nd the spoke of the wheel. One or
e of these may be used on a wheel as
red. These sell for 50 cents each.

L. T. G. 1908 Leather Inner Tube.

ber inside.

The "Cord" Detachable Tire for Electrics

Goodyear Tire & Rubber Co., Akro
Ohio, have added to their already larg
line, a new tire designed especially fo
use on electric cars, and called the "Cord
detachable. They also have a new ri
for electric car wheels made on the sam
lines as the well known Goodyear Un
versal rim, but made much lighter fo
the purpose of economy. For a machin



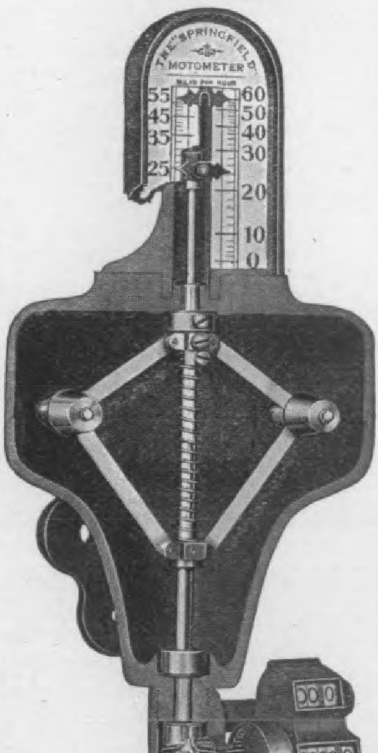
The "Cord" Detachable Tire, a new Goodye
Product designed for use on electric cars.

using 30x3½-inch tires, a 29x3-inch bas
rim is applied, on which tubular sid
rings are used. A 30x3½-inch tire will f
perfectly, they say, on this 20x3 rim, th
outer circumference being the same a
the 30x3½ rim. The "Cord" electric ca
tire is made of very resilient rubber, bu
up on a carcass of special fabric posse
sing great strength.

Mammoth Garage Company, Whit
Plains, N. Y., has recently installed a we
equipt machinery department and is pr
pared to do any kind of machine wor
Its building is of reinforced concrete an
contains 21,600 square feet of space o
one floor.

No other automobile publication give
its readers such a large amount of valuab
descriptive matter as the "Journal." W
have already described about three sco
1908 cars, counting those in this issu
and will publish many more descriptio

The Springfield Motometer



Now offers, covered by the same guarantee and backed by the same record of proven goodness as for the two seasons past,

These New and Valuable Features:

A Maximum Hand which is Perfection.

Travels up the scale with the regular pointer but remains at the highest speed reached until released by the pressure of a button when it instantly drops to the point where the regular pointer may be standing at the moment. It can be made inoperative in an instant, traveling with the regular pointer up and down and being inv'sible.

The Handsomest and Most Readable Dial Made

Large, Symmetrical Figures in jet-black fired enamel, on a perfectly white enamel ground Read with ease from the back seat of any tonneau It will please all critics of the old one.

New Oil Tempered Spring Steel Reinforce,

at each end of the shaft. Prevents a short bend. Compels the easy curves necessary to smooth running and long life, which no make shift in the way of gears can replace.

The Non-Clogging Pinion.

Will not hold mud. A straight-forward and correct mechanical device of absolute efficiency

These are additions, not changes With them the Motometer is even more than before "The Speedometer For Service."

SEE IT AT ALL THE BIG SHOWS

50-Mile Model, $45.00. 60-Mile Model, $50.00

Either with Maximum Hand, $5.00 Extra.

THE R. H. SMITH MFG. CO.

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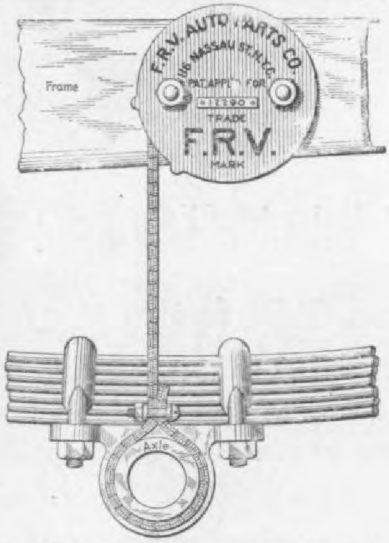
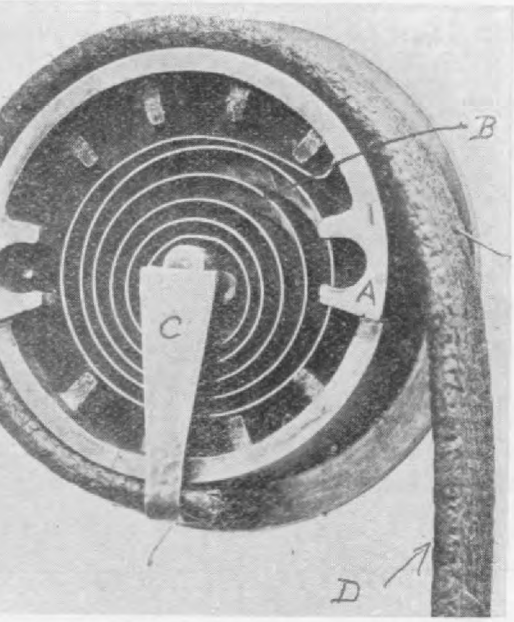
the base A, spring B, arm C, a of camel's hair belting D, and a



The "F. R. V." Shock Absorber.

base fastened to the frame of the le, carries a frictional drum, and d it is run the belting, one end of is attached to the axle, and the to the arm C, which is fastened to pring B. The spring is adjustable y weight of vehicle, and acts to take e slack of the belt on the compres- of the vehicle spring and wind it

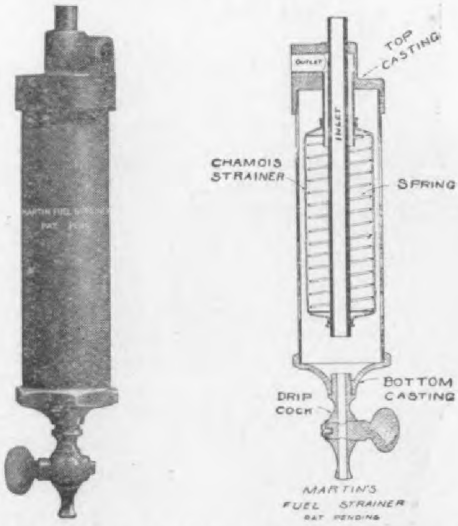


il view of the spring, etc., in the "F. R. hock Absorber.

r around the drum. The friction of elt on the drum surface as the vehicle g returns to its normal position re- its action and prevents quick re- of the body.

"Martin" Fuel Strainer

A new automobile specialty, the Martin gasoline strainer, has recently been placed on the market by the Turner Brass Works, now at Sycamore, Ill.



The "Martin" Fuel Strainer, exterior and sectional views.

The object of the Martin fuel strainer is to furnish pure, clean gasoline to the carburetor. It is constructed with a chamois bag, which separates the water from the gasoline the water falling to the bottom with other foreign substances, where it may be drawn off thru a pet cock provided for that purpose. The device is so arranged that the vibration of the car keeps the filter or chamois bag striking against the sides of the tube, thereby dislodging the foreign substance and keeping the chamois free, thus giving the full filtering surface and preventing it from clogging.

Improvements in the Delta Spark Plug and Dry Cells

A few improvements have been made in the Delta spark plug and dry cell manufactured by the Delta Mfg. Co., Bloomfield, N. J., the newest feature in the spark plug being the use of special alloy wire for both sparking points, instead of the center spindle being all steel as formerly. The spark plug is made in half-inch, metric and the new A. L. A. M. standard threads, and is sold in a round metal bound heavy cardboard box with metal screw top, the advantages of the box being that it protects the plug from being broken or the

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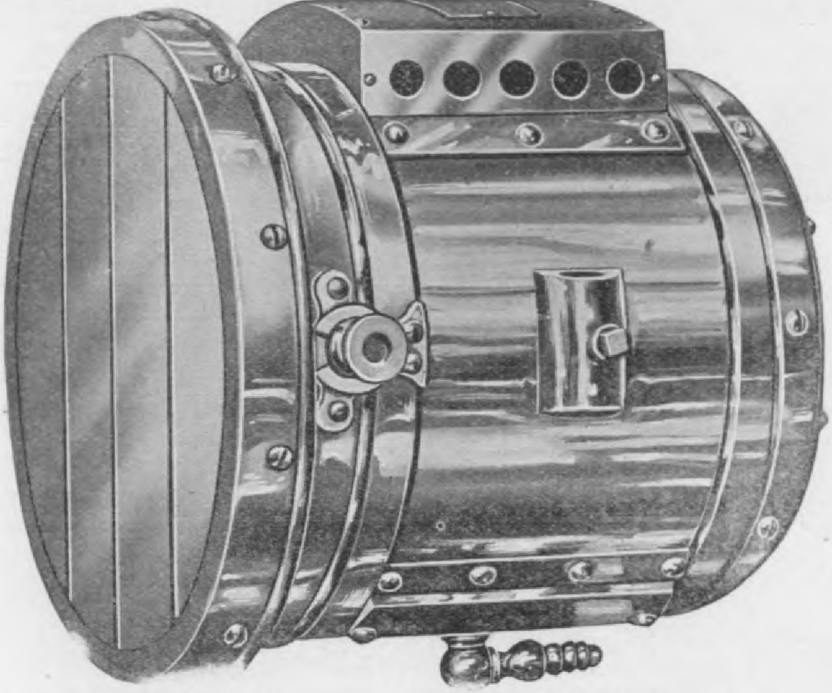
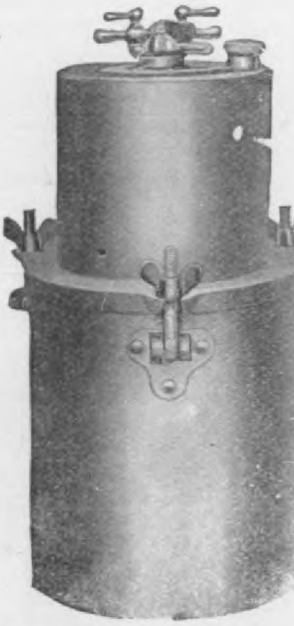
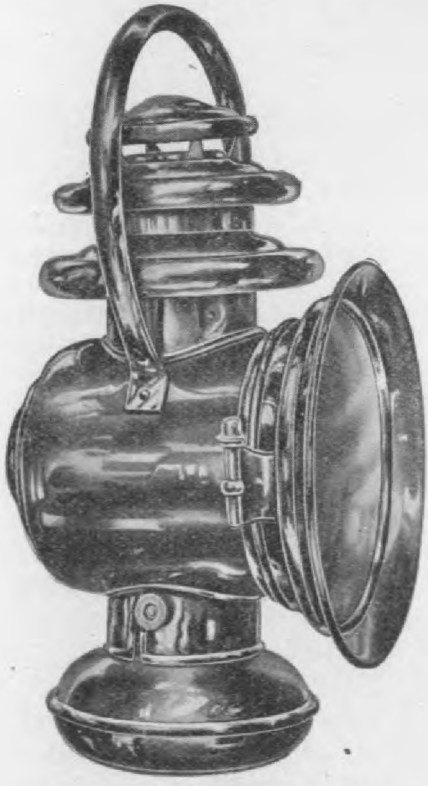


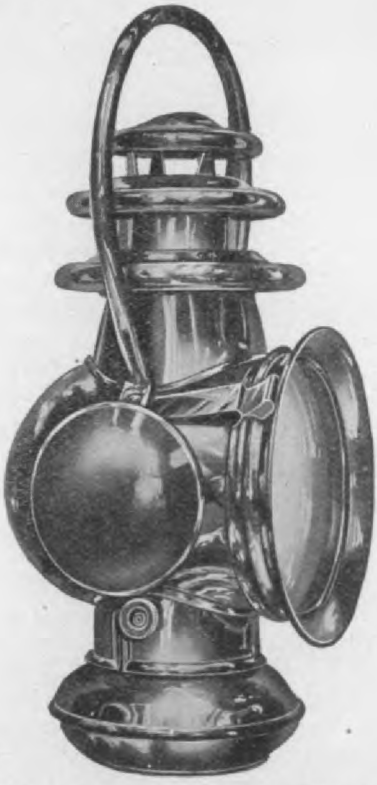
$\frac{1}{16}$" brass body, reinforced wi h extra bands ⅛" thick. Full size Bausch & Lomb Mirror, Adjustable Focus



Double Generator, Heav Gauge b ass, Auto at cut off Valve; wate jack.t cast base.



Large size side oil lamp. Heavy gauge brass, silver refl ctors; perfect draught, will stay lit.



Handsome tail oil lamp, heavy gauge seamless brass bodies. Fine semaphore glass; combination prop for round or flat bracket; will stay lit.

Very handsome s lamp, heavy gauge silver reflector, pe draught; will stay lit

PRICES, QUALITY, DELIVERY IS WHAT WE OFF

Have you received our 1908 booklet showing "What's What" in the lamp business?

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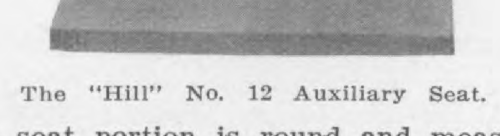
The "Hill" No. 12 Auxiliary Seat.

seat portion is round and measures inches in diameter. The back is 17 es high and its standards are hinged that it can be folded down on the



The Hill Body for High Powered Runabouts. is illustration shows it with the rear seat d down entirely out of sight.

ion. This No. 12 seat is attached to floor by screwing into a socket laid on floor same as their No. 10 seat.

New Hill Body for High Powered Runabouts with rear seat up.

his company also has a new body de- ed for high powered runabouts. This

noticeable when the seat is down. Th rear seat has a folding lazy back and a commodates three passengers.

"Philadelphia" Auto Tops, Etc.

The Philadelphia Automobile Accesso ies Company, 153 North Broad stree Philadelphia, which started business year ago, has made a large trade in sma articles, and so successful have they bee that they have determined to extend the line for the coming year by the additio of a top department.

Mr. G. B. Demarest, of New York, wi manage and direct the building of aut mobile tops, slip covers, tonneau seat top boots and covers, baggage racks, fo rests, robe rails, and many other co trivances. In direct charge of the wor of building these tops will be a Frenc workman, Francois Nuncy, who has ha many years' experience abroad, buildin tops, fine carriage work, trimming an upholstering, etc.

Every top will be made to order. Th tops are not made up in quantity to f any or all cars, but each top is fitted t its own special car and the measurement taken direct from it. The materials use will be imported water proof goods, soli wood bows, forged irons and hand wor will be employed thruout. In addition t the Top Department this company will als carry many other fittings of their ow manufacture and design, all of which wi be attached to the car at their place, fre of charge. A list of these articles include trunk racks, robe rails, foot rests, toile cases for limousine cars, limousine a accessories, sprags, etc.

The J. Alexander Co., 1931 Broadway, N Y. City has succeeded to the business o the Mirroscope Co., which manufacture the "Mirroscope," a device which enable a chauffeur to see the condition of traff behind him.

The next issue of the Journal will b the Chicago Show number, containing forecast of the Chicago show and descri tions of all the new things exhibited at th Madison Square Garden Show, but not d scribed in this issue. To keep fully u to-date in developments of the motor ca field, it is absolutely necessary to rea the Journal. If you are not a subscribe you should send $2 at once, so as to r

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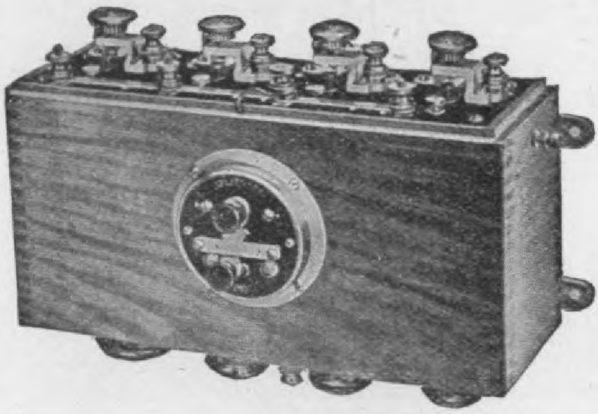
IN YOUR OWN INTEREST

We ask you to personally familiarize yourself with the merits of

Splitdorf Ignition

and to consider what it means to you as a Motorist—how it affects your own comfort and pleasure.



The Old Reliable

Splitdorf Coil

which has been the favorite with thousands of autoists so many years will maintain the same high degree of excellence which has made it famous.

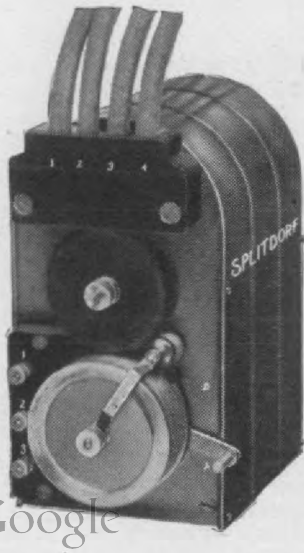
The demand for the

Splitdorf High Tension Magneto

by reason of its efficiency is so great we can hardly keep up with our orders, although the season for equipping cars is almost over.

A significant feature is the fact that we are replacing many foreign magnetos with this machine.

See it for yourself—Space 57 Balcony



C. F. SPLITDORF

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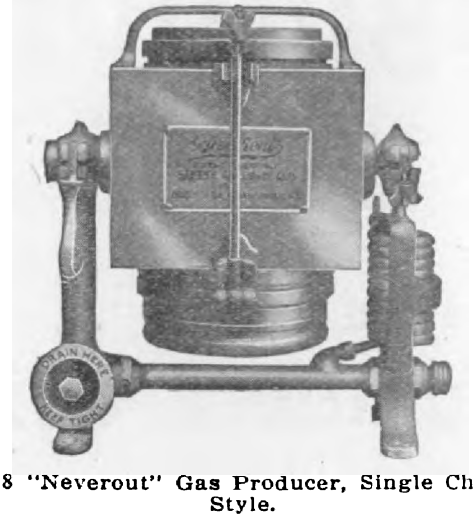
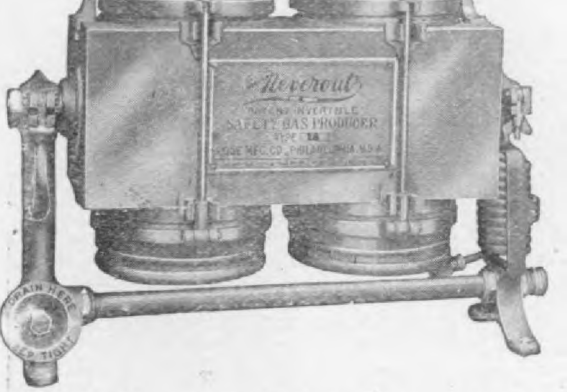
und necessary in the "Neverout" Gas oducer for 1908, and the several changes at appear in the new model, while im- rtant and valuable improvements, are t refinements of details designed to ren- r the device more thoroly immune from mage by careless handling. The original incipal of invertibility for the purpose



pe 8 "Neverout" Gas Producer, Single Chamber Style.

bringing the carbide into contact with e water; or to break the contact between e dry carbide and the wet ashes when more gas is wanted, has been rigidly hered to in each successive model and e improvements made from year to year ve been chiefly in the nature of added fe-guards and strengthening of parts ble to careless handling.

Probably the most important improve- ent in type 8, is the change in the gas rifying system. In the 1907 model the



pe 8 "Neverout" Gas Producer, Double Chamber Style.

rifier was in the form of a sack shaped ass receptacle at the side of the pro- cer, but in the 1908 model the gas vels down a tube at one side, thru a rizontal tube at the bottom and up thru

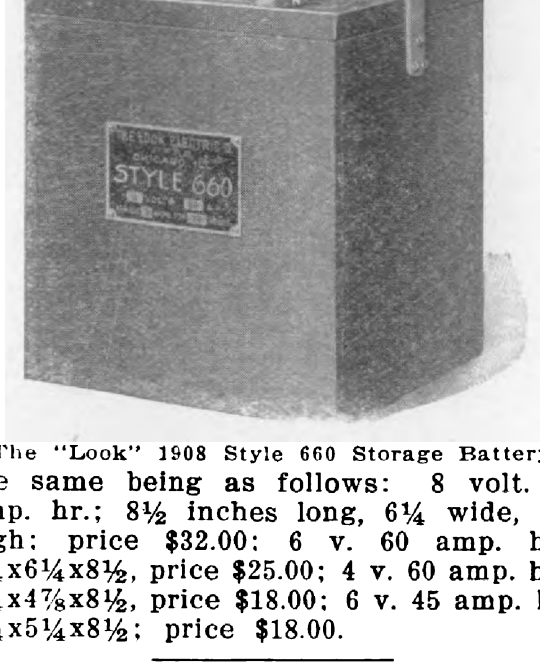
able, is an extension on the framew of the device which makes it impossi to turn the producer too far in eit direction. A similar feature prevents clamping handle from denting the sta ard at that side. The handle is also m compactly placed and does not extend yond the line of the producer proper.

Besides the U. S. and European pate that have been allowed on this device makers, Rose Mfg. Co., 911 Arch str Philadelphia, have also been gran patents in Asiatic countries includ Japan.

"Look" 1908 Storage Batteries

The accompanying cut shows the 1 Look Storage Battery. style 660, manu tured by the Look Electric Co., (Inc.), 1 Michigan avenue, Chicago, Ill.

For the 1908 season this company making four styles, the sizes and prices



The "Look" 1908 Style 660 Storage Batter the same being as follows: 8 volt. amp. hr.; 8½ inches long, 6¼ wide, high; price $32.00; 6 v. 60 amp. h 6¾x6¼x8½, price $25.00; 4 v. 60 amp. h 6¼x4⅞x8½, price $18.00; 6 v. 45 amp. h 7¼x5¼x8½; price $18.00.

In the October issue the statement ma by Mr. Dolnar that the original Elm Motor was designed by Roberts, we informed by the Elmore Mfg. Co. is correct, as the original two-cycle mo developed by this company was paten by Mr. Jos. Day, of London, England, was taken up by the Elmore Company 1899.

Empire Automobile Tire Co., Trent N. J., has brought out for 1908 a

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OH LOOK WHO'S HERE!

DR. DYKE of St. Louis with his Painless Prices on Automobile Supplies.

DR. DYKE is the originator of the first Automobile Supply business in America. DR. DYKE published the first Books on Automobiles. READ DR. DYKE'S BOOKS. Dr. Dyke's "Diseases of a Gasoline Automobile and How to Cure Them." 225 pages—thousands sold. Price $1.00. DR. DYKE'S "Anatomy of the Automobile," over 700 pages, $1.50. If both books are purchased at one time price $2.00.

Look—Painless Prices—Look

$3000 CAR FOR $850

ALL PARTS TO BUILD THIS CAR

A prominent Auto Manufacturer who changed his design for 1908 placed with us for sale parts, etc., for building 15 or 16 of these cars. Transmissions, Engines, Axles, Coils, Steering Gears, etc., at less than wholesale prices.

15 TO 25 PER CENT. SAVED ON ALL MAKES OF TIRES

TIRES

We SELL ALL MAKES and guarantee to SAVE you money, but right at present we have some exceptionally good bargains.

30 x 3½ Amazon, new, first grade tires, list $35.05. Our price **$16.95.**

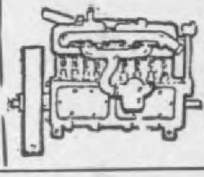
32 x 4 G & J "Second" Tires, worth twice the money. List price $47.00. Our price **$18 50.**

15 to 25% saved on all makes of TIRES

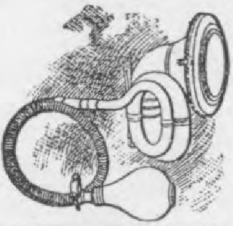
Lamp Outfit "Belle"

We have just secured a lot of imported from a receiver's sale. Lamps are made of heavy brass and riveted throughout. Double lens, finest finish throughout. Sold for $25 each. We guarantee them equal to the finest lamps you can purchase. Open front and back. Outfit consists of

2 Belle Lamps
1 Solar Generator
8 ft. Tubing
} $22.50

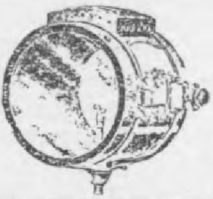


Dyke's 4¼x4¾ Engine. Price is right. We have other styles.



Imported, German Make Dragon Horns

Deep toned. Regular price $10. Our price $4.50. Only a few left.



No. 133 Lamp Outfit

for Runabout.

2 Mirror Lens Lamps
1 Generator
8 ft. Tubing
} $14.00

Jacks—100 Shaw, Screw Jacks, **75c.** ea.

Gogglettes—The latest French goggle, **$2.00.**

4 Glass Goggles 50c.

Prestolyte Gas Tanks, new, $27.50.

Tail Lamps, $2.90.

Mica Spark Plugs, 50c.

Mirror Lens, Shifting Searchlight, 7¼-inch and Generator $14.90

Glass Fronts, $18 to $36.

Tops $15 to $65.

Steering Devices, latest model, control levers on top of wheel. Regular $50 style. Only few left, **$29.50.**

Curburetters, Universal make, 1-inch size, price **$6.40.** 1¼-inch size, price **$6.90.** Only few of these left.

Porter 6 volt, 60 ampere Storage Batteries

This size Battery in other makes sells for from $25 to $30. We guarantee these batteries for one year. Fresh stock. Price $15.00.

Coils, 4 cylinder, latest model, Splitdorf, mahogany case, switch on front, guaranteed, **$26.50.**

Combination Meters for testing either dry cells or Storage Batteries 0 to 8 volts and 0 to 30 amperes. **$2.95,** guaranteed.

Am Meters 0 to 30 amperes, **$1.90.**

Volt Meters 0 to 8 volts **$1.90.**

REMEMBER our goods are not old and shop worn, they are all new goods and first class. We purchased a nice clean stock of goods recently and desire that you enjoy the benefit of the prices. **If all goods are not as represented return them and money will be cheerfully refunded.**

New Catalogue Just Out.

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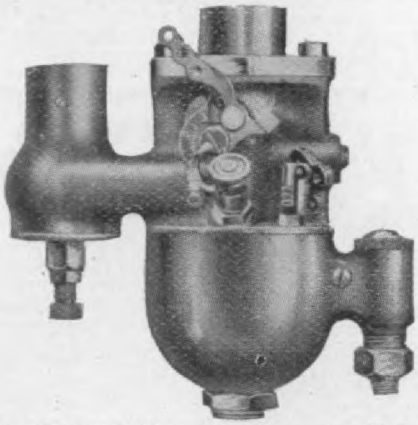
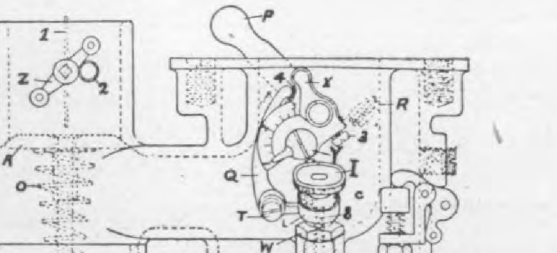
ler styles, but in general it embodies the principles involved in them. The rottle is water-jacketed with a butter- valve in place of the sliding disc type ed on the other models.



The "Schebler" Carburetor, Model F.

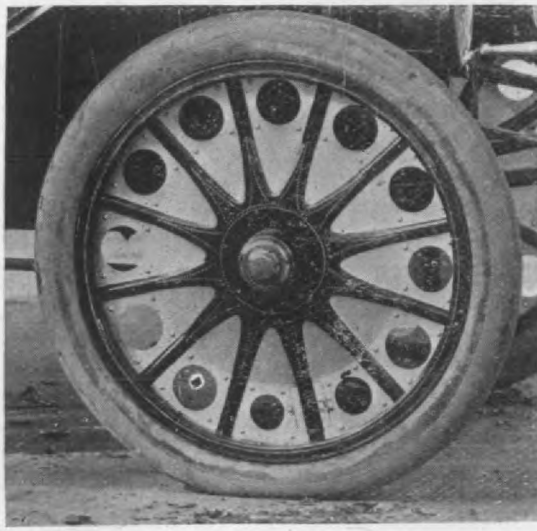
There are two adjustments of the gaso- e needle valve. The first acts thru a urled button marked I, which is turned the right or left until a proper mixture obtained with a low throttle. The second ustment, acting thru an eccentric cam rked Y, causes the lever Q to move the edle valve up and down in the spraying zzle until the proper mixture for high eed is obtained.



he "Schebler" Carburetor, Model F. A, Com- sating Air Valve; B, Float Chamber; C, Mix- Chamber; D, Spraying Nozzle; E, Needle ve; F, Float; G, Reversible Union; H, Float ve; I, Needle Valve Adjusting Screw; J, Float er; K, Throttle; L, Needle Valve Retainer; Air Valve Adjusting Screw; N, Cork Gasket; Air Valve Spring; P, Throttle Lever; Q, Needle ve Lift Lever; R, Throttle Stop; S, Pivot ew; T, Float Cap; U, Flushing Pin; V, Lock ; W, Needle Valve Hex. Connection; X, Spring Casting; Y, Eccentric High Speed Adjust- t; Z, Air Valve Lever; 1, Air Valve Butterfly ; 2, Spring; 3, Lock Screw; 4, Cam Spring; ock Nut for Bowl; 6, Air Valve Cap; 7, Needle ve Retaining Spring; 8, Needle Valve Spring;

Open Pattern "Indestructible" Steel Wheel

The Indestructible Steel Wheel Co., 1 Michigan avenue, Chicago, now has the marker a special type of its all-st automobile wheel, this new type, cal the "open" pattern being designed es cially for pleasure cars.



The New Open Pattern "Indesctructible" s wheel used on a Premier car in which Mes Fish and Metzel toured thru Indiana, Ohio Michigan, demonstrating the wheel.

The open pattern wheels makes a fi appearance and is transparent when motion. This feature places it in succes ful competition with wood wheels, maki it a welcome offering to the automob trade.

Messrs. Fish and Metzel, the preside and vice-president of the Indestructib Steel Wheel Co., recently made a demo strating trip thru Indiana, Ohio a Michigan in a Premier Roadster, fitt with these open pattern "Indestructibl steel wheels, and visited various aut mobile factories in those states. T engineers, superintendents and purchasi agents in these factories showed great i terest in the wheel, and studied i mechanical points intently. Many fa tories placed orders for these wheels f their 1908 output.

Are you desirous of reading descriptio of all 1908 cars on the market? If so su scribe for the "Journal," for it contai more technical descriptive matter relati to 1908 cars than any other publication its kind. About 60 1908 cars have be described and if new subscribers desi to commence their subscriptions with t June number, which contained the fi

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Atwater Kent Spark Generator

Praised By The

ELMORE MFG. CO.

Taken from the Philadelphia Record of Oct. 6th, 1907.

NO IGNITION TROUBLES

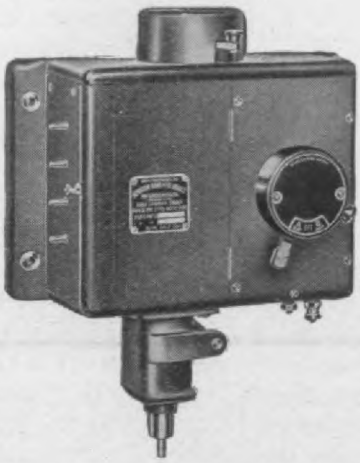
Elmore Company Announce Remarkable Improvement.

Absolutely and unquestionably one of the most remarkable improvements that will be shown in the automobile season of 1908 is the ignition system of the new Elmore valveless two-cycle cars. After a series of the most exhaustive tests, both by the factory and by purchasers who have reported to the factory, the Elmore Manufacturing Company, which makes the Elmore cars, has come out with the most remarkable promises and guarantees ever offered.

Their tests have convinced them—and they will verify the statement—that upon one set of six ordinary six-inch dry cells the Elmore car will run more than 1500 miles, and that it has done over 2000. This sounds somewhat stupendous, but the name and reputation of the Elmore Manufacturing Company is absolutely back of it. In fact, were the truth told, even greater figures than those can be cited and proved to be the rule.

This means that with the new system an average season's driving can be accomplished on two sets or a dozen six-inch dry cells, with which every Elmore is equipped. Not only that, but the system is so sensitive that it has been known to work for many, many hours on a set of batteries thrown away as exhausted. In fact, the operation has been performed till the cells were drained down to one ampere.

This new ignition system absolutely does away with timer troubles, with vibrator coil worries and with depleted, shortened or run-down storage cells. All these things so bothersome are banished and perfection is almost, if not quite, reached. Because of the success of this new ignition system and because of the proven value and success of the two-cycle idea in their new cars, the Elmore people in the most unobtrusive manner are proclaiming their car for 1908 "the most perfect car of its class in the world."



The above refers to the ATWATER KENT SPARK GENERATOR which the Elmore Mfg. Co., have adopted for their 1908 output.

Our Spark Generator gave such entire satisfaction on Thomas Flyers in 1907 that the E. R. Thomas Motor Co. will again use them for 1908.

"Once used, Always used."

ATWATER KENT MFG. WORKS,

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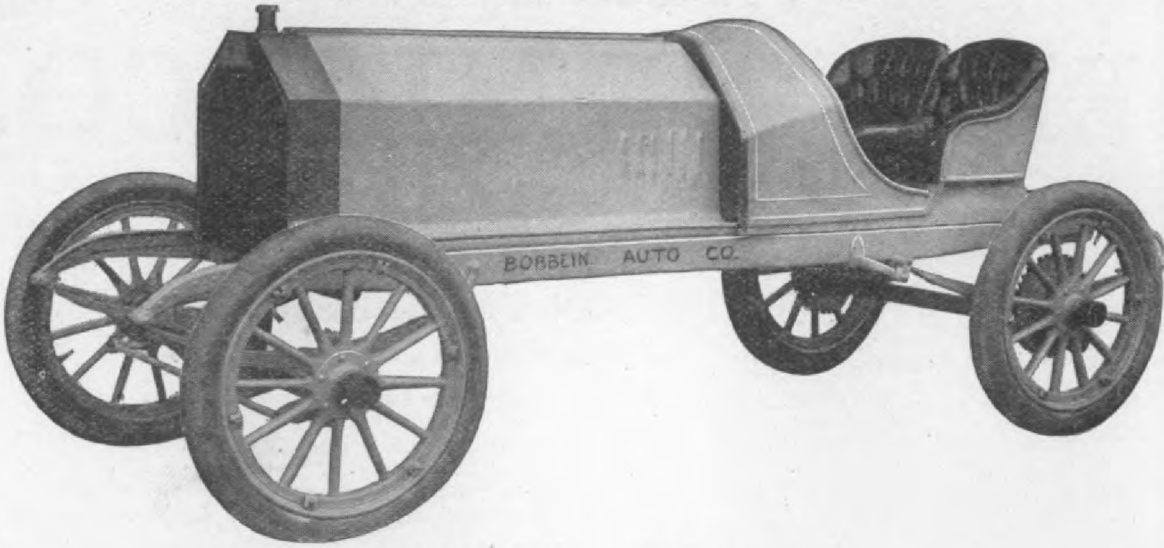
ission. It is the product of the Borbein uto Co., 2109-2111 North Ninth street, St. ouis, Mo.

The front axle is I-beam section with rge roller bearing spindles. The rear xle also has roller bearing spindles. The rtillery wheels have steel rims fastened

making a very rigid and indestructible frame, capable of taking any poss strain without breaking. On the up part of the steel hoop is bolted the back and this lazy back is upholste with hand buffed leather over the curled hair obtainable.



The "Borbein" No. 35 Car Ready for Power.

n them, ready to take 4x36-inch clincher res. The rear wheels have sprockets ith brake drums fastened on same. The eth on sprockets are cut for 1¼x⅝-inch oller chain. The track is 56 inches, and heel base 120 inches. The body is made wood with a large metal shield back of e dash. The radiator is of a special rge size, and the folding hood is 50 ches long. The manufacturers also rnish wheel steering devices, fenders nd running boards if desired. They make everal sizes and styles of these cars.

The seatboard is placed in this s hoop in the proper position on pivots, is held in the open and closed position steel lugs. When the seat is not wan the seatboard is turned up in the fr under the lazy back, and the seat and b make one continuous whole. Then seat is allowed to revolve backward u it folds flat against the side of the car which position, it occupies exactly 2 inc room alongside of the side of the car can be removed entirely by simply lift the seat up, if removal is desired.

The manufacturers are also putting the market some new styles in automo tops, and rumble seats for high powe runabouts.

The 20 Century Extra Tonneau Seat

The 20th Century Extra Tonneau Seat st being placed on the market by F. W. nderson & Co., Brown and Uber streets, hiladelphia, Pa., is a new departure in eats of this kind. The seat can be attached

The 20th Century Extra Tonneau Seat.

a novice, as the only attachments neces- ry are a small plate to be screwed in the oor on which the leg revolves and a col-

Springfield Hat & Cap Co., 27-35 Ta street, Springfield, Mass.. are including their 1908 line a double band cap wh ties under the chin with a silk ribbon is provided with a small ventilator in flap of the band, so adjustable about ear that the wearer, tho having his e covered for warmth, does not have hearing obstructed.

Besides the very valuable spe features that have characterized this the last issue of the Journal, the n four issues will be special numbers great value, and no persons interested the manufacture, sale or use of motor c

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New Models—New Prices

We now announce the completion of tools and equipment for producing the Improved 1908 Stewart Speedometer (with enclosed Odometer)—absolutely the most perfect Speedometer ever turned out of any factory, American or Foreign. Every feature and function of this truly splendid instrument has been brought to such a stage of perfection that all former efforts in Speedometer manufacture have been completely outclassed.

Our plan to make the best possible Speedometer, regardless of price, and sell it at a lower price than any other make, enables us to announce a change of price in Model No. 4, our 60-mile instrument, heretofore sold at $60. New price, $40.

$40

No. 4 Stewart Combination Speedometer-Odometer, 4-inch dial, 60-mile **$40**

No. 5 Stewart Combination Speedometer-Odometer, 4-inch dial, 90-mile **$75**

Covered by Our Ironclad Guarantee

A NEW SPEEDOMETER

The American

A low priced Speedometer of quality, exceedingly well made. A simple mechanism positively accurate within 50-mile limit permits us to sell THE AMERICAN at a price astoundingly low. This is a high-class instrument, suitable for all cars that do not require a Speedometer capable of indicating a greater speed than 50 miles.

Covered by Our Ironclad Guarantee

THE FASTEST SELLING SPEEDOMETER EVER OFFERED TO THE TRADE

SEND FOR CATALOG

$25

Stewart & Clark Mfg. Co.

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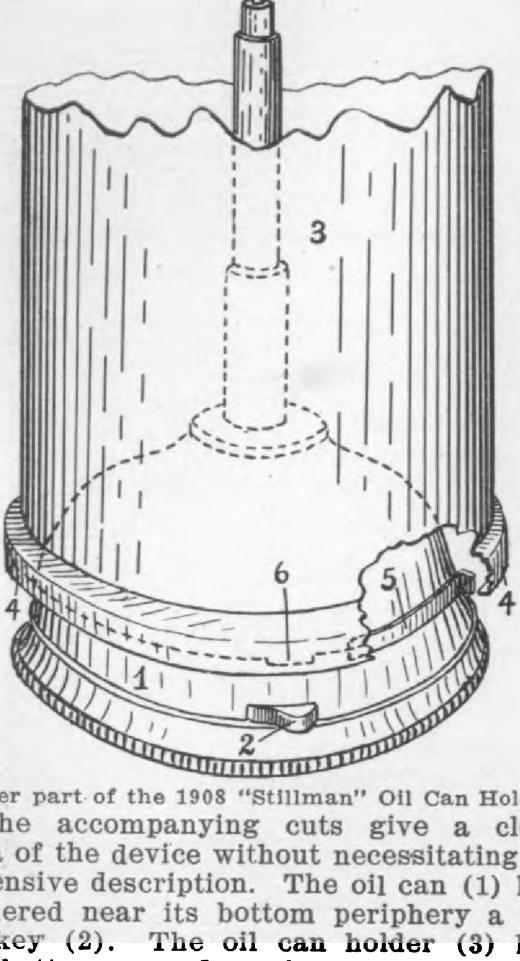
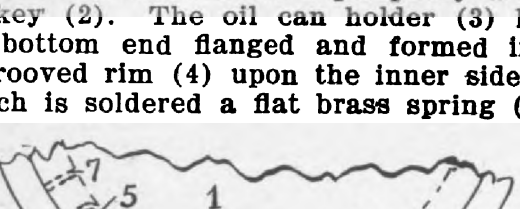
ch was described in our May, 1906, is-
, page 294, has recently been improved
the makers, Philadelphia Automobile
essories Co., 153 North Broad street,
ladelphia, Pa., the new feature consist-
of a catch provided at the bottom
ch will prevent the oil can falling out
also eliminates rattling.



er part of the 1908 "Stillman" Oil Can Holder.

he accompanying cuts give a clear
of the device without necessitating an
ensive description. The oil can (1) has
ered near its bottom periphery a lug
key (2). The oil can holder (3) has
bottom end flanged and formed into
rooved rim (4) upon the inner side of
ch is soldered a flat brass spring (5).



ll view of the fastening device on the 1908 "Stillman" oil can holder.

mally this spring is in a position bend-
toward the center of the holder, but
n the oil can is put in place, the lug
slides up on the back of the spring
compressing it and holding the oil
rigid. The lug (2), of which there

prevent the can from being turned in
wrong direction or too far.

New "Riley-Klotz" Automobile Horn

The Riley-Klotz Mfg. Co., 17 and 19 Mu
berry street, Newark, N. J., includes
its line of automobile horns for 1908,
new oval pattern with triple twist whic
is styled No. 27.

The horn is designed for use on th
largest and highest priced touring cars.
is highly polished, and finely finished i

The "R-K," No. 27, Oval Horn.

side and out, and is equipt with the ver
best quality of bulb. The bell is 8 inche
long by 6 inches wide thru centers. Th
concern is now furnishing all its larg
Dragon type horns with either oval
round bells, and is constantly adding ne
types to its line which at present consis
of all the desirable styles used on tourin
cars, runabouts, motor cycles and bicycle

Do not miss the December number
the Journal, which will contain a larg
number of descriptions of 1908 cars, an
will also contain a forecast of the Chicag
Show. If not a subscriber send $2 at onc
and we will enter your subscription fo
one year, commencing with any of th
back numbers as far back as June if d
sired, so that you can obtain description
of the 1908 cars that have been describe
The Cycle & Automobile Trade Journa
Forty-ninth and Market streets, Philade
phia, Pa.

The Breeze Carburetor Co. is enlargin
its business at a very rapid rate, securin
responsible parties as agents thruout th
country and abroad, in most importan
population centres. Jackson & McKinle
of 16 Seaforth avenue, Toronto, Ont., Can
and Mr. Thomas H. McNevin, 70 La Sal
street, Chicago, Ill., are among those a
ready interested. Their Eastern Agent
The Breeze Carburetor Co. of N. Y. 101 E

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GIBNEY TIRES

GIBNEY TIRES

Announcement

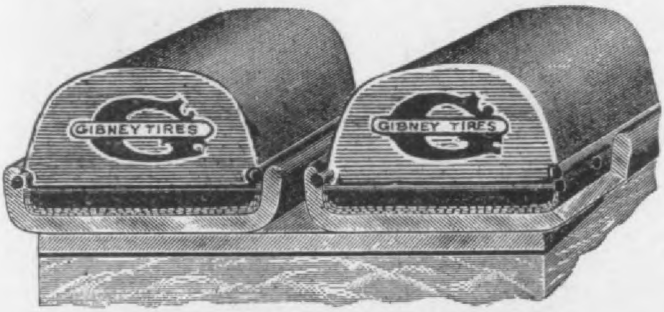
to the Owners of Commercial and Pleasure Vehicles:

AFTER many years of close study and intimate knowledge of European and American tire manufacturing processes, we take pleasure in presenting herewith two tires of our own creation.

Years of research enable us to assure the public that in the new products we have not only embodied the best features for the old and new world, but have secured resiliency and durability to a degree equaled by no other solid tire yet constructed.

GIBNEY

Solid Tire and Sidewire Endless Motor Tire



are made of purest Para rubber with minutest care by selected workmen of the highest grade, under the direction of expert chemists.

As our name in the past has stood for the "square deal" so our trade mark in the future will be synonymous with all that the term implies.

JAMES L. GIBNEY & BRO.

211-13 N. Broad St. Philadelphia, Pa.

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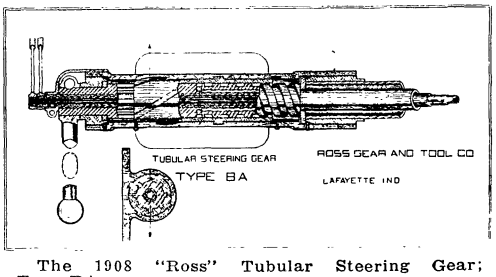
GIBNEY TIRES

1908 "Ross" Steering Gears and Universal Joints

The Ross Gear & Tool Co., Lafayette, Indiana, are offering for 1908 three types of steering gears, viz: tubular, spiral and disc, the same being herewith illustrated. They also make an improved form of universal joint.

The tubular gear Type BA, was designed with the idea of producing a steering gear that would work in any position or angle; that would be very small, yet very strong and durable; that at the same time would have contact surfaces so large and ample that the wear would be reduced to a minimum; that would not wear in the mid

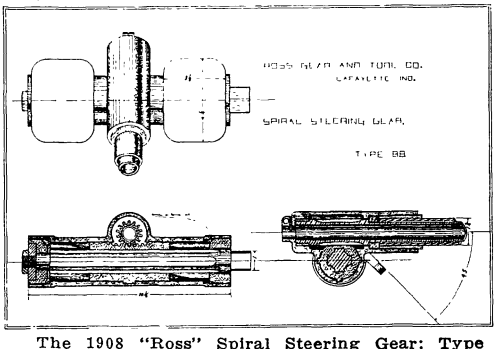


The 1908 "Ross" Tubular Steering Gear; Type BA.

position and bind in the extreme position if the wear in the mid position was taken up. It is constructed to meet the demands of truck and touring car construction, where the back-lock should be absolute.

The steering gear may be fastened to any car by bolting thru the plate, shown on the side of the housing, and thru the chassis or sub-frame.

As the drawing shows the steering arm has the side-wise motion. It can be put on the square end of the shaft shown, where the controls are desired thru the column, or it can be made all in one piece with the shaft, which in that instance would be solid and the controls would be placed on the outside. The internal con-

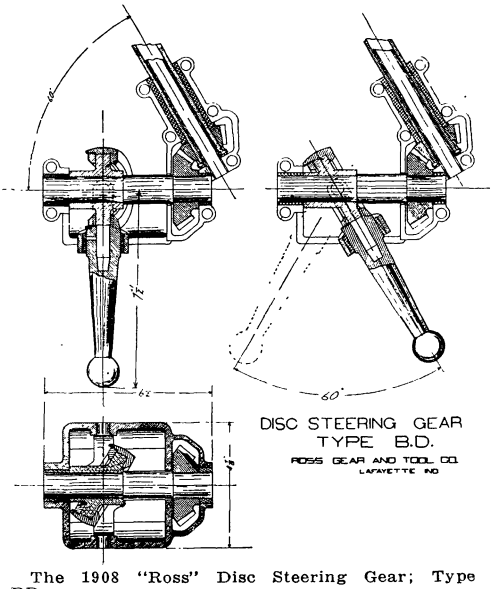


The 1908 "Ross" Spiral Steering Gear; Type BB.

trols are operated in a notched sector on top of the wheel. The sector does not rotate. To meet the demand for a gear of this type for use on cars of light construction, they have designed type BC. It has the same advantages of the large wearing surfaces, absolute back-lock, etc., that the BA type has. It is absolutely dust-proof and oil-tight. The controls are fastened on the outside of the column.

Type BB, has the same advantages of the tubular construction, but has the fore and aft motion of the arm. In this design the back-lock is obtained by making the spirals on the housing with 16 2-3-inch lead so that all the road jar is taken up by the spirals and no shock is transmitted to the pinion. Therefore, the only force acting on the pinion is the effort to steer the car.

The wearing surfaces are so large that no lost motion is devolped in the wheel. The control levers for spark and gas are placed inside the column, and are operated on a notched sector on top of the wheel. This sector does not rotate. In the cut, two plates are shown on the horizontal part of the housing. The plates can be used for bolting the steering gear on the chassis when the main frame and the sub-frame are on the same level. When this



The 1908 "Ross" Disc Steering Gear; Type BD.

is not the case, the plate is cast on either side of the upright part of the housing, so that the steering gear may be bolted either to the sub-frame or to the main frame as desired.

The disk type BD is a departure from all of the general designs of building steering gears. The motion of the arm is obtained by rotating the inclined disk on the shaft and enveloping this disk by the extended portion of the arm. This gives a large wearing surface and very little wear is developed. However, as a slight wear is magnified on the rim of the wheel, ample means have been provided for taking up any lost motion which might develop. One side of the envelope, surrounding the disk, is threaded and may be tightened very

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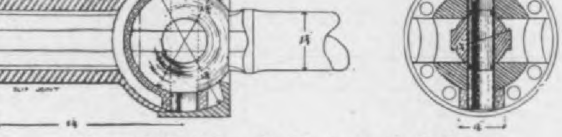
ar is keyed to the horizontal shaft with ır key-ways, so that it may be turned ru a quadrant if it develops any lost otion. The smaller gear may be turned a new wearing surface by throwing the ars out of mesh and turning the wheel.



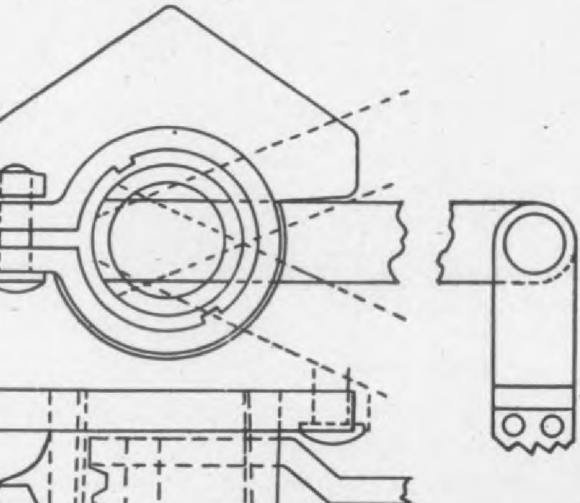
The 1908 "Ross" Universal Joint.

This steering gear is designed for run-outs and cars of light construction. Inal column controls for spark and gas furnished with this type. The control ers are operated in a notched sector on of the wheel. This sector does not ate.

The universal joint shown herewith is de in four sizes to suit different shaft meters. The joints are very easily dissembled and are oil-tight and dust-proof.

The "Colonial" Suspension

Colonial Spring Suspension Co., Newark, J., has just placed on the market a new e of spring suspension or shock abbing device which is being sold at a sonable price.



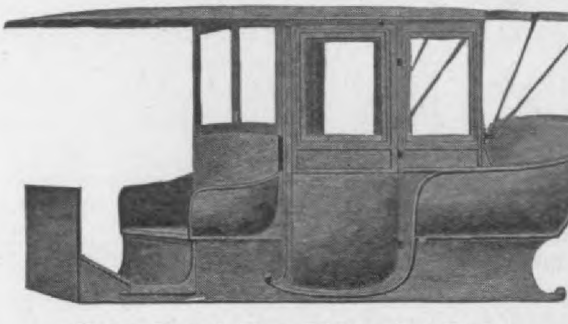
Details of the "Colonial" Suspension.

The controlling principle embodied in

jointed arm or lever attached to the h The appearance, when adjusted to t automobile we are advised is that of carefully thought out piece of mechanis which, because of its symmetrical prop tions, seems to be an integral part of t car.

New "Dann" Limousine

Dann Bros. & Co., 80-86 Franklin stre New Haven, Conn., well known as hi grade body builders, are offering a n style of limousine body for 1908 tra This body is furnished to the trade in t white, and bent wood is used wherev practical, instead of wood sawed to sha thus avoiding a number of exposed join



Dann Bros.' New Limousine Body.

All visible interior woodwork is in t best mahogany, and the best locks, hing etc., are used, the object being to produ a strictly first-class body for the be trade. This job is always built to speci order and can be varied to suit custome tastes.

1908 "Whitlock" Specialties

The Whitlock Coil Pipe Co., Hartfo Conn., are making hoods of steel or alu num, and of any size or shape, with without louvres.

They also make a specialty of bra hinges of two distinct types. One is t tangent style with ⅜-inch or 5-16-inch r This style opens only one way, and adapted for the center or top hood hing The other is the central style with ⅜-in or 5-16-inch hinge rod. This style ope both ways, that is, it will swing thru angle of nearly 360 degrees. It is special adapted for use as the side or corn hinges. The hoods can be furnished co plete, or the hinges can be had seperate

This company is making a special fe ture of motor connections of bent tubi for exhaust, inlet and water pipes. It prepared to quote on bends only, or complete pipes with branches brazed

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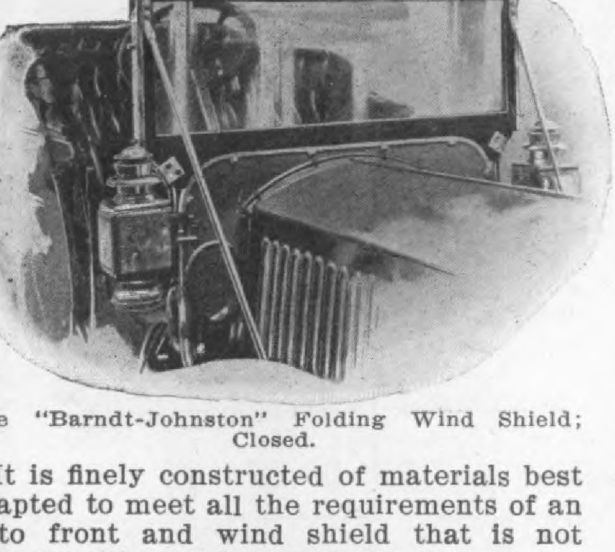
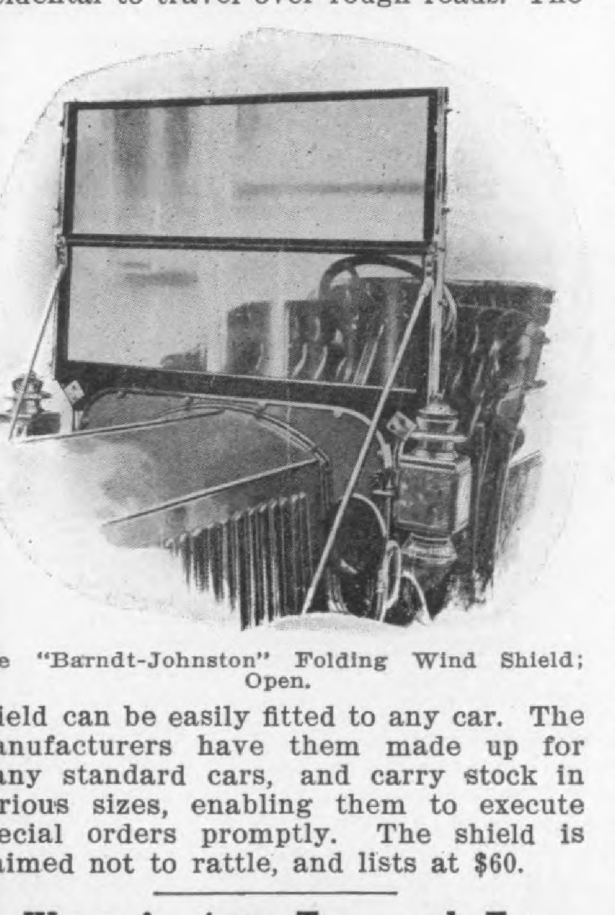
lding Wind Shield in folded and open sitions. The shield is manufactured by e Barndt-Johnston Auto Supply Co., of lumbus, Ohio.



e "Barndt-Johnston" Folding Wind Shield; Closed.

It is finely constructed of materials best apted to meet all the requirements of an to front and wind shield that is not ly durable, but handsome in appearance. e fitting and brace rods are of solid ass, higly polished. The frame is solid hogany, and the glass a special, polished ate, made to withstand the jar and strain cidental to travel over rough roads. The



e "Barndt-Johnston" Folding Wind Shield; Open.

ield can be easily fitted to any car. The anufacturers have them made up for any standard cars, and carry stock in rious sizes, enabling them to execute ecial orders promptly. The shield is aimed not to rattle, and lists at $60.

quality of curled hair, which keeps th always in shape, and prevents sagging tween the bows. Cross strainers betwe each bow and end to end strainers a used; also best second growth ash wo bows. The Warner people have al adopted an extra heavy, leather cover steel bow socket, which has a double st tube, with a hardwood and steel fill which overcomes breakage of bow socke The well-known Murphy curtain faster is used exclusively.

Warner's Auto Top fitted to a touring showing side curtains and face shield. The tension top is fitted with straps, eliminating joints.

All the tops are equipt with full c tains and a three piece storm front hav a large light in each curtain, and two la ones in the storm front. All the necess irons for attaching the top to the seat the car as furnished. The best non-stret able harness leather straps are used, w solid brass buckles and snaps. The t are finished off in front with a w Moleskin valance, with a brass oval mou ing thru the center, which gives the a neat and tasty finish. An extra cha is made for side joints. These tops furnished in Single Texture Imitat Leather and high Grade Fairfield Rubb Mackintosh Drills, Pantasote, High Gra Imitation Leather Double Fabric and tra Quality 32 oz. Fairfield Rubber Du in a variety of colors.

"Skidoo" Soap

"Skidoo" Soap is the product of Brown Soap Co., of Columbus, Ohio, w claim it to be the only soap that will ta out any kind of stains, as well as dirt a grease, without in any way burning chapping the hands. The manufactur recommend this soap especially to au mobilists and the automobile trade general. It is not furnished in the fo of a cake, but is put up in tin cans in pa form. It can also be used for clean glass, metal, etc., and is sold at $2.70

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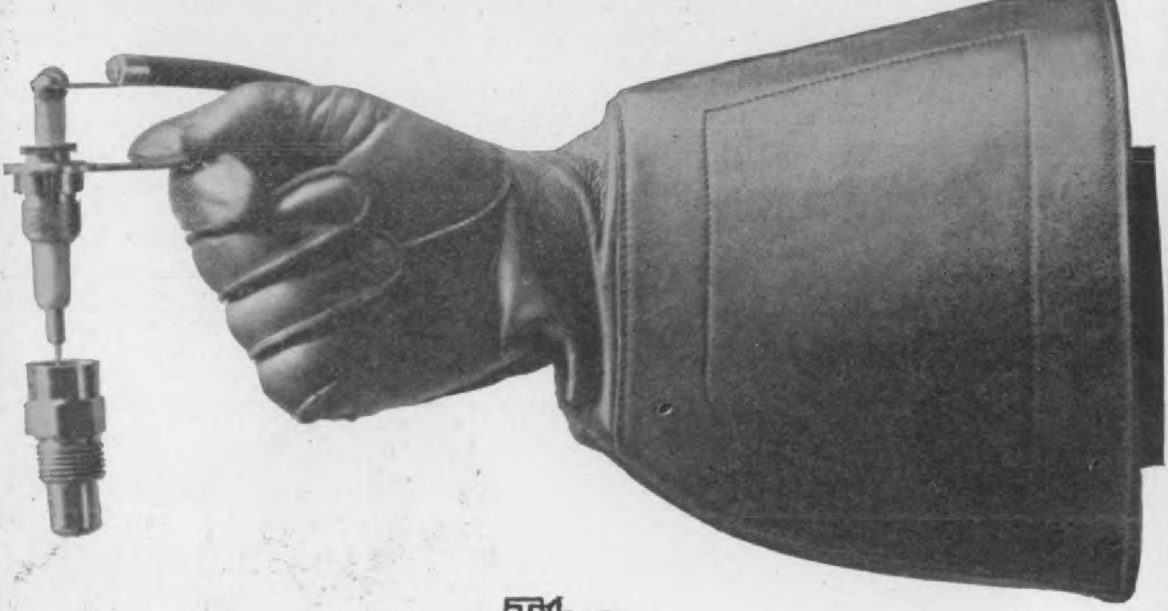

The "Breech-Block" Plug

No ordinary plug, with fixed spark gap, can be tested for leakage or breakage without removing the porcelain. To lay a plug on the engine and pass the spark is a foolish formality. It shows nothing and means nothing as far as testing the plug is concerned. A fouled plug with a broken insulator is a fine sparker outside the engine—but a dead one under compression.

With the "Breech-Block" it's different and simple. You have the intense satisfaction of instantly knowing whether or not your plu s are in perfect condition. To test, pick them out, one by one without removin z the wire, (T kes same time and effort as to pick out your watch) hold by the handle with the sparking point close to the shell, (See picture above) turn on the current and gradually increase the length of the spark to one half inch. If no shock comes from the handle, the plug is in p rfect condition. You know it. No guess work.

To clean, pick out and wipe off with one twist to instant whiteness. Drop back. Time: 4 seconds.

The chambered end of the "Breech-Block" is incomparably better than the open end type with projecting wire points. It protects the porcelain and keeps fragments out of the cylinder. The rapid movement of gas through the spark opening keeps the points clean. No amount of oil can cause skipping.

The chambered end also brings the spark deep down into the mixture and makes the engine run sweetly when throttled down to the limit.

For cold weather starting, this chambered end is invaluable. Simply open the breech and squirt gasoline into each of the nipples which settles down into the chamber **around the sparking points** and the first quarter turn of a stiff cold engine starts her off.

After each run, pick out each breech and pour in a spoonful of kerosene while the engine is hot and on the next start she will just dance on compression and not be stiff and sluggish but lively.

If you carry an extra plug with you, you can replace a questionable plug without stopping the engine.

All dealers carry all threads.

Write for booklet.

THE STANDARD COMPANY,
44 FIELD STREET,

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on, Ohio, the accompanying cut showing
heir latest style of volt-ammeter. The in-
ruments are made in volt-meters and am-
eters separately or in a combination of
oth, in all ranging up to 20 volts and 30
mperes.

he "Readrite" Pocket Battery Volt-Ammeter.

The scales are hand drawn, and each
eter is separately adjusted to a high-
rade standard instrument. The magnets
re forged from the best imported magnet
teel, and are aged so that there is no
hange in the reading of the instrument
fter it leaves the factory. The indica-
ons are practically dead beat, which al-
ws quick readings to be taken. The
exible cord is connected with the case
nd can be dispensed with if desired. The
uts on the binding post are non-remov-
ble. Each instrument is guaranteed for
ne year.

The voltmeters list at $3.00, and the
nmeters at $2.50 each. The volt-am-
eter lists at $3.50, for an instrument
eading up to 3 v. and 30 amps; and $4.00
r a 10 v. 30 amp., or a 12 v. 30 amp.
eter.

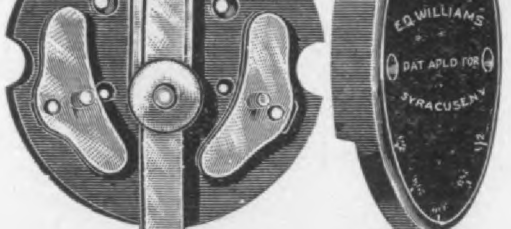
Keystone" Crucible Steel Automobile Castings

The Keystone Steel Casting Co., of
hester, Pa., are making a specialty of
ucible steel castings for automobile con-
ruction. A grade of crucible steel cast-
gs for automobile parts is furnished,
hich, it is claimed, is not only exception-
ly clean so that it requires but little
nishing after casting, but the metal is
niformly sound, will withstand the sever-
t tests as to bending and welding, and
ill also machine readily to a fine finish.

The facilities of the company are such
s to enable it to make very prompt de-
veries, and include the quickest-acting

features in his latest type spark coil,
most notable being the manner
mounting the coil so as to make it
solutely water-proof to resist rain
spray. It is claimed that water may
poured in the outside box without in
fering with the action of the units.

A slight change has also been made
the vibrator, making it much more ra
and efficient. The switch has also b
changed and is built on the knife swi
principle, which it is claimed makes

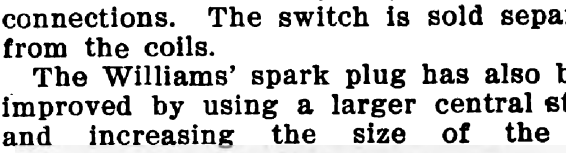


The "Williams" Knife Switch, with cover
moved, showing knife switch construction.

surest contact of any, as the blade pa
in between two contacts so that it is
possible for it to fail to make a cont
It is so arranged that either of two
of batteries can be used, or by push
the lever still further over, they are
nected in parallel. Taking out the
locks the switch.

All the contacts are mounted on a f
base which is first put on, and all con
tions made and the switch tested be
the cover is put on. The cover can
removed at any time, and the switch
amined without in any way disturbing
connections. The switch is sold sepa
from the coils.

The Williams' spark plug has also b
improved by using a larger central st
and increasing the size of the



The "Williams" Spark Plug.

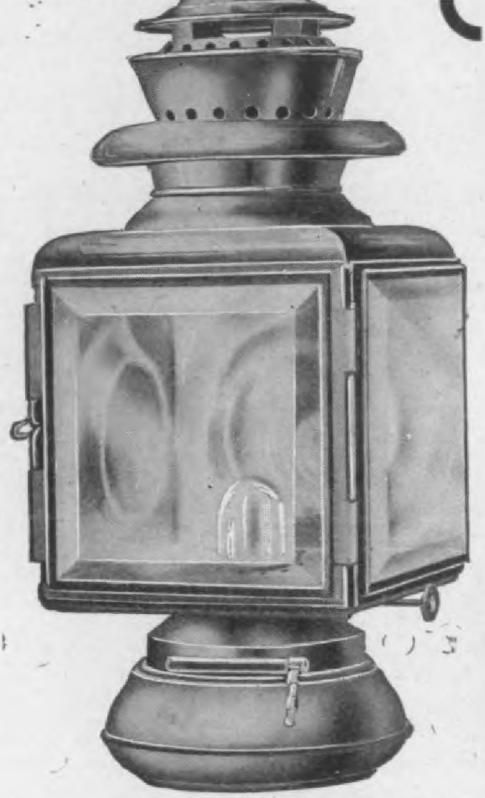
sulating core. It is made with both m
and porcelain insulation. The drip
shape of the wire, it is claimed, keeps
oil away from the sparking points i
vertical cylinder. The plug is also m
with a shorter electrode for cylin

Ham's Famous "COLD BLAST" Auto Lamps

will be on exhibition at the New York Shows, where we will be pleased to see all our friends.

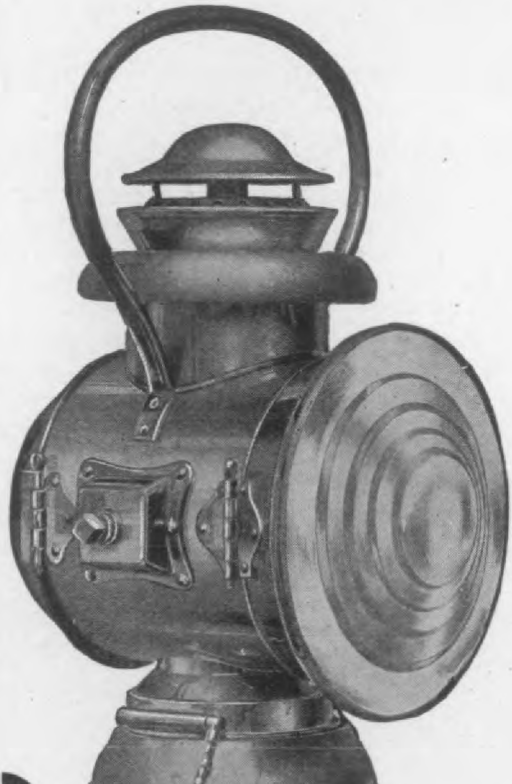
Manufacturers,
Jobbers,
Dealers,
and Users.

Don't place your orders until you have seen our 1908 line.



HAM'S ROCHESTER

Call and let us demonstrate why Ham's Lamps are superior to any other make of lamps on the market.



Our exhibits will be as follows :—

In Section B, Space 139, Grand Central Palace, October 24th to 31st.

In Concert Hall, Madison Square Garden, November 2nd to 9th.

Also at the Chicago Show to be held in December.

If you are interested in the best Automobile Lamps on the market, lamps that are guaranteed to give satisfaction, it will pay you to make us a visit, also write for our new catalogue. Address Dept. D.

C. T. Ham Mfg. Co.

ROCHESTER, N. Y.

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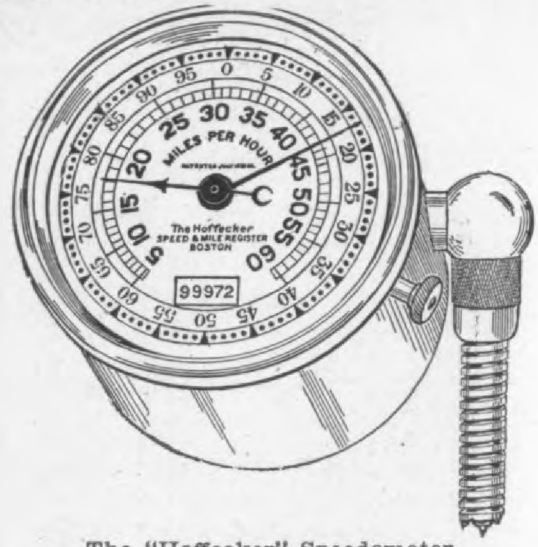
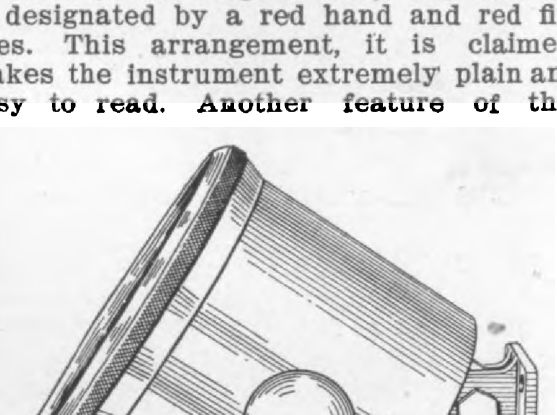
uare, Boston, Mass.



The "Hoffecker" Speedometer.

The speed which is registered up to 60 les per hour, is shown by a black hand d heavy black figures. The trip mileage designated by a red hand and red fig- es. This arrangement, it is claimed, akes the instrument extremely plain and sy to read. Another feature of this



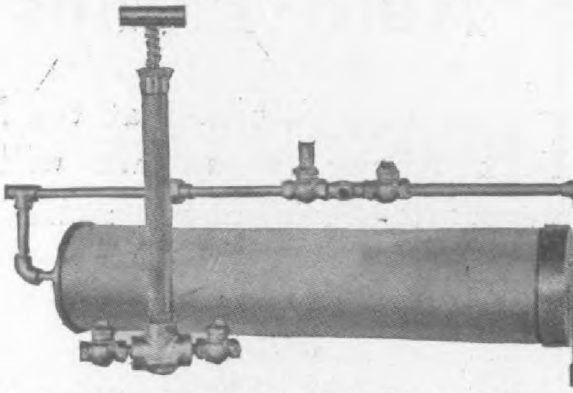
ide View of the 1908 Hoffecker Speedometer.

eedometer is the method employed in nnecting the flexible shaft. A bevel gear used at the instrument, as well as at e wheel connection, a combination ich is claimed to eliminate the annoy- ce of broken shafts arising from curved rved or cramped shaft connections.

Ofeldt Automatic Fuel Feed

F. W. Ofeldt & Sons, Nyack, N. Y., have t brought out a new fuel feeding de-

compresses the spring and the spri gives the pressure to the fuel. T springs are guaranteed not to take a s and are sufficiently strong to give pounds pressure. Provision is made any fuel which leaks by the piston to



The Ofeldt Automatic Fuel Feed. Patent plied for.

turn to the tank, and an adjustable saf device is attacht for by-passing the f when the desired pressure is reached

These devices are made in various si from 4 inches by 18 inches at $30.00 t inches by 36 inches at $60.00. A ha fuel pump accompanies each feed.

By eliminating the hand air pump greatly simplifies the operation of ste cars, and makes starting extremely eas

New Comprest Gas Tank

The Acetylene Specialty Company, 105 Walker stret, New York, is licens by the Commercial Acetylene Company the manufacturing and sale of small g cylinders, known as the Acetone syste

This cylinder is a new departure in t country, and is an exact reproduction the French method. The outfit consi of a set of two-cylinders, put up in cabinet finished box, which box is fitt up with a pressure gage giving the pr sure of gas stored in the cylinder in u also a patented pressure regulating va is located in the box. The box is 18 inch long, 12 inches high, and 6 inches wide

Only one-cylinder at a time is in u and connected to the pressure gage a reducing valve, the other one is kept reserve. When the first cylinder is en tied the second one is put in its pla while the empty one can be sent to be charged, or can be exchanged for a f one. The weight of each cylinder wh charged is about nine pounds.

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AVERY PORTABLE LIGHTING COMPANY
MARCH 27-1906
No. 235
AUTOGAS.
MILWAUKEE, WIS.

Autogas Tanks

AVERY PORTABLE LIGHTING COMPANY
MARCH 27-1906
No. 235
AUTOGAS.
MILWAUKEE, WIS.

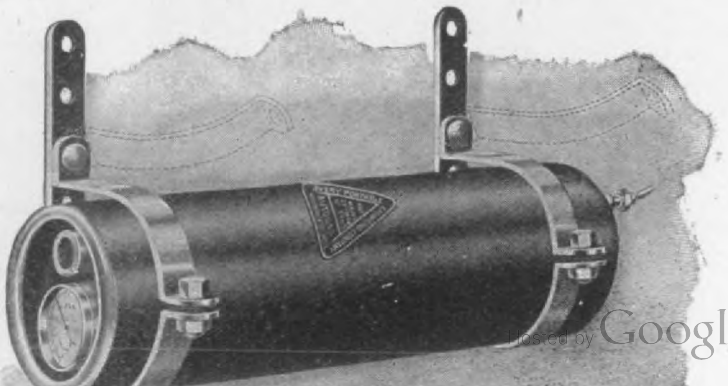
supply 60 cu. ft. of compressed pure gas, which can be burned in any make of gas lamp, increasing its efficiency 30% and giving absolutely unfailing light. Gas turned on or off at will and lasts for months. Our product is superior to any in this line. Write us for prices and list of dealers supplying AUTOGAS.

Avery Portable Lighting Co.

Milwaukee, Wis.

NEW YORK OFFICE: 51 W. 63rd St.
LOS ANGELES BRANCH: 1018 S. Main St. H. W. Bogen, Agency

If you value value of experience, specify Avery AUTOGAS



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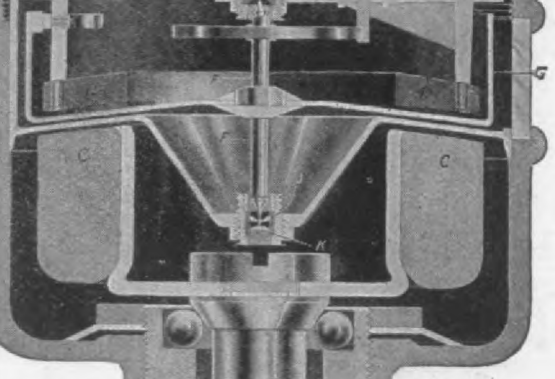
vements add to the efficiency and rability of the 1908 model. This speed icator is the product of Warner Inument Co., Beloit, Wis., and has comed with the speed indicating mechan, an odometer for recording mileage, is usual in this class of instruments.



ctional View 1908 Warner "Auto-Meter"

ne of the chief improvements in the 8 instrument is in the odomoter drive, pecial arrangement being now employed ch prevents derangement of the speed cating mechanism in case the odoer gets out of order.

he Auto-Meter is driven by a flexible ft, and the general construction of this ft is not changed in the 1908 model, it has been improved by having both s fitted with swivel connections and partially covering the shaft with a hand ed leather casing that prevents chafing oth the shaft and car.

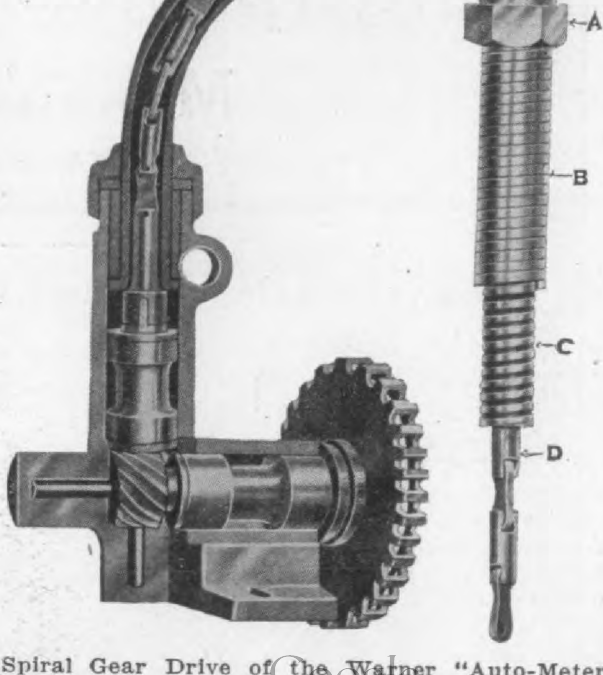
he bearing has also been improved by pping it with spiral hardened gears. s bearing also connects with the shaft neans of a swivel joint so that, regard- of sharp turns of the steering knuckle he car, the shaft always hangs in a and easy position.

he construction of the flexible shaft e is made clear by the accompanying trations, showing a sectional view of shaft and drive and a detailed view he shaft and its sheath. In the latter "A" is the swivel nut; "B," a rercing casing; "C," the flexible brass ng, and "D" the shaft itself. The shaft nade of links, a flat link alternating a round link. The round links are ed at each end to admit the flat links.

all strain. The Warner company clai to have one of these shafts running co tinuously in its factory, and the shaft ha at last report, run the equivalent 160,000 miles without showing sign wear. The swivel nut (A) at the upp end of the brass casing screws into t speed head of the instrument and mak it easy to attach the shaft to the instr ment without twisting the casing.

The Auto-Meter is, we believe, the on speed indicating device operated on t principle of magnetic force, and th feature is patented by the Warner Co pany. In the sectional view herewith t magnet which is the operating force designated by the letter "C." The lin of force flow from the north pole of t magnet thru the aluminum dial "G" the field ring "D" located just above t disc of the dial, then back again to t south pole of the magnet.

The tendency of the magnet when r volving is to rotate the dial in the dire tion of its own revolution. This rotatio of the dial is in proportion to the spe of the magnet. A hairspring acts as drag on the dial, always having a te dency to bring it back to the zero poi The strength of this hairspring increas directly in proportion to angle of displac



Spiral Gear Drive of the Warner "Auto-Meter" and the Warner Flexible Shaft in detail.

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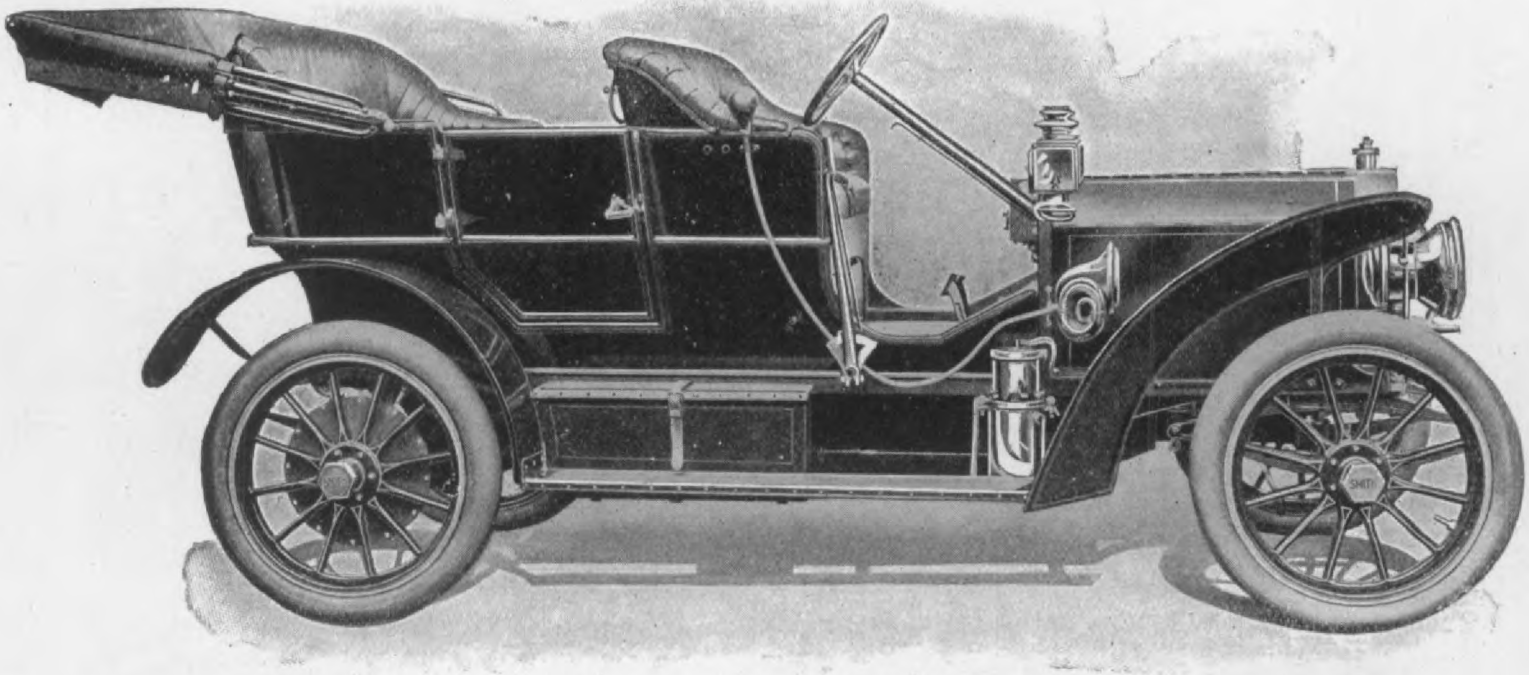
ment or turning of the dial, with the speed



"Isn't it Great?"

The Great Smith four-cylinder touring car for 1908 is just as dependable as ever, it looks just as good, and it behaves just as well. These are the big things that count. Then come the little things, and this is where we have made improvements that have mat ased the general efficiency of our 1908 model.

The addition of roller bearings on the auxiliary shaft makes far less noise and more power. The tonneau door has been made two , and a quadrant has been placed over the steering wheel giving better control of the throttle and spark levers.

e, Including Lamp Equipment - $2,650.00 Price, Including Lamp Equipment and Pantasote Top : $2,

OUR 1908 LITERATURE IS NOW READY

SMITH AUTO COMPANY, *Manufacturers,* **Topeka, Kansas, U. S. A.**

THE SMITH MOTOR CAR CO., Sole Distributors

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The simplicity of the magnetic principle is its most admirable quality. The magnet acts directly upon the indicating dial. There are no intermediaries whatever between the two; nothing to wear out and cause inaccuracy.

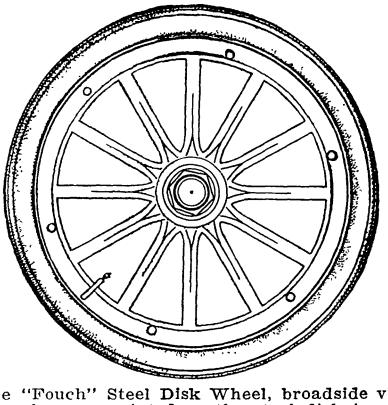
The speed dial of the Auto-Meter rides in genuine sapphire jewel bearings (J and K). The pivot that carries the dial is made of high grade imported steel, and each end of the pivot rides in two jewels, one set of them (J, J) being hole jewels, and the other set (K, K) being cap jewels. The pivot ends are ground and lapt with diamond dust to a perfect fit in the jewels.

The hairspring is more durable than those used in the best made watches, altho it is required to do but a small fraction of what the watch spring must perform, the Auto-Meter hairspring making a complete movement only when the speed indicating dial travels a full revolution, which is only when a speed of 60 or 100 miles per hour is attained, a rare occurrence.

Universal fittings are not furnished with the Warner instrument, as the makers do not believe in the practicability of such fittings. They furnish special fittings for each make of car, which are guaranteed to fit without expert labor being employed. Other features of the Warner Auto-Meter have been fully described in past issues of the Journal, and are retained in the 1908 model. The device has not been altered in general appearance and hence no exterior view is here given.

The "Fouch" Disk Wheel

The Fouch Steel Disk Wheel Co., No. 11 Tribune Building, Minneapolis, Minn., is placing on the market a new automobile wheel of the disk type. This wheel consists of two main parts of sheet steel, each

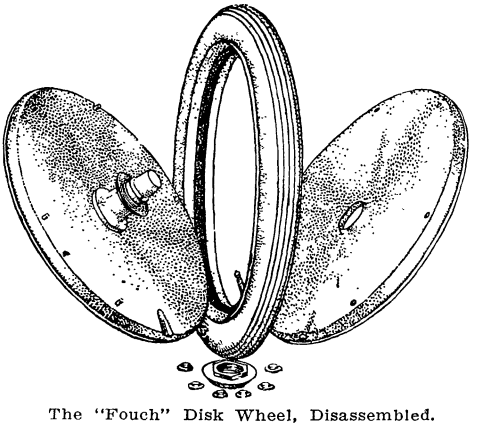


The "Fouch" Steel Disk Wheel, broadside view. The spokes are painted on the steel disk in color to match car, and the intervening spaces are painted aluminum, the effect being same as a spoked wheel.

part comprising practically one-half the wheel, including the spokes and rim, the hub, which is of malleable iron, being separate. The two disk portions are held together by six bolts and nuts at the rim, and one large nut at the hub. The hub is made to fit any axle or bearing.

The spokes are painted to match the car finish and the spaces between the spokes are the color of aluminum, so that at a distance of ten feet the "Fouch" wheel cannot be distinguished from an ordinary wood wheel.

The valve stem protrudes in practically the same manner as on a wood wheel, and there is thus no need for providing a door in the wheel disk to allow access to the valve. The special construction that permits this feature is covered by patent.



The "Fouch" Disk Wheel, Disassembled.

This type of wheel while combining the advantages of lightness and strength is also very easily cleaned, a feature of great practical value. The quickness and ease with which the tire can be removed is another advantage. This is accomplished by removing the nuts above referred to. This allows the disks to separate, thus freeing the tire. The inner tube can be replaced and locked between the disks without danger of pinching the same, and it is claimed that this operation can be performed by an inexperienced person in three minutes.

Ham 1908 Lamps

C. T. Ham Mfg. Co., Rochester, N. Y., announces that it has made no radical changes in its cold blast lamps for 1908, its policy having always been to avoid extremes in design and to stick to the construction principles that have proved satisfactory. The slight changes made in Ham lamps for 1908 are merely a "dressing up" to make them more handsome than they were last year.

In a news note in our October issue we mistakenly stated that A. R. Davis is secretary and general manager of the Garford Company. He fills these offices with the Garford Motor Car Company, of Ohio, not the Garford Company, the latter being the manufacturer and the Garford Motor Car Company, the distributor of the Garford chassis.

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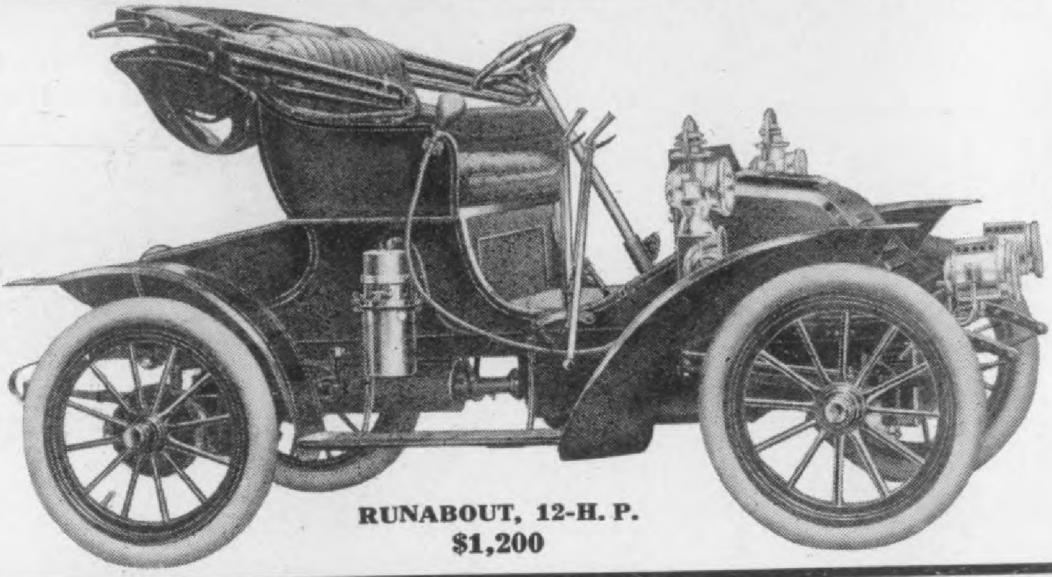
The Autocar

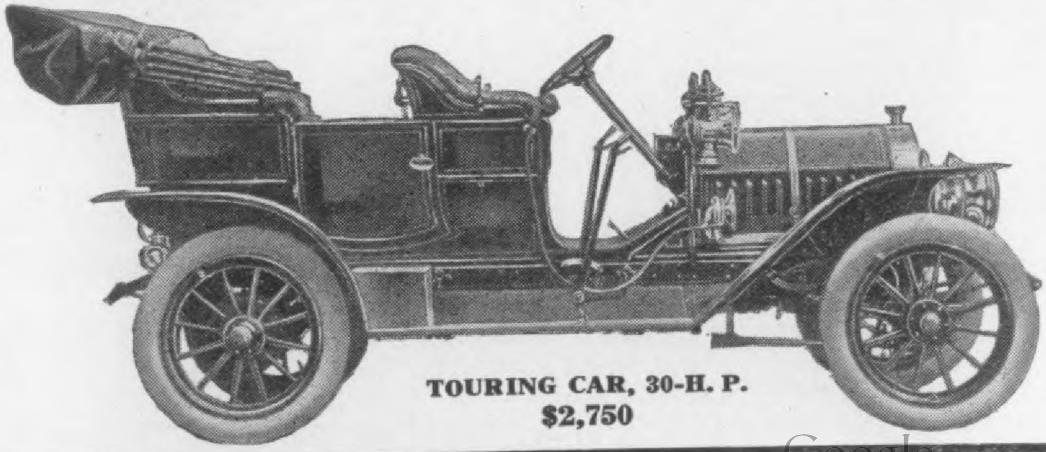


RUNABOUT, 12-H. P.
$1,200

THE 1908 AUTOCAR PRODUCT IS READY FOR IMMEDIATE DELIVERIES

RUNABOUT, Fully Equipped, Lamps and Top,	12 H. P.	$1,200
TOURING CAR, - - - - - -	30 H. P.	$2,750
LIMOUSINE, - - - - - -	30 H. P.	$3,750
ROADSTER, Fully Equipped, - - -	30 H. P.	$2,750

Write For Autocar "Life" All About Autocar Doings, and The 1908 Autocar Book, Illustrated in Colors.



TOURING CAR, 30-H. P.
$2,750

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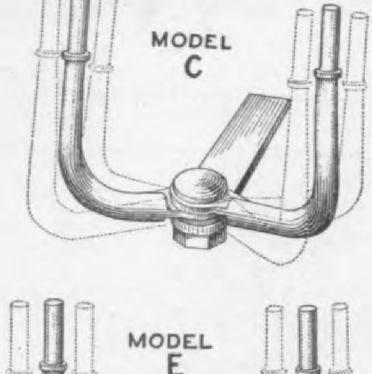
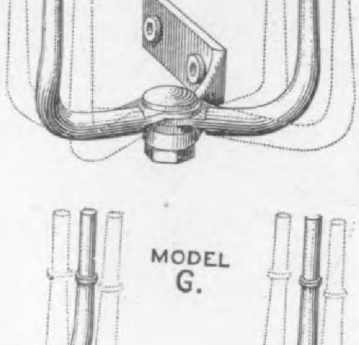
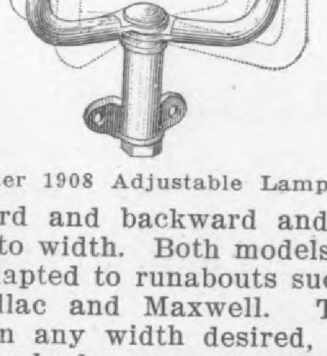
THE AUTOCAR CO. Ardmore, Pa.

d fits on the old style frame fastening. odel B, is the same as model C, with the ception that the arms on model B tilt







Rochester 1908 Adjustable Lamp Brackets.

y forward and backward and are not ustable to width. Both models are par- larly adapted to runabouts such as the d, Cadillac and Maxwell. They are nished in any width desired, and also led properly for any car desired.

odel E, is an adjustable bracket fitted the new Northway frame fastening, ch looks much neater than the model astening, but holds practically the e bracket. Model D is the same in e, but is rigid with the exception of arms which can be tilted.

odel G is a new high grade bracket ch has been adopted by several manu- urers for next year. It is designed to on a prest steel frame with a curved ng horn. This bracket is also furnished rigid pattern as model F. All these kets are furnished either in polished or brass plated.

M. Owen & Co., have moved their York office from 40 West 60th street

the wheel, axle or paint.

The wheel puller is laced to the spo of the wheel by means of a strong co It can be laced to wheels with any num of spokes, and close brake drums will interfere. The puller is built strong, a

The "Weeber" Wheel Puller.

is also useful to remove fly wheels a many other parts to which it is possible lace the device. The finish is in black, a padding is placed wherever the puller liable to injure the paint when applied the wheel. One size is made to fit wheels, and lists at $16.50; but a sp cial size to fit over extra large hubs made to order without extra cost.

Poz's New Water-Proof Cloths fo Automobiling

Wm. M. Poz, 134-136 Spring street, Ne York, sole agent for the well-know "Rubba-silk" is now offering a new fabr known as "Lohengrin," which is compose of all silk in the fabric, and is coate with the best Para gum. It is a mo serviceable fabric, and besides being ric in appearance as well as very strong an durable, it is also water repellant. M Poz is getting out a new cloth for ne spring, called the "Cloth of Gold" in popli and birds-eye weaves, which will be place on the market for spring and summe use. This fabric which is also silk water-proof and water repellant, and run 36 inches wide.

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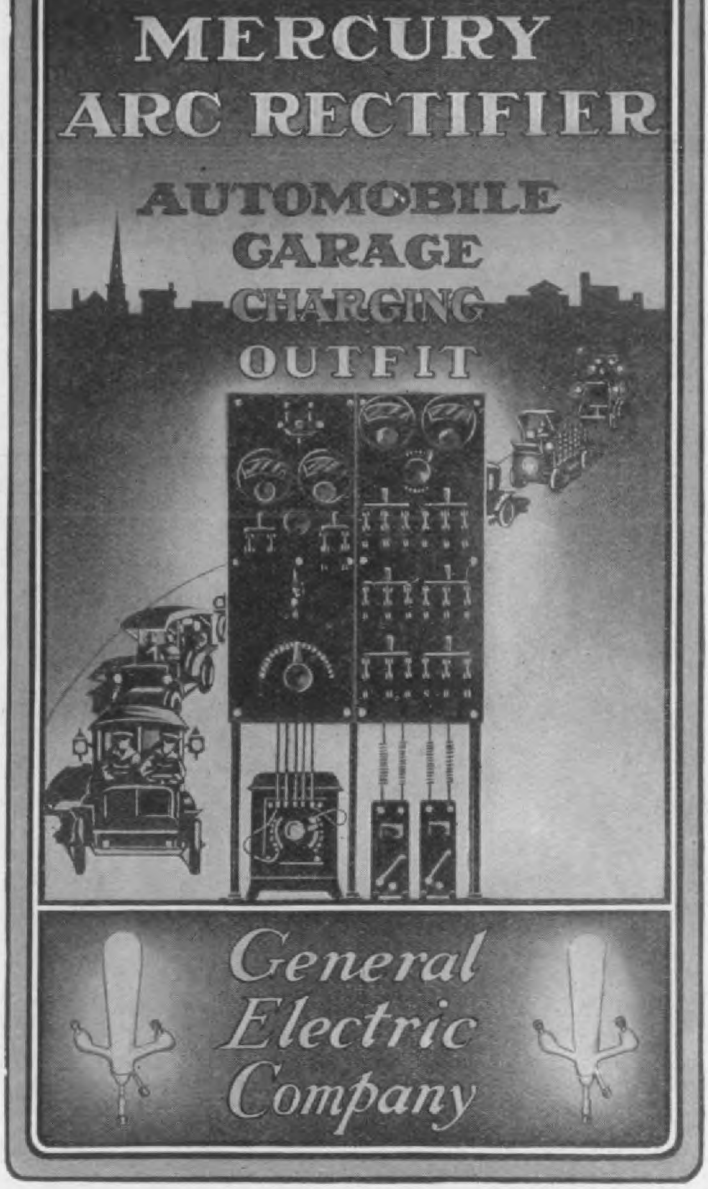

The simplest, most efficient and economical way to charge storage batteries from alternating current. No moving parts—no heavy machinery. Does the work of a 10-kw motor generator at less cost.

Ask for booklet 211—X if interested in this subject.

GENERAL ELECTRIC COMPANY

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Principal Office: Schenectady, N. Y.

and tear on the tire, etc., has just brought out by the Thomas Spring ear Co., Canisteo, N. Y.

spring cushions are made to fit any of car, and can be attached to the axle either on top or underneath. are instant in action, beginning to when the upward motion of the car begins, allowing the spring complete on the downward movement, and no attention when once properly ap-

The "Coil Auto" Spring Cushions.

y are attached to a forged Strap er, bolted on to the frame of the car , near the bottom of the frame, so he eye of the cushion is under that, he pull of the strap is directly up lown. This strap is buckled taut the regular load of the car is in, so he coil of the cushion operates softly nply from the first movement upward d the normal. On cars of great t and for high speed it may be neces- o apply a pair also to the front axle.

---

urity" Robe and Apparel Holder

s receptacle for robes and wearing el en tour is the product of the Im- Brass Manufacturing Company, 247 Jefferson street, Chicago, Ill., who it in various colors with a view of

When opening, the mouth of the bag is pivotably swung to its full telescopic adjustment, and the lugs on the toggle arms becoming engaged bring the center rod to a level with the aperture of the bag.

The "Security" Robe and Apparel Holder.

The frame is then pushed slightly backward, the elongated holes on the back end of the toggle arms allowing this, the lips on these arms becoming engaged under the lugs of the main brackets by which the device is attached to the body of the car, the receptacle is thus rigidly held open, permitting of the proper arrangement of the contents on the center rod.

In closing, the frame-work is pulled slightly forward, thereby disengaging the lugs, and the mouth collapses, pivotably carrying the center rod into and to the back of the lug, allowing the lips to fully close regardless of the quantity of its contents, thus making it absolutely dust-proof. The metal work is handsomely designed, and made of highly finished brass. Brass grasp handles are also fitted to the sides of the holder.

Separately suspended from the top front rail inside the bag are two immense pockets especially provided for carrying each several pairs of gauntlets, veils and toilet articles. On the outside directly under the flap cover is a handsomely finished portmanteau for the safe and convenient arrangement of goggle cases. The flap cover, when closed, covers nearly half the front of the case, and is secured with a padlock. The device protrudes but two and one-half inches from the body, and is constructed so that regardless of the quantity of its contents it always maintains the same symmetrical lines as the body. These holders are made in six styles, listing from $20.00 to $50.00 each.

The Ranier Company's application for the registration of the name "Ranier" as a trade-mark has been refused by the

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MICHELIN

FRANCE ITALY
ENGLAND AMERICA

No more duty—no more trans-Atlantic transportation charges on MICHELIN Tires. Manufacturers can now afford to equip their cars with MICHELINS. What kind of an excuse can be given by the agents of the manufacturer who can, but does not?

The car-buying public KNOWS that MICHELIN Tires are the world's standard—are by far the most durable, serviceable, most economical that money can buy. The car buyers want the BEST—manufacturers can now afford to give it to them.

A large number of America's highest-priced cars will use MICHELIN Tir They will be the standard catalogued equipment of leading cars in other class Agents who sell these cars will find that MICHELIN Tires are a tremendou powerful selling aid. Customers who buy these cars will find MICHELINS a gr saving in tire cost in the course of a year.

The high import duty and heavy transportation charges on MICHELIN Ti have been eliminated through the erection of our great American MICHELIN facto The tires made here are identical with the output of our other factories in Fran England and Italy—the world-famous MICHELINS that have been used on winning cars in all the world's greatest races for the last six years and which ma their victories possible.

Exhibiting at Grand Central Palace, Gallery Space 129.
Exhibiting at Madison Square Garden, Basement Space 209.
Exhibiting at Chicago Coliseum, Annex Spaces 102 and 103.

CLINCHER TYPE.
Round, Flat and Anti-Skid.
American and Millimeter Sizes.

QUICK DETACHABLE TYP
Round and Anti-Skid.
American Sizes only.

All the above can be used on any of the well-known Quick Detachable Rims.

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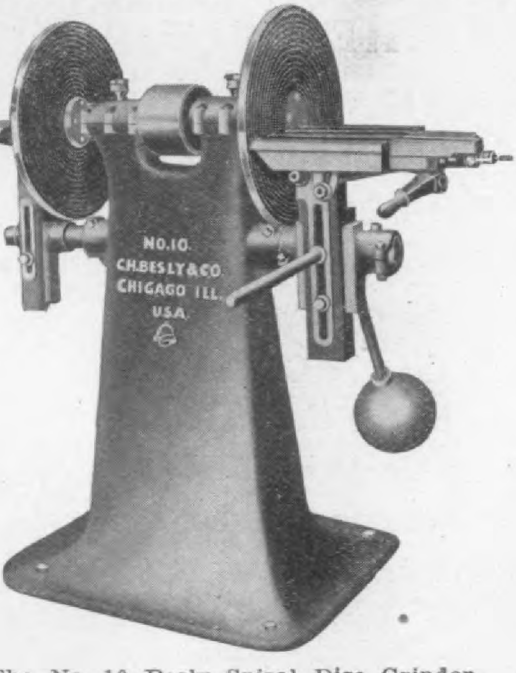
facturing trade by Chas. H. Besly & Chicago, Ill., who state that this er is in successful use at present by 25 of the largest automobile manu-ers in the country.

s grinder is fitted with a geared lever table, as shown in the cut. The feature of the grinder consists of the grooved steel disc, which is fur-d with all Besly grinders. This disc with a spiral groove on its face so when the heavy Helmet spiral circle ery paper is glued or cemented to it,



The No. 10 Besly Spiral Disc Grinder.

glue becomes imbedded into its es, thereby giving a lateral hold of ircles to the disc and preventing its ing, blistering or throwing off, due expansion or contraction of the steel The diameter of the disc is 18 s. The floor space required for this er is 26x31 inches. The weight of achine complete with countershaft is pounds. The price of the grinder lete with counter shaft, floor setting ress two only 18-inch spiral grooved discs and all accessories, including et cement, Helmet oil, glue pot and es, wrenches, etc., and a complete tment of Helmet spiral paper and circles, is $280.00.

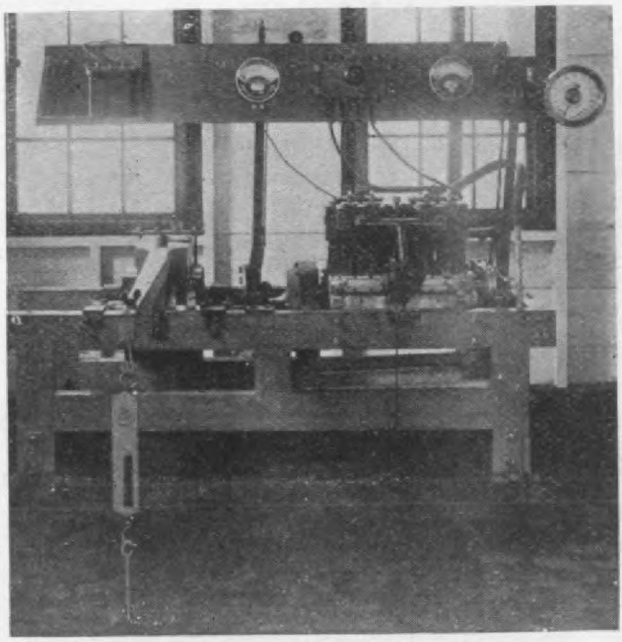
"Cambria" Forged Parts

nbria Drop Forge Works, Johnstown, a., has facilities for producing all of drop forgings, and while most of ork is special, it is in position to furnished specially if desired.

This concern is equipt to turn out anything in the way of special drop forgings from a fraction of an ounce to 100 pounds per piece.

The "Heinze" Testing Table

The accompanying cut shows a gas engine testing table, used by the Heinze Electric Co., Lowell, Mass., well known manufacturers of the Heinze spark coils, timers and magnetos. for the purpose of measuring most accurately the horse-power developed in gas engines by different ignition devices, and in order to perfect their own product to the highest standard of efficiency.



The Heinze Electric Co.'s testing table, built for the purpose of measuring, accurately, the horse-power developed in gas engines by different ignition devices.

It is their object in this line of work to do everything possible which can be done in order to be in a position to absolutely guarantee the merits of their product, and they invite any automobile engineer in the country to visit their plant where they will be pleased to demonstrate to him the efficiency of their product.

John G. Craig, treasurer of Wyckoff-Church & Partridge Automobile Co., died on October 4, at his home in New York City.

The Maxwell-Briscoe Pittsburg Company is the style of the new company recently organized in Pittsburg by the Maxwell-Briscoe interests, which place will be a

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For Pleasure Cars

YOUR 1908 CAR

can just as well be equipped with superior tires as ordinary ones and at no additional expense to you, if you specify and FIRMLY INSIST upon

"Firestone" TIRES

They are a little more expensive to the automobile manufacturer but he will put them on for you if you FIRMLY INSIST.

There is not a tire on the market to-day that is made of as good materials as FIRESTONE Tires. That is one reason why they cost a little more and serve a great deal better.

SPECIFY THEM!!! INSIST UPON THEM!!!

The largest exclusive rubber tire makers in America

Firestone Tire & Rubber Co.

Factory and General Offices . . AKRON, O.

New York Boston Philadelphia Chicago St. Louis Detroit Buffalo Pittsburg

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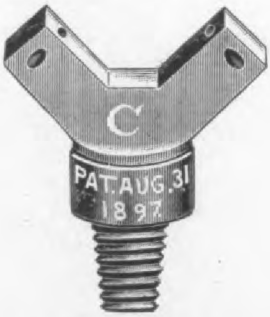
The Crescent Acetylene Burners

Licensed and Manufactured of German Stone

ONE PIECE LAVA BURNERS

CRESCENT



VICTORY

Avoid Substitutes. Note marks on Pillars and Tips. If your Dealer tries to substitute worthless imitations as "Genuine Crescent" or "Just as Good," please advise us. A Crescent Burner that does not give perfect combustion and highest efficiency is scarce, but when found can always be exchanged for a new one.

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Messrs. M. Kirchberger & Co., New Yor

TO PAY

$500 Reward

FOR INFORMATION LEADING TO THE CONVIC
TION OF ANY PERSON GUILTY OF SELLING A

Von Schwarz Burners

BURNERS NOT MANUFACTURED BY MYSELF

AVOID IMITATION

BY CAREFULLY NOTING MARKS ON PILLARS AN
TIPS.

NONE GENUINE WITHOUT THESE MARKS.

VON SCHWARZ BURNERS ARE THE **RECOGNIZE**
STANDARD WHEREVER AUTO GAS LAMPS AR
USED. EVERY BURNER BEARS MY GUARANTEE A
TO ACCURACY AND EFFICIENCY.

FOR SALE EVERYWHERE

J. VON SCHWARZ, Nurember

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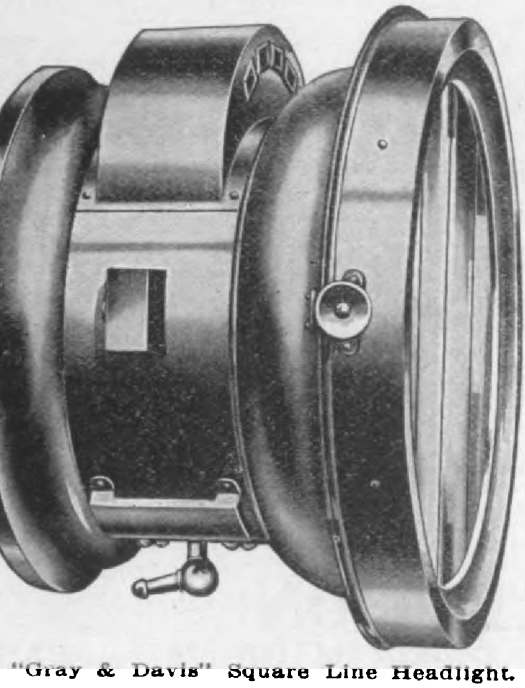
usiness-like and artistic lines of their
e line oil side lamp.

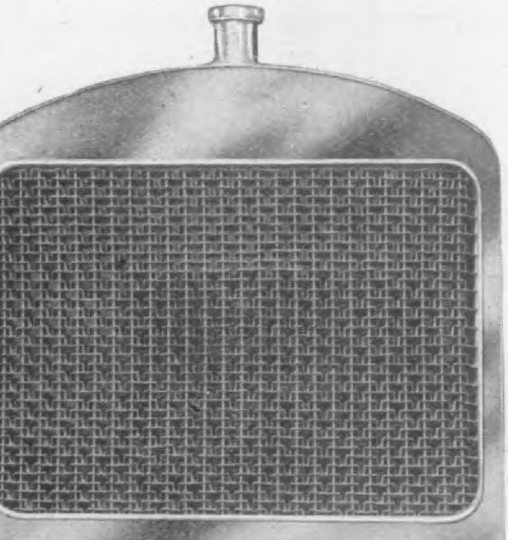


"Gray & Davis" Square Line Headlight.

rticular attention is called to the
e corners made from straight lines.
ventilating holes in the hood are
e, as is also the cocket of the lamp.
ct, every part on it is designed so as
in harmony with their square side
s.

Wright Coolers and Hoods

e Wright Cooler & Hood Mfg. Co.,
45 Michigan avenue, Chicago, Ill.,
known manufacturers of coolers,
, mud guards, etc., are placing their
rs on the market for 1908 with many
vements in their construction.



constructed that it can be easily repaired in case of damage.

The feature of the hood they manufacture lies in the hinge construction, the side hinges being made with a lap which makes the side hinge invisible from the outside, and at the same time makes them water-proof. The center hinge on top is also water-proof, and at the same time forms a truss so that the top of the hood in the center never sags.

"Lunkenheimer" Hand, Oil and Air Pump

The Lunkenheimer Company, of Cincinnati, Ohio, has been making for some time past several types of hand, air and oil pumps for various automobile manufacturers—below are illustrated the types most generally used.

They can be attached on the dash or heel board, or some other convenient place on an automobile. The air pumps are intended for pumping air into the gasoline tank to force gasoline to the carburetor,

New Lunkenheimer Hand Oil and Air Pumps on one bracket, the air pump is on the left, and the oil pump on the right. Each pump is furnished separately if desired.

and can also be connected to an auxiliary oil tank to force oil to the oil chamber of the mechanical lubricator.

The oil pump is usually used for pumping oil into the crank case of an engine, altho it can also be used for filling the oil chamber of a mechanical lubricator from some auxiliary tank.

There has been such a demand for these pumps used together, that the Lunkenheimer Company is also marketing the two pumps mounted on one bracket.

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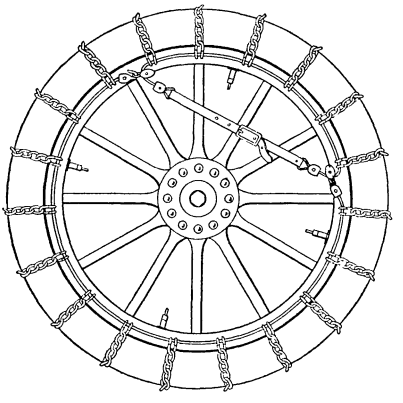
AT LAST! The Perfect Non-Skid

THE NOISELESS S. & W.



INSIDE VIEW OF WHEEL

No More Clashing Chains

No More Broken Fenders or Fender Irons

No More Worry

THE S. & W. NON-SKIDS may be applied and removed without tools and without deflating tires. They are instantly adjusted and stay so until you take them off. The cross chains are attached to flexible steel cables which encircle the wheels at the right points. Tension on chains is regulated by an adjusting strap which secures an even adjustment all around the wheel without binding or chafing the tire. S. & W. Non-Skids will not creep. It is not necessary to have the chains tight to produce the proper result, but it is absolutely necessary not to have them too loose. Our adjustment gives the happy medium and prevents noise and extra wear on cross chains.

PRICES PER PAIR

American Sizes	Metric Sizes	
28 x 3	700 x 85	$10.00
28 x 3½	710 x 90	
30 x 3	750 x 85	$11.00
30 x 3½	760 x 90	
30 x 4	760 x 105	$11.50
30 x 4½	760 x 120	
32 x 3	800 x 85	$12.00
32 x 3½	810 x 90	
32 x 4	815 x 105	$12.50
32 x 4½	820 x 120	

American Sizes	Metric Sizes	
34 x 3	860 x 85	$13.00
34 x 3½	870 x 90	
34 x 4	875 x 105	$14.00
34 x 4½	880 x 120	$15.00
34 x 5	880 x 125	
36 x 4	915 x 105	$16.00
36 x 4½	920 x 120	
36 x 5	920 x 125	

Fisk sizes, 50 cents extra

Remember, this device will positively not injure your tires. Order a pair now —don't wait until after the accident. SAFE, SURE, SILENT.

STORY & WINKEL CO., Woodbury, N. J.

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The "F. R. V." Gearless Differential

F. R. V. Auto Parts Co., 116 Nassau street, New York City, recently entered the field with a line of automobile parts one of which is a gearless differential, which is here illustrated in detail. This compensating device, designed to do away with the bevel and spur gear mechanisms

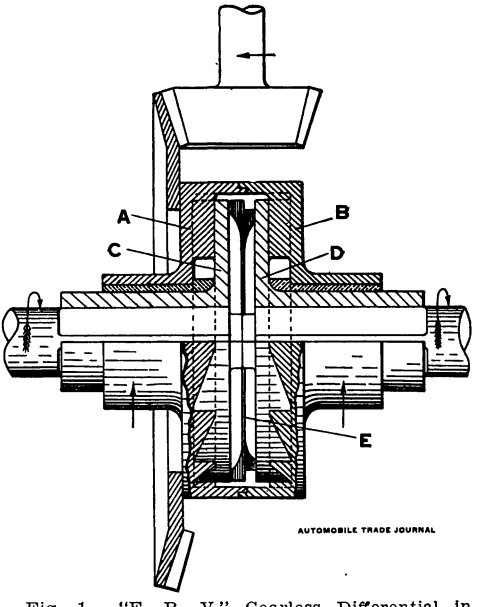

Fig. 1. "F. R. V." Gearless Differential in straight ahead driving position.

now in common use, consists of five parts which are designated in the accompanying drawings by the letters A, B, C, D and E.

A and B are the two halves of the case that carries the bevel gear, and are held

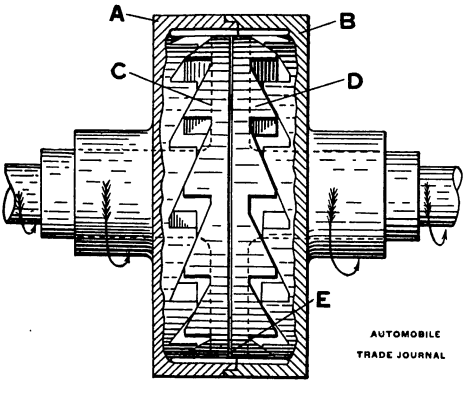

Fig. 2. "F. R. V." Gearless Differential in reverse position.

together by the bolts that fasten the gear to the case. C and D are the two driven members in the case carrying similar ratchets on their faces which engage those on the case. E is a disk spring which serves to cause the members C and D to re-engage the ratchets on the case.

Fig. 1 shows this device, as designed for floating rear axle construction, in the straight ahead driving position. Fig. 2 shows the position of the parts on the reverse drive. Fig. 3 shows its action on rounding a left hand turn, from which it will be seen that the outside wheel is allowed to overrun the other.

An underlying feature of this device is the fact that it compensates for, or equalizes, distances, not resistance, and that the drive is always on the wheel that is holding its traction. This prevents incapacitation of one rear wheel, if the

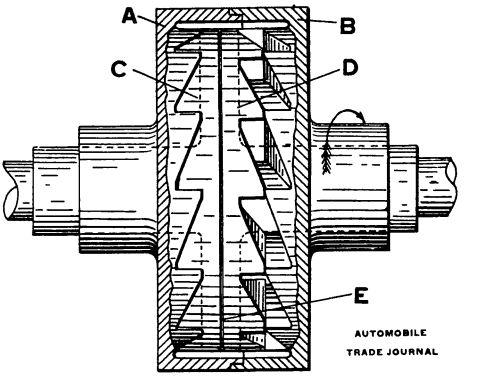

Fig. 3. "F. R. V." Gearless Differential going around a left hand corner.

other is off the road, and, in such a case, instead of the free wheel spinning around at high speed while the other remains inert, the wheel on the road, with the F. R. V. differential, is the driven wheel, and the free wheel has no motion given to it. Hence the car cannot get stuck in a mud hole, or under similar conditions. It is also claimed that it is impossible to impart greater speed to one wheel than to the other, thus eliminating one of the main causes of skidding.

The Pennsylvania Auto Motor Company, of Bryn Mawr, Pa., has closed contracts for the sale of the Pennsylvania car with the following agencies: City Hall Automobile Company, 66 Fulton street, San Francisco, Cal.; The Greer-Robbins Company, 1501-1505 South Main street, Los Angeles, Cal.; The Denver Omnibus & Cab Company, Denver, Col.; The Hamilton Automobile Company, 1251 Michigan avenue, Chicago, Ill.; The Frederick E. Randall Company, 245 Columbus avenue, Boston, Mass.; The Pennsylvania Motor Car Company, Providence, R. I.; The Bellefield Motor Company, 4514-16-18 Henry street, Pittsburg, Pa.; Robert D. Jones, 409 New England Building, Kansas City, Mo.; Rice's Garage, Madison street and North avenue, Baltimore, Md.; West-Stillman Motor Car Company, 153 North Broad street, Philadelphia, and Charles F. Batt, 1378 Bedford avenue, Brooklyn, N. Y.

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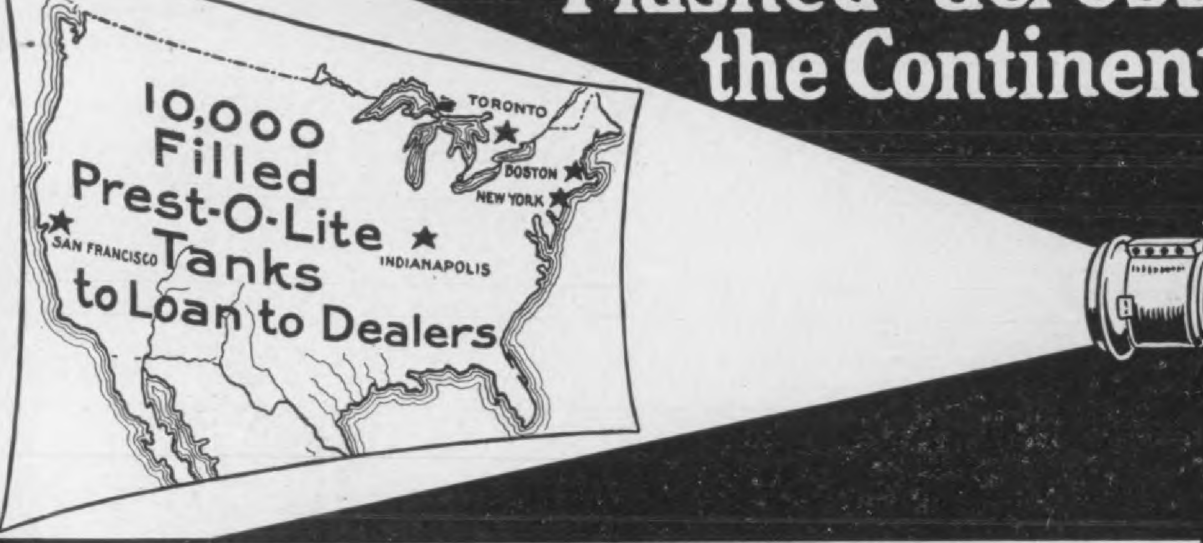

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Filled Tanks
Prest-O-Lite

Ready to Loan to Responsible Dealers

You never have to wait anywhere for Prest-O-Lite

5 main stations, 1200 supply agents

where Prest-O-Lite users can have their Prest-O-Lite Tanks exchanged without a moment's delay. Prest-O-Lite is sure and safe at all times.

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Inc., Fort Wayne, Ind., is a portable el tank for lubricating oil, similar in ral construction to their gasoline el tanks. Its purpose is to enable the ic garage owner to supply all the cars is garage with the various grades of cating oils required in a quick, cleanly convenient manner.

construction, this outfit is composed wo, three or four separate tanks, as be desired, with a total capacity of gallons. These tanks are constructed eavy galvanized steel, riveted and ered and securely fastened in a steel e. The whole is mounted on rubber-, steel, ball-bearing wheels, with two l guide wheels in front. The outfit its contents is perfectly balanced and y moved about from one car to an-.

"Bowser" Portable Wheel Tank for Lubri- Oils.

e oil is discharged by means of self-uring pumps which measure quarts, and half-pints as may be desired. e pumps are fitted with quick action off nozzles, by means of which the of oil may be shut off on the instant, dripping absolutely prevented. The s are also equipt with a lock to pre-tampering and pilfering.

e Bowser portable wheel tank for ine has been improved for this season at it is now provided with a wheel e, securely locking the wheels and ng the tank rigid when drawing gaso- The pump is also equipt with an ar-ement, which prevents its operation the tank is empty, thus obviating

measure pump. This outfit is finished maroon and varnished.

The "Standard" Automobile Jack

The accompanying cut shows the Standard No. 1, single acting automobile jack, manufactured by the Cook's Standard Tool Co., Kalamazoo, Mich.

This jack is similar to their well-known Standard No. 0 jack, except that it is of the single acting type, that is, it lifts only on the down stroke. It is also heavier than their other jack, and is especially

The "Standard" Automobile Jack, No. 1.

adapted for use in touring cars and other heavy automobiles. With this jack accidental dropping of the load is impossible as one of the two panels is always in place. A turn of the eccentric at the side of the frame reverses the movement, upward or downward. The rack bar is made of the finest cast steel.

The Ajax-Grieb Rubber Company, has at present four branches on the coast, two of which were recently opened. In San Francisco Cal., the Ajax interests will be looked after by Hughson & Merton, who will have charge of special branches in Los Angeles, Oakland, and Portland. The other branch opened on the coast is at Seattle, Wash., in charge of Harold W. Stimpson.

An erroneous impression has gotten abroad that The Angier Company, 735 Boylston street, Boston, Mass., and 9-11 Dorrance street, Providence, R. I., has sold out, caused by the sale by Mr. O. M.

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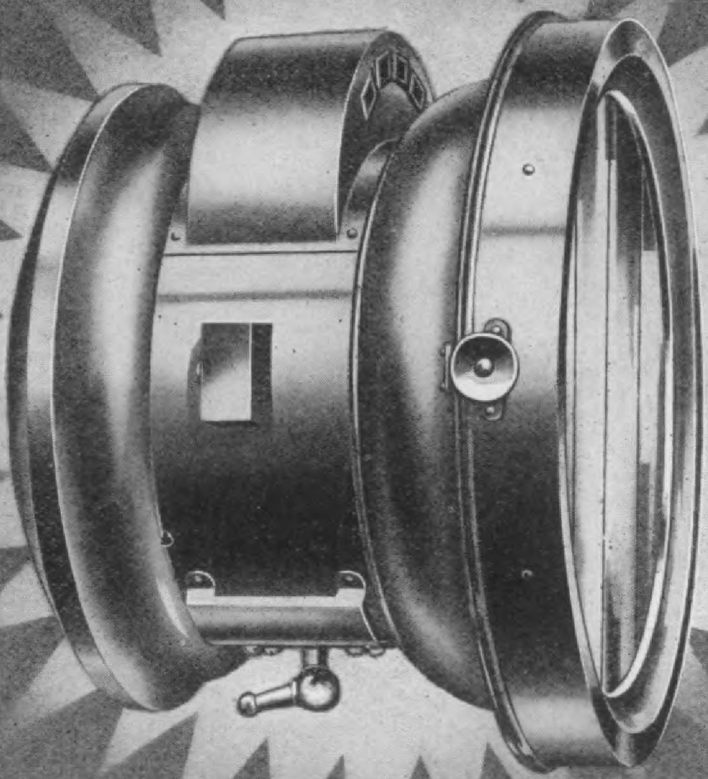
GRAY & DAVIS

1908

LENS MIRROR SEARCHLIGHT



SQUARE OR STRAIGHT LINE EFFECT TO MATCH OIL SIDE LAMPS

Ever since the coming vogue of the square oil side lamp, our designers have been trying to produce a headlight that would match the business-like and artistic lines of the square line oil lamp.

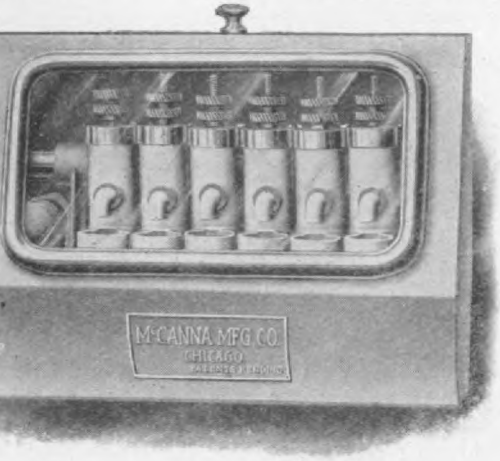
A square headlight was out of the question. We have therefore designed a square line headlight (as looked at from the side, the point from which a car is generally seen.)

Particular attention is called to the square corners made up from straight lines, the ventilating holes in the hood are square also; socket of lamp is square, in fact everything is in harmony, and if you have square side oil lamps, you should have our 1908 headlight and then your lamp equipment will be in perfect harmony and up to date in every particular.

GRAY & DAVIS AMESBURY, MASS

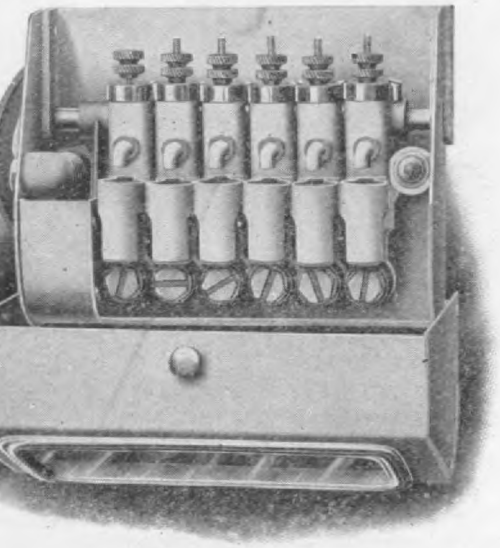
Hosted by Google

Chicago, Ill. The chief advantage d for the McCanna oiler is that nk can be placed at any desired n, and at practically any distance he oiler. This insures the pumping other substance than the pure lubri- oil contained in the tank, also avoid-



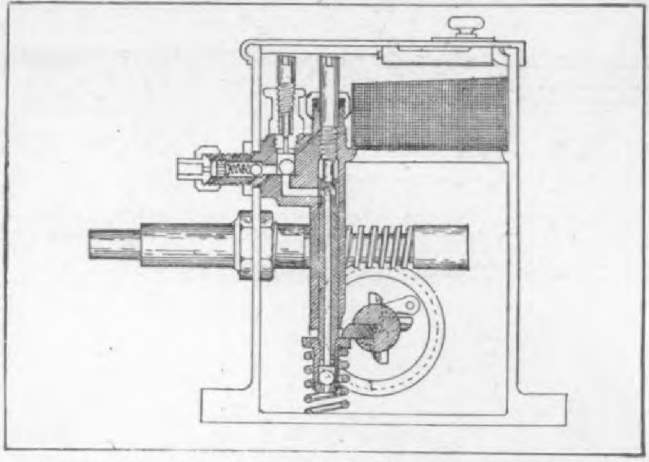
McCanna" Multiple Pump Oiler; Closed.

e possibility of foreign substances introduced into the oil from the g or wearing parts of the lubricator. ler occupies only a small space on sh, and is so constructed that any mp can be operated by hand without ng the adjustment. A single pipe rom the tank to the oiler, and single from pumps, to points to be lubri- The casing of the oiler can be removed. A small electric light is



"McCanna" Multiple Pump Oiler; Open.

ed to show the feed at nights. An k of large capacity can be used, and e placed at any, easily accessible

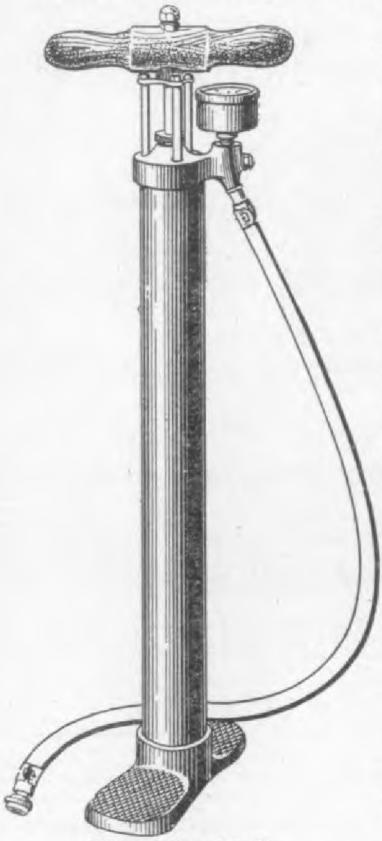


Sectional view of the "McCanna" Runabout Oiler.

motor boats and gas engines in general. This type is made in 1 quart to 3 quart sizes, with 1 to 12 feeds, and ranges in price from $5.00 to $19.75.

The "Stapley" Compound Tire Pump

The Bridgeport Brass Co., Broadway and Murray streets, New York City, has recently placed on the market with a number of improvements the Stapley compound tire pump herewith illustrated.



The "Stapley" Compound Tire Pump

The pump cylinder is made of a seamless brass tube, and is fitted with a pressure gage. One of the features of the pump is an automatic valve-opener, which is a small plunger in the nipple which screws on to the valve in the tire, and automatically opens and closes the valve. A patented method of fastening the pump cylinder to the foot base is used, which makes an absolutely non-leakable joint, obliterating all threading, soldering and set screws.

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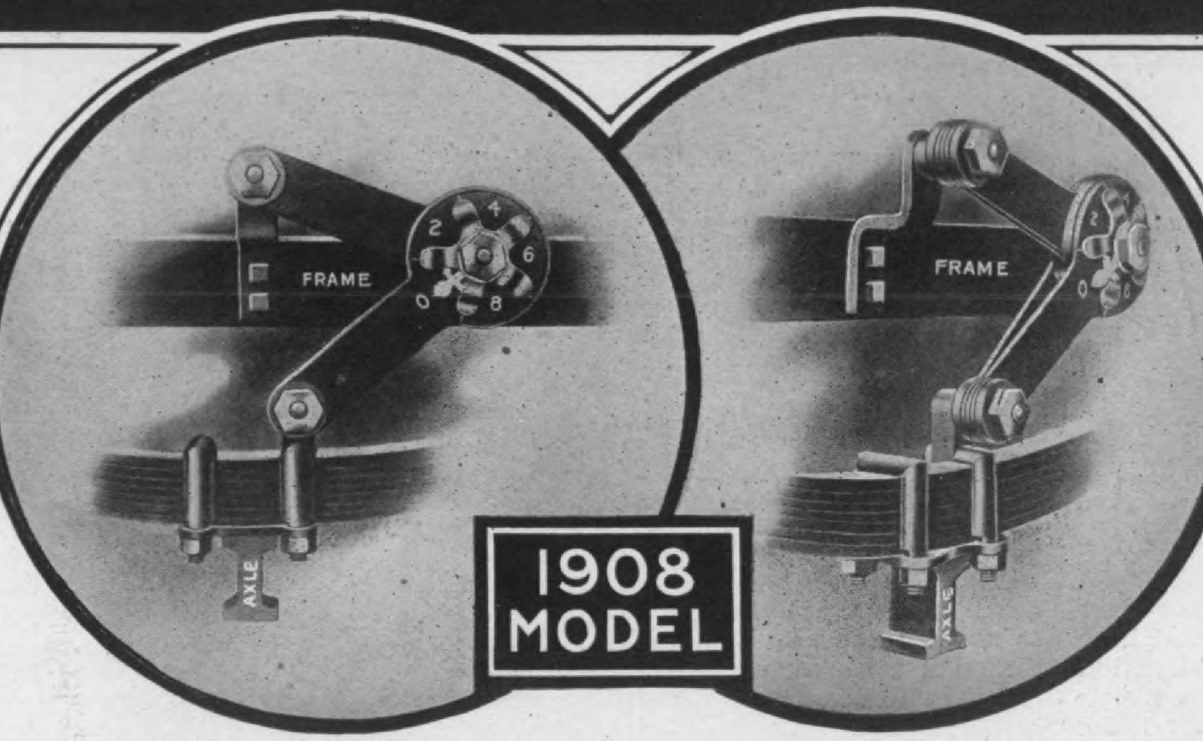
TRUFFAULT HARTFORD SHOCK ABSORBER



Renders Real Rough Road Relief

The proper control of the springs secured only by the use of the Truffault-Hartford Shock Absorber, prevents excessive oscillation, insures less wear and tear, longer life of tires, greater speed and genuine comfort.

In the 1908 model we believe that we have practically obtained shock absorber perfection.

The friction discs are encased and telescope in cup-shaped brass discs, making practically a perfect bearing surface which gives the highest possible efficiency.

The end pieces have been simplified, making the application of the Shock Absorbers to the car a very easy matter.

A distinctly new feature has been added consisting of a regulating dial with indicator making it possible for even a novice to obtain a perfect and uniform adjustment to suit the exact requirements of the car as measured in terms of its gross weight and easily secure the maximum benefit.

The Truffault-Hartford is the only shock absorber manufactured with a regulating dial. It is automatically lubricated, absolutely dust and water proof, interchangeable, practically indestructible and fully guaranteed.

The superior and individual qualities of this pioneer of shock absorbers is best demonstrated by the fact that it is in use exclusively as part of the regular equipment of seventeen prominent automobile manufacturers.

WRITE FOR RUFF ROAD BOOKLET DEPT. B.

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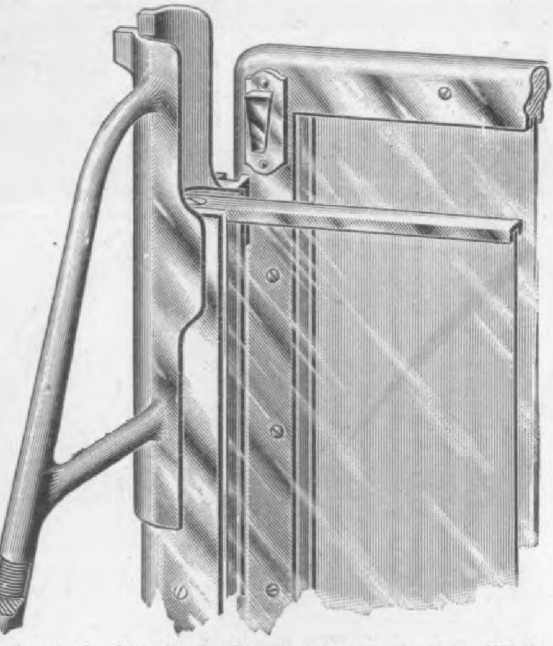
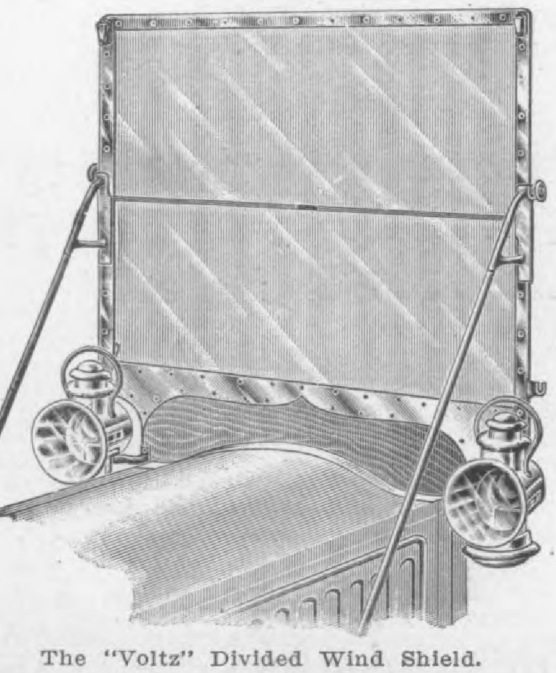
HARTFORD-SUSPENSION CO.

ned the Voltz has recently been brought .



nlarged detailed front view of the "Voltz" ided Wind Shield, showing the dove-tail block holding the top glass when it is down; also receiving slot for holding one of the sides he top frame when up.

'his shield is extremely simple in opera- n. There are no top rods required, the struction employing a socket which ex- ds above the lower half, only two and alf inches in connection with the stud the top half, which has a thumb screw it, and holds the top half perfectly firm; dove tail top holding the top glass fectly firm when it is down.



The "Voltz" Divided Wind Shield.

issue, page 344. The improved case herewith shown. It is manufactured the Kimball Tire Case Co., 167 Broadwa Council Bluffs, Ia.

One of the first disadvantages exp ienced with this tire case was the breaki of the hooks, which was, however, rem died by using a special steel and a certa

The "Kimball" Steel Tire Case.

process of pressing the same. The plat have also been made somewhat lighte In the old type case it was found th after a few months, the joints next to t tread plate were wearing too fast. This w remedied by designing an entirely differe shaped joint. The prices of the improv case are the same as formerly, rangi from $13.25 for 26x3-inch, to $33.75 for 36x4½-inch tire. Single clasps list fro 50c to $1.00 .

Mr. James F. Fairman has recent joined the forces of the N. Y. & N. Lubricant Company, 14 Church stre New York City. Mr. Fairman is w known in automobile circles.

The Auto Car Equipment Company,

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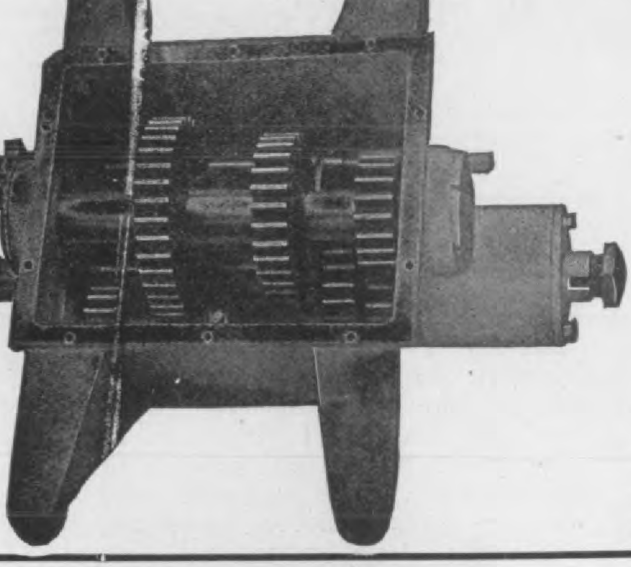
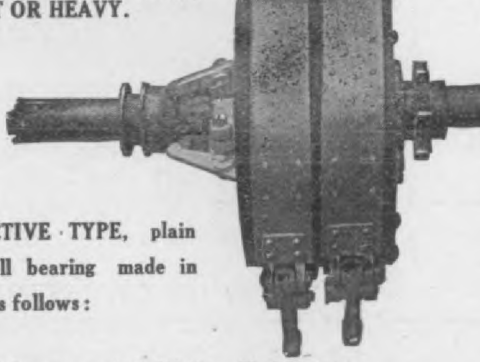


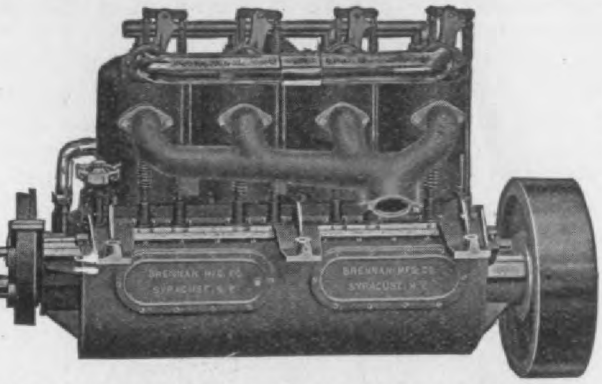
LIGHT OR HEAVY.



SELECTIVE TYPE, plain or ball bearing made in sizes as follows:

No. 3 for cars up to 2,000 lbs. Shaft Drive.
No. 3½ for any size motor up to and including fou cylinder 5x5.
No. 4 shaft drive and double chain drive, built for th largest types of pleasure and commercial cars and trucks.
PLANETARY GEARS. Made in two sizes: No. 3, for ca up to 1850 lbs. No. 4, for the heaviest types of pleasure an commercial cars. Let us quote you prices.

SYRACUSE GEAR CO., - Syracuse, N. Y



Brennan Standard Motors

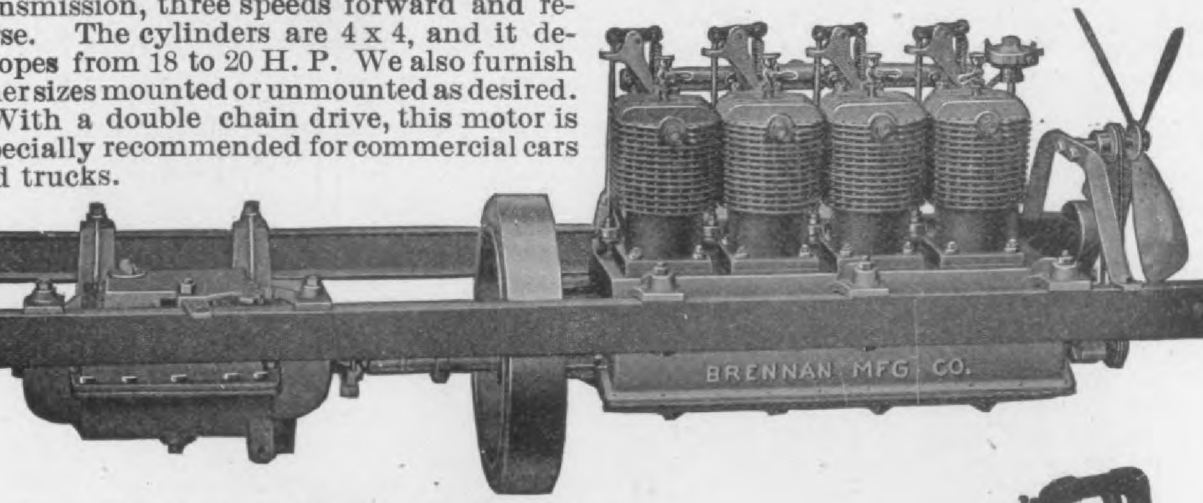
will make your new cars 50% more efficien
They have stood the test of time.

Built in the following six sizes:

4 x 4, 20 H. P.	$4\frac{9}{16}$ x 5, 28 H.
5 x 5, 32-38 H. P.	5½ x 6, 45 to H.
6 x 6, 60 H. P.	7 x 6, 90 H.

These motors are also furnished with tran mission gears,—the motors being mount on sub-frame.

UR CYLINDER AIR-COOLED MOTOR
Mounted on sub-frame, with sliding gear nsmission, three speeds forward and re-se. The cylinders are 4 x 4, and it de-opes from 18 to 20 H. P. We also furnish ler sizes mounted or unmounted as desired. With a double chain drive, this motor is ecially recommended for commercial cars l trucks.



Two-Cylinder Horizontal Motors

with transmission gear, for either chain or shaft drive.

For All Standard Makes of Cars

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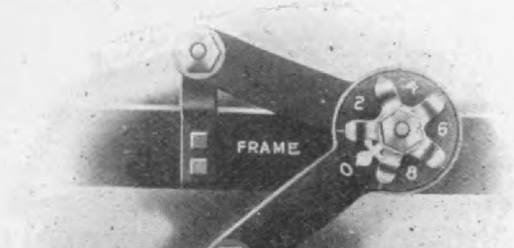
ufactured by the Hartford Suspension 67 Vestry street, New York City, has n placed on the market for the 1908 son, with some radical changes, the t important being the adoption of a ulating dial with an indicator to gage correct friction on all four absorbers. he dial shows the number at which shock absorber should be set for every dred pounds of weight. The device, n the exception of the friction disks is structed of the best quality crucible l and high grade brass thruout.



1908 Truffault-Hartford Shock Absorber.

hree arms of equal dimensions, two ed and one acting as a middle arm, firmly joined together by a center l, making the shock absorber inter- ngeable and reversible. The middle working on a hardened steel bushing, s a straight up and down movement, ch prevents shearing and side swaying. he inner surfaces of the lower or out- arms come in direct contact with cup ped brass disks, firmly secured to, in- d of against the friction washers as tofore, while on each side of the center the friction disks are attached. Over e a brass cup is fitted into which the ion and brass disks telescope. This is of the improvements of the 1908 model. brass disks encasing the friction hers make practically a perfect bearing ace, giving higher efficiency and the s telescoping, together with the brass make the new construction, it is ned, absolutely dirt and water-proof, contained and indestructible.

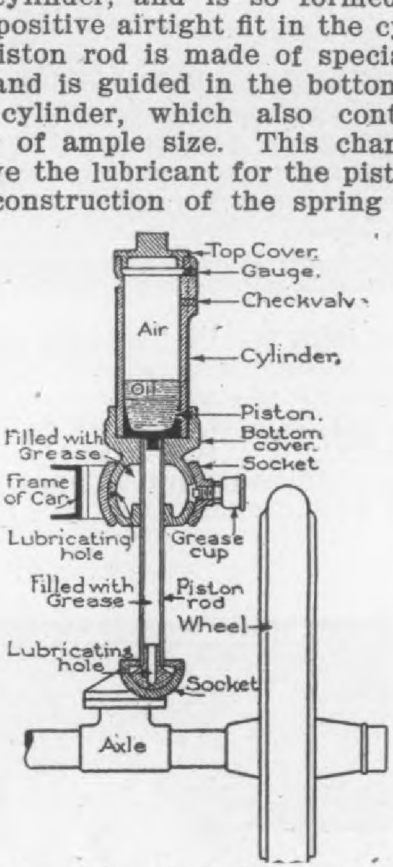
he same frictional material used in 1907 model is retained. Its construc- is such, that it lubricates automat- y, sufficient lubricant extracting itself when the heat from the action of the

The "Hydro" Pneumatic Spring

This is a new device recently brougl out by the Trojan Hydro-Pneumatic Whe Co., Watervliet, N. Y., for absorbing shock and road bumps, etc. The manufacture claim that by the use of the Hydro sprin steel springs and pneumatic tires will b eliminated.

The spring, which is herewith shown i section, consists of three principal part viz:, first, the cylinder, connected to th frame by a ball joint; second, the sel adjusting piston connected thru the pisto rod and the ball joint to the axle; an third, the main part or "oil air," a cus ioning medium located between the pisto and cylinder. The cylinder is made cast iron and is tested up to 700 pound per square inch, bored and ground t calibre. The piston is made of a specia steel stamping and ground to a perfect f in the cylinder, and is so formed as t make a positive airtight fit in the cylinde

The piston rod is made of special ste tubing, and is guided in the bottom cove of the cylinder, which also contains chamber of ample size. This chamber to receive the lubricant for the piston ro In the construction of the spring specia



Sectional view of the "Hydro" Pneumatic Sprin

care is taken to prevent any recoil wha ever. Each spring is equipt with a gag and a valve, the required pressure bein obtained by the use of an ordinary ti pump.

E. R. Thomas, of Buffalo, N. Y., a nounces that he will retire permanent

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Studebaker

No "show off" or "stunt" cars, but high class reliable cars built to satisfy the buyer on good roads or bad roads, up hill, or on the level

THREE GASOLINE MODELS

Studebaker "30," Model A, Touring Car, Speed Car, Limousine, Landaulet
Studebaker "30," Model H, Touring Car, Speed Car, Limousine, Landaulet
Studebaker "40," Model B, Touring Car, Speed Car, Limousine, Landaulet

The design of our Model B, an entirely new car, while adapted to the requirements of a larger car, follows very closely that of our smaller cars, Models A and H.

The chassis of all three cars is the Garford, which perhaps more than any other represents the highest attainment of the *orthodox* art. This conviction led to our financial interest in the Garford Company.

Our qualification as experts in the design and equipment of a body is unquestioned. As the manufacture of automobiles is becoming more and more standardized the design of body and the equipment now receives from the prospective buyer more attention than heretofore and the discriminating purchaser should not fail to visit our exhibit at the

Licensed Show in Madison Square Garden, New York, November 2-9, Space 31.
Combined Show in Coliseum, Chicago, Space 3-B.

STUDEBAKER AUTOMOBILE CO., South Bend, Ind.

MEMBER ASSOCIATION LICENSED AUTOMOBILE MANUFACTURERS

General Office, CLEVELAND, OHIO.

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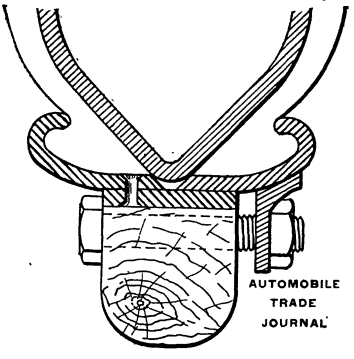
The "Parker" Rim

The Parker rim is the invention of Mr. Orrel A. Parker, and is marketed by the Newmastic Tire Company, of Sixty-eighth street and Broadway, N. Y. City, makers of the well-known "Newmastic" Tire Filling.

The Parker rim consists of the regular standard one-piece clincher rim cut in two equal halves by the removal of about a quarter of an inch of the centre of the rim all the way round. The inside half of the rim is securely fastened to a plain band about the felloe of the wheel, and the other half may be taken off and on, and slides back and forth on the same band. This outer half is held in place by a stiff ring or flange, and is drawn towards the other half by bolts thru the felloe of the wheel. The chief difference between this rim and



Sectional View of the "Parker" Rim.

other rims is that it can be adjusted so that the edges of the clinch may be brought slightly together or left slightly wider than the standard clincher measurements. This change is so very slight that it has no effect on the wear of the tire, still it is sufficient to bring about the desired degree of inflation.

The inner tube used in connection with tire shoes on this rim is another recently introduced product of the Newmastic Co. The inner tube is made especially for use filled with "Newmastic," and is made so as to exactly fit inside the clincher casing, the variations in the size of the casings or any slight stretching is taken up by the adjustment in the rim. As the nuts are tightened the base of the tire is deprest, or in other words, the edges are drawn more closely together and the casing is drawn more tightly about the inner-tube. The tighter the casing is drawn the greater the degree of inflation and vice versa.

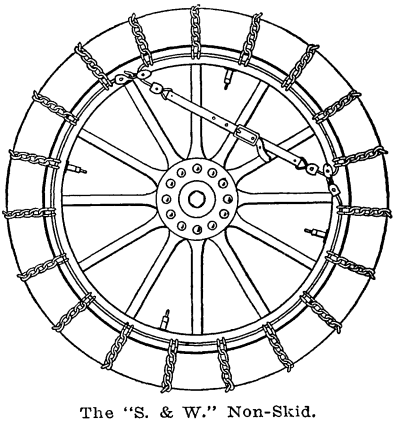
The new Parker rim will enable any user of tires to equip his machine with Newmastic without shipping his wheels to the factory, and he will also be able to inflate his tires to any desired degree, simply by using a wrench.

The Auto-Light manufactured by the Rolfe-Fox Co., of Rochester, N. Y., has recently been reduced in price from $20.00 to $12.50.

The "S. & W." Non-Skid

A new anti-skid has recently been brought out by the Story & Winkel Company, of Woodbury, N. J., known as the S. & W. Non-Skid.

Beside its non-skidding qualities it is claimed to be absolutely noiseless, easily attached, and to stay adjusted until taken off. The adjustment is novel, and is capable of wide range. The cross chains are attached to flexible steel cables which encircle the wheel, and are regulated by an adjusting strap which draws together the



The "S. & W." Non-Skid.

auxiliary cable running thru two small equalizing pulleys and secures an even adjustment all around the wheel. The device is strongly made of best materials, and the cross chains are interchangeable. The non-skids roll in a small package and are packed in a neat canvas bag when not in use.

The non-skids are made in all sizes for tires, from 28x3 to 36x5 inches. The 28x3 inch size lists at $10.00 per pair, and the 36x5 inch at $16.00 per pair.

New "Krome" Leather Fan Belt

The Chicago Rawhide Mfg. Co., 75-77 Ohio street. Chicago, Ill., is manufacturing a new V-shaped fan belt for use on grooved pulleys made of its Krome leather. This is a new mineral tanned leather which by many tests has proven to be extremely strong fibred and most durable. The belt is copper rivetted, and as it does not depend upon cement or glue, it is impossible for the belt to come apart, no matter how much oil or water may come in contact with it. The leather is also practically heat- and oil-proof, and it is claimed will not deteriorate and lose its strength.

The directors of the Peerless Motor Car Company, met on Monday, September 30, and declared its annual cash dividend of ten per cent.

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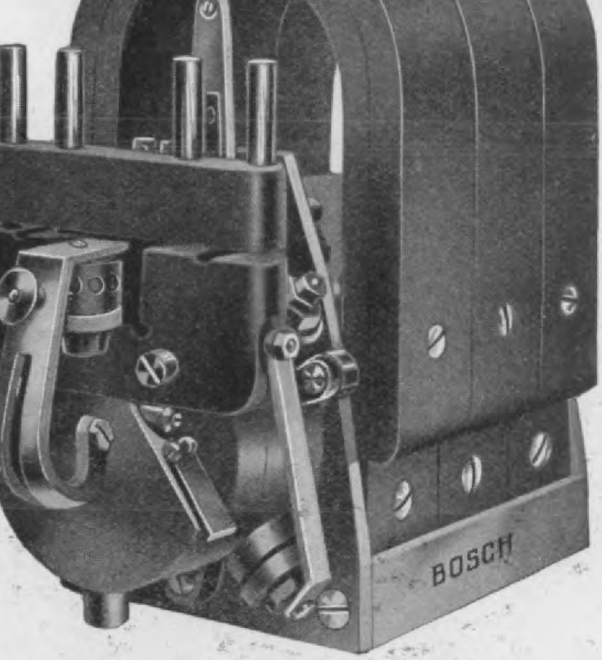

PERFORMANCE OF

THE BOSCH MAGNETO

has well earned its reputation as the *Standard* Ignition System.

In the Morris Park Twenty-Four Hour Race with unerring reliability the Bosch ignition system, with which the THREE WINNING CARS (Fiat 1, Studebaker 2, Itala 3,) were equipped, again demonstrated beyond a doubt that the Bosch is the best ignition system in the World.

At the Brescia Races the Bosch Magneto was part equipment on twelve out of fourteen cars that finished the course under the rules of the German Emperor's Race, limiting cylinder area to eight litres,—won by Minovia on an Isotta Fraschini, averaging 64.7 miles per hour. Under the Grand Prix Rules Bosch Magnetos were part equipment on

ALL WINNING CARS

Race won by Cagno on an Itala, averaging 65.3 miles per hour. From Pekin to Paris; the first five cars in the Vanderbilt Cup Race; the Winners of the Emperor's Prize, Germany; the Grand Prix, France; Tourists' Trophy, England; Targa Florio, Italy; Ardennes (A. F. C.) Belgium; first Twenty-four hour Race at Morris Park won by Renault—were equipped with the Bosch Magneto.

These severe and extreme tests prove the reliability of the Bosch Magneto. On Touring Cars a perfect system of ignition is just as positively demanded. The Bosch Magneto is essential for use on motor vehicles of every class where gasolene engines are the method of propulsion.

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Dealers' Department

A Well Appointed Establishment

/e herewith give an illustration of an rior view of the salesroom of the Auto- t and Motor Supply Co. in their new rters, Nos. 506 and 508 N. Broad street, ladelphia. This is one of the most con-

lesroom of the Autolight and Motor Supply ently arranged and finely appointed srooms we have had the pleasure of ing, finished thruout in Flemish oak. Paul P. Rippien, General Manager of Company, is the designer. The Auto- t Co. has quickly taken a place in front rank of jobbers of automobile ac- ories. Altho it has been in business than a year it is already reckoned as of the leaders in its line, and carries ry large and varied line of the highest e of goods.

New Elmwood Garage

ne new fireproof garage of the Crane omobile and Garage Company, known he Elmwood Garage, located at Potter ue, near Elmwood avenue, Providence, , was completed about October 1. The building has an area of over 11,000 e feet, with a floor space of 20 shop, which has a floor space of 20 square feet. Aside and away from the two buildings is situated a cement gasoli supply house, made in the ground, with capacity of 800 gallons. The company a partnership composed of Howard Cra and William J. Braitsch.

Company, 506-8 North Broad Street, Philadelph

Retail Notes

American Auto Company, of Cedar Falls, Ia has opened a garage at 214-216 Fourth avenu that place.

Arrowhead garage of San Bernardino, Cal., r opened the middle of August, under the manag ment of Merwin & Drummond.

Fort Smith Automobile & Supply Co. now o cupies new quarters on North Twelfth stree Fort Smith, Ark.

Gooden Motor Car Company, 541-543 Ellico street, will handle the Winton cars in Buffal N. Y.

Gooderham, George H., of Boston, Mass., r cently purchased the property at 26 and 30 Te aulay street, where he will erect a five-stor garage.

Goyet, P., of Woodland, Cal., has opened a automobile renting establishment, where he ha installed a number of machines for public hire.

Hutchinson, R. M., has opened a new firepro garage at 1839 North New Jersey street, Indian apolis, Ind., with a capacity of fifty automobile

Hiatt, O. W., of Wichita, has opened an au tomobile salesroom in Coffeyville, Kan.

Joe Chene Auto Garage has opened at 108 Jefferson avenue, Detroit, Mich., with Mr. Che

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Commercial Motor Car Department

Experience of Commercial Motor Car Users

More Speed and Costs Less to Maintain Than Horses

In giving their experience with the commercial motor car the Warfield-Pratt Howell Co., of Des Moines, Ia., state that they have run their truck for two years with complete success, and that it costs them 50 cents per day for charging the storage battery, for which amount it would be impossible to maintain a team.

The truck is a 5-ton Electric, built by the Vehicle Equipment Co., of Long Island, and is used to carry goods from their warehouse to the freight depots. They make about nine trips per day with a 5-ton load, which is about twice the number of trips that can be made with a team and wagon. They employ an operator at $48.00 per month. The car cost $4500. They claim it is the initial, not maintenance cost, which makes the motor car less used. No trouble was had in securing a driver, their plan being to take a raw man at the outset, who they state had stayed with it, and takes pride in handling the car in a practical and economical way.

They store their own car. Besides making more speed with the motor car they also have the advantage of securing an unloading door at freight houses. So far they have not had a great deal of expense, mainly tire expense, but not of very costly proportion.

Using Motor Car On Stage Line

Mr. J. F. Royer, of Greenwood Forks, B. C., has recently placed in service a 70 H. P. gasoline passenger 'bus, which he is using in connection with two 4-horse stages.

The motor car carries an average weight of one ton, and makes an average of 120 miles per day. One trip is made daily; 8 calls per trip. Gasoline costs $4.50 per day and lubricating oil $5.00 per month. The average monthly cost for repair work and repair parts is figured at $25.00. Mr. Royer considers it more advantageous to store his own car. He pays the operator $125.00 per month.

The average weight of load carried by the horse coach is 1 ton. One trip is made daily; 4 calls per trip; covering a radius of 60 to 85 miles. The horses cost $150.00 each; harness, $30.00 per set, and coaches $450.00 each. Twenty-four horses are constantly kept in service, costing $1.00 per day each for care and feed; $3.00 each per month for shoeing; while about $5.00 monthly is spent for repairs to vehicles. The driver is paid $100 per month, and $45.00 each for two helpers. Mr. Royer figures that the motor car depreciates $250.00; the horse $20.00, and each coach $50.00 per year, respectively.

Comparing the two summaries we find that the advantages of the motor car are not alone speed and mileage, but at the same time the daily up-keep of the car is less than half that of the horse equipment. Mr. Royer states that the horse-drawn vehicle possesses no advantages over the motor car. Lighter and less complicated chassis construction for the number of passengers carried is the most needed improvement in motor cars as suggested by his experience.

Can Make More Deliveries With Motor Car

John Simmons & Co., 110 Centre street, New York City, are using a 5-ton electric truck and two gasoline trucks of 3-ton and 1½-ton carrying capacity, respectively. The electric truck was built by the Vehicle Equipment Co., and the gasoline trucks are Knox Waterless cars built by the Knox Automobile Co.

An average of 25 miles daily is made by the 5- and 3-ton truck, and about 35 miles per day by the 1½-ton truck. They use these cars for hauling iron pipe, etc. Two trips are made daily, with from 15 to 20 calls per trip; covering New York City and outskirts. About 540 gallons of gasoline are used each month for the two Knox cars. They pay their drivers $16.00 per week.

One great advantage for this concern in the use of motor cars is the fact that big loads of heavy pipe can be transported to the points where the pipe is to be used, and only one loading and one unloading is necessary. Without the motor car it would be necessary to haul the pipes to a freight station, load it on cars, and then have it loaded, hauled by horses and unloaded again at the other end. The immense saving of time and labor is obvious.

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One Motor Truck Replaces Two Four-Horse Teams

A 3-ton, 30 horse-power, Reliance gasoline truck is now being operated by Mr. W. L. Wheeler, proprietor of the Wheeler Transfer Line, of Menasha, Wis., for hauling groceries, baggage, papers, household goods, and nearly every class of merchandise. It takes the place of two four-horse teams previously employed.

With the truck Mr. Wheeler hauls an average load of about 3 tons, and makes an average of 50 miles daily, which includes two trips to Oshkosh, a distance of 16 miles—10 to 20 calls each trip. The car cost $2800. The average cost of gasoline and lubricating oil per day is $2.00. Repair work and repair parts cost him $10.00 per month. One operator is employed, who receives $50.00 per month. Mr. Wheeler stores his own car. He figures that his car depreciates 20 per cent. in value in a year.

With the two four-horse teams an average of 3 tons were carried, and a distance of about 25 miles covered per day. The wagons cost $400 each, horses $250 each, harness $60.00 per set. The average monthly cost of care and feed of each horse was $25.00; shoeing of each horse $1.50, and cost of repairs to each vehicle $5.00. The drivers were paid $40.00 per month. The depreciation in value in a year of a horse and truck was figured at 20 per cent. each.

Mr. Wheeler suggests that tires should be improved in order to make the motor car more successful, and states that the greatest advantage of the motor car over the horse-drawn vehicle is in making long hauls, but says that the horse is best on muddy roads.

New York's Fifth Avenue Gasoline Motor 'Bus Line

New York's old horse omnibus service on Fifth avenue has been succeeded by a line of new gasoline motor omnibuses. The New York Transportation Company has placed in service fifteen machines, the first being put in operation about the middle of July, and the others as soon as they were assembled. The machines are of the double-deck type. The chasses were received from the London agents of the De Dion factory in France, in a "knocked down" condition, and reassembled in New York. The bodies were built by Fulton & Walker Company, Philadelphia. The seating capacity is thirty-four, sixteen inside and eighteen on the upper deck. The 'buses at present are being operated from Washington Square to Fifteenth street only, a distance of a little over four miles. The regular schedule allows one hour for the round trip, including a stop of five minutes at each end. The average running speed is ten miles per hour. The fare charged is 10 cents.

More Speed, Heavier Loads and Less Expense with Motor Car

The Findlay Auto Transit Company, 1321-2 North Main street, Findlay, O., recently purchased a Reliance Model I, 28-30 horse-power gasoline truck, and has been running the same principally to and from Riverside Park in that city, carrying passengers. The car carries a load of about 3000 pounds each trip, and has proved entirely satisfactory. The distance to and from the Park is about 1½ miles each way. The car is run from 12 to 18 hours per day, a round trip being made about every 30 minutes. The car cost $3110. and is figured to depreciate from $300 to $500 in value in a year. The maintenance expenses are as follows: Gasoline, $77.00 per month; lubricating oil, $5.00; repair work and repair parts, $8.00; storage, $3.00; operator's wages, $80.00, and helper's wages, $60 per month.

The most needed improvement in motor cars suggested by their experience is to produce solid tires that will stay on the wheel. They claim that their tires give out. No trouble has been experienced in securing a suitable driver.

Mining Companies Use Automobiles For Inspection Work

The Coal & Iron Company, of Pottsville, Pa., is furnishing its mine bosses with automobiles for use on their tours of inspection, to take the place of mule power.

The Reading officials have already placed an order with the Maxwell-Briscoe Motor Company for two of their 16 H. P. cars converted into runabouts, and will very likely order 16 more if these prove satisfactory.

At the present time some of the subordinate officials travel from colliery to colliery by mule power, and the time wasted in traveling is so considerable that they have come to regard the automobile as a necessary adjunct to their business.

Ropkins & Co., of Hartford, Conn., have used a Knox truck for the past three years, and report that the same has given good satisfaction. They say it is not cheaper than horses, altho it has the advantage of covering more mileage, quicker delivery, and is a great advertiser.

Biglow-Kennard Co., Boston, Mass., use one of the General Vehicle Co.'s 10 H. P. electric trucks for handling clocks, bronzes, silverware, etc., work previously done by a 2-horse team and a light, covered wagon. The truck covers a mileage of 25 daily in a radius of 15 miles. The average load is 500 pounds. The cost for battery charging is $30 per month, for storage $20, and for operator $60.

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ffers for 1908 a three ton spiral gear rive truck, the peculiar feature being the hange from bevel gears to the spiral gear rive. This is the Hindley drive manu-

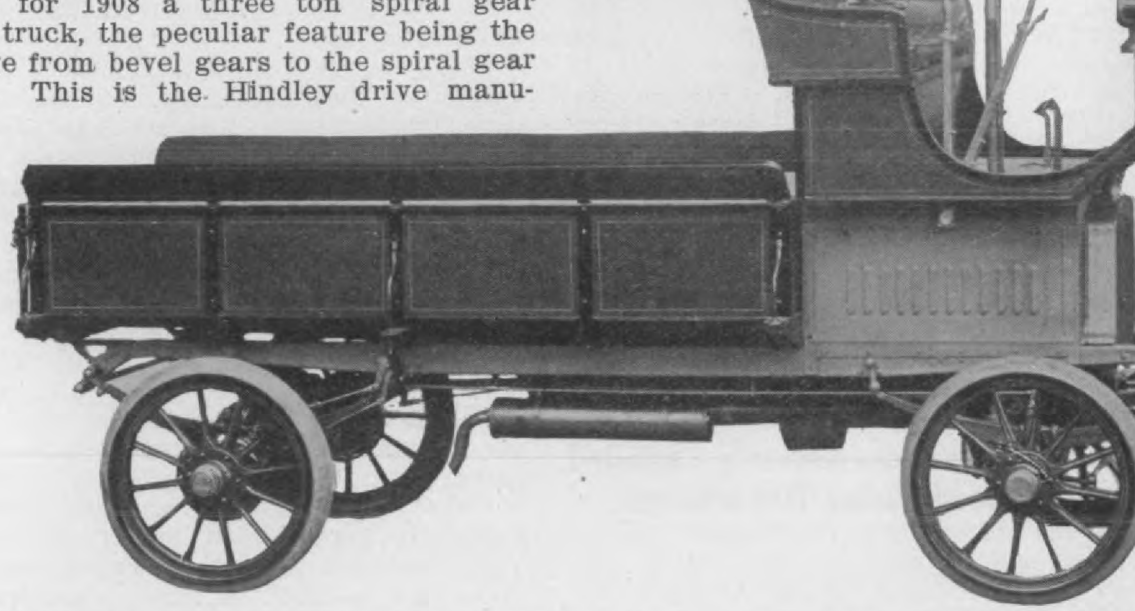
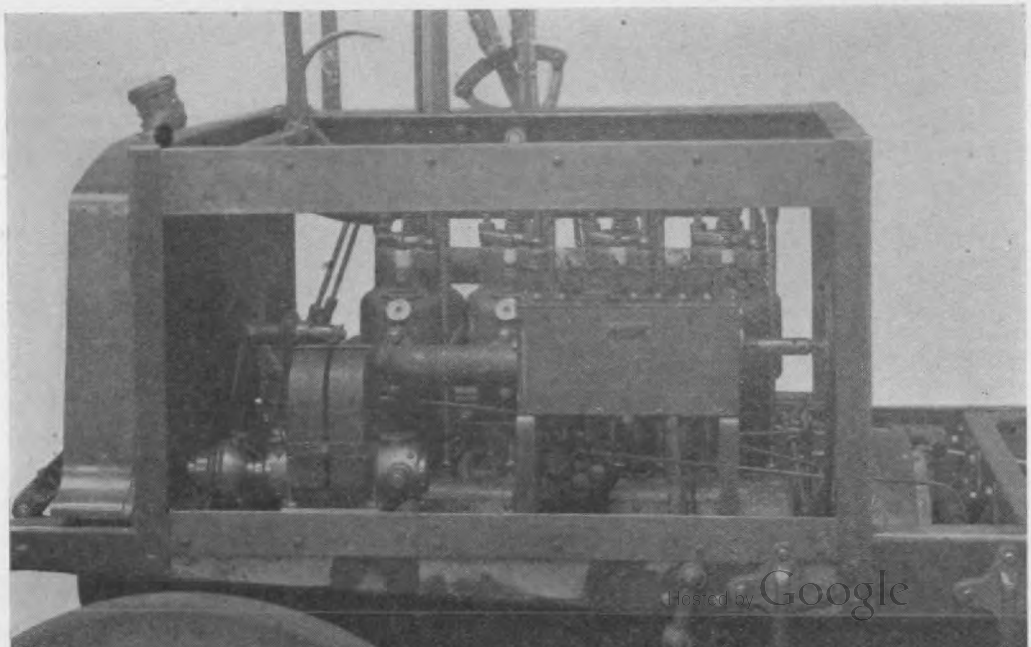


Fig. 1. Mitchell 1908, 3000 pounds, paying load truck. Wheel base, 110 inches; gage, inches; solid tires, 32x3½ inches in rear, and 32x3 inches front; motor, 4, 4x4-inch cylinders, same as runabout motors, 20 B. H. P. at 950 R. P. M. Sliding gear, three forward speeds an reverse, with spiral gear, hardened steel, for both the worm and the worm-gear, to divided r axles. Weight of truck, standard platform, 2300 pounds, as shown in illustration. Price, $2 including three oil lamps, top and tools.

actured by Morse, Williams and Co., of Philadelphia, and was described in the January, 1907 Journal, page 232. This gear is rather more costly than the bevel gear, but, it is claimed, has very marked advantages in the way of silence, smoothness of action and impossibility of breakage, which are expected to bring the spiral gear into very large use. The Mitchell company has been pushed to fill its orders for passenger cars, and has therefore made no effort to extend the sale of its tr up to the present time. It is believed the large increase of 1908 factory capa will permit the company to exploit spiral gear drive, in which their engin have unbounded confidence.

The same four-cylinder motor is as on the 1908 runabout, described in other part of this issue. This moto shown in the accompanying illustra A magneto is used and located at the of the engine. A stiff frame work



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king both sides of the engine accessible. e cylinders, cast separately, are 4-inch e and 4-inch stroke, and show 20 H. P. the brake at 950 R. P. M. The change ed is by sliding gear, giving three eds forward and one reverse. Both worm and worm-gear are hardened el. The truck has a standard platform a capacity of 3,000 pounds paying d. Any form of body will be fitted to er. The car weighs with the standard y shown 2300 pounds, and sells for 00, including three oil lamps, top and ls.

tor Patrol Wagon Recently Installed by Hartford Police Department

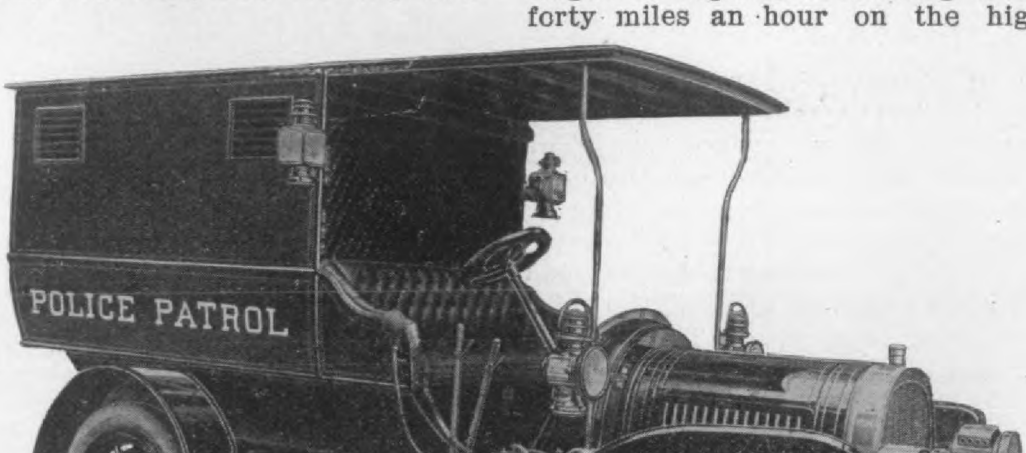
$3500 Motor Patrol Wagon has re- tly been delivered to the Police De- tment of Hartford, Conn., by its build- Pope Manufacturing Co., Hartford, n. The machine is built along the s of a speedy, safe, easy running tour- car.

dome light is controlled from the left s at the rear end.

One of the valuable features of t wagon is that the seats fold up, and case of necessity, the vehicle could used as an ambulance. The seats can taken entirely out of the way when a bulance accommodations are desire The cushions and all other upholsteri can be removed easily for the purpose cleaning them, a desirable sanitary a rangement.

There is a box on each running boar One contains the batteries for ignitio purposes and for the lamps; the oth contains a complete outfit of tools for u pairs.

Under the wagon is a brass gong, te inches in diameter, which is operated a foot pedal. An auto horn, in the usu place, will assist the bell. Hartford Du lop five-inch tires equipt with the Mid ley Tread are used on each wheel. Th wagon is capable of making from six forty miles an hour on the high gea



Motor Patrol Wagon built by the Pope Mfg. Co., of Hartford, Conn., for the use of the Po- Department of that city.

is a gasoline wagon of 30 H. P., with ndard Pope-Hartford engine. The el base is 112 inches. The body is shed in Brewster green, with gold pes. The weight is 3,500 pounds, with s full, ready for the road. The body of laminated wood, and will comfort- seat eight persons. Entrance is had n the rear, up steps heavily covered

There is a large expanding brake on eac rear wheel, and a large external clampin brake on the driving shaft at the rear the transmission.

The Pennsylvania Railroad Company will so establish a line of automobiles in Chicago, Il with the object of improving the carriage a cab service from its station.

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National Association Automobile Manufacturers
INCORPORATED

Association Licensed Automobile Manufacturers

American Motor Car Manufacturers Association

Motor and Accessories Manufacturers Association
INCORPORATED

The members of *all of them* will participate in the

Seventh Annual Show at Chicago

November 30—December 7, 1907

For the third consecutive season it will be THE ONLY NATIONAL SHOW. In conjunction with it will be held the

First Annual Exhibition of Commercial Cars

Three Buildings—Coliseum, First Regiment Armory and Seventh Regiment Armory

The usual courtesies will be extended to visiting dealers from 10 a. m. until noon daily.

S. A. MILES, Mgr., New Southern Hotel, Chicago

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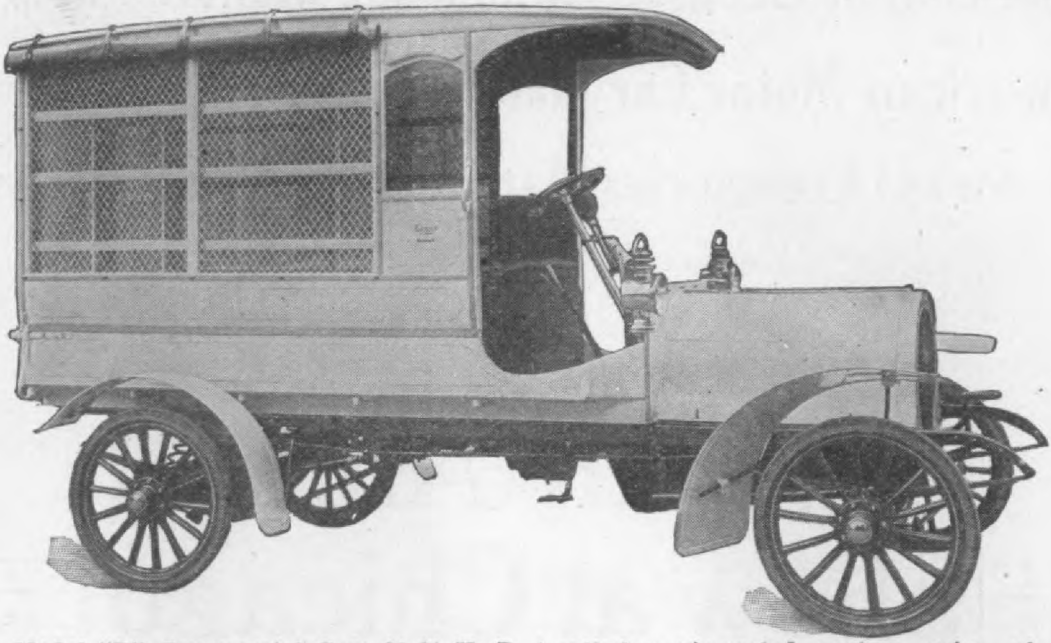
owered by a 4-cylinder, air-cooled, 20-
H. P. gasoline motor, and is here illus-
ed with a screen side body. Solid

speed gear gives two forward spee
changes and one reverse. All gears ar
idle on the high gear. Drive is by sha

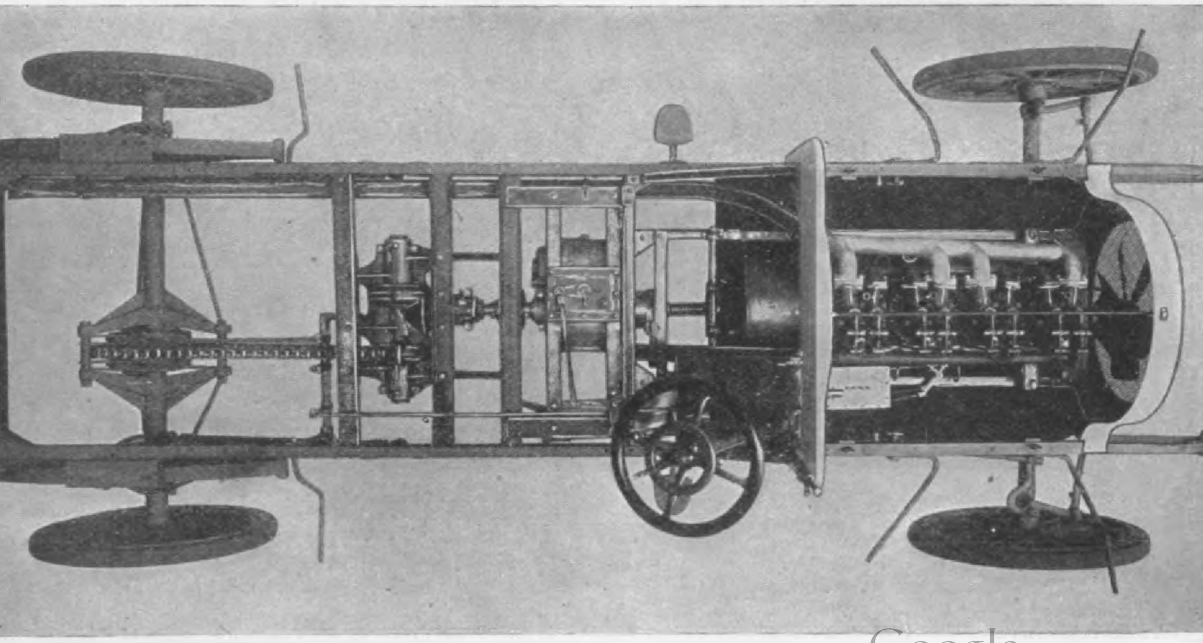


Logan Model "R" Commercial Car; 20-24 H. P. 4-cylinder air-cooled motor; price of chassis
ne, $1700; with screen side, solid panel or passenger type body, $1800.

el and passenger type bodies can also
furnished at the same price—$1800.
chassis alone lists at $1700.
his car carries 1500 pounds useful load
weighs 1800 pounds empty. The
ne is of prest steel, and is amply re-
rced. Semi-elliptic springs are used
ront and full-elliptics in the rear. Four-
-spoke wheels, 32 inches in diameter

to the counter-shaft and by single chai
from the counter-shaft to the rear axl
The counter-shaft is mounted on larg
roller bearings with liberal end thrusts.

The chain is so placed as to give a d
rect pull and the radius rods are so co
structed that the ends meet the center
of both driving-shaft and rear axle, hol
ing them rigid and equi-distant, thus kee



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Logan Model "R" Chassis; sold separately at $1700, or with body at $1800.

RELIANCE MOTOR TRUCKS

For Freight and Passenger Service.

¶ In successful operation under all kinds of conditions and service in all parts of the country.

¶ Sold under a liberal guarantee by a company in position to back it up.

¶ Manufactured complete in our own large plant which is devoted exclusively to the production of high grade commercial vehicles.

¶ Not an evolution from a pleasure vehicle, but designed strictly along truck lines with a surplus of strength in all parts.

¶ One man and a **Reliance Truck** will do the work of three men and three horse-drawn trucks, with an operating cost about equal to one horse-drawn truck. (We give you data and names of users to prove it.)

Write for catalog, and state kind of service in which you use trucks.
Some good territory open for responsible agents.

RELIANCE MOTOR CAR CO.

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ween the clutch and the gear-set and ween the latter and the counter-shaft. matter of accessibility and ease of air, so essential in any commercial icle, have come in for special atten-, and any part may be readily re-ed. Every part of the mechanism is roly encased, and the driver is pro-ted by a wind-shield and storm-cur-s. All operating levers are inside the so that the curtains once in place, d not be interfered with.

he equipment includes side lamps, tail p, horn and tools.

New Lindsay Commercial Car Axle

. J. Lindsay, of Indianapolis, Ind., has ly brought out a new spur or herring-e Gear Direct Drive Axle for light de-ry wagons and trucks.

ll the gears in this construction can adjusted. The shaft sections carry the l and receive the end thrust of the eels, and are provided with end thrust rings. Wear of these bearings is en up by the spindle nut at the end of hub. All the gearing runs in oil. The el pinion on the drive shaft is made a sleeve that is feathered on to the e shaft and can be adjusted forward back on the shaft. It engages with a el gear that is carried by the square rmediate shaft, and can be adjusted mesh with the bevel pinion. The in-hediate shaft carries a spur or herring-

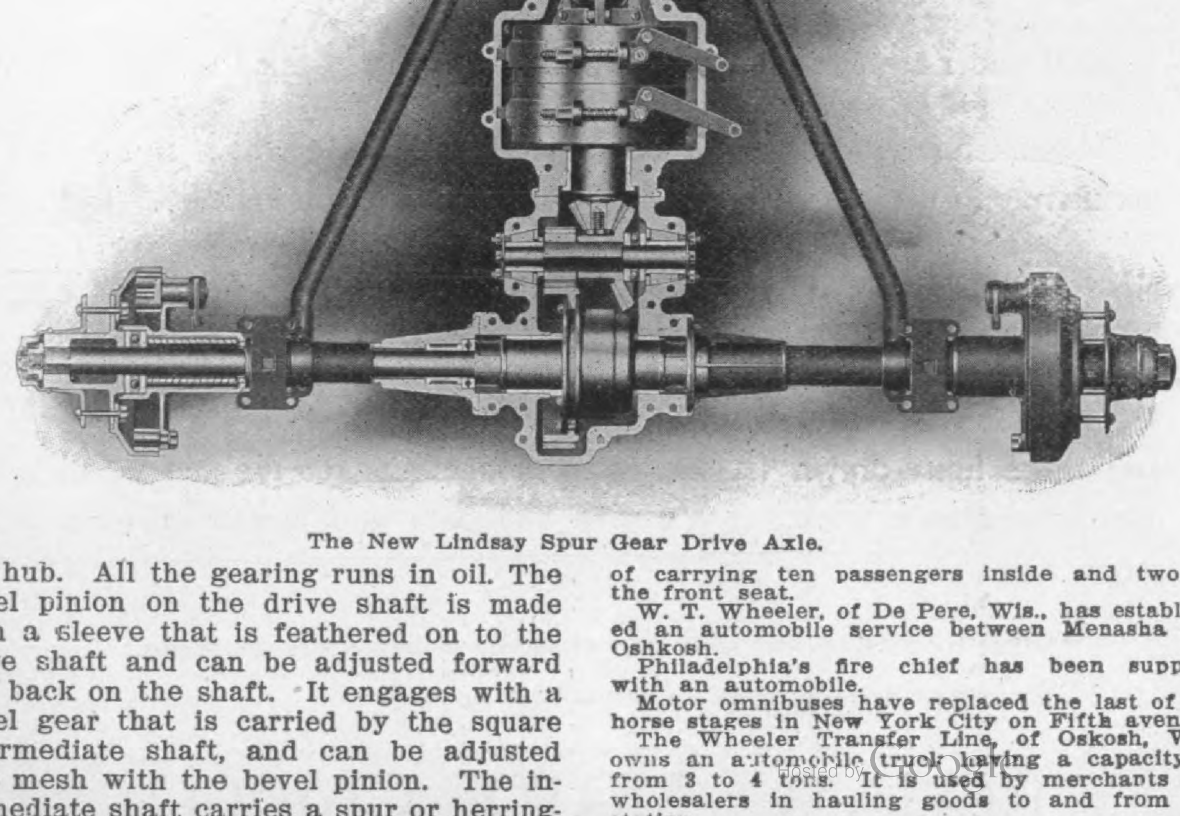
disturbing the shaft-sections.

This construction enables the manufa turer to reduce the diameters of the gear thereby gaining a greater amount of roa clearance, power, and long life, ratio gears being the same.

It eliminates the use of big end thru bearings, and large costly bevel gear This axle is furnished with a first-clas planetary transmission attached or wit out a transmission, as desired.

The standard axle has 37 inch sprin centers. The shaft-sections are 1½ inc diameter. The drive shaft is 1¼ inc diameter and is flanged at the front en The ratio of gear is six to one.

All the gears have 1⅝ inch face, ar are 5 D. P. The tooth of the master ge is spur type.



The New Lindsay Spur Gear Drive Axle.

Commercial Vehicle Notes

A motor chemical wagon will probably be pu chased by the Council of Webb City, Mo.

During the early part of July a count of Lo don's motor 'buses showed that 977 vehicles we in active operation.

It is reported that Fort Riley, Fort Leave worth and some other large army posts, a soon to be equipt with motor ambulances capabl of carrying ten passengers inside and two the front seat.

W. T. Wheeler, of De Pere, Wis., has establis ed an automobile service between Menasha a Oshkosh.

Philadelphia's fire chief has been suppli with an automobile.

Motor omnibuses have replaced the last of t horse stages in New York City on Fifth avenue

The Wheeler Transfer Line, of Oskosh, Wi owns an automobile truck having a capacity from 3 to 4 tons. It is used by merchants a wholesalers in hauling goods to and from t

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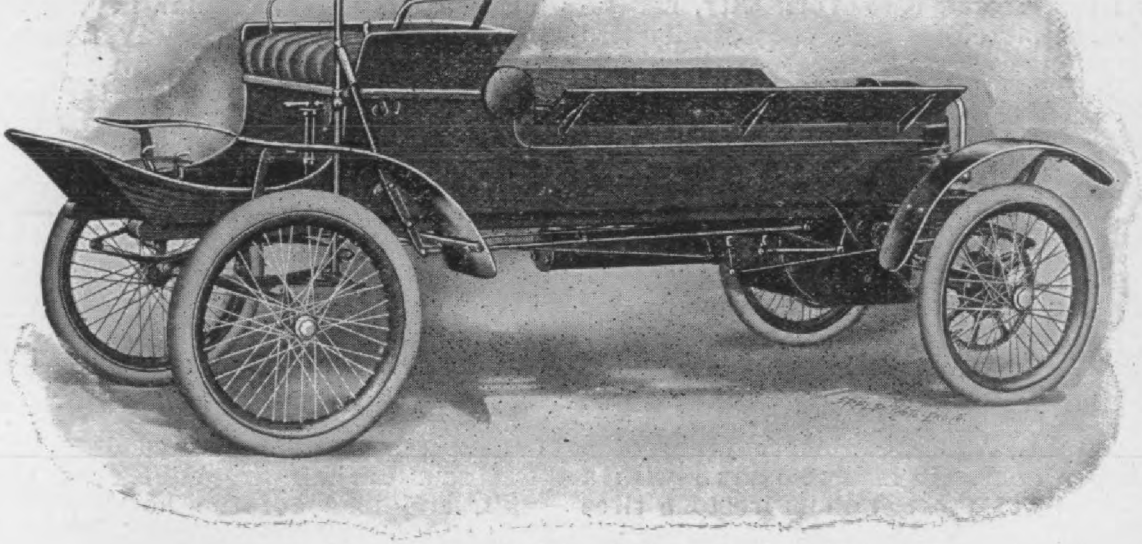

1908 DELIVERY CAR

MODEL D. C., 4 H. P., $550; 8 H. P. $650

Fitchburg, Mass., Sept. 25, 1907.

WALTHAM MANUFACTURING CO.,
Waltham, Mass.

Gentlemen:

Perhaps you may care to hear of a trip that I made July 4th to demonstrate the good qualities of my Delivery Car—Model DC 4-HP.

There is a young man here who has been talking of buying one to use on a poultry farm. He had called upon me twice and I had called on him some six or eight times, and I felt very sure that if I could make a good demonstration, I could make a sale, so I agreed to meet him at ten o'clock, July 4th, and we would go up to his farm which is about eight miles out from the city. I met him as agreed, and as he had a friend with him I had nearly 200 pounds extra load. The combined weight of us three was 545 pounds. For the first five miles I was well acquainted with the road; then we turned on to a road that I had never been over and for three miles I drove my car over the roughest and worst road that I ever want to see. There were places where grass had covered the entire width of the road and other places where one side was washed out; there were deep gullies across the road; there were places where the brush was so close that the fenders on each side of car would hit. It was a steady ascent with no very steep grades but one that called for very careful driving.

At last I caught a glimpse of a house through the trees and began to feel better, but just before we reached the house there was a sharp turn in the road and all that we had passed was but play to what was before us.

We were at the foot of a hill some five rods long, covered with small pebbles and it was the steepest grade that I ever remember riding over, either with team or auto. But my faith in the little motor was strong and I started; about one-third of the way up I thought what if something should break—I would be in a fix—so I stopped and asked one man to get off and walk behind with a big rail to block the wheels in case of an accident to brake or power. But nothing happened and we reached the top in safety, and I want to say right here that I made a standing start on the steep hill and reached the top as quick—if not a good deal quicker—than a horse could, and the friction transmission did not slip.

That was the worst hill on the trip for the rest was easy. I stopped and waited for the man to come up, looked the machine all over; oiled up; and soon reached our destination.

When we were ready to return I asked if there was another road home. He said "Oh, yes," go about half a mile and we would have State Road all the way home.

I have run my car over 3000 miles and the friction is in fine condition yet. All the trouble I have had has been in the tires. Nails and glass bottles are bad for rubber.

Yours very truly,
W. A. YALE.

Write for information and illustrations of all 1908 Models
Discounts quoted dealers in unassigned territory

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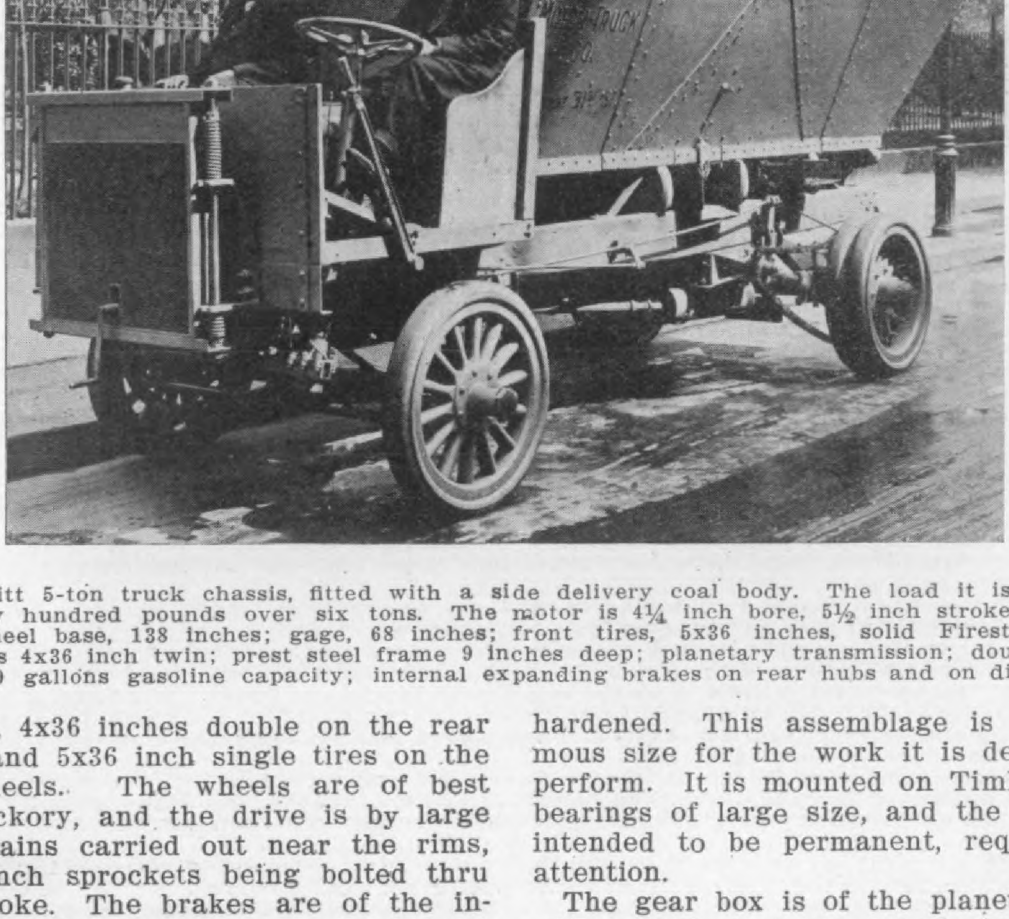
Waltham Manufacturing Company

ntly completed its 5-ton truck, a detailed scription of which is given herewith. ne illustrations show the truck chassis ted with a side delivery coal body; a tail view of the radiator suspension, and detail view of the spring and sprocket nstruction.

The weight of the truck unloaded is out 7000 pounds. It is built to carry e tons, and is said to be able to start on the high speed on a reasonable adway with seven tons load, also to cend grades as high as 10 per cent. with se, and to run up grades of 5 or 6 per nt. on the high gear at the rate of 8 les per hour. It is here shown with a ad of over 6 tons. Solid Firestone tires

ches deep, and is similar in construc to the best modern railway freight ca The three units of the power plant, c sisting of the counter-shaft, the gear and the motor, are entirely separate fr each other, and are connected by univ sal joints, one between the motor and g and one between the gear and the co ter-shaft, so that the whole frame n go out of line and not injure the pow transmission in any way. Each of th units is bolted separately to the fra and can be removed quickly and eas thus facilitating repairing and ass bling.

The bevel gear drive and differential the counter-shaft are built as a separ unit, and made of the best nickel st



Hewitt 5-ton truck chassis, fitted with a side delivery coal body. The load it is carryi s a few hundred pounds over six tons. The motor is 4¼ inch bore, 5½ inch stroke, 4 cyli lers; wheel base, 138 inches; gage, 68 inches; front tires, 5x36 inches, solid Firestone; a ear tires 4x36 inch twin; prest steel frame 9 inches deep; planetary transmission; double cha drive; 30 gallons gasoline capacity; internal expanding brakes on rear hubs and on differenti

e used, 4x36 inches double on the heels, and 5x36 inch single tires on the ont wheels. The wheels are of best ade hickory, and the drive is by large ller chains carried out near the rims, e 24 inch sprockets being bolted thru ery spoke. The brakes are of the in- rnal expanding type, and are the largest at can be gotten on the wheels, ap- oaching as near the ground as it is fe to have them. The axles are very rge and of the highest grade materials. mken roller bearings are used thruout

hardened. This assemblage is of e mous size for the work it is designed perform. It is mounted on Timken ro bearings of large size, and the desig intended to be permanent, requiring attention.

The gear box is of the planetary t with nickel steel gears and shaft. B clutches, fiber-faced, and the high sp clutch of the push-in, cone type, held position by a plate, which acts upon a of springs, give only the necessary p sure to drive the car, and will ne

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A light and powerful

DELIVERY CAR

Correctly designed and carefully built

Load capacity, 1000 lbs.
Price F. O. B. Lockport, $1000.00

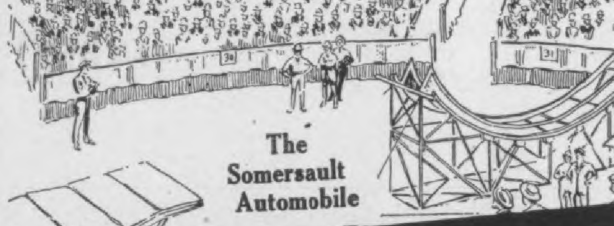
COVERT
MOTOR VEHICLE COMPANY.
Lockport, N. Y.

WEARS LIKE IRON—RIDES LIKE RUBBER

The Hubbard Patent Tire

Made of rubber sections, bolted into recesses in a cast eel channel, the bolts forming a non-skidding surface. washer of cast steel covers the face of the rubber and xtends over the edge keeping the rubber from being ut or torn by wear. This does not affect the non-skidd- g qualities, nor reduce the resiliency of the rubber.

The life of these tires is many times greater than that of



The Somersault Automobile

—Don't Mis

the Indestructible Ste Wheel Exhibit (Booth No. 15 One of the Best Features o the Whole Show.

The Indestructible Steel Wheel exhibit a convincing demonstration of how to ma the wheel the *strong* point of your machi and get the maximum of satisfactory servi out of it.

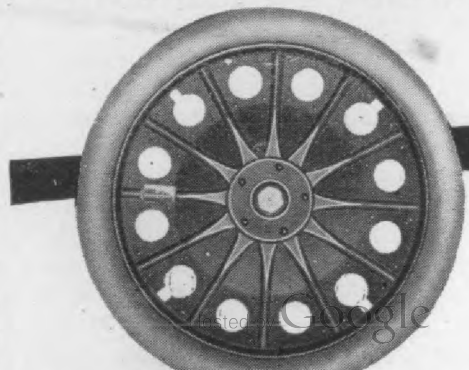
The Indestructible Steel Wheel is absolu ly the only safe wheel for any vehicle attai ing high speed or carrying great weigh It is proof against wheel accident—it is t *only* automobile wheel that *can't collapse*—a is as mechanically perfect in every detail the greatest steel bridge ever engineered.

The Indestructible Steel Wheel will su tain the most tremendous jolts and wrench without injury, and even stands up unc the terrific strain of the automobile som sault. Ringling Brothers say: "We bro one or more wood wheels at every perf mance—the strength and endurance of yo steel wheel is phenomenal."

The Indestructible Steel wheel is as lig as a wood wheel and much more sightly- perfect fit for any hub and rim. Saves axl collects less mud and dirt, is more resilie costs no more and never wears out.

A personal visit to Booth No. 155 will prove value to you in time, money and all-round satisf tion of a set of steel wheels on your machine.

We also make all kinds of automobile steel stampin



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Rear view of the Hewitt 5-Ton Truck, showing spring and sprocket construction.

ergency the suddden application of this ke will throw out any speed which is gaged.

'he motor is a four-cylinder, 4¼-inch e by 5½-inch stroke, and develops 30 35 horse-power, which figures out to horse-power, according to the A. L. A. formulæ. The motor is of entirely v design, built expressly for this truck. e connecting rods and pistons are very g, giving a low angle of pressure on pistons in order to secure long wear. e pistons can be removed from the cyl- ers without dismantling the engine ply by opening doors in the side of the nk case, disconnecting and taking m out. This allows of new rings be- put on or new crosshead pins being erted without a complete overhaul of car. This feature is a great advance commercial work, where the car can ver be laid up for many days at a time. e cam shaft is in one piece of nickel el. The crank shaft is of nickel steel, over 160,000 pounds tensile strength. e water jackets of the cylinders are ply large, and the flat-seated valves are ch larger than is usual in automobile ctice. The Sims Bosch high tension gneto is used. The spark plugs are ced in the inlet valve cap so as to be of the reach of oil.

employed. In order to prevent the rad tor from being injured by excessive vib tions on bad roads when the truck is u

Front view of the Hewitt Truck Radia showing patented method of suspension.

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That's Our Specialty

Prompt Delivery

We are pioneers in heavy and difficult stamping and drawing work for automobiles.

THE CROSBY COMPANY, Buffalo, N. Y.

THE MEISELBACH TRUCKS

One, Two and 3 Tons

One Speed Forward. One Speed Reverse. Friction Drive, Perfectly Supported. All Wheels on Timken Rollers. Powerful Brakes. The Simplest and Easiest Controlled Trucks yet Shown. Cannot be Over-Speeded. Thirty Horse Power.

The A. D. MEISELBACH MOTOR WAGON CO
NORTH MILWAUKEE, WISCONSIN, U. S. A.

3 TON 5 TON

AMERICAN MOTOR

TRUCKS

FOR ALL PURPOSES

AMERICAN MOTOR TRUCK CO., Lockport, N. Y.

3 TON 5 TO

"Manhattan"

Commercial Trucks and Sight Seeing Ca

Buy the Best and save money and annoyance.

MACK BROS. MOTOR CAR CO., - Allentown, Penn

PEUGEOT
FRANCE

Peugeot Chains—"Strongest in the World"
296 Broadway, New York

The Car of Quality

The SOULES LIGHT DELIVERY CAR, 22 H. P., two 5½ horizontal opposed cylinders, sliding gear transmission, be gear drive. THE CAR THAT HAS BEEN TRIED AND FOU NOT WANTING. Agents wanted. Correspondence solicited.

Soules Motor Car Co.

Sales Dept., 736-740 WOODWARD AVE., Detroit, Mi

CRAMP

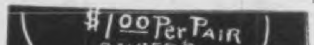
Parsons' Mangane Bronze Axles

Stronger than ste Thousands in use None have ever broken.

The Wm. Cramp & Sons Ship Engine Building Company, Philadelphia, Pa.

BALZER'S PATENTED

"Sign-All" Perfection Indestructible



Monograms that are not on artistic but at same time readabl

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ent is such that the radiator may be re-
oved from the car in a few minutes, and
other substituted, in case of damage by
llision or other accident.

The steering gear is of the rack-and-
nion type, of ample proportions.

Any form of body may be mounted on
is truck, or it can be used as a passen-
r vehicle, carrying about 36 persons.

light would be at least fifteen miles
hour.

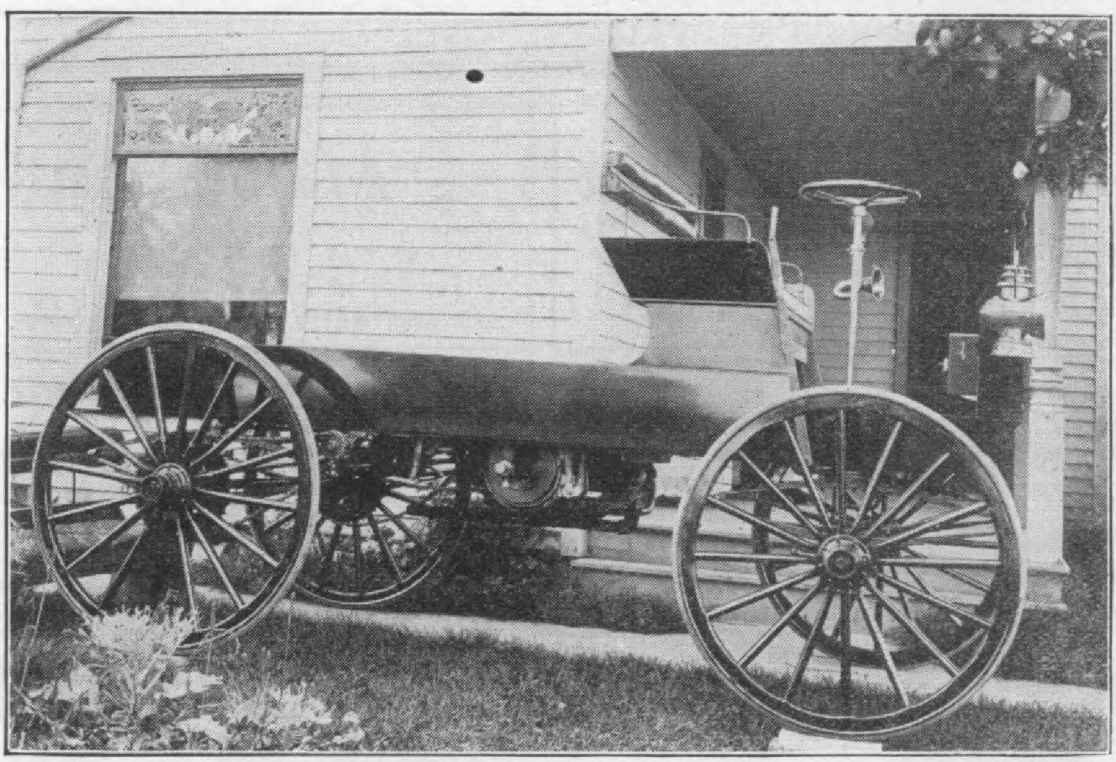
The manufacturers advise us that
of these trucks recently carried a load
5 tons of oil in barrels from New Y
to Philadelphia, making an average sp
of 14 miles per hour, and required no
tention in the way of repairs or unus
adjustments.

The "Van" Motor Wagon

A practical, economical motor wagon,
ilt to meet the demands of the business
an, farmer, etc., has recently been placed
the market by H. G. V. Wambeke &
ns, Elgin, Ill. The special features of
e motor wagon are that it is light and
mpact, and that it is suitable for any
nd of light delivery, the high wheels
d solid tires fitting it especially for town
d country roads.

The motor used is a 4-cycle, double op-
sed, air cooled. The cylinders are 4⅜
re by 4 inch stroke. The spark and

used, 36x1½ inches, four leaves in fr
and 38x1½ inches, five leaves in the r
The drive is by ½ by 1 5-16 Baldwin Bl
Chain to the rear wheels. Two brakes
provided, one acting on the transmiss
and the other on the rear wheels.
axles are 1¼ inches in diameter, and fit
with Timken roller bearings. Solid
ber, 1¼-inch tires are used and
mounted on 36 and 40-inch wood whe
fitted with 1⅜-inch spokes. The wh
base is 92 inches, and the gage stand
steering is by Brown & Lipe Self-Lock



The "Van" Motor Wagon; 12 H. P. air-cooled motor; planetary transmission, two speeds fo
vard, one reverse; cone clutch; full elliptic springs; 1½-inch solid rubber tires on 36 and 40-in
vheels; 92-inch wheel base; standard gage; weight 1200 pounds. Price, $750.

rottle are controlled by stationary levers
top of the steering post. Ignition is
jump spark, a Splitdorf coil being em-

Gear. Gasoline capacity is 10 gallons.
body is 10 feet 4 inches long, by 36 inc
wide, and is fitted with two seats.

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TIMES BUILDING - NEW YORK, N. Y.

We furnish Business Automobiles of all types and makes—machines exactly suited to any class of service.

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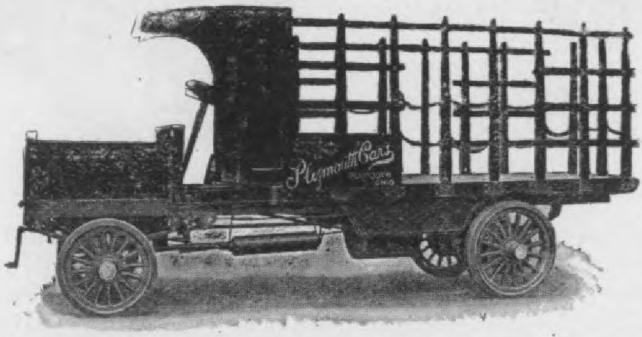
PLYMOUTH Sight Seeing Vehicles Commercial Trucks

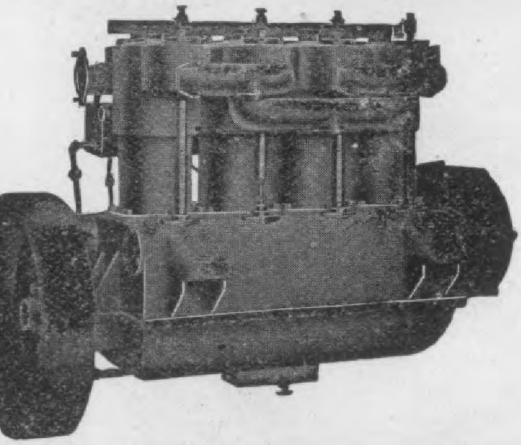
Commercial Motor Truck Co.

Plymouth Ohio



Two and Three Tons Capacity

Duplex Friction Transmission

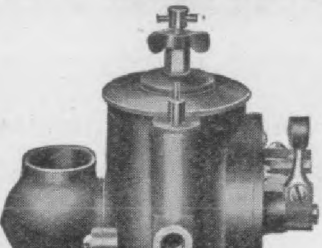


Automobile and Truck MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

HERSCHELL-SPILLMAN CO.
W. Tonawanda, N. Y.

A GREATER MOTOR POWER



Runs Slower and Faster and Engine Responds Instantly to Throttle Movement by Users of the

Palmbla Carburetor

THERE IS A REASON. WRITE US WHY.

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lincothe, O., has constructed two
lels of motor trucks for the 1908 sea-
—one a three-ton truck specified as
lel S, and the other a one-ton truck,
iel T. The Model S, which is here-
n illustrated, was completed about two
nths ago, and has been tested out un-
severe conditions. The results were
gratifying that the company decided to
d a one-ton truck along the same lines,
, so far as practicable, an exact dupli-
e in miniature of the larger car.

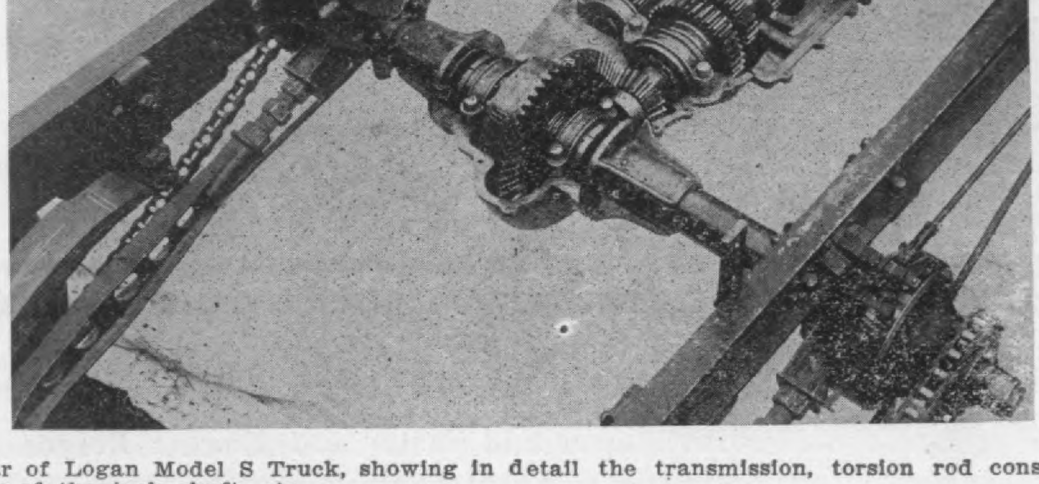
pedals. The gasoline capacity is 15 ga
lons.

The clutch, which was specially d
signed for this car, is of the multiple-di

The Logan Model S, 40 H. P., 3-ton truck. A 1-ton truck will be offered of similar construc-

he Model S truck is equipt with a 40
P. water-cooled vertical motor, which
nsmits its power to the wheels thru the
lium of a large multiple-disc clutch,
fly wheel; thence thru a propeller
ft, with two universal joints, and a
ee speed sliding gear transmission,

type, is encased, operating in an oil bat
which renders stalling of the motor l
quick and sudden engagement, or inju
to the clutch by slippage impossible.
unique advantage is that in the throwi
out of either foot clutch or emergen
lever, a brake is applied to the clut



Rear of Logan Model S Truck, showing in detail the transmission, torsion rod construction
anging of the jack shaft, etc.

ose shafts and gears are mounted on
l and roller bearings, and finally thru
chains of 1½ inch pitch and ¾-inch
th to the wheels.
he cylinders are cast in pairs, 4¾ in-

which prevents it from spinning or dra
ing while shifting gears.

The transmission is of the selecti
type, giving three forward speeds and o
reverse, operating thru gears of 6-in

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inding under any possible condition. All ransmission bearings are either Timken r Hess-Bright bearings, with ample adustments on each part.

The heavy side chains used are guarnteed to stand a strain of 60,000 pounds ach, and the makers claim that one set f chains will give good service for at east two years. These chains lie in a irect pulling line with the tops of both prockets, and the radius rods coming diect from the center pull, between the wo sprockets, do away with all undue trains on the chain itself, whether the ruck be empty or loaded.

The tires are 36 inches in diameter, 5 nches wide in front and 3½ inches, twins, n rear. The springs are full elliptic in ront, 11 leaves, 5-16 inch thick, 2½ inches vide, and 38 inches long. On the rear, latform springs are used with 12 leaves -16 inch thick and 3 inches wide.

method. The company uses cars with ter seats, and will charge one dollar for the tr

Mrs. W. W. Condo, the first woman rural carrier in the country, uses a small gasoline about over her route. Mrs. Condo's route the vicinity of Alexandria, Ind.

The Mutual Transfer Company, of Hacken N. J., and New York City, have received Model B 3-ton trucks from the Knox M Truck Company, of Springfield, Mass. T trucks are run on regular daily trips bet New York and Ridgwood, N. J., for subu deliveries, covering 50 miles per day. Each doing the work of three double teams.

The Birmingham (Ala.) Transfer Company been formed to carry freight and passenge

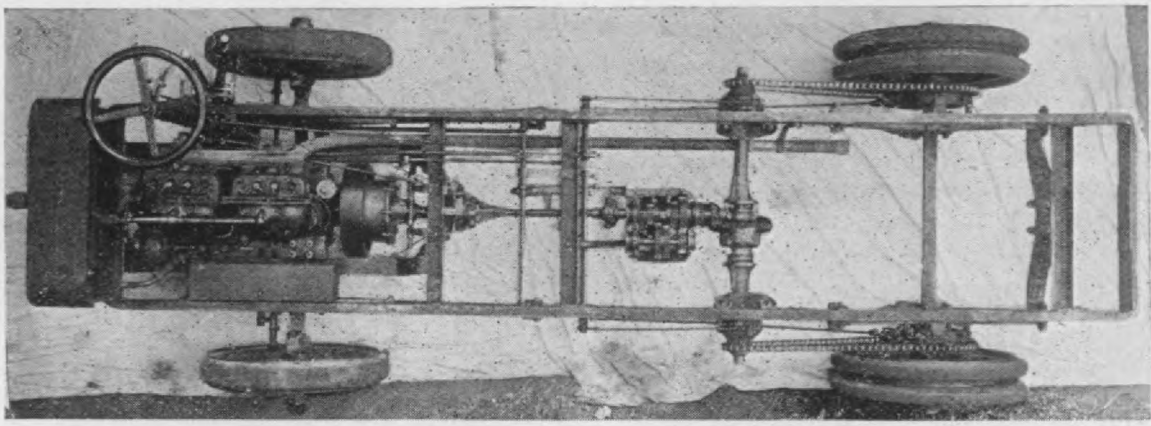
Pine Brook (N. J.) Auto Stage Company been formed with a capital of $20,000 to op motor 'buses in that vicinity.

An automobile 'bus line is to be establishe tween Pinehurst and Southern Pines, North lina.

The Utica and Sauquoit Valley Transport Company, of Utica, N. Y., have placed a 'bus in operation between Utica and Clay The new machine will accommodate sixteen sengers.

The Adams Express Company is plannin replace its horse trucks and delivery wago Indianapolis with electric trucks.

The Board of Public Safety, of Akron, O., ordered a Logan runabout for the use of



Chassis Plan of the Logan Model S Truck.

The rear axle is solid steel, 2½ inches quare, with very large Timken roller earings, and hubs of steel. The front xle is constructed thruout to provide reat strength. The spring seats are nade solid in the axle, which is provided vith large Timken roller bearings, both n hubs and steering knuckles. A noticeble point is the extra large knuckles held n a manner which supports the greatest oad. This heavy weight is carried on oller bearings, which makes steering asy.

The entire shifting of speeds is done vith one lever, which is of special design, atented by the Logan Construction Company.

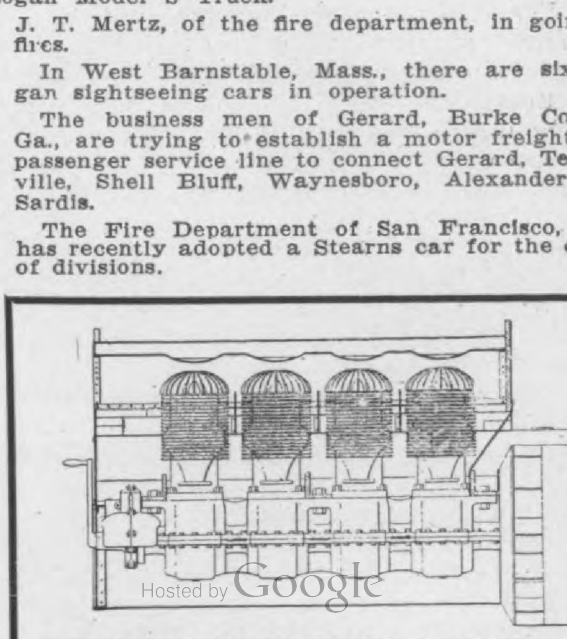
There are five brakes on this truck, one et on the rear hubs, one set on the jack haft, and one brake on the clutch. These nsure safety at all times and in what-

J. T. Mertz, of the fire department, in goi fires.

In West Barnstable, Mass., there are si gan sightseeing cars in operation.

The business men of Gerard, Burke Co Ga., are trying to establish a motor freigh passenger service line to connect Gerard, Te ville, Shell Bluff, Waynesboro, Alexander Sardis.

The Fire Department of San Francisco, has recently adopted a Stearns car for the of divisions.



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Motor Cycle Department

Valuable Suggestions to Motor-Cycle Dealers

As has been the practice in other lines of business, and wisely so, L. E. French, now connected with the American Motor Co., of Brockton, Mass., maker of the M. M. motorcycle, has prepared a series of instructions for motorcycle dealers comprising a great many valuable suggestions. After setting forth the wisdom of selecting a machine entirely on its merits, and not because of the size of the trade discount allowed Mr. French, who is a graduate of the Engineering Department of Harvard University, goes on to enumerate and explain five characteristics of a successful motorcycle dealer, and below we quote numerous extracts from his suggestions and remarks:

"1—It will pay you in every way to understand your machine. You will save expense because you can make necessary adjustments yourself quickly and without delay. The man who understands his machine is rarely troubled by having it stop on the road and he can locate, quickly and accurately, any trouble that does occur. There is nothing that queers a new machine so quickly as having it stop or give trouble in a public place.

"2—It pays the agent to keep his machine well cleaned and the nickel parts polished. The ordinary motorcycle outfit is repulsive. The oil is allowed to collect on the engine and this catches the dirt. The nickel parts become dull, and the whole machine is coated with dust. With the motorcycle in this condition the rider naturally wears his oldest clothes and the outfit is certainly not attractive. This accounts in some measure for the aversion of a certain class of people to motorcycles.

"Cleaning the machine each time you return from a ride is largely a matter of habit, and takes only a little time, since the dirt does not accumulate. It also enables you to locate loose nuts.

"To clean the engine spray around the recesses with gasoline from an oil can. Place under the engine a flat pie pan to catch the drippings and apply gasoline from this, with a small paint brush. When clean finish with a dry rag or piece of waste. The nickel parts should be cleaned once a week with brass polish.

"3—Everyone before buying a machine takes the precaution of looking up the good points of several different makes. The buyer comes to you to hear what you have to say about your machine. He expects you to exaggerate its merits, and is waiting to disbelieve anything that sounds in the least unreasonable. Later he will question others about the same things and draw his own conclusions. Tell him in the fewest number of words why you selected the particular machine you handle, in preference to other makes.

"The buyer then asks you what you think of the — machine. If you know nothing of this machine, and tell him it is "Perfectly Rotten," and "You wouldn't have it for a Christmas gift, etc., he wisely concludes that you are prejudiced and that you only want his cash after all, so he goes away disgusted, and later buys the — machine. Now if you have previously looked up the machine you are all ready for him. When he asks the above question you can tell him candidly what your own investigations have taught you, and he will conclude that you are fair-minded.

"4—In many cases the agent has the idea at first, that all he has to do is to wait for the people to come to him and place orders. If such an agent is lucky, he may be run into by some one who is just about to order a machine, but the chances are that in a short while he will be replaced by someone who wants to make a little money.

"There are thousands of people in this country who want automobiles, but who cannot afford them. Anyone can afford a motorcycle, if he is thoroughly convinced that he needs it, and there are thousands who need it but haven't realized the possibilities or advantages of the machine. Such people need personal contact; they must see for themselves to be convinced. This work has to be done by the agent. The commission paid is very large, and if the manufacturer could sell direct to the public, he would double his profit. He does not pay the agent this price for doing what he could do as well himself. To do business then, the agent must go out after the orders, not wait for them to come to him.

"The first thing to do is to make a list of the people in your territory who could use motorcycles to advantage: doctors, drummers, and anyone who has to travel for business on frequent short trips of twenty miles or more. Visit these people and explain to them the advantages of the motorcycle over the horse, electric car, train, etc., and its cheapness of cost and maintenance.

"When a man is interested, give him a short ride on a good piece of straight road, but do not lend the machine promiscuously to your friends, for, not understanding it,

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Mr. Bicycle Dealer:

Are you interested in establishing a reputation for selling reliable goods? If so, foremost in your line should be

KOKOMO BICYCLE TIRES

They are economical, durable, and speedy, and are sure to give satisfaction.

The "New Oxford" and "Kokomo Defender Special"

Either will add to your prestige and profit, and the users' happiness.

Write For Particulars

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Let people see you using the machine stantly for every day purposes. After eral weeks use, people notice that your chine is always in order and is clean attractive, and that you do not have wear old clothes.

5—Organize a motorcycle club in your n, or join it, if they have one, and win ew contests. There is nothing like ting a man to make him want a better chine. Notices of motorcycle club s may be put in the local paper free harge, and will arouse general interest.

The "Royal" Motor Cycle

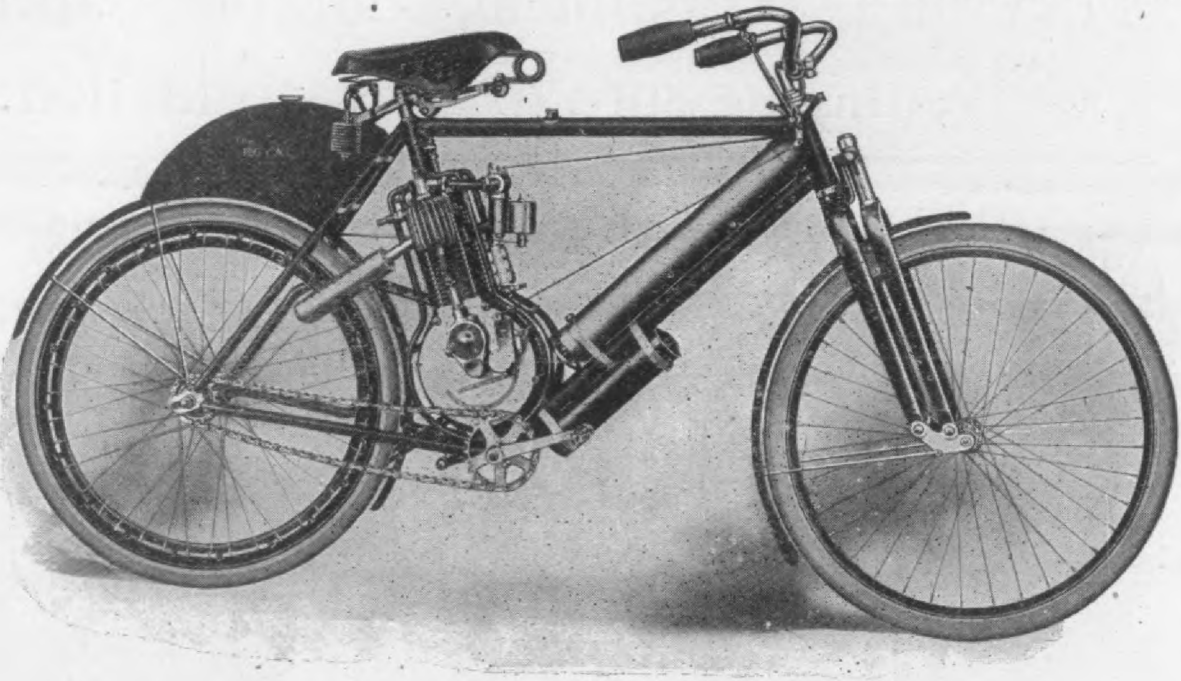
he Royal Motor Cycle Works, Inc., rcester, Mass., is now ready with the yal" motor cycle, which has been in cess of development for a long time, is now offered the public after the t painstaking testing and attention to y detail.

the transmission.

The motor is driven by a "V" belt, c at 28 degree angles, ⅞-inch wide at t top, and is fitted with internal blocks give flexibility. These belts fit the pu leys perfectly, and are claimed to be pra tically free from slip. No idler is r quired.

The Royal is fitted with straight cus ion forks, which are of new and interes ing construction. They work in doub hinges at the bottom, the weight bein carried on springs in the head on the fo ward fork. This construction give smooth riding, and is said to entirel eliminate wrist fatigue. All side-play also eliminated.

The carburetor used on this machine a Royal product, and is claimed to giv a perfectly dry and uniform mixture. Th throttle, when closed, allows just enoug air to pass the spraying post to pick u



The Royal Motor Cycle.

he frame is made of seamless steel ng thruout, the main tubes being 1¼ es in diameter and the stays ¾ inch. bars of steel pass from left to right he top of the motor cage, and are ed in. Midway on these plates is ed a strip of spring steel, running and aft, and the top of the motor es to within 1-64 of this retaining bar. eavy hexagonal-head bolt passes thru bar and screws into the center of the , binding the plate firmly to the r. Thus while the slightest side or

sufficient vapor to give satisfactory expl sions. As the spark is advanced the pr portions of the mixture remain the sam The vertical spraying post is surrounde by a tube thru which the primary curre of air passes, encircling the post, and, a the throttle is opened, this current i creases, picking up the normal flow gasoline. At the point of increase, ho ever, where the speed of the air woul ordinarily become so great as to caus too much suction, thus drawing up to

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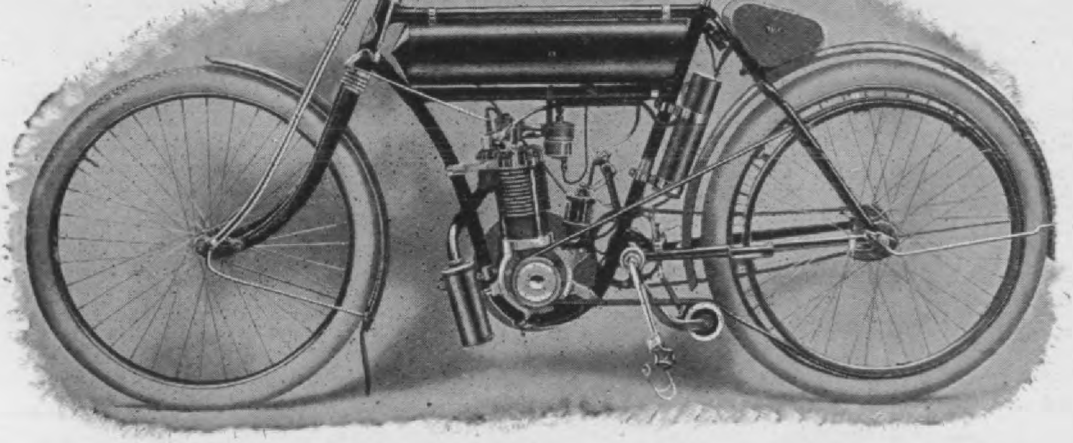

1908 YALE-CALIFORNIA MOTOR CYCLE---Price $185

In the Endurance Contest New York to Providence, R. I. July 30 an 31, 305 miles. Three Yale California Motor Cycles entered and all thre came through on time at every control making a showing not equalled b other makes double its power.

This is proof of Yale-California reliability.

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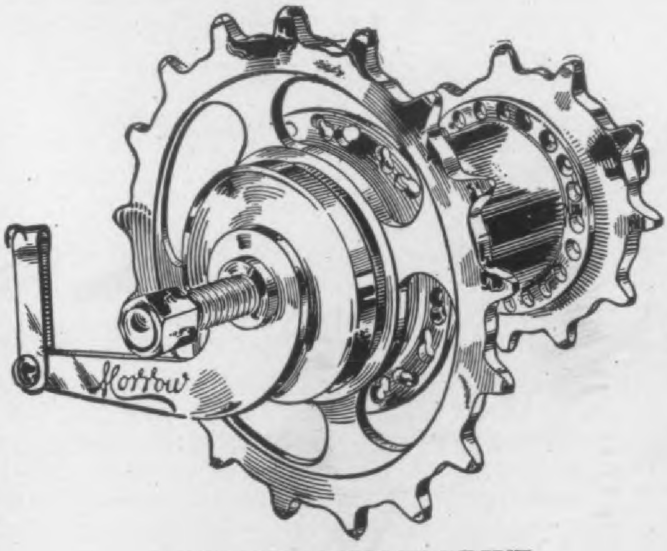
TOLEDO, OHIO.

Automobile Shows are for Those Who Want to be Shown



BRAKE FOR CHAIN DRIVE.

Our customers have bee shown, year after year, that th MORROW COASTER BRAK is absolutely the most reliabl device of its kind in existenc It is made not only for use, bu for abuse and because of th fact it has stood the test of tim and become universally popula The wise dealer and manufa turer acknowledges THE MO ROW as leader; he handles exclusively.

Write for Printed Matter.

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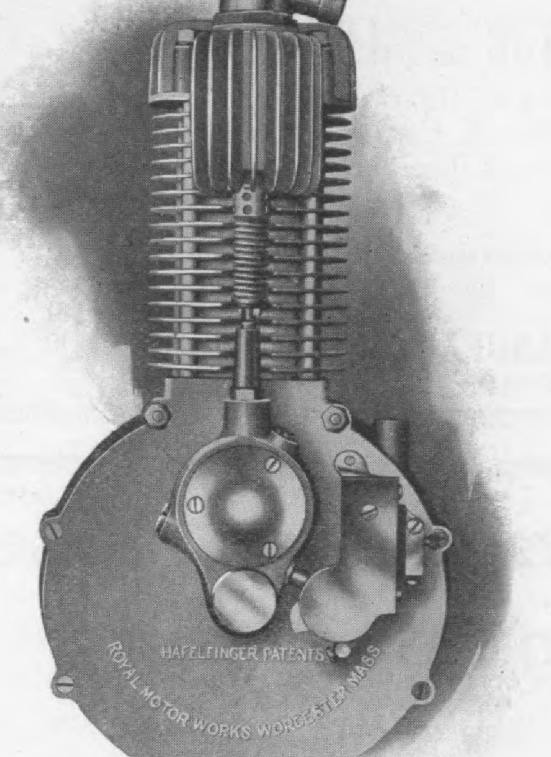
he battery case is made of 2¼ inches nless brass tubing, heavily plated, and ng enough to hold three standard dry . A Splidorf coil, 2½x10 inches, is . The hubs, front and rear, are of y construction, and are the product he Eclipse Machine Company. This pany's "Morrow" coaster brake is also d. In the rear wheel forty spokes are d, and in the front wheel thirty-six. tires are G & J 2½-inch double her type.



finger Motor used on the Royal Motor Cycle.

e Royal grip control is made entire- om steel parts, milled and machined solid stock, and is designed to te properly at any angle at which handle bar may turn. The right when turned to the left, closes the ust valve and advances the spark. left grip, when turned to the left, s the throttle, giving more gas to the e. The grips are of good proportion, of soft rubber and covered with calf cemented on and hand-stitched. The are 14-gage seamless steel tubing with separate bolts for operating the nder and holding the bar.

e wheel base is 52 inches, which

a single cylinder, 2¼ H. P., chain drive machine; model "B," a 3 H. P., singl cylinder gear driven machine, and mode "C," a 5 H. P., double cylinder, gear drive machine. The three motors are all "Thor products, made especially for the Ligh Company.

The newest feature on models "B" an "C," is the gear drive which is a part o the motor and contained in the moto base, comprising a spur gear which is at tached to the main shaft of the motor The motor shaft runs on roller bearings The pinion engages with an internal gea of large diameter. This internal gear i cut on the inner surface of a large disk which has a center to which the drive sprocket it attached. The center of th side to which the gear is cut forms a shaf which sets in ball bearings. The outsid diameter of this internal gear also run in ball bearings, thus the friction of thi drive is reduced to the smallest fraction and as it is contained in any a part o the motor it is impossible for it to get ou of alignment or adjustment. It is constant ly running in oil which is supplied fron the motor base, thus making it absolutel silent. The device is not an experiment but has been tested out in a motorcycl for the past eight months over rough road and has been adopted and used in com prest air motors where pneumatic tool are used and subjected to greater abuse

In connection with this motor is use a new design of muffler called "Radio," manufactured by the Light Company. Th discharged gases are past into a tub or chamber, where it is divided among a number of ⅞-inch tubes which are expose to the air. These carry the gases into a smaller chamber and then out into th open.

All three models will be equipt wit up-to-date grip controls. All the model have new design drop truss frames an a new type of tank designed to hold gaso line, oil and three standard dry cells.

The arrangement of the coil on these models is such that the wires are ver short, and placed in close communicatio with the motor and batteries, for the pur pose of obtaining longer battery service

All chains used are of ⅝ pitch. Th regular equipment includes G and J 2¼ inch tires; 2½-inch tires being extra Sager spring forks are used on all of these models.

The Light Co. is in position to mak immediate delivery of the 2¼ and 3 H. P models and April 1st delivery on the

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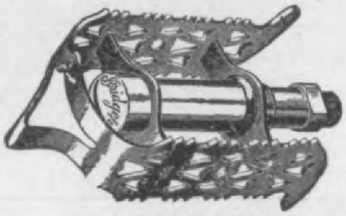
NO. 3 STAR R. T. PEDAL



NO. 3 BRIDGEPORT R. T. PEDAL

NO. 1 STANDARD R.T. PEDAL

Bicycles Ought to Have Them.

Therefore every manufacturer and dealer should se
to it that his customers are protected by havin

STANDARD PEDALS

on all their cycles.

Three kinds to choose from and everyone a winne

Star, Bridgeport and Standard

MADE FOR MEN'S, WOMEN'S, OR CHILDREN'S WHEELS

THE STANDARD CO.

TORRINGTON, CONN.

Makers of

"Diamond E" Spokes and Nipples, "Sager", "Star" and "Export" Toe Clips, and the "Breech-Block" Spark Plug

---

THOR

Must be on the Motor in your Motor Cycle if it is genuine, and a winner.

Supplied by the following manufacturers:

Reading Standard Cycle Mfg. Co., Reading, Pa.
Miami Cycle & Mfg. Co., Middletown, Ohio.
The Pierce Cycle Co., Buffalo, N. Y.
Light Mfg & Foundry Co., Pottstown, Pa.
Fowler-Manson-Sherman Cycle Mfg. Co., Chicago, Ill.
Emblem Mfg. Co., Angola, N. Y.
Hornecker Motor Mfg. Co., Whiting, Indiana.
Brown & Beck, Denver, Colo.
Brown Mfg. Co., Chicago

Aurora Automatic Machinery Company

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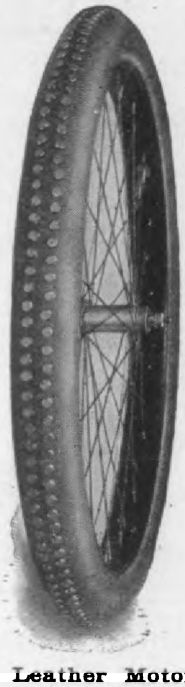
ced on the market a tire for motor-
les, constructed after the well known
ly principles used in their automobile
s.

wo rows of steel studs are fitted on
tread of the tire, which give it its non-
lding qualities. It is also claimed to

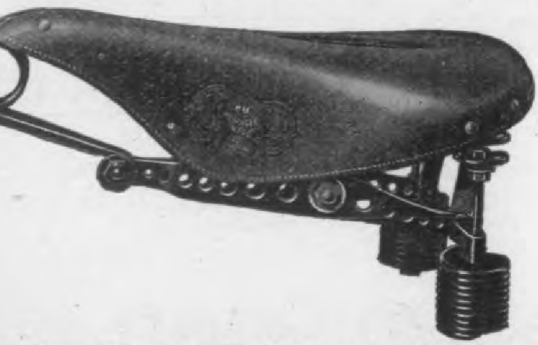


The "Healy" Leather Motor Cycle Tire.

vent punctures, blow-outs and rim cuts.
tire is made for single or double
cher rims, and to order when wanted
Dunlop rims. The stock tires are made
Moulded tires will be furnished if
ired. The tire is made in sizes from
¾-inch, listing at $20.00 to $26 for a
½-inch tire.

ew Mesinger Motor Cycle Saddle

& F. Mesinger Mfg. Co., 1801 First
nue, New York, have added a new
orcycle saddle to their extensive line
the 1908 season, called the "Standard."
top is of soft flexible leather, re-in-



e New "Standard" Motorcycle Saddle just
ht out by the Mesinger people.

side bolt on the clamp and a set scre
locks the saddle to the seat post and pe
mits tilting of the saddle to any desire
position.

The "Pfanstiehl" Motor Cycle Coil

In addition to the Pfanstiehl autom
bile coils described in our August, 1907, i
sue, page 148, the Pfanstiehl Electric
Laboratory of North Chicago, Ill., is als
manufacturing a motor cycle coil, whic
is constructed along the same lines a
its automobile units, having the sam
remarkable efficiency and producing th
"Caterpillar Flame."

The coil is compact and neat in appea
ance and its windings are so arranged an
balanced that the coil responds very quic
ly, allowing for a short length of conta
at the timer, thus insuring low curren
consumption and giving very accurat
timing of the motor. The coil is put u
in a polished hard fibre water-proof an
non-breakable case. It is fitted with thre
or four terminals or flexible wire leads, o
binding posts as desired. The size of th
coil is 2¾ by 5½ inches, and the weigh
2½ pounds.

B. & S. General Service Wrenches

The Billings & Spencer Co., of Hartfor
Conn., are putting out their well know
general service wrenches in sets of five
comprising ten sizes of openings. These
wrenches are put up in convenient form i
nicely finished wood boxes, which th

B. & S. General Service Wrenches.

shelf-hardwaremen will appreciate, and als
in kit bags of drill or of canvas for th
automobilist. These wrenches are mad
of high grade drop forged steel. They ar
made light and strong, and will also b
found very useful for other purposes.

The Philadelphia branch of the Hartfor

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rticles for a complete Bicycle, but we have
dded to this line a specialty of Tubings, Lugs,
tems, Stays and other fittings. All makes of
Cups and Cones, to help the repair man.

Come to us with your troubles, and we will supply you. See Catalogue 1907.

Auto Line Tires, Tubes, Lamps, Generators, Goggles, Carburetors, Timers, Coils, Switches, Mufflers, Jacks, etc., at **Rock Bottom Prices.**

Write for Catalogue and Discount Sheet.

Progressive Cycle & Automobile Supply Co.

81 Chambers St., N. Y.

Motor Cycle Supplies

HORNS, SADDLES, PARTS

Send for our Catalogue

F. A. BAKER & CO.

37 Warren St., N. Y.

THE ORIGINAL.

THE SARTUS

Ball Retainer

(Brought Out in 1896)

BEST ANTI-FRICTION

THE SARTUS BALL BEARING CO.

155 Spring Street, NEW YORK CITY

Unbreakable Wrenches

Years of Service in every Wrench

Unexcelled for Lightness and Strength.

BI AND MOTOR **CYCLE** Contained and Separate Generator **LA**
"BABY GRAND" *Motor* Boat, Car an
Searchlights. Consult 20th Century Catalogu
AUTOMOBILE LAMPS—20TH CENTURY MFG. Co
19 Warren St., N

THE A. & J. MANUFACTURING C

Sole Manufacturers, **THE ORIGINAL A. J. Repair Hanger and Braziron**

The best cast iron brazing compound.

Special motor cycle bracket and hanger for builde

26 W. Randolph St., Chicago, Ill.

BRADLEY MOTOR CYCLE

Single and Double Cylinder, $200 and $275

C. E. Bradley Motor Co

268 Diamond St., Philadelphia, Pa.

JOHN S. LENG'S SON & C

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Mayo Motor Cycle

The Most Perfect Mechanically Constructed.

Power and Speed to Spare.

MAYO DAMPER CO., Pottstown,

TORPEDO

WON

Perfect Score in 414 Mile Endurance Run

Chicago-Kokomo, September 14-15

What do you think of a 414 mile run, in which almost ev prominent make of motor-cycle took part and ended with o 3 perfect scores (25 starters)? Some manufacturers started 4 ar machines, but sandy and rough roads didn't allow them to fini

What made the Torpedo Stock machine, ridden by Geo. Lyons go through so easy with 45-60 minutes to spare at ev control?

It's the right construction of the machine assisted by Torpedo Spring Fork, with Springs properly located, wh

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New for 1908. Correct in Design, Strength and Comfort.

Top has a flexible reinforcement, is ft, and will hold its original form.

Free action in front suspension springs well as in the rear.

The rear spring rod is guided to stay centre of the coils and cannot break bend.

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Built for every day practical use by the average man.

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eorge C. Warner and W. K. Aurandt, have been connected with the Miami

Motorcycle Club this season, at Pol Breeze track, October 5, proved to be o of the most successful motorcycle mee of the season, and was witnessed by a enthusiastic crowd of several thousa persons. Stanley T. Kellogg on a tw cylinder Indian won the ten mile ope race in the fast time of 11.41, by a sca 200 yards, from Walter Goerke, also on twin cylinder Indian. Kellogg also mad two attempts to break his own record 1.03 3-5, made on August 4. The best could accomplish was 1.04, a rate of 56. miles per hour. Summary:

Event No. 1—Three mile novice, open. Charl Schleiffer, 3-H. P., Harley Davidson; A. Hil man, 3½-H. P., Hilaman; F. Yewdell, 5-H. Bradley; William Augustine, 3-H. P., Harl Davidson; E. T. Banes, 5-H. P., Bradley. Fir F. Yewdell, Bradley; second, William Augusti Harley Davidson. Time, 4.51 1-5.

Event No. 2—Five-mile Philadelphia Moto cycle Club championship. Alexander Klein, H. P., Harley Davidson; Charles Schleiffer, H. P., Harley Davidson; A. Wicknick, 3-H. Indian; William Augustine, 3-H. P., Harl Davidson; E. T. Banes, 5-H. P., Banes. Fir Alex Klein, Harley Davidson; second, Charl Schleiffer, Harley Davidson. Time, 6.36 3-5.

Event No. 3—Three-mile race private owne Charles Schleiffer, 3-H. P., Harley Davidso A. Wicknick, 3-H. P., Indian; William Augu tine, 3-H. P., Harley Devidson; E. T. Banes, H. P., Banes; Pettle, 5-H. P., Bradley. Fir E. T. Banes; second, William Augustine. Tin 4.28 2-5.

Event No. 4—Ten-mile race, open. Alexand Klein, 3-H. P., Harley Davidson; Walter Goerke, 4-H. P., Indian; Stanley T. Kellogg, H. P., Indian; H. Hilaman, 3½-H. P., Hilama F. Yewdell, 5-H. P., Bradley; E. T. Banes, 5- P., Banes. First, Stanley T. Kellogg, India second, Walter Goerke, Indian. Time, 11.41.

Event No. 5—Five-mile handicap. A. T. T ton, 1.30, Armac; Alexander Klein, .40; 3-H. Harley Davidson; Charles Schleiffer, .55, 3-H. Harley Davidson; Walter Goerke, scratch, 3- P., Indian; Stanley Kellogg, scratch, 3-H. Indian; A. Wicknick, .40, 3-H. P. Indian; W liam Augustine, 1.00, 3-H. P., Harley Davidso First, Walter Goerke, Indian; second, Stanley Kellogg, Indian. Time, 6.18.

Special—One mile time trial. Stanley T. Ke logg, 5-H. P. Indian. Time, 1.05.

Event No. 6—One hour national championsh race. A. T. Wilson, Armac; Alexander Kle 3-H. P., Harley Davidson; Walter Goerke, 4- P., Indian; Stanley T. Kellogg, 4-H. P., India G. Yewdell, 5-H. P., Bradley; A. Hilaman, 3 H. P., Hilaman. First, Walter Goerke, 48 mil 1570 yards; second, Stanley T. Kellogg, 47 miles.

One Mile Time Trial—Stanley T. Kellogg, H. P., Indian. Time, 1.04.

Ovington Motor Co., New York Cit sole American representatives of the " N." 4-cylinder motorcycle, are now locate at 2234 Broadway, not 2208, as stated our October number. The new quarte are near 80th street.

In the recent 1000-mile motorcycle tri in England, conducted by the Auto Cyc Club of Great Britain, an American-mad motorcycle, entered by Mr. Hasting

Marine Coming Events

December 7-14.—Annual Motor Boat Show, and Central Palace, New York. National Asciation of Engine and Boat Manufacturers.

1908.

January 1-8.—Chicago Motor Boat Show, liseum, American Association of Engine and at Manufacturers. Chester E. Campbell, Mgr., Park Square, Boston.

January 14-18.—Hartford Automobile Dealers' ow, Foot Guard Hall.

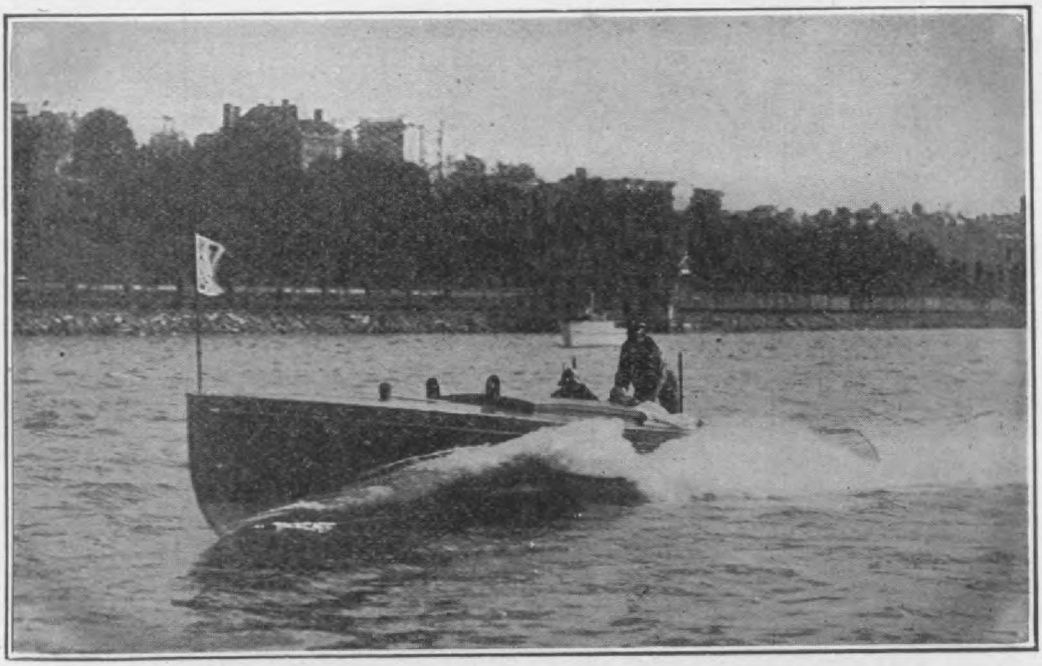
January 25-February 1.—Boston Motor Boat ow, Mechanics' Hall. New England Engine d Boat Manufacturers' Association. Chester Campbell, Mgr.

April 6-11.—Buffalo, Convention Hall, Motor at and Sportsmen's Show. D. H. Lewis, Mgr.

he Hudson River Motor Boat Carnival

Altho bad weather prevailed nearly all eek, the third annual motorboat carnival the Motor Boat Club of America, on e Hudson, proved very successful. rene," a beamy, comfortable 40 footer, ilt by John S. Sheppard, of Essington, ., from his own designs, and equipt th two four-cylinder Chadwick motors 8-inch bore and 7-inch stroke, made an ceptional record, by carrying everything over the river eight boats started for reliability trials. Owing to the threat ing conditions of the weather the comm tee experienced some trouble in secur observers, yet at the appointed time eve thing was in readiness and the ev started with the following boats: Du II, Sparrow, Speedway, Speedway, Jr., open boats, and Mao II, Myosotis, Ral and Idler cruisers. The course was l off from the club-house at the foot of C Hundred and Eighth street, N. Y. City, t buoy up the river off Fort Washing Point, and thence to another buoy loca close to the Jersey shore about oppos Sixty-ninth street, and from this back the start at the club-house, the course be ten nautical miles in length. This sa course was used thruout the week for events except the mile trials and the lo dictance race. Sparrow and Speedw came around first close together, and fact, made a pretty race thruout the wh run until Sparrow ran out of fuel on ninth lap and was compelled to give

Ralaco and Mao II, ran another equa close race. At this writing it is imp



Irene, winner of the International Cup Championship on the Hudson River.

fore her in the speed-boat class. The ene besides winning the International p championship broke the one-mile cord. Time 2.17, or at the rate of 30¼ atute miles per hour. One of the features this year's meet was the large number cruising boats which competed, and furshed many close finishes.

sible to state the winner of this event, the measurements of the two latter bo are not known.

TUESDAY'S EVENTS.

On Tuesday, the second day, the n trials were run, but owing to some c fusion in the timing the trials were run Friday.

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tiest ever seen on the river, with the Dixie leading. When the boats returned the Irene was leading by 200 yards, and as the Dixie came up opposite the club-house, she slowed down and stopt, her propeller being put out of commission by coming into contact with a log. The Irene continued her first round in 25 m., 38 s., actual time. Three minutes later Den finished the circuit in one second less than Irene. Skedaddle followed in 26 m., 18 sec. Shortly after the boats past the home mark a heavy rain squall set in, during which time Irene's ignition mechanism was soaked, compelling her to quit, and the Den had struck a log causing her to return to anchor. This left Skedaddle the only survivor who finished at 6:08:46, making the best round of the course thruout the carnival, 24 m., 40 sec.

WEDNESDAY.

Wednesday, the third day, was the start of the series races for the Manufacturers' Association cups, and the cruiser classes in which there were 26 contestants. The start was made at 2 p. m. The cruisers were to make two rounds, while the racers which followed covered a distance of thirty miles.

Sparrow finished first in her class, the Idler made the best time in hers, and Ailsa Craig finished ahead of her only competitor.

In the National trophy class X. P. D. N. C. gained three points, Skedaddle two and Speedway one. In the International cup race Den won two points.

THURSDAY.

Thursday the series races were continued. In the cruiser class, practically the same boats started. Dixie and Irene fought it out for the International trophy, with Irene leading at the finish of the first round, by 1 m. 10 s. At the start of the second round the Dixie dropt out, leaving the Irene to finish, which she did in 1:15:07, the fastest time so far made for 30 miles.

FRIDAY.

On Friday the series races were completed. The mile trials were also run off in the morning. Den and Skedaddle were the only boats to run. Each of the boats made three runs with the tide once against it, going over the line in either direction. The results given show that Den made 28.71 statute miles per hour, and Skedaddle 26.909. In the series races on the following day, the Irene and Den determined to fight to the finish, and the race between the two was the prettiest of the carnival. Irene took the lead but lost on the turn, only to take it again on the stretch. She covered the first round 1 m., 1 s., ahead; the second a little less than 2 m., and won finally by not quite 4 m. In the National cup race Skedaddle beat X. P. D. N. C. by 4 sec. Only two boats finished in the Interstate trophy, Sparrow and Artful, with Sparrow making the best time each day.

THE LAST DAY.

Saturday the last day was set for long distance races. The racers were run to Poughkeepsie 116.3 nautical miles with 6 starters, and the cruisers to Peekskill 75 nautical miles, with 14 starters. After the long distance contestants had been started the Irene was allowed to make six runs of the mile for a record, but not as a competitor for the mile trials cup.

In the long distance race for cruisers, Grayling covered the course in 4 h., 22 m. In the racer class, Den and Skedaddle finished within one minute of each other, with Den in the lead. The winners of these classes are not yet determined, as a number of the boats had not been measured.

The following table gives an idea of the time made by the Irene in its speed trials:

Down . . .	2.17—26.277	25.904	25.815	25.770	25.694	
Up	2.21—25.532	25.726				
Down . . .	2 17—26 277	25.726	25 726	25.619	25.500	25 597
Up	2.23—25.175	25.300	25.513	25.382		
Down . . .	2.18—26.087	25.205	25.252			
Up	2.28—24.324					

Pittsburg Regatta

The final regatta of the Pittsburg Launch Club, was held on September 28, over a three mile course on the Allegheny river; all races not otherwise designated being for that distance. The races proved very successful. Following is a summary:

Race for 3 to 6 H. P. launches—1, Ku Chu (H. L. Sipe and L. McMasters), time 21m. 30s.; 2, Silbon, (Gus Probst and D. McCready); 3, Rainmaker (W. J. and H. McGivern); 4, Paul (Chas. H. Burke and Chas. Clintner). Race for boats up to 11 H. P.—1, Helen (W. A. Tomlinson), time 15m. 45s.; 2, Skipper (Jos. and Wm. Curry). Six-mile race for launches with not more than 17 H. P.—1, Hornet (M. P. Sauers and F. Smith), time 26m. 30s.; 2, Tranter (J. F. Robertson and P. H. Magnus). Nine-mile race for launches with not more than 25 H. P.—1, Water Witch (J. Kowalsky and M. T. Epling), time 35m.; 2, El Rayo (G. E. Kallock). Race against time—Sprinter (H. C. Price), no other competitors, time 8m. 35s.

The New York agency of the Buffalo Gasoline Motor Company has been taken over by the Motor Boat Supply Company, who have removed from their old address to the store at 107 Liberty street, New York, which has so long been the headquarters of the Buffalo engines.

Dayton Electrical Manufacturing Co., Dayton, O., have placed on the market a new switchboard, listed as No. 8-S, which is suitable for use in connection with large gasoline marine engines with which a lighting dynamo is used.

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simplest, smoothest running, most powerful engine on earth.

Quality considered, it's the lowest priced. We guarantee absolute satisfaction and

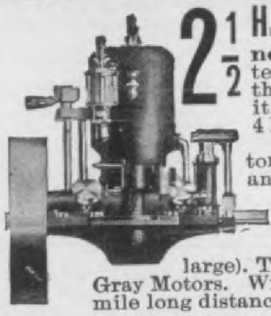
IMMEDIATE SHIPMENT

Write at once for new catalogue showing Ten sizes, 2½ to 27 H. P., at prices that will surely interest you.

2½ H P $60

(With complete equipment.)

DU BRIE MOTOR CO., 432 GUOIN ST., DETROIT, MICH.



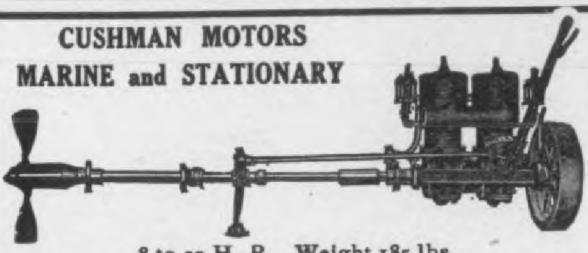
2½ H.P. Complete Outfit $6

not bare—and guaranteed to develop more than 3 1-2 H.P.—in fact, it is as powerful as most 4 H.P. engines.

We built and equipped a n tory last winter—the most and up-to-date plant in the wo voted exclusively to marine engines. We ar moving into another n larger plant—5 stories (3 ti large). This shows the enormous dem Gray Motors. Write today for the story of mile long distance race on Lake Erie, also

Engines 2½ to 40 H.P. GRAY MOTOR CO., 28 Leib St., Detr

CUSHMAN MOTORS
MARINE and STATIONARY



8 to 10 H. P. Weight 185 lbs.
Designed for service. Material best obtainable, workmanship unsurpassed. Cylinder, Piston Rings and Crank Shaft ground. Bearings hardened. Write for catalogue.

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Clutch

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SNOW & PETRELLI MFG. CO., New Haven, C

Perfection

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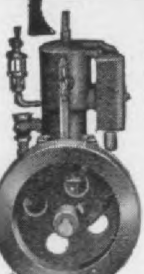

For real service, for looks, finish and power the Perfection beats any motor ever sold at anywhere near its price—can't be beaten at any price.

2 H P $45 COMPLETE

Simple, speedy, reliable and reversible. No cranking. Price is for engine complete with full boat equipment—NOT BARE. Fully guaranteed and backed by one of the largest plants in the business. Send for handsome catalog of all sizes.

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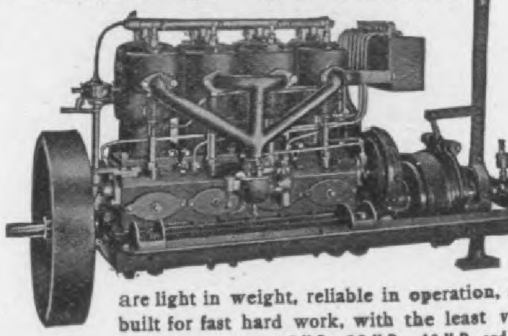
IF you want a high grade boat outfit, write for illustrated catalogue. Our motor boat outfits



are light in weight, reliable in operation, and built for fast hard work, with the least vibra and noise. Sizes 6 H.P., 22 H.P., 40 H.P. and 50

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posess more practical characteristics than were ever comprised in a motor of any kind. Their exclusive features have given them a world-wide celebrity. When you are ready to select a motor, write us.

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Our Specialty
Write and give us particul
We guarantee every clutch
STOWE MFG. CO.,
Wilmington, Del.

High Grade Marine and Auto Engines, 2 and 4 Cycle, 2 to 20 H. P. Best material and

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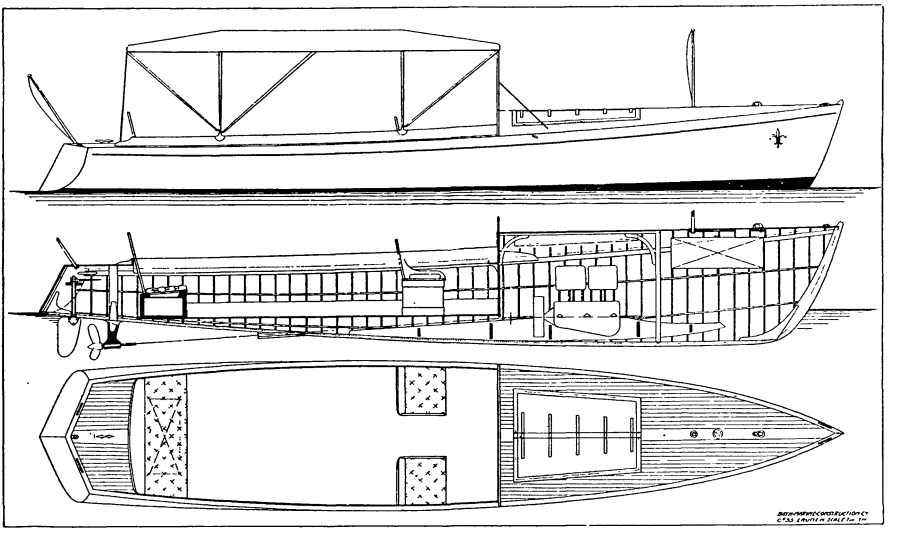
The "Bath" 26 Foot Runabout

The Bath Marine Construction Company, Bath, Maine, is offering for 1908 a new 26 foot 6 inches by 5 foot runabout herewith shown.

The frames, floors, keel, deadwood, stem, stern board, sheer strake, covering board, clamps, stringers and all parts requiring special strength are of clear straight grained white oak. The planking is of clear white pine with only one butt in each strake, the butts being reinforced with white oak butt blocks.

The interior finish can be had in oak or cypress. The deck is of clear white pine, and all deck fittings, such as bitts, chocks, flag pole sockets, and steering wheel cleats, are of brass.



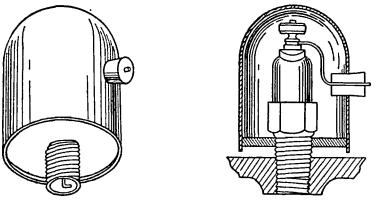
The "Bath" 26 feet 6 inches by 5 feet Runabout.

The motor can be started, steered and controlled from the bulkhead. The price of the runabout, hull only, with coaming run around in the usual manner, is $350; hull only, with turtle back over engine, $400. The hulls are fitted with 7½, 11, 15 or 25 H. P. motors, listing at $196; $277, $345 and $517, respectively. If the engine is to be controlled from the bulkhead $20 should be added to the above prices, and $30 if the engine is to be started from the bulkhead. If boat is to be finished in mahagony $100 extra is charged. An auto cover and side curtains with celluloid windows is fitted for $100 extra, and $25 extra is charged for a canvas cover over the engine.

"Casey" Spark Plug Protector

One of the latest spark plug protectors placed on the market is the Casey protector, manufactured by Casey Spark Plug protector Company, Cocoa, Fla.

The protector consists of a metal plate 2½ inches in diameter by ⅛ inch thick, having a hole in the center into which the spark plug is screwed. Over this



The "Casey" Spark Plug Protector.

plate a hood of polished brass, 3½ inches high by 2½ inches diameter, is set. This hood has a hole or opening in its side in which is placed a flexible rubber bushing. This bushing will accommodate any size wire to be used for connections with spark plug and battery.

The spark plug is first screwed into the metal plate, and then into the engine, the end of wire from the battery is past thru the rubber bushing, and then thru the hole in the side of the hood, making it fast to the spark plug, care being taken to have the insulation of the wire come up close to the plug, in order to prevent long insulated ends of wire extending from the plug. After these connections have been made the hood is slipt down over the spark plug and plate, thereby completely housing in the plug so that no amount of rain or spray can short-circuit it.

It is claimed that this protector also prevents getting a shock from the spark plug, and that should it be accidentally damaged it can easily be put into shape with a wrench or hammer. The hood is made to fit any spark plug of standard size, and lists at $1.00.

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It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO
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Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

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and at all good automobile supply stores in all leading cities.

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ton street, Brooklyn, N. Y., in 5, 7½,
and 15 horse power sizes.

ll parts of the motors are made ac-
ding to jigs and dies, and are inter-
ngeable. All bolts, nuts, screws, etc.,
of standard sizes and threads. The
nk shafts are made of steam ham-
red forgings, and are of ample propor-
ns. The bearings are also extremely
ge to insure long life. Parson's white
ss is used for bearing material thruout,
Parson's manganese bronze is used
gely in construction of the various re-
vable parts.

he lubrication system has been very
efully worked out, and is claimed to
thoroly positive and reliable. The
nk shaft and crank pin bearings are
vided with compression grease cups,
ch force grease into the main bear-
s, and thru the hollow crank shaft to

"Fulton" Marine Motor; made in 5; 7½, 10 and 15 H. P. sizes.

crank pin. The cylinders are oiled by
ssure oil cups. Lunkenheimer fittings
used thruout. The Schebler car-
etor is fitted. No splash is employed
all. All brass parts are nickel plated
avoid corroding from contact with salt
er. There are no pipe fittings used on
part of the engine whatever, but spe-
castings and cored holes in the cast-
s take their place.

ll sizes of engines are fitted with
er make and break or jump spark
tion, at the option of the purchaser.
ese engines run equally well in either
ction, and have a spark control on
n systems of ignition, which varies the
ance or retard of the spark thru an
of 45 degrees in either direction of
ation.

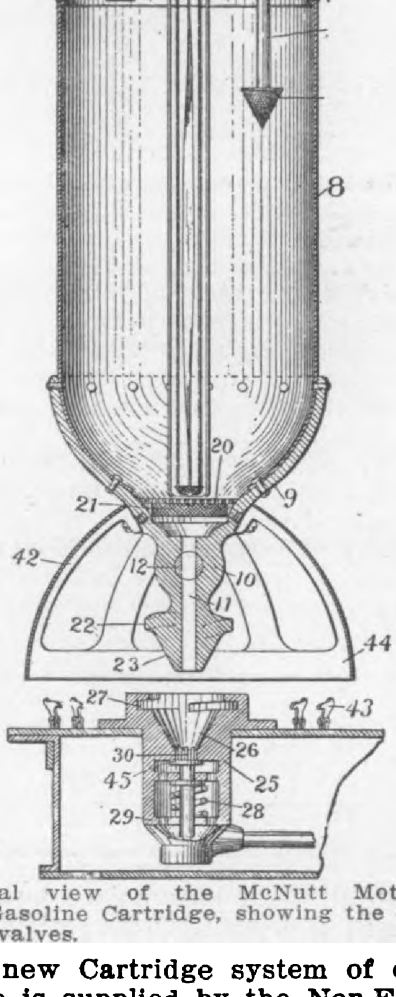
oth single and double cylinder forms
he Fulton motor are made. In the dou-
cylinder type the two cylinders are cast
one piece with a large water space be-

are extremely light to avoid undue we
on the bearings.

With each motor are furnished bilg
pump, oil and grease cups, Schebler ca
buretor, ball thrust bearings, propell
shaft coupling grooved for dynamo, reli
cock, knife switch mounted on spark
box, one pound grease, one quart cylind
oil and a set of wrenches.

The McNutt Motor Boat Safety Gasoline Cartridge

The object of this device is to provi
means for carrying gasoline on boat
whereby all danger of explosion of t
gasoline at the tank, premature explosi
from leaking pipes, also evaporation a
fire will be obviated.



Sectional view of the McNutt Motor Bo
Safety Gasoline Cartridge, showing the cartrid
and its valves.

This new Cartridge system of carryi
gasoline is supplied by the Non-Explosi
Safety Naphtha Container Company, Ne
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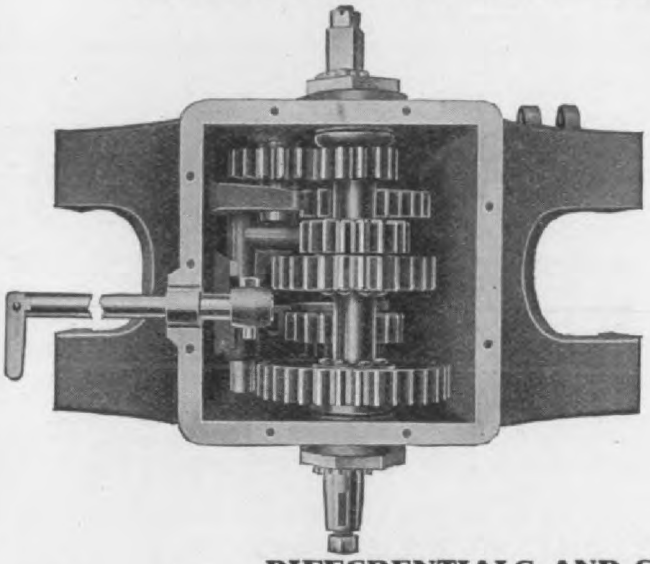

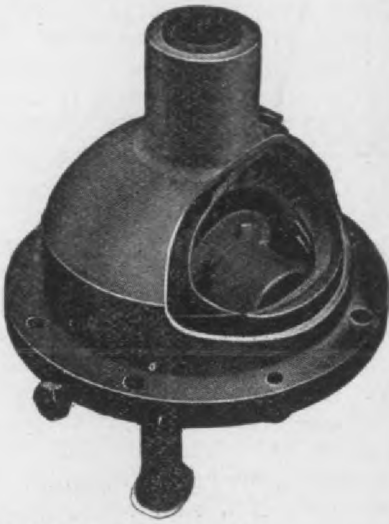

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ıze member (21), to prevent any possi-
ty of flame passing into the cartridge,
l to serve also as a strainer for the
oline. The plug (10) of the cartridge
provided with screw threads (22) on a
ered end portion (23); and the tank of
boat or car is provided with a socket
), whose bore has threaded slots (27),
which the cartridge is screwed on the
k and makes a very tight joint there-
h. The tank (25) has a check valve
), closing the bore (26) from below, a
ing (28) serving to normally retain the
ve closed. But when the cartridge is
erted the lower end of its plug (10)
l engage pins (30) on the valve and un-
t the valve, permitting the contents of
cartridge to flow downward if the plug
ve (12) is open.

The cartridge is provided with a flar-
base (42) that extends below the plug
), and serves to support the cartridge
en detached and resting on the ground
floor. This base also serves to rest the
tridge on the tank (24). Clips (43)
the tank engage the rim (44) of the
e and lock the cartridge in position
the tank or vessel. When one cartridge
empty it is removed, and a full one is
stituted; the empty cartridge to be
ed for future use. A number of
h cartridges can be filled and
t on hand. By this means it is not
essary to pour the gasoline or other
uid into the receiving vessel for the
t or car, but the cartridge is quickly
ached, and then a suitable valve is
ned, permitting its contents to be used
needed.

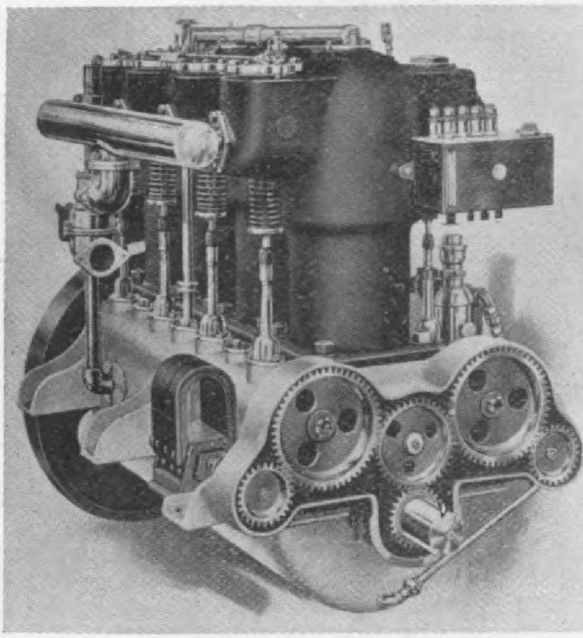
'Jencick" Auto and Marine Motors

The Jencick Gasoline Motor Manufac-
ing Company, Port Chester, N. Y., are
ering a complete line of automobile
l marine motors in eight sizes from 15
210 horse-power, listing from $550 to
00.

The Jencick motor has vertical water-
led cylinders cast in units of close
ined gray iron, the water jackets be-
cast integral with the cylinders. The
et and exhaust valves are on opposite
es of the cylinders, and are machined
a single forging of a special alloy con-
ning a high percentage of nickel. The
ton is of the trunk pattern with domed
d and made extra long to give great
aring surface and positive guidance to
rings. Each piston is fitted with four
gs, three at the head and one about

means of chrome nickel steel studs a
nuts, all cotter pinned.

The carburetor is of the float feed typ
The manufacturers allow a choice of a
of three systems of ignition for moto
made under eighty horse-power, and t
systems for the larger ones. Their mak
and-break system is actuated by a sing
cam, and is easily accessible on the t
of the motor. It is fitted with a device
prevent reversal of the motor, and ru
on Hess-Bright ball bearings. The Bos
low tension magneto is used for the
make-and-break system, and the Bos
high tension, with a choice of plugs a
coil for jump spark.



A "Jencick" 4-Cylinder Motor, Inlet Side.

Lubrication is by a Pedersen mecha
cal sight feed oiler, located on the re
part of the motor, and driven by a b
from the magneto shaft. In addition
this they use a plunger pump on the n
rine motors which forces the oil to t
crank and wrist pin bearings under
pressure of 125 pounds.

The standard equipment furnished wi
every motor consists of a float feed c
buretor, magneto or battery and coil, jum
spark plugs or make-and-break plugs,
nition cable, oil pump, water pump. I
dersen mechanical oiler, starting devi
and controls.

Here you are at last,
a high-grade
Marine Engine

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 6. PHILADELPHIA AND NEW YORK DEC. 1, 1907

November Edition, 20,119

14,121 Copies mailed.
5,054 Copies Delivered to News Company.
1,189 Copies to Philadelphia and foreign, etc., under stamps.
1,684 Copies expressed to New York Show.
140 Copies held in reserve.

22,188
2,069 Back numbers sent out.

20,119 Total copies November edition.
Of these
12,172 Were paid subscriptions.
5,054 Delivered to News Company.

17,226
1,102 Returned by News Company, to November 16, 1907.

16,124 Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the November issue was 20,119.

Of these, 25,594 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 29 ounces, representing 14,121 copies, and 2,069 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

The Cycle & Automobile Trade Journal will be represented hereafter in England by T. A. Robinson, 148 Old street, London, E. C., to whom we refer all inquiries in the United Kingdom on subscription and advertisements.

Mr. G. H. Smith, of the United Motor Industries, Ltd., of London, England, the oldest established motor and accessory fitting firm outside of France, will on December 26, visit America for the purpose of arranging agencies for any American novelties in the way of motor accessories that manufacturers may be prepared to place. Mr. Smith, while in America, will stay at Hotel Astor, New York City.

Automobile Coming Events

November 22-30—Annual Stanley Show, London, England.

November 29-December 6—Chicago Automobile Parts Show, Casino Garden.

November 30-December 7—Chicago National Automobile Show, S. A. Miles, Mgr., 7 E. Forty-second street, New York City.

December 5-22—Touring Car Exhibition at Berlin, Germany, under direction of Kaiserlicher Automobile Club.

December 8—Paris, Straightaway Aeroplane Speed Test, auspices of "L'Auto."

December 9-14—San Francisco, Coliseum, First Annual Automobile Show, Automobile Dealers of California. N. R. Cooper, Mgr.

December 13—Paris, Competition for Agricultural Automobiles, auspices of "L'Auto."

December 14-21—Local Show, St. Louis, Mo., Auto Manufacturers' and Dealers' Association.

December 19-22—Commercial Vehicle Exhibition at Berlin, Germany, under direction of Kaiserlicher Automobile Club.

December 21-January 2—Automobile Show, Brussels, Belgium.

December 26-28—Reliability Trials of the South Indian Motor Union.

December 28-January 4—Importers Salon, Madison Square Garden, New York City, C. R. Mabley, Sec. and Mgr.

1908.

January 18-February 2—Fifth International Auto Exposition, Palace of Fine Arts, Valentino Park, Auto Club of Turin, Italy.

January 4-11—Dublin Show, Ireland.

January 14-18—Automobile Show, Foot Guard Armory, Hartford, Conn.

February 10-15—Detroit, Mich., Tri-State Automobile and Sportsmen's Association's Show in Light Guard Armory.

March 7-14—Sixth Annual Auto Show at Mechanics Building, Boston, Mass., Boston Automobile Dealers' Association, Chester E. Campbell, Mgr., 5 Park Square, Boston.

March 9-14—Buffalo, N. Y., Automobile Show, Buffalo Automobile Club, 760 Main street, Buffalo, David H. Lewis, Secretary.

March 20-28—Automobile Show, Liverpool, England.

March 21-28—Cordingly Show, London, England.

March 21-28—Auto Show, St. Lawrence Rink, Toronto, Canada, M. Jaffry, Mgr.

March 26-April 24—Second Annual International Commercial Vehicle and Motor Boat Show Olympia, London. Society Motor Manufacturers and Traders.

April 5-12—Third Annual Automobile and Sportsmen's Show, Montreal, Canada, Arena, M. Jaffry, Mgr.

April 16-21—Second Annual Show of the Pittsburg, Pa., Automobile Club.

May 12—Sicily, Targa Florio, Automobile Club of Italy.

June 20-July 5—Grand Prix, Dieppe Circuit, Automobile Club of France. (Exact date to be announced.)

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Budlong Now Heads A. L. A. M.

At the annual meeting of the Association of Licensed Automobile Manufacturers in New York City, November 6, thirty of the thirty-one members were present, and officers were elected for the ensuing year.

Mr. M. J. Budlong was elected general manager, to fill the vacancy caused by the retirement of E. H. Cutler.

The officers chosen are: Charles Clifton, of the Pierce Company, president; Thomas Henderson, of the Winton Company, vice-president; H. H. Franklin, of the Franklin Company, treasurer, and L. H. Kittridge, of the Peerless Company, secretary.

The Executive Committee will be composed of Charles Clifton, W. E. Metzger, S. T. Davis, George H. Day and Thomas Henderson.

Immediately preceding this action, and following the provisions of the new constitution and by-laws adopted at the Atlantic City meeting, the following directors were elected:

For a three-year term—W. S. Gorton, Standard Welding Co.; H. S. White, Shelby Steel Tube Co.; P. S. Steenstrup, Hyatt Roller Bearing Co.; H. E. Raymond, The B. F. Goodrich Co.; for two years—C. E. Whitney, The Whitney Manufacturing Co.; D. J. Post, Veeder Manufacturing Co.; C. T. Byrne, Byrne, Kingston & Co.; W. H. Chapin, Brown-Lipe Co.; for one year—E. S. Fretz, Light Manufacturing and Foundry Co.; H. T. Dunn, Fisk Rubber Co.; F. E. Castle, Gray & Davis; L. M. Wainwright, Diamond Chain & Manufacturing Co.

Engineers Meet

A well-attended meeting of the Mechanical Branch of the Association of Licensed Automobile Manufacturers was held November 7, at their offices, 7 East Forty-second street, New York City. Owing to the presence in the city of so many engineers from the leading factories, the discussions on the various subjects were of more than usual interest.

The topics considered were safety starting handles, models of some new inventions being exhibited; the problem of eliminating noise in valve timing gears, the shape of cams, the properties of valve springs and engine torque at various speeds. After the meeting the members visited a laboratory and witnessed tests of a new type of two-cycle engine.

Henderson Chosen to Head N. A. A. M.

Thomas Henderson, of the Winton Motor Carriage Company, of Cleveland, O., was elected president of the National Association of Automobile Manufacturers at its recent annual meeting in New York City. The by-laws were amended, so that the initiation fee will be $500, instead of $25. In accordance with a request of the A. A. A., the president was instructed to make such appointments for a reference committee. The suggestions relative to racing on circular tracks, recently adopted by a conference under the auspices of the A. A. A., were referred to the contest committee for action. Messrs. S. T. Davis, Jr., L. H. Kittridge, William E. Metzger, Charles Clifton and S. D. Waldon were reelected as members of the executive committee, and the following officers were reelected:

Vice-president, S. D. Waldon, Packard Company; second vice-president, William E. Metzger, Cadillac Company; third vice-president, L. H. Kittridge, Peerless Company; secretary, C. C. Hildebrand, Stevens-Duryea Company; treasurer, William R. Innis, Studebaker Company.

Annual Meeting of M. & M. A.

About sixty members attended the annual meeting of the Motor & Accessory Manufacturers' Association, held in Hotel Astor, New York City, on November 6. The president's report covered a brief outline of the growth of the association since its organiatizon in February 11, 1904, at Cleveland. The treasurer's report showed an ample balance in the treasury, and it was definitely decided to establish permanent headquarters for the association. The following officers were elected: H. S. White, president; H. E. Raymond, first vice-president; H. T. Dunn, second vice-president; F. E. Castle, third vice-president; W. S. Gorton, treasurer; P. S. Steenstrup, secretary.

Philadelphia's Most Successful Show

Considering the limited amount of space afforded by the First Regiment Armory the seventh annual automobile exhibition of the Philadelphia Automobile Trades' Association, held November 9-16, proved to be the most successful show ever held in that city.

The setting was that of an out-of-doors effect secured by decorating the booths with an abundance of autumn foliage, while the floors of the booths were carpeted with a grass green burlap, with a similar material of a gravel color representing paths. The sidewalks and ceilings were covered with blue and yellow bunting, while each exhibit was designated by a golden banner with the names of the cars in crimson lettering.

The attendance was remarkably large, the armory being crowded to such an extent that it interfered with business. Altho the committee followed out the scheme of the New York shows and charged double admission on Tuesday and Thursday evenings, the attendance was large.

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Meeting of the A. A. A. Legislative Board

On October 31st, at Grand Central Palace, President Hotchkiss of the American Automobile Association called to order the convention of the members of the Association interested in legislation. Mr. Charles Thaddeus Terry, chairman of the Legislative Board, in his address stated that the Legislative Board has kept in touch with the legislative situation in the various States, in the legislatures of which at the last session statues relating to automobiles had been presented. Altho the general trend of the legislation as gathered from the data collected points to a larger degree of fairness than heretofore, it is to be regreted that automobile legislation is even yet of so divergent a nature thruout the States as to indicate an imperative demand for one of two things—either the speedy enactment of a federal law or the enactment thruout the States of a uniform State law framed upon the best of the present state laws as a model with improvements thereon if possible.

Three A's Re-Elect Old Officers

On November 8 the Board of Directors of the American Automobile Association held its annual meeting in New York City, and unanimously re-elected the officers as follows: President, William H. Hotchkiss, of Buffalo; first vice-president, Lewis R. Speare, of Boston; second vice-president, Asa Paine, of Minneapolis; treasurer, George E. Farrington, and secretary, F. H. Elliott.

Besides the election of officers and a vote to increase the Board from 11 to 17 members, the meeting was taken up by reading the annual reports of the officers.

The report of the secretary showed the membership of the association at this time to be as follows: Sixteen affiliated State associations, comprising 120 clubs, with a membership of 17,550; 15 unfederated clubs, with a membership of 1035; three life members and 621 individual members; in all, a membership at this date of 19,-209.

The treasurer's report, November 1, showed a balance on hand of $4,851.03. The total receipts from February 1 to November 1 were $20,862.85, including the balance carried over.

Action was taken vesting the Racing Board with control over all speed contests, including races between stock touring cars.

A. M. C. M. A. Plans to Invade Foreign Market on Wholesale Scale

Following its convictions that the time is ripe for an invasion of the foreign automobile markets on a wholesale scale, the Committee of Management of the American motor Car Manufacturers' Association, at a recent meeting, delegated its general manager, Alfred Reeves, to visit the London and Paris automobile shows to study foreign conditions, with the view of paving the way for the 51 makers in the organization to reach the foreign markets.

The best methods for selling cars, whether thru agents or branch houses, the plan of advertising campaign that should be followed, and other details are to be carefully investigated.

It was also decided to arrange for a wholesale exhibition of American cars at the foreign shows of next year, to be participated in by all the members of the A. M. C. M. A.

Suggestion for 1908 A. A. A. Tour

A meeting of the touring board of the A. A. A. was held in New York City on November 6, with Chairman Hower presiding. Mr. Hower stated that the board had compiled a mass of valuable information since its organization. It was the sense of the meeting that a special effort should be made by the incoming board to gather information as to garages and hotels together with their rates, and that this work should be pushed as rapidly as possible, so that the information may be on file for the 1908 touring season.

Many suggestions were made for next year's annual tour. The idea that met with the greatest approval was that of selecting a central point between Chicago and New York, and having the tour start from that city and finish there each day.

The tenth annual automobile salon of France, at Grand Palais and Place Des Invalides, Paris, under the auspices of the Automobile Club of France, was opened by President Fallieres, on November 12. It is on a more magnificent scale than ever before, the electrical display both inside and outside of the palace being especially striking.

T. F. Moore, secretary of the Automobile Manufacturers' Committee in charge of the American International Road Race to be held in the spring, announces the following Executive Board and Rules Committee which has been appointed by Robert Lee Morrell: Col. George Pope, Hartford, Conn.; Henry Ford, Detroit, Mich.; E. R. Hollander, New York City; H. A. Lozier, Plattsburg, N. Y.; A. Massenat, New York City; C. A. Singer, New York City; Jas. Joyce, Providence, R. I.; Paul Lacroix, New York City; Hayden Eames, Cleveland, O.; F. P. Brand, Williamsport, Pa.; Walter Allen, New York City; F. B. Stearns, Cleveland, Ohio. It is the intention of Mr. Morrell that this body frame the rules, fix the entry fee, definitely select the day in April when the race is to be held and take executive control of the meet.

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IN THE MARCH OF PROGRESS

R-S MOTOR CYCLES

easily lead all others!

UNSURPASSED IN EXCELLENCE

R-S Motor Cycles formed the most original, interesting and varied exhibit of the Motor Cycle Section at the recent New York Automobile Show.

Their high quality of workmanship and material excited the admiration of every motorist and mechanic.

The **1908 Prices of R-S Machines** formed a pleasant surprise to Dealer and Rider. The orders booked by us attest both the appreciation as well as the good judgment of those who wanted "America's Best,"—

THE "R-S" MOTOR BICYCLE

BUILT AND TESTED IN THE MOUNTAINS

REMEMBER: The "R-S" Motor is the only original, real and successful mechanical intake valve motor made and marketed in America today.

If not represented in your town, better write promptly to

READING STANDARD COMPANY

Reading, Pa., U. S. A.

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

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Change of advertising copy must reach this office not later than the 10th of each month. New advertisements will be accepted as late as the 20th.

Philadelphia, December 1st, 1907

"Nothing Succeeds Like Success"

At a time like the present when there is a feeling of unrest, and yet all acknowledge that the country is in truly a prosperous condition, the present state being largely due to the uncontrolled speculation of comparatively few, the wise members of the automobile industry redouble their efforts to bring themselves before the public. Makers who are now able to put themselves more prominently to the front will undoubtedly reap a much larger percentage of profit for their outlay, than at any other time. The very inactivity of their competitors opens the way for much more pronounced results from every dollar invested in legitimate publicity.

The old adage "Nothing succeeds like success" is still true and those who now push to the front will immediately be recognized as the successful, sound, conservative and progressive manufacturers. The companies who show that they are not afraid and now increase their efforts, add immediately to the weight tending to restore to equilibrium, the disturbed balance of public confidence and at the same time, mark themselves, in the eye of the buying public, as the most reliable and dependable makers. Those who hesitate and hold back will find themselves greatly injured by their inactivity and entirely distanced by their less fearless competitors, who grasp just such opportunities to get the added publicity offered by the retirement of the others.

SPECIAL NOTICE

We are now revising and correcting the 8th Annual "Buyers' Guide," which will appear in the January number of the CYCLE & AUTOMOBILE TRADE JOURNAL. If you have not returned the "pink sheet" sent you duly corrected, do so promptly. If you have not received one of these pink sheets and are manufacturing anything for the trade, advise us promptly, giving full particulars of your product.

CYCLE & AUTOMOBILE TRADE JOURNAL

Market & 49th Sts., Phila.

American Improvements Cause Drop in Foreign Car Prices

The recent drop in the prices of several of the best known foreign machines which are being sold in the United States has caused considerable comment. This move on the part of the importers is what should be expected at this time, and is the inevitable result of the marked improvement which has been made in the American product within the last few years. American makers of high-priced cars have gradually increased both the price and the manufacturing expense by the liberal use of alloyed steels, high grade ball bearings and other high quality materials. In the words of one of the best known importers, "There can be no doubt that the best types of American cars have shown remarkable improvement during the last two years. The prices on imported automobiles have in many instances been too high, in some cases fancy prices have been asked and paid for European machines. The day is past when, with the American product increasing in worth, the importer can point to such marked differences as will warrant these exceedingly stiff prices. The result is that there is a shrinkage in his ambitions in the price line, and a tendency to meet the American cars or come as near it as the extremely fine material and workmanship of the foreign machines will permit." This statement of the case from one of the leaders of the importers seems very close to the truth. The time is indeed past when fancy prices will be paid for imported machines, which, even acknowledging the fine material and workmanship put into them, are not at the present time in anyway superior to the best American-made cars, and, furthermore, are not as well adapted to our road conditions.

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ers is, then, the first public acknowledgment by the foreign makers that the American automobile has reached a stage of perfection which makes it a close competitor even to the very highest grade foreign machines, upon which type of machine the foreign makers have largely concentrated their efforts; while it is well known that the American builders have perfected to a greater extent the small light weight and low cost, but serviceable car. In the manufacture of the latter type of vehicle the foreign makers are not yet able to compete with us. This, then, shows the remarkable advance of the American makers in the last few years in the entire line of automobile construction, and the time cannot be far distant when it will be difficult to sell the highest priced foreign machines in any quantity in this country, even if the original price is the same as that asked for the best American-made machines, because in every case considerable increase in price must be made owing to the duty.

The importers this year for the first time will hold a show in Madison Square Garden, New York, in the endeavor to impress the American public with the number and importance of the foreign cars in this country.

Need for Motor Starting Devices

The present tendency in automobile design is toward the use of better material and increased refinements in construction. This refining process has been steadily continued until the up-to-date high-grade car is a compact, well-built, serviceable and reliable piece of mechanism, yet in spite of the numerous improvements of nearly all the details one glaring crudity still remains, and paradoxial as it may appear this crudity owes its continuance to the other refinements. Altho nearly everything has been done to make the present motor car comfortable, convenient and even luxurious, we daily witness the spectacle of a well-dressed owner stepping out into the street, often into the mud, and ignominously turning a crank, like the proverbial hand-organ grinder, before he can enter his superbly equipt and much refined car. The rear entrance tonneau was very soon discarded, largely because it necessitated walking into the street to enter the car, and it is certainly time that the even more antiquated starting crank, which is not only inconvenient, but even dangerous, should also be relegated to the past.

Refinements in motor construction are largely the cause of the continued use of the starting crank. The introduction of the four-cylinder motor and refinements in cylinders, pistons, rings, and ignition apparatus, made it possible to start on the spark. This occurred just at the period when attention was being given in some quarters to positive motor starting devices, and it was immediately said that the motors were now sufficiently self-starting not to require any special starting devices. With the coming of the six-cylinder motor, with its high percentage, when in good condition, in regard to starting on the spark, another setback was given the introduction of motor starting devices. Nevertheless, in spite of all these improvements, the fact still remains that many times even the best multi-cylinder engines have to be cranked, and this menial operation is even harder to perform on these large four- and six-cylinder cars than it used to be on the smaller models. Why are car motors left running at the curb side when this is not necessitated by the weather? Simply because the driver or owner dislikes to crank the engine, there is no other possible excuse.

Automobiles are being operated in constantly increasing numbers by women, and the cranking of the motor is still one of the objectionable features, and deters many an otherwise proficient driver from daily using a machine. It is certain that the family horse will never be eliminated as long as the starting crank remains.

Aside from the question of mere convenience, now that the gasoline truck and light delivery wagon are coming prominently to the front, the need of self-starting devices is even more pronounced, as their introduction means time and money saved, and is a business necessity. It has been variously estimated by large users of gasoline commercial vehicles that their trucks are on an average standing idle at the curb or in blockades from one-third to one-half of the time, according to the length of haul and number of stops. In nearly every case the truck driver rather than crank the motor will let it run idly while making a delivery, and even for longer stops when unloading. This practise not only is an absolutely needless waste of fuel, but unnecessarily heats and wears out the mechanism.

Altho the fuel used in any one instance or trip is comparatively trifling, yet when continued for an entire season, the waste is decidedly appreciable. Assuming that during a ten-hour day the motor runs idly on an average about four hours, this is approximately 100 hours a month, or in a season of eight months' service the motor is run idle 800 hours, which is equivalent to running it continuously and uselessly for 80 working days of ten hours each.

From the foregoing facts it will be seen that altho the antiquated method of starting a motor by cranking may be tolerated on a pleasure car, it should not be on a commercial vehicle, where it is more or less of a necessity, and such devices should be demanded, and doubtless will be, in the near future, by commercial car purchasers.

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This is the first and probably the only ear to give two Motor Car Exhibitions t Madison Square Garden, New York, and hort as the time was between January ast and November 1st, the automobile nakers accomplished much work and had he results as nearly ready for inspection s at any previous display where a full welve months was available for thought nd toil.

Not only were the cars ready on time, ut these 1908 exhibits showed study and triking advance towards finalities in everal features of the highest importance, here being ample evidence of intention to ully enclose all working machinery, to ake advantage of three-point suspension, o move the gear box forward to the motor

should be grouped together in assem units of rigid frame work and that versal joints are nothing to be proud

There are yet plenty of cars with gear box in the middle of the chassis, four universal joints of some sort bety the crank-shaft and the driving axles, there are also many examples of c designing, with nothing but the prop shaft between the front and rear mo and propulsion assemblies.

THE GARDEN DECORATION SCHEME

In the 1907 January show an out of d effect was sought, with sky and stars head. This November the main motive is a park simulation, sky and s left out, with a near-marble gateway real, practicable iron gates, wholly

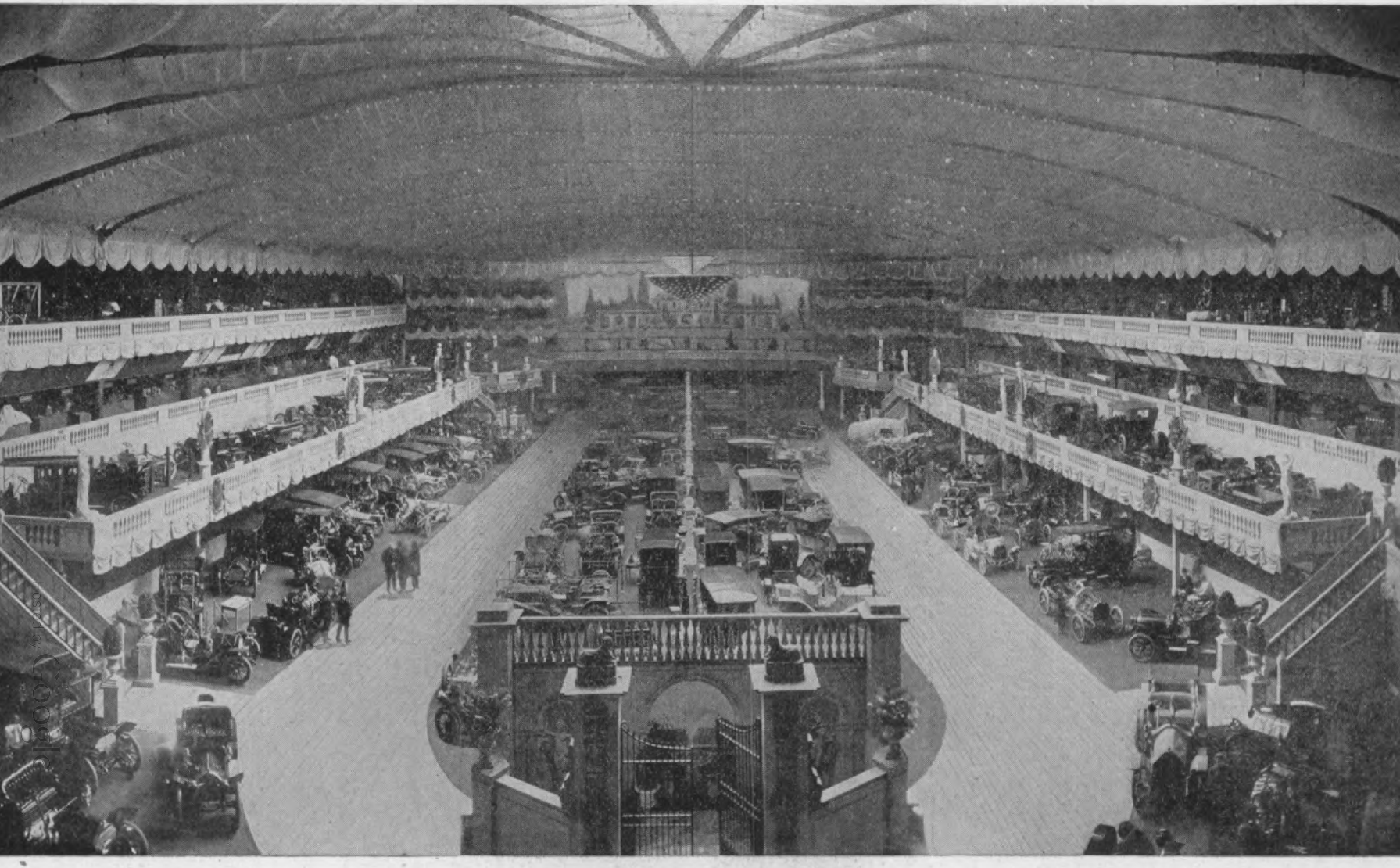
Madison Square Garden Show—View looking toward the entrance. This photograph w aken after the v hicles had been covered up for the night.

ase, or back to the rear axle, and place t in integral assembly with one or the ther, and to make brake diameters large enough for the work brakes have to do.

Of course these 1908 cars are better han any before shown; improvement is nevitable where mind, money and muscle are applied without stint to the advance- nent of any art or achievement, but the

used however, in front. Within the two decorative female figures stand a right and left, and point with their h for the guidance of spectators who m otherwise essay the futile gates. C figures were arranged with decorativ fect on pedestals around the balcony e

Much more to the purpose is the ch made in the space designation, which



Madison Square Garden Show, showing the entire interior of the building, as seen from the first gallery just within the entrance. The show this year was notable for the com
on the main floor and mezzanine floor, neat shields taking their place. The decorations this year were very neat and plain thruout.

The motorcycle has been very much
glected in America, but now claims
cognition by a far larger collection of
hibits in the basement than were ever
view at once before in this country.
e motorcycle is an unsocial affair, and
es not lend itself to touring functions
ve with severe luggage limitations, but
e number and excellence of the motor
iven two wheelers in evidence makes it
ear that buyers are plenty.

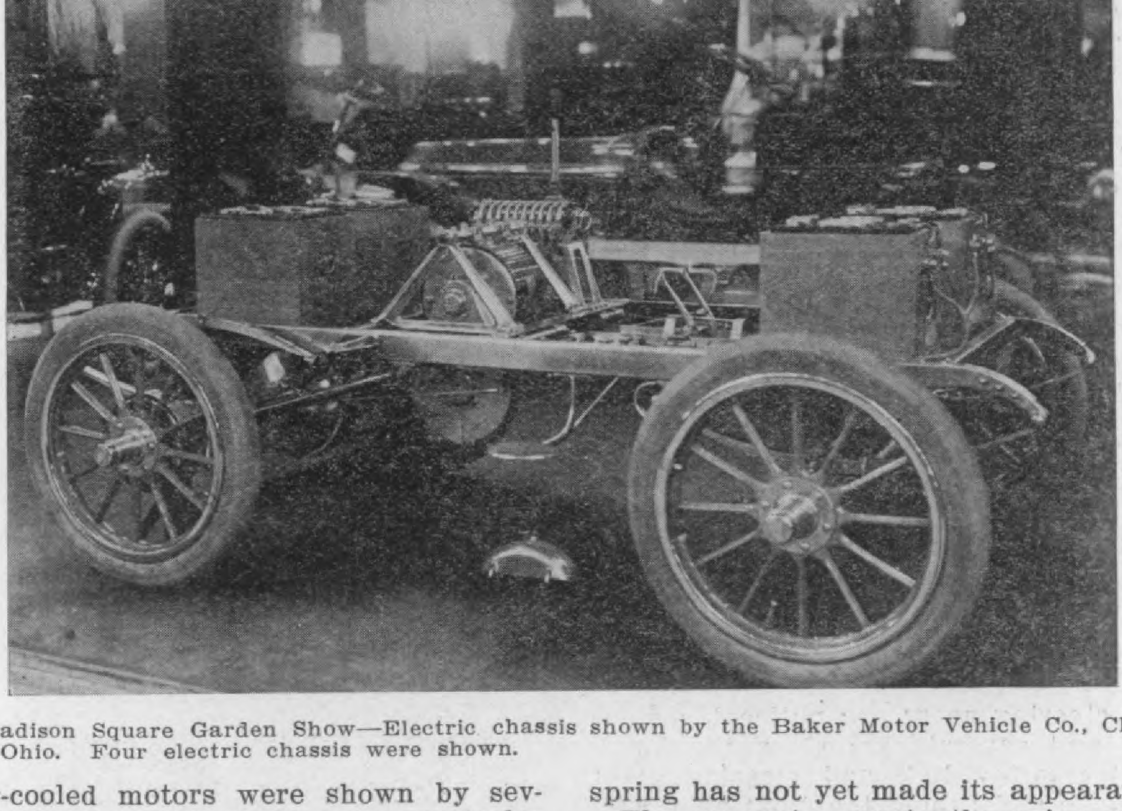
TWO-CYCLE AND AIR-COOLED MOTORS.

The solitary Elmore showed a bold and
ndiminished 2-cycle front among the over-
helming number of 4-cycle motors with a
e 4-cylinder sectional motor, electrically
iven in place in a stripped chassis, which
ows the extreme simplicity of the 2-cycle
otor to such advantage, and so loudly
oclaims its low cost and probable
rability, that it cannot fail to have a
ry great educational effect on the crowds
spectators.

THE PREST STEEL CHASSIS FRAME.

The Franklin and Pope Hartford c
as usual, show the only wooden chas
frame-sides in the garden, and the pr
steel frame is everywhere present and
treated in the most serious manner
several instances, notably in case of
Lozier, where it has sides bent in b
horizontal and vertical planes, is given
enormous depth of side members and
elaborate cross-members with deep op
work webs, all of the most costly desc
tion, designed thruout with the utm
care to obtain strength and stiffness.

The Packard showed an astonish
variation in its prest steel chassis fra
sides, by giving them short upward be
over the rear axle to take rubber buffer
curiously bold avowal of half-elliptic spr
assistance, but after all not more mark
perhaps, than the fitting of shock absorb
in the finely finished great Arrow chas
Very clearly, the wholly satisfactory



Madison Square Garden Show—Electric chassis shown by the Baker Motor Vehicle Co., Clev
nd, Ohio. Four electric chassis were shown.

Air-cooled motors were shown by sev-
ral different makers, one in particular
howed a complete line of air-cooled mod-
ls. Others, however, have weakened to
e extent of showing also some water-
ooled models altho all assert that the
ir-cooled cars were all right but the
hange had to be made to cater to public
ancy. In some instances where both are

spring has not yet made its appearanc
The magneto constantly gains gro
and the jump-spark holds its own.

BODY CONSTRUCTION

Probably at no previous show of
kind has there ever been seen fine
more costly vehicle bodies. In many
stances, condensed into the small s

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construction ornamentation and equipment. The colors are not as pronounced or as contrasty as in former years, altho much untufted enameled red leather is in evidence, in fact the tufted upholstery is largely giving place to the cleaner and neater with finish of the untufted leather. Particularly in the fittings have the makers designed and equipt with apparent disregard of expense. Straight line body designs largely predominate and the increase of enclosed body designs is very noticeable. It is in the latter that the most luxurious fittings are found.

One car was finished in hand tooled leather, ornamented by dainty colored lacquer and gold leaf, and so royally fitted that it might well be the equipage of a medieval monarch, yet this is but a regular stock model.

Even in the small comparatively low priced machines the workmanship and finish are much better than in previous years. The small enclosed town car which has previously been confined almost exclusively to the electrics has now entered the gasoline field and will undoubtedly be made in large numbers this season.

The coweled dash is now confined almost entirely to high powered runabouts, the front boards of the touring cars being usually plain boards of mahogany with brass beaded edges. All the dashes are freer of mechanism and there is a notable decrease in the number of sight feeds of the oiling system on the dash.

The wheel hubs are gradually being flattened to reasonable proportions, instead of protruding to even a dangerous degree as in some past models. The fenders are vastly superior this year being not only more substantial, but much more graceful in outline. In nearly every instance splash shields either of metal or enameled leather web the space between the guard proper and the body. These in conjunction with the liberal length under pans make it impossible for the flying dirt to strike the body, sides or passengers. Double rumble seat and rear convertible seats are rapidly increasing in number in the runabouts.

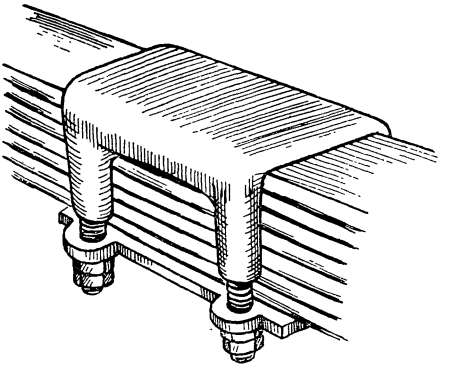
SMALL MECHANICAL DETAIL CHANGES.

The steering gears are noticeably more sturdy and several cars show the longitudinal steering link and steering pivot arm above and behind the front axle, well protected from road obstructions. The spark and throttle levers on the hand wheel are in many cases friction retained in place of the use of the stationary notched sector. The leakage at the lower end of the column to the carburetor and timer are better made and provided with bell joints. Half height doors at the front are largely used, a few being stationary, sides protected from foot scratching by decorated or monogramed leather pads. The floor boards and run boards are as a rule either aluminum or pyramid rubber.

One well-known maker shows a double fly-wheel engine, a small one being used at the front and the remainder of the necessary fly-wheel weight being carried as usual at the rear. The arrangement tends toward lessened torsion in the crank shaft and flexibility.

SPRINGS

The springs do not show much change, except better provisions are made for spring eye oiling, and the fastenings are more secure, the spring clips being in some cases webbed together as shown in the sketch.



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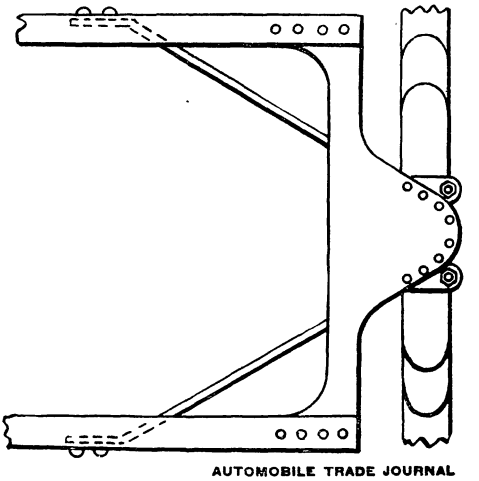
Shock absorbers are largely used, more being fitted by the makers than in previous years. In the case of platform springs the method of supporting the rear cross spring is much more substantial than in former years. One method is illus-



AUTOMOBILE TRADE JOURNAL

trated herewith. The rear cross frame member is carried outward to the rear at the center and supports the center of the cross spring being rigidly braced by diagonal bars, greatest depth in a vertical plane.

INTRODUCTION OF GUN METAL FINISH.

This show marks the real beginning of the use of dark finished lamps, radiators

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and steering posts. Gun metal finish as shown on the parts usually of highly polished brass of several high priced models. That there will be an extended use of this dark finish is unquestionable as it is not only serviceable, and saves unnecessary labor, but in addition it does not cast an unpleasant glare in the eyes of the driver or occupants and is with all very handsome in appearance.

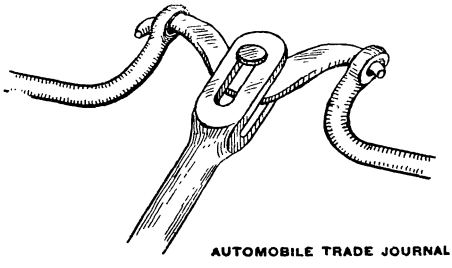
Square pattern side lamps have entirely superseded the bullet forms.

IGNITION.

Nearly all the high priced cars are now equipt with two distinct ignition systems and in most cases one of these includes a high tension magneto, many more of these being furnished as part of the regular equipment than ever before. The shaft drive is shown in overwhelming numbers and of the double side chain driven cars several are fitting chain guards.

BRAKES AND EQUALIZERS.

Nearly all brake rods have interposed equalizers, these being of the single tree type with variations, these solid rod constructions having almost entirely displaced the so prevalent former use of cable. In the accompanying drawing is shown one new form consisting of a yoke shaped single tree piece, the ends of which operate cross shafts supported on a cross frame member, the ends of the cross shafts carrying short arms connected by rods to the rear wheel brakes. All the car brakes are of increased size and both sets located on the rear wheel drums, the transmission brake being shown in only a few instances.

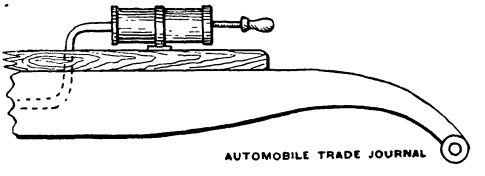


AUTOMOBILE TRADE JOURNAL

Motor governors seem to have almost entirely disappeared, altho one well-known firm shows a new diaphram governor connected to the cooling water system. The fans are more and more being positively driven by gears with a small friction device interposed to prevent breakage. Nearly all are supported on the motor base, and almost none on the radiator frame. Fans still using belts are fitted with flat ones or round ones of coiled wire.

CARBURETORS.

There are not so many new carburetors shown by the accessory makers, but there are numerous changes being made in the carburetors made by car manufacturers and supplied on the 1908 models. A few show new multiple jet types, while many have changed the design to that of an annular float with central gasoline nozzle which is unaffected by the angle at which the carburetor stands.. More are regulating the nozzle opening simultaneously with the throttle and water jacketing the mixing chamber, and most are arranged to take either warm or cold air. More care is shown in the placing of screens and the location of the intake to the carburetor to prevent the entrance of dirt. One carburetor is provided with a muffler over its intake pipes to prevent the whistling sound of the air. Priming devices are not as much in evidence as formerly, but one company has placed a very small hand plunger air pump as shown on the forward end of the right side frame member, a couple of strokes of which will depress the carburetor float sufficiently to flood the instrument.



AUTOMOBILE TRADE JOURNAL

The bearings are largely of the annular non-adjustable ball type, and are used freely thruout the constructions. Ball bearing crank shafts and cam shafts being numerous. Many are also using ball bearing steering pivots.

The show this year included a very complete list of exhibitors, in spite of the fact that the importers were not included, the list shows over 300 exhibitors as compared to 255 at the January show of last year.

Thirty-one different makes of gasoline cars, eight makes of electrics, thirteen commercial vehicles, and one make of steam car were shown, in addition to fifteen makes of motorcycles and 211 accessory exhibits. Eleven six-cylinder models varying in price from $3500 to $6500, and in horse power from 42 to 70 were exhibited, a large increase in the sizes over last year.

In regard to the show date a definite expression of opinion as to whether it is too early, has not been given, and owing to the financial situation can probably not be given. The setting of the date for the next show however will show the feeling of the A. L. A. M.

One of the features of the early shows this year was the number of automobilists that toured to the show, and it will even be more popular next year, provided the makers continue to promote early shows.

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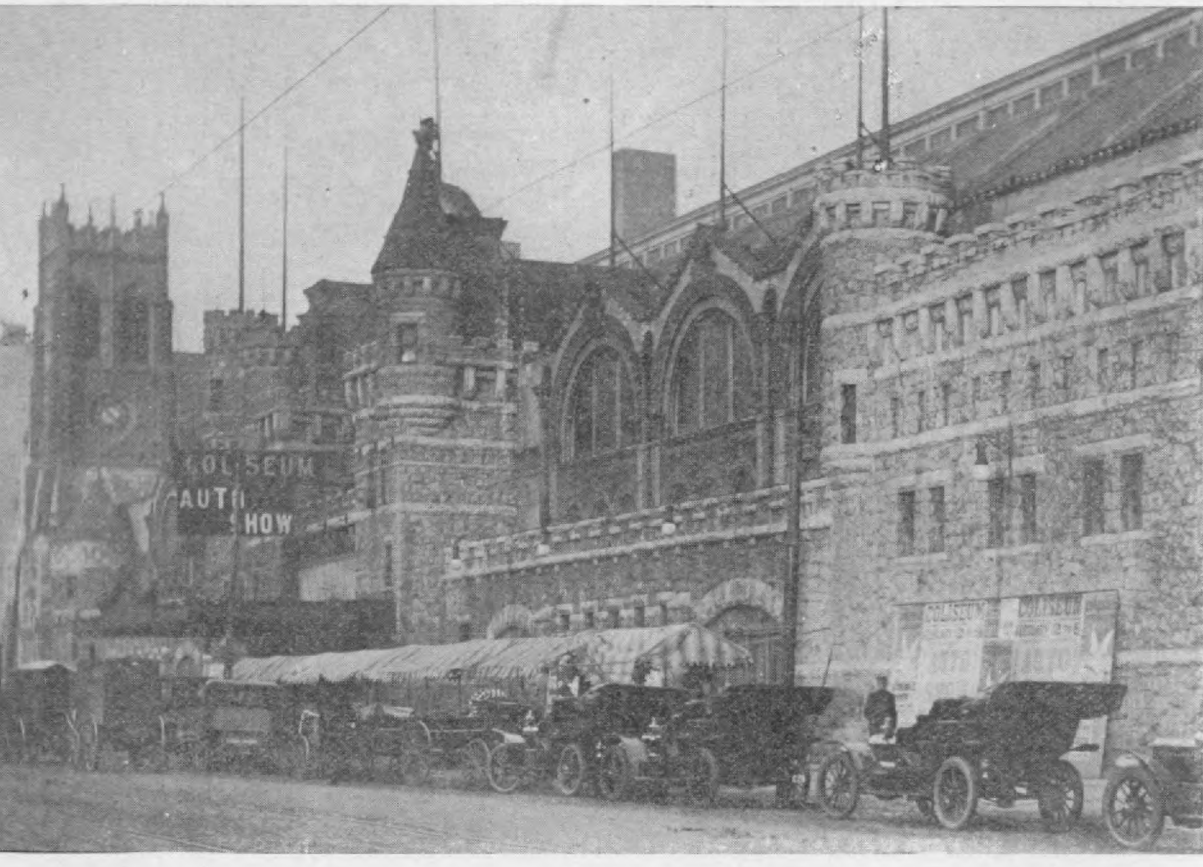
held in Chicago a monster triple build- exhibit, the only really representative omobile show in this country, as it l be held under the auspices of the Na- nal Association of Automobile Manu- turers, Inc. Here will be gathered to- her not only the licensed and unli- sed motor car makers, but by far the gest and most complete exhibit of ac- sories by the motor and accessories nufacturers that has ever been seen in s country. In addition a department l be devoted exclusively to motor- les, the little fellows who are surely tined to play in the near future an im- tant part in the motor-propelled vehi-

held, was formerly known as Tattersa and is located at Sixteenth and Sta streets, four blocks from the Colise and First Regiment Armory. It is 3 feet long and 153 wide. There is not post in the entire building.

Every form of motor-propelled comme cial vehicle, and, in addition, farm impl ments, fire department wagons and oth novelties will be shown, thirty-two co panies being represented.

The other two buildings which w house the pleasure vehicles are the we known Coliseum on Wabash avenue a the First Regiment Armory. The magn tude of the show can be grasped from t



The Coliseum, Wabash avenue, Chicago, where a large part of the exhibits of the Chicago venth National Annual Automobile Show will be on view. Additional space has this year been de available in the basement where will be housed about 20 car exhibits and 40 exhibits of cessories.

industry of our country. For the first e a comprehensive exhibit of commer- vehicles occupying an entire building be shown.

his will be known as the First An- l Exhibition of Commercial Motor icles. While it is, in some respects, a t of the old show, it was thought wise give it a distinct title, thus marking time when the commercial car as-

fact that there will be more automobi exhibitors than at the combined Ne York shows, and that there will be ov fifty accessories makers not represent at either of the Eastern exhibits. Th combined floor space will aggregate 16 067 square feet, which makes this th largest show of its kind yet held in Ame ica.

At the time of this writing it is stat

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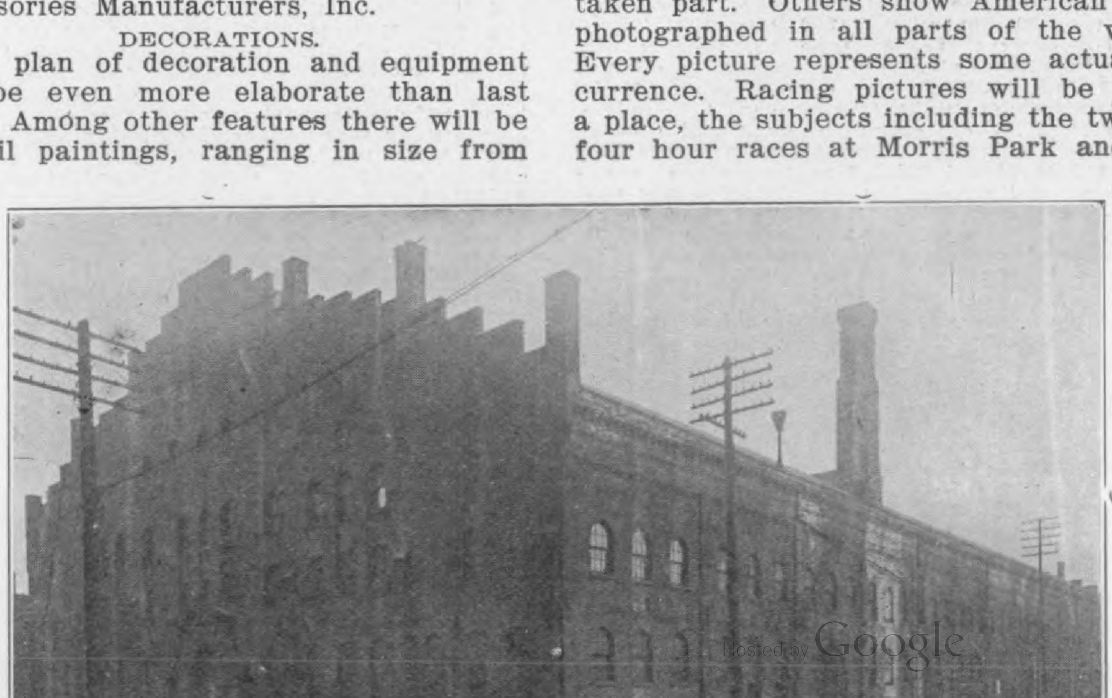
The 1st Regiment Armory, Chicago, where part of the Seventh National Annual Automobi
how will be held November 30-December 7, 1907. The combined floor space of the three buildin
or this show is 165,067 square feet, more than in any previous automobile show held in th
ountry.

the space, have been transferred to a parate building. The entire gallery of e Coliseum and second floor of the an-x, except the motorcycle section, have en taken by members of the Motor and ccessories Manufacturers, Inc.

DECORATIONS.

The plan of decoration and equipment ll be even more elaborate than last ar. Among other features there will be 2 oil paintings, ranging in size from four by eight to eight by twenty-four f covering, in all, 873 square feet of c vas. These pictures represent, in ma cases, scenes in which the cars exhibi in the immediate neighborhood h taken part. Others show American ca photographed in all parts of the wo Every picture represents some actual currence. Racing pictures will be giv a place, the subjects including the twen four hour races at Morris Park and



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Brookfields track, in England; a race on the Detroit track, and two scenes at the Vanderbilt cup race of 1906.

The motorcycle seems to have assumed a position of such importance as to demand considerable attention. A section in the second floor of the Coliseum annex has been devoted to it and ten manufacturers have taken advantage of the opportunity presented. The list includes all the leading makers of the country. This is not, as a matter of fact, the first year attention has been given to the motorcycle, as has been stated, for they have formed a feature of the Chicago show for three years. But it is the first time they have been given a place by themselves.

ADMISSION.

For the first time at Chicago the price of admission will be raised on Wednesday and Thursday. The crowds attending the show for the last four years have been so dense that it has been a difficult matter for investigators to get the attention to which they were entitled. The change in price of admission is designed to give these people breathing space and a chance to make an examination of the new models without overcrowding, and to afford the attendants an opportunity to give them the necessary time for proper instruction. The admission fee on the other five days will be 50 cents, as heretofore.

One price will entitle the visitor to admission to all of the buildings. It is not intended, however, to so crowd the commercial exhibit as to prevent proper investigation by persons genuinely interested. The management feels that it is due to the exhibitors in this department to afford the interested, investigating visitor every opportunity to secure all the information he desires.

Visitors to the Coliseum who are sufficiently interested to make the request, will be given tickets of admission to the commercial show without charge. Invitations, containing season tickets, have been mailed to members of the Illinois Manufacturers' Association and merchants in all parts of the country, and every effort is being made to secure the attendance of persons who are interested. The exhibitors have each been furnished as many invitations as needed for distribution among prospective customers and those interested.

The show will open as usual at 2 P. M. on Saturday, November 30, and each day thereafter, except Sundays, at 10 A. M., and will close at 10.30 P. M.

Summaries of Exhibits

The following is a list of the cars and parts exhibited, with brief specifications and references to the place where complete descriptions will be found:

ACME MOTOR CAR CO., Reading, Pa., about the same as exhibited at the recent New York Show; type 20, Sextuplet, $4500; Sextuplet limousine, 7-passenger, $5500; type 18, touring car, $4000; the new Sextuplet described in this issue.

AEROCAR MOTOR CO., Detroit, Mich., Model "D," 4-passenger, light touring car, 4 cylinders, 4x4, 20 H. P., three speeds forward and reverse, sliding gear, shaft drive, wheel base 104 inches; price, $1500; Model "E," 3-passenger car, motor same bore and stroke, but air-cooled, wheel base 105 inches; price, $1500; Model "F," 5-passenger touring car, 4 cylinders, 5x5 inches, 40 H. P., same general specifications; price, $2200.

ALDEN-SAMPSON MFG. CO., Pittsfield, Mass., same as exhibited at the recent New York Show, consisting of a gasoline-electric road train. Described in this issue.

AMERICAN LOCOMOTIVE AUTOMOBILE CO., 1886 Broadway, New York City; factory, Providence, R. I., 4 models; a 6-cylinder, 60 H. P. chassis, 4¾x5½, sliding change speed gear, selective operation, side chain drive, 126-inch wheel base, fitted as a touring car or runabout, $7500; with limousine body, $8500; a 40 H. P. car with combination body, 4 cylinders, 4¾x5½, sliding change speed gear, selectively operated, 4 speeds forward and one reverse, direct on both third and fourth, 126-inch wheel base; price as a touring car, $6500; with limousine body, $7500; 22 H. P. town car, 4 cylinders, 4x4¾, general chassis arrangements the same as in the 40 H. P. car, wheel base 112 inches; price, $6000; to be described in our next issue.

AMERICAN MOTOR CAR CO., Indianapolis, Ind., same as shown at the recent New York exhibit. To be described in our next issue.

AMERICAN MOTOR TRUCK CO., Lockport, N. Y., commercial vehicle, three tons capacity, with stake body, four cylinders, vertical, water-cooled motor, under driver's seat, 5x6, 40 H. P., planetary change speed gear, two forward and one reverse, double side chains, wheel base 9 feet 8 inches; price, $4000. Described in this issue, page 286.

APPERSON BROS. AUTOMOBILE CO., in addition to the models shown at New York, a 30-35 H. P. shaft-driven touring car, with a 5-passenger body. 1908 models described in our November, 1907, issue, page 78.

ATLAS MOTOR CAR CO., Springfield, Mass., the same 2-cycle line as shown at the recent New York exhibit. 1908 models described in this issue, page 104.

AUBURN AUTOMOBILE CO., Auburn, Ind., two models upon similar chasses. Model "G," 5-passenger touring car, 2-cylinder, opposed motor, under body, 5¼x5, 24 H. P., planetary change speed gear, 100-inch wheel base; price, $1350; a runabout with low, rakish body with rumble seat, same chassis; price, $1250. To be described in an early issue.

AURORA MOTOR WORKS, Aurora, Ill., gasoline touring cars.

AUSTIN AUTOMOBILE CO., Grand Rapids, Mich., Models LX-L, LX-R, XC-T and XC-R, as shown at the recent New York exhibition. These cars range in price from $4500 for the LX-T touring car to $7000 for the XC-C 6-cylinder touring car, which latter model is not shown, however, at Chicago. 1908 changes to be described in an early issue.

AUTO CAR CO., Ardmore, Pa., same models as shown at the recent New York exhibit. 1908 cars described in our November issue, page 156.

BABCOCK ELECTRIC CARRIAGE CO., Buffalo, N. Y., in addition to the models shown recently in the New York Show, a 4-passenger coupe, inside driven; 40-cell battery, half in front in the hood and half in the rear, two 3 H. P. motors, capable of 300 per cent. overload, operated from the left hand side by side levers, 4 passengers, or 5, if necessary, can be accommodated; price, $3000. To be described in an early issue.

BAKER MOTOR VEHICLE CO., Cleveland, O., same models as at the recent New York exhibit. To be described in an early issue.

BARTHOLOMEW CO., THE, Peoria, Ill., the same types as shown at the recent New York exhibition. Described in our November, 1907, issue, page 96a.

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BRUSH RUNABOUT CO., Detroit, Mich., same as shown at the recent New York exhibition. 1908 changes described in this issue.

BUCKEYE MFG. CO., Anderson, Ind., in addition to the cars exhibited at the recent New York Show, Model "S," 2-cylinder, opposed motor, 6x4½, 24 H. P., seating capacity five, 94-inch wheel base; price, $1275. 1908 models described in an early issue.

BUGMOBILE COMPANY OF AMERICA, 208 Wabash avenue, Chicago, Ill., motor buggy, Model B, passenger capacity two, two-cylinder, opposed motor, under seat, 4x4, 12 H. P., patented chain and sprocket, change speed gear with clutch between high and low, giving two speeds and one reverse, chain cable drive, wheel base 75 inches; price, $650. To be described in an early issue.

CADILLAC MOTOR CAR CO., Detroit, Mich., the same complete line of pleasure vehicles as shown at the recent New York exhibit. 1908 models described in our November, 1907, page 88.

CHICAGO COACH & CARRIAGE CO., 1223 Michigan avenue, Chicago, Ill., Model "A" runabout, passenger capacity three, two-cylinder, opposed motor, 4x4, 10-12 H. P., special selective change speed gear, consisting of three bevel gears and two pinions, two speeds ahead and one reverse, cable drive to rear wheels, wheel base 65 inches; price, $750. To be described in an early issue.

CLEVELAND MOTOR CAR CO., New York, same as shown at the recent New York exhibition. 1908 features described in this issue.

COLT RUNABOUT CO., 1548 Michigan avenue, Chicago, Ill., about the same as shown at the recent New York exhibition, consisting of the Colt 6-cylinder runabout, described in our August, 1907, issue, page 96.

COLUMBUS BUGGY CO., Columbus, O., the same as shown recently in New York. To be described in an early issue.

COMMERCIAL MOTOR TRUCK CO., Plymouth, O., commercial vehicle or sight-seeing body on same general chassis; Model "G," 20-passenger capacity, four-cylinder, water-cooled motor, under driver's seat, 4¾x5, 40 H. P., friction transmission, giving two to twenty miles per hour, double side chains, 103-inch wheel base; price, $2250. With this special friction transmission no differential is required. Described in this issue, page 276.

CONTINENTAL MOTOR CAR CO., 785 Jackson Boulevard, Chicago, Ill.

COPPOCK MOTOR CAR CO., Decatur, Ind., one commercial truck, Model "A," capacity 1 ton, 2-cycle motor, 2 cylinders, bore 4½x5 inches, stroke 5 inches, under the driver's seat, H. P. 20-24, progressive change speed gear, three forward and one reverse, double side chains, wheel base 87 inches; price of chassis, $2500. To be described in an early issue.

CORBIN MOTOR VEHICLE CORP., New Britain, Conn., same as shown at the recent New York exhibition. 1908 models to be described in our next issue.

CORNISH-FRIEDBURG MOTOR CAR CO., 1233 Michigan avenue, Chicago, Ill., "C-F" touring cars, 4 cylinders, 4¼x4¾, Ball planetary change speed gear, wheel base 108 inches. Described May, 1907, page 68.

COUPLE-GEAR FREIGHT WHEEL CO., Grand Rapids, Mich., an exhibit of electric commercial vehicles with four wheel drive of the couple-gear system. To be described in our next issue.

C. V. I. MOTOR CAR CO., Jackson, Mich.

DAYTON MOTOR CAR CO., Dayton, O., in addition to the cars exhibited in New York, Model 8-T, 6-cylinder roadster, 4⅝x6, 50-60 H. P., seating capacity 2, 3 or 4; price, $3750. To be described in an early issue.

DE LUXE MOTOR CAR CO., THE, Detroit, Mich., two touring cars and a polished chassis, same as exhibited at the recent New York Show. Described in this issue, page 199.

DIAMOND T AUTO CO., 3 Huron street, Chicago, Ill., Diamond T touring car and runabout.

DOLSON AUTOMOBILE CO., Charlotte, Mich., two models, H. and F; Model F, seven-passenger touring car, 4 cylinders, 5x5¾, 60 H. P., selective sliding change speed gear, three speeds forward and one reverse, shaft drive; price, $3250; Model H, five-passenger touring car, 4 cylinders, 4½x5¼, wheel base 115 inches; other specifications similar to Model F, weight 2700; price, $2500.

DRAGON AUTOMOBILE CO., Philadelphia, Pa., same models as shown recently in New York. To be described in an early issue.

ELECTRIC VEHICLE CO., Hartford, Conn., Mark 66-3, the combination gasoline and electric seven-passenger car, chassis fitted with touring car and limousine bodies. The transmission is electrical, no gears being used; in fact, the engine is not in any way connected mechanically with the driving shaft. These vehicles were shown at the recent New York exhibition. Described in our November, 1907, issue, page 70.

ELMORE MFG. CO., Clyde, O., same as exhibited at the recent New York Show, consisting of its line of well known two-cycle, three and four-cylinder models. 1908 changes to be described in an early issue.

FRANKLIN MFG. CO., H. H., Syracuse, N. Y., the same line of air-cooled cars as shown at the recent New York exhibit. 1908 changes described in the October, 1907, issue, page 168.

GAETH AUTOMOBILE WORKS, Cleveland, O., same as shown at the recent New York exhibition. 1908 models described in November, 1907, issue, page 87.

GEARLESS TRANSMISSION CO., Rochester, N. Y., three models, friction driven, the same as exhibited at the recent New York Show. Described in our September, 1907, issue, page 118.

GENERAL VEHICLE CO., Broadway and Sixty-second street, New York City.

GIFFORD-PETTIT MFG. CO., 720 Devon avenue, Chicago, Ill.

HATFIELD MOTOR VEHICLE CO., Miamisburg, O., same as shown at the recent New York exhibition. 1908 models described in the November, 1907, issue, page 144.

HAYNES AUTOMOBILE CO., Kokomo, Ind., the same models as shown at the recent New York exhibit, the 1908 models being described in our March, 1907, issue, page 215.

HOLSMAN AUTOMOBILE CO., Chicago, Ill., the same models as shown at the recent New York exhibit, and in addition the new limousine model motor, 2 cylinders, opposed, under the body, seating capacity 2, cylinders 4x4, 12 4-5 H. P., air-cooled. This car is fitted with a special enclosed limousine type of body. 1908 models practically unchanged, referred to in our February, 1907, issue, page 262.

IMPERIAL MOTOR CAR CO., Williamsburg, Pa., the same as shown at recent New York exhibit; one 30-35 H. P. chassis, and the same fitted with four individual bucket seats; price, $2650, and with folding rumble seat and runabout body, $2500. Described in this issue.

JACKSON AUTOMOBILE CO., Jackson, Mich., in addition to the cars shown in New York, Model F runabout for two; 2-cylinder motor, 5x4 inches, horizontal, under the hood, water-cooled Thermo-Syphon circulation, planetary change speed gear, two speeds forward and one reverse, 90-inch wheel base; price, $850, or $900 with top. 1908 models with the exception of this latest Model F, described in our November issue, page 83a; Model F to be described in an early issue.

JEFFERY & CO., THOMAS B., Kenosha, Wis., Model "Thirty-four," medium weight, five-passenger touring car, four-cylinder, vertical motor, 4½x4½, 32 H. P., sliding change speed gear, selective operation, three speeds forward and one reverse, shaft drive, 112-inch wheel base; price, $2250; Model "Thirty-four" touring roadster, passenger capacity 3, 4 cylinders, vertical, 4½x4½, same general features, but touring box and rumble seat removable, leaving a large deck for storing baggage; price, $2250; Model "Thirty-one" utility car, capacity five passengers, two cylinders, opposed, under the body, 5x6, 22 H. P., planetary change speed gear, two forward and one reverse, single chain drive, 106-inch wheel base; price, $1400. This machine is equipt with detachable tonneau and torpedo deck to be used in place of the tonneau will be furnished for $25 additional, or car will be furnished with the deck, without tonneau, at $1300. Described in our November, 1907, issue, page 79a.

KISSEL MOTOR CAR CO., Hartford, Wis., practically the same as exhibited at the recent New York Show, consisting of a limousine, touring car, roadster, and polished chassis. Described in our October, 1907, issue, page 164.

KNOX AUTOMOBILE CO., Springfield, Mass., the same as shown recently in New York. To be described in our next issue.

LARSEN ICE MACHINE CO., 315 Dearborn street, Chicago, Ill., gentlemen's speeding car, six-cylinder motor, 4⅞x5½ 120 H. P., sliding change speed gear, three speeds forward and

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one reverse, located in the rear axle, shaft drive. This machine is special thruout, and is built only to private order, direct from purchaser. It is most luxuriously fitted, all the bright portions being quadruple, silver plated. It is geared 2½ to 1 with 40-inch wheels, and weighs but 2700 pounds, and it is claimed with its 120 H. P. it can easily do two miles per minute. Price, $7500. To be described in an early issue.

LAUTH-JERGENS MOTOR CAR CO., 94-98 Rawson street, Chicago, Ill., Lauth-Jergens 4-cylinder touring car, 5x5 inches, selective transmission, partly by sliding gear and partly by lug clutches. To be described in an early issue.

LEAR AUTOMOBILE CO., OSCAR, Springfield, O., 2, 3 and 4-passenger air-cooled cars, as shown at the recent New York exhibition. 1908 changes to be described in an early issue.

LOCOMOBILE COMPANY OF AMERICA, Bridgeport, Conn., the same as shown at the recent New York exhibit. Described in our August, 1907, issue, page 56.

LOGAN CONSTRUCTION CO., Chillicothe, O., the same as exhibited at the recent New York Show; the latest models were described in our issue of November, 1907, Model "R" delivery wagon, on page 278, and Models "S" and "T" on page 288.

LORRAINE AUTOMOBILE MFG. CO., 1812 Twenty-second street, Chicago, Ill.

LOZIER MOTOR CO., 396 Wabash avenue, Chicago, Ill., Models G, H and I, Model G limousine, 7-passenger, 4 cylinders, 4⅝x5½, 40 H. P., selective sliding change speed gear, 4 speeds forward and one reverse, double side chain drive, wheel base 117 inches; price, $5000; Model H, 7-passenger touring car, 4 cylinders, 5¼x5¼, 45 H. P., same chassis arrangement, but 124-inch wheel base, $5000; Model I touring car, 6 cylinders, 4⅝x5½, 50 H. P., same general specifications, but 131-inch wheel base, $6000.

MATHESON MOTOR CAR CO., Wilkesbarre, Pa., same as at the recent New York Show. 1908 models described in this issue.

MAXWELL-BRISCOE MOTOR CO., Tarrytown, N. Y., the same models as shown at the recent New York exhibition, the 1908 models being described in this issue, page 192.

MEISELBACH MOTOR WAGON CO., A. D., North Milwaukee, Wis., two commercial vehicles; Model A, 1-ton chassis, two cylinder, opposed motor, 6x4½, located under the seat, 28 H. P. Friction change speed gear, known as a double bevel friction drive, giving speeds from one to ten per hour or greater if desirable, double side chains, wheel base 96 inches; price of chassis, $2000; Model B, two-ton brewery bottle wagon, with sliding doors, and also a Model B chassis, fitted with a sight-seeing body of 14 passengers capacity. The bevel drive of these machines obviate the necessity for a differential. Described in our October, 1907, issue, page 228.

MITCHELL MOTOR CAR CO., Racine, Wis., in addition to the cars shown at the recent exhibit in New York, a Mitchell truck with open body and the same chassis fitted with an enclosed laundry type of body, will be shown; the motor is four cylinders, vertical, 20 H. P., three speed and one reverse, sliding gear change speed, worm drive, wheel base 110 inches; price, $2000. The pleasure cars were described in our November, 1907, issue, page 108, and the truck in November, 1907, page 275.

MOLINE AUTOMOBILE CO., East Moline, Ill., three models, A, S and H, as shown at the recent New York exhibit. 1908 models described in the November, 1907, issue, page 93a.

MOON MOTOR CAR CO., St. Louis, Mo., same as exhibited at New York; Model C, 5-passenger, 30-35 H. P., 4½x4½, 4 cylinders, 110-inch wheel base, 4 speeds forward and reverse by sliding selective change speed gear, shaft drive; price, $3000; roadster seats 3 or 4 persons, same chassis, shaft drive, $3000; Model D, seats 7 persons, 4 cylinders, 4¼x4½, same general chassis specifications, except 121-inch wheel base; price, $3750.

MONARCH MOTOR CAR CO., Chicago Heights, Ill., two gasoline models, touring car, passenger capacity 5, 4-cylinder motor at the front, 4¾x5½, 40 H. P.; price, $2000; runabout, with the same motor, with double rumble seat; price, $1750. To be described in an early issue.

NATIONAL MOTOR VEHICLE CO., Indianapolis, Ind., same as exhibited at the recent New York Show, described in this issue.

NORDYKE & MARMON CO., Indianapolis, Ind., the same models as shown at the recent New York exhibition. The changes in the air-cooled motor were described in our November issue, page 142. The water-cooled model will be described in an early issue.

NORTHERN MOTOR CAR CO., Detroit, Mich., the same cars as exhibited recently in New York. 1908 models described in this issue.

OAKLAND MOTOR CAR CO., Pontiac, Mich.

OLDS MOTOR WORKS, Lansing, Mich., the same models as shown at the recent New York exhibit. 1908 models described in our November issue, page 90.

PACKARD MOTOR CAR CO., Detroit, Mich., same as shown at New York. Described in the July, 1907, issue, page 64.

PEERLESS MOTOR CAR CO., Cleveland, O., two models; Model 18 with touring limousine and roadster bodies, and Model 20, six-cylinder car, the same as exhibited at the recent New York Show. 1908 models described in November, 1907, issue, page 101.

PIERCE CO., GEORGE N., Buffalo, N. Y., four models. two six-cylinder touring cars, a four-cylinder touring car, and the same chassis with the suburban body and a small six, polished chassis, the same as exhibited at the recent New York Show. Described in this issue, page 120.

PIERCE ENGINE CO., Racine, Wis., same as shown at the recent New York exhibition. To be described in an early issue.

PITTSBURG MOTOR VEHICLE CO., 110 W. Thirty-fourth street, New York City, two models, both electric delivery wagons, driven by Westinghouse motors. Type 1 has a capacity of 750 pounds, and is driven by a single chain, has a wheel base of 75 inches. The price is $1875. Type 2 has 1500 pounds carrying capacity, is driven by double side chains, has 85-inch wheel base, and sells for $2625. To be described in an early issue.

POPE MFG. CO., Hartford, Conn., same as shown at the recent New York exhibit, consisting of Model M runabout and touring car, Model R touring car, Model X runabout, and X touring car. Model M, passenger capacity 2, 3 or 4. 4 cylinders, 30 H. P., selective sliding change speed gear, wheel base 109 inches; touring car the same general specification, wheel base 112 inches; price, $2750, same as the runabout; Model R touring car, passenger capacity 5, 4 cylinders, 25 H. P., progressive change speed gear, shaft drive, 102-inch wheel base, $2500; Model X runabout, passenger capacity 2, 4 cylinders, 20 H. P., progressive sliding change speed gear, wheel base 95 inches, $1750; Model X touring car, to seat 4, same specifications and price. To be described in our next issue.

POPE MOTOR CAR CO., Hartford, Conn., same as exhibited at the recent New York Show. To be described in our next issue.

PREMIER MOTOR MFG. CO., Indianapolis, Ind., three models, the same as exhibited at the recent New York Show. To be described in an early issue.

PULLMAN MOTOR CAR CO., Tacoma Building, Chicago, Ill., Model "15," Pullman "Flyer," seven-passenger touring car, four cylinders in front, 5¼x5½, 55 H. P., sliding change speed gear, four speeds ahead and one reverse, direct on the third, shaft drive, 120-inch wheel base; price, $4000. The motor and transmission are each on three point suspension, and five brakes are used for mountain travel. To be described in an early issue.

PUNGS-FINCH AUTO & GAS ENGINE CO., Detroit, Mich., two models, Model "H," five-passenger touring car, four-cylinder, vertical, water-cooled motor, 4½x5, 28-32 H. P., sliding change speed gear, selective operation, three speeds and one reverse, the second and third speeds are obtained by interlocking dogs in place of sliding gears, 106-inch wheel base; price, $2500. Model "35" runabout, with folding rumble seat, four cylinders, vertical, 4¾x5, same transmission, shaft drive, 106-inch wheel base; price, $2500. To be described in an early issue.

RAINIER MOTOR CAR CO., Broadway and Fiftieth street, New York City; factory, Saginaw, Mich., the same line of cars as shown at the recent New York exhibit. To be described in an early issue.

RAPID MOTOR VEHICLE CO., Pontiac, Mich., a large commercial car exhibit, consisting of Models E 182, 132, 125, 21, 85, 202 and 194, as shown at New York. The 1908 changes will be described in an early issue.

RAUCH & LANG CARRIAGE CO., Cleveland, O., complete line of electric pleasure vehicles. Described March, 1907, page 225a.

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RELIANCE MOTOR CAR CO., Detroit, Mich., same as exhibited at the recent New York Show, consisting of 2 to 5 -ton 2-cycle trucks and commercial cars. To be described in an early issue.

REO MOTOR CAR CO., Lansing, Mich., same as exhibited at the recent New York Show. 1908 models described in November, 1907, issue, page 176.

ROYAL MOTOR CAR CO., Cleveland, Ohio, same as at the recent New York exhibit. To be described in an early issue.

SAFIR AUTOMOBILE CO., Zurich, Switzerland.

SAYERS & SCOVILL, 2243 Colerian avenue, Cincinnati, Ohio, one commercial car, capacity 3000 pounds, air-cooled motor, under the seat, four cylinders, 4x4, 20-24 H. P., sliding change speed gear, three speeds forward and one reverse, double side chains, wheel base 100 inches; price, $2500. A special feature of this machine is the fact that no side levers are used. Described October, 1907, page 222.

SCHACHT MFG. CO., Cincinnati, Ohio, three models of high wheeled type with opposed motors, as shown at the recent New York exhibit. Described in our April, 1907, issue, page 136.

SHOEMAKER AUTOMOBILE CO., Freeport, Ill., touring car, Model "C," 4 cylinders, 4½x5¼, 35-40 H. P., selective sliding gear, 3 speeds forward and one reverse, shaft drive. Described in our September, 1907, issue, page 68.

SMITH AUTOMOBILE CO., Topeka, Kan., same as shown at the recent New York exhibition. 1908 models described in November, 1907, issue, page 77.

STAVER CARRIAGE CO., 76th and Wallace streets, Chicago, Ill., Model "D" buggy type with Stanhope body, passenger capacity two, motor, two-cylinders, opposed, at the rear, 5x5, 18-20 H. P., planetary change speed gear, two speeds forward and one reverse, double side chains, 78-inch wheel base, $1000. To be described in an early issue.

STEARNS CO., F. B., Cleveland, Ohio, in addition to the cars shown at the recent New York exhibit, a three-passenger runabout, $4500; a seven-passenger limousine, $5750; and a five-passenger landaulet, $5750. All with 4-cylinder motors, 5⅜x5⅞, 30 H. P., all being on the same, and only 4-cylinder chassis built by this company.

STEVENS-DURYEA CO., Chicopee Falls, Mass., same as shown at the recent New York exhibition. 1908 models to be described in our next issue.

STREATOR MOTOR CAR CO., Streator, Ill., touring car "C Halladay," passenger capacity 5 or 7, 4-cylinder, Rutenber motor, 4⅝x5, 35-40 H. P., sliding change speed gear, three forward and one reverse, shaft drive, wheel base 118 inches; price, $3000. To be described in an early issue.

STUDEBAKER AUTOMOBILE CO., South Bend, Ind., same models as shown at the recent New York exhibit, the 1908 models being described in this issue.

THOMAS MOTOR CO., E. R., Buffalo, N. Y., same as exhibited at the recent New York Show. 1908 models described in our October, 1907, issue, page 101. Six-cylinder and town car to be described in an early issue.

TINCHER MOTOR CAR CO., South Bend, Ind., four models on two chasses, seven-passenger touring car and three-passenger roadster of six and four cylinder type, the engines being under the hood, with bores of 4x6 and 5x6, 50 and 90 H. P., selective sliding change speed gear, four speeds ahead and one reverse, double side chains, wheel bases 110, 127 and 140 inches; prices, $5500, $6500 and $7500. Described in our September, 1907, issue, page 110.

WALTHAM MFG. CO., Waltham, Mass., the same as shown at the recent New York exhibit, consisting of Models DLR, 20 H. P., 4-cylinder, runabout; Model 18 H. P., single cylinder runabout; Model 29, 8 H. P., 2-cylinder, runabout; Model 158, 14 H. P., 2-cylinder, tonneau car; Model 188, 14 H. P., 2-cylinder, Democrat Wagon, described in this issue, page 95.

WAYNE AUTOMOBILE CO., Detroit, Mich., the same as shown at the New York exhibit, consisting of the Wayne "Thirty," with touring, tourabout and roadster bodies: also a polished chassis. Described in our November issue, page 148.

WAYNE WORKS, Richmond, Ind., two models, 4 cylinders, air-cooled, 3¾x4, sliding change speed gear, shaft drive; price without top, $1450; with top, $1525. Also a Model I, 5 or 6 passenger car, 4 cylinders, air-cooled, 4¼x4½, sliding change speed gear, selective operation, three speeds forward and one reverse, 106-inch wheel base. Described in November, 1907, issue, page 148.

WELCH MOTOR CAR CO., Pontiac, Mich., Models 6-L and 4-I, as shown at the recent New York exhibit. Price of the touring car is $6000 and for the limousine $5500. To be described in an early issue.

WESTERN TOOL WORKS, Galesburg, Ill., Model "K," 8, five-passenger touring car, two-cylinder, opposed, motor under body, 5½x5½. 30 H. P., planetary change speed gear, two forward and one reverse, single chain drive, 95-inch wheel base; price, $1250. The body on this machine is tilting, exposing the motor. Model 8, two-passenger runabout, two-cylinder, opposed, motor under hood, 4¼x4¾, 14 H. P., planetary change speed gear, two speeds forward and one reverse, bevel gear shaft drive, wheel base 85 inches; price, $1000. To be described in an early issue.

WHITE COMPANY, Cleveland, O., full line of steam pleasure vehicles, as shown at New York Show, and also an exhibit of the White commercial vehicles.

WINTON MOTOR CARRIAGE CO., Cleveland, O., identically the same exhibit as shown recently at New York, consisting of the different models of the Six-Teen-Six, described in our September, 1907, issue, page 132.

WOODS MOTOR VEHICLE CO., electric vehicles as follows: No. 214, with solid tires, $2100; 214 B, same chassis with additional seat, $50 extra; 214 A, four-passenger inside operated brougham; also the Victoria chassis. To be described in an early issue.

WORTH MOTOR CAR MFG. CO., Evansville, Ind., sight-seeing vehicles. Brief description March, 1907, page 232.

ACCESSORIES AND PARTS

The following accessory and parts makers are those who are exhibiting at Chicago, but did not exhibit at either of the New York Shows. The Chicago exhibits of those who were also at either or both of the New York shows will be the same as the New York exhibits and were summarized in the November 1907 Journal.

ARNSTEIN, EUGENE, Thirty-fifth and Shields avenue, Chicago, Ill., Star Power Pumps, double and single types, as illustrated in our June, 1907, issue, page 216; the H. P. Spark Plug to be described; the Century Lamps, described in our June, 1907, issue, page 216; Goggles, and also a complete line of Automobile Accessories.

ATWOOD MFG. CO., Amesbury, Mass., full line of 1908 Gas Headlights, Oil Side Lights, Tail Lights, Electric Lamps and Generators, newest designs of which will be illustrated and described in the January Journal.

AUTO GOODS CO., 95 Milk street, Boston, Mass., the Cinch Tire Repair Kit, as described in our March, 1906, issue, page 306, and April, 1907, issue, page 192.

AVERY PORTABLE LIGHTING CO., Milwaukee, Wis., "Autogas" tanks, described in our September, 1906, number, page 164, with a new method of fastening to the running board, to be illustrated in our next issue; also the "Autogas" tire filling tank, described on page 240 of the January, 1907, Journal.

BEMUS, T. ALTON CO., Boston, Mass., "Bemus" latest Timers and Distributors, as described in our February, 1907, number, page 354, and in this issue, page 264.

CARTIER, CHAPMAN & CO., Ludington, Mich., Models E and F wind shields, to be described in our next issue. These are half-folding, while the Models A and B, which have been described in these columns, are full folding.

CHICAGO BATTERY CO., 1400 Michigan avenue, Chicago, Ill., "Duro" ignition battery, described in the December, 1906, number, page 192, and the "Duro" electric searchlight, described in the same number, page 202; also full line of dome lights, battery charging plugs, and other electrical specialties.

CHICAGO WIND SHIELD CO., 235 Johnson street, Chicago, Ill., line of wind shields, to be described.

DUPLEX COIL CO., Fon-du-Lac, Wis., "Du-

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plex" spark coils, described January, 1905, page 248.

FOWLER-MANSON-SHERMON CYCLE MFG. CO., S. W. Corner Rush and North Water streets, Chicago, Ill., 1908 Manson Motorcycle, to be described in a future issue. This is a Thor type machine, listing at $225.

FRANCO-AMERICAN AUTO SUPPLY CO., 1404 Michigan avenue, Chicago, Ill., line of automobile supplies.

EDMUND E. HANS CO., 424 South Fourth street, Minneapolis, Minn., "Hans" gasoline indicator, described in this number, page 228.

HARLEY-DAVIDSON MOTOR CO., 35 East Adams street, Chicago, Ill., 1908 Harley-Davidson motorcycles, to be described.

IMPERIAL BRASS MFG. CO., 241-249 South Jefferson street, Chicago, Ill., large variety of brass fittings, including tire pump, described February, 1906, page 180; gasooline strainer, robe and apparel holder, new priming cups and gasoline cocks, to be described, and air pumps, pressure regulators, gasoline systems, lamp brackets, name plates, hood and radiator fittings, wind shield fittings, etc.

LIPMAN MFG. CO., Beloit, Wis., "Lipman" circulation pumps, timers and speed indicators, described in our February, 1907, number, page 294, and the "Lipman" dashboard Odometer, described in our May, 1907, number, page 148.

LONGDIN-BRUGGER CO., Fond du Lac, Wis., three motor car tops, one in black pantasote, with black silk lining; one pantasote strap unlined top, and one pantasote black silk lined runabout top; also a full line of their top materials.

LONG MFG. CO., 1432 Michigan avenue, Chicago, Ill., "Long" radiators, which have been described in previous issues of the Journal. Any new features will be described in our next issue.

McCANNA MFG. CO., 56 North Jefferson street, Chicago, Ill., latest McCanna oilers, as described in our November, 1907, issue, page 262. Exhibit will represent a tower decorated with 1- to 12-feed oilers, each oiler being provided with a 6-volt electric light, which is part of the regular equipment.

McCORD & CO., 1412 Old Colony Building, Chicago, Ill., "McCord" force feed oilers, described in our February, 1907, issue, page 372; radiators, carburetors, wire belting, spark plugs, circulating pump and "McKim" copper asbestos gaskets. New features will be described in a future issue.

McMULLEN, ROGER B., 1241 Michigan avenue, Chicago, Ill., prest steel frames and automobile stampings, made by Hydraulic Pressed Steel Co., Cleveland, Ohio.

MUNCIE AUTO PARTS CO., Muncie, Ind., "Muncie" change speed gear, steering apparatus, differentials, etc., made on contract.

NATIONAL OIL PUMP & TANK CO., Dayton, O., "National" gasoline storage outfits, late models of which were described in our March, 1907, number, page 288; 1908 improvements will be described in our next issue.

NEELY, EDWARD & CO., 244-246 Wells street, Chicago, Ill., "Neely" mechanical oilers, to be described in our January number.

NEVER-MISS SPARK PLUG CO., Lansing, Mich., the Never-Miss Ammeters and Voltmeters, as described in our September, 1907, issue, page 160; the Never-Miss Spark Plug, described in our November, 1905, issue, page 164, and the chain repair device, to be described.

PFANSTIEHL ELECTRICAL LABORATORY, North Chicago, Ill., Pfanstiehl Automobile Coils, as described in our August, 1907, issue, page 148; Motorcycle Coils, described in our November, 1907, issue, page 296; and Marine Coils, described in our December issue, page 319.

PITTSFIELD SPARK COIL CO., Dalton, Mass., "Pittsfield" 1908 coils, magnetos, switches, plugs and commutators, new features of which will be described in our next issue.

PRECISION APPLIANCE CO., 832-840 Austin avenue, Chicago, Ill., latest type of Hill Precision Oiler, to be described in our next issue.

WM. C. ROBINSON & SON CO., 336 North street, Baltimore, Md., line of lubricants, including their Autoline, Greoil, Journal Compound, as described in our January, 1906, issue, page 348, and Graphite Machine Grease, a new lubricant, to be described.

ROSS GEAR & TOOL CO., latest Ross Steering Gears, as described in our November, 1907, issue, page 236, and the Ross Bevel Gear Drive, in December, 1906, issue, page 286.

STANDARD LAMP & MFG. CO., 455 South Canal street, Chicago, Ill., full line of acetylene, oil and electric lamps, including the new designs described on page 268, this issue.

STANDARD VARNISH WORKS, 2629 Armour avenue, Chicago, Ill., samples of Standard varnishes, exhibition consisting mainly of bottles containing varnishes for automobile finishing, and a fine selection of varnish gums.

TRIPLE ACTION SPRING CO., 1254 Michigan avenue, Chicago, Ill., "Triple Action" semi-elliptic springs, as described in our September, 1907, issue, page 160, and the platform spring, described in this issue, page 214; also a new full elliptic spring, to be described in our next issue.

UNCAS SPECIALTY CO., Norwich, Conn., "Leavitt" Timer, described February, 1907, page 352; "Leavitt" siren, described March, 1907, page 284, and the latest "Leavitt" distributor, to be described.

VEHICLE TOP AND SUPPLY CO., 900-902 Cass avenue, St. Louis, Mo., one Vesco Top, demonstrating their 1908 construction, which will be described in a future issue. Other new Vesco products have been described in our March, 1907, issue, page 302.

VIVAX STORAGE BATTERY CO., 2224 Michigan avenue, Chicago, Ill., showed the Vivax Sparking Battery, which was described in our September, 1907, issue, page 148.

WARNER CLUTCH CO., 1461 Michigan avenue, Chicago, Ill., "Warner" clutch; 1907 model was described in our March, 1907, number, page 322, and 1908 changes will be described in a future issue.

WESTERN MALLEABLE STEEL CO., 1250 River street, Detroit, Mich., line of steel castings for automobile construction, grey iron cylinders of different design, a flywheel cast with 14 fan blades set at an angle of 45 degrees; also line of drop forgings, including nickel and nickel chrome crank shafts, and one-piece front axles of difficult designs.

WHITELEY STEEL CO., Muncie, Ind., samples of Whiteley Crown Steel Castings.

WRAY PUMP & REGISTER CO., Rochester, N. Y., "Kellogg" and Kellogg, Jr., tire pumps, "National" tire pressure register and "Wraylog" pneumatic jack, all of which are well known to the trade, and have been fully described in previous issues of the Journal.

Directory of Chicago Show Exhibitors

(Alphabetically Arranged)

The few deviations from the Show Catalogue are due to changes made since this list went to press. Wherever the building is not mentioned in the accompanying list the space is in the Coliseum.

Acetyvone Co., 1st Regiment Armory, Gallery 10.
Acme Mot. Car Co., 1st Regiment Armory, E-4.
Aerocar Co. (The) First Regiment Armory, B-3.
Ajax-Grieb Rubber Co., Gallery 58.
American Aluminum Coating Co., Basement 9.
Amer. Elec. Nov. & Mfg. Co., 2nd floor annex 136.
Amer. Locomotive Auto Co., 1st Reg. Armory A-4.
Amer. Motor Car Co., 1st Reg. Armory D-4.
Amer. Mot. Truck Co., 7th Reg. Armory, Main Floor 3.
Apperson Bros. Auto Co., Main Floor C-1.
Armac Motor Co., Second Floor Annex 125.
Arnstein, Eugene, 1st Reg. Armory, Gallery 5-8.
Atlas Mfg. Co., Seventh Regiment Armory.
Atlas Motor Car Co., Basement 34-35.
Atwater-Kent Mfg. Works, 2nd floor Annex 89.
Atwood Mfg. Co., Second Floor Annex 110.
Auburn Automobile Co., 1st Reg. Armory F-1.
Aurora Automatic Mach. Co., Gallery 16-1.
Aurora Motor Works, Basement 23-25.
Austin Automobile Co., 1st Reg. Armory D-1.
Auto Accessories Mfg. Co., 2nd floor Annex 81-82.
Autocar Co., (The), Annex M-1.
Auto Goods Co., Basement 7.
Auto Improvement Co., Gallery 14.
Automobile Topics, Basement 44.
Auto. Utilities Co., 7th Reg. Armory, Gallery E.

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Auto Parts Co., 1st Reg. Armory, Gallery 32.
Auto Pump Co. (The), Second Floor Annex 98.
Avery Port. Light'g Co., 2nd Floor Annex 116.
Babcock Elec. Carriage Co., Main Floor J-1.
Badger Brass Mfg. Co., Gallery 40-41.
Baker Motor Vehicle Co., Annex O-1.
Baldwin Chain & Mfg. Co., Gallery 61.
The Bartholomew Co., Main Floor D-5.
Bemus, T. Alton, Basement 8.
Bosch, Robt., N. Y., Inc. 1st Reg. Armory, Gal. 39.
Bowser, S. F. & Co., Inc., Gallery 72-73.
Breeze Carburetor Co., 2nd Floor Annex 97.
Briscoe Mfg. Co., 2nd Floor Annex 105.
Brown-Lipe Gear Co., Gallery 36.
Brownell, F. A. Mot. Co., 1st Reg. Armory. Gal. 35
Brush Runabout Co., 7th Reg. Arm. Main floor 8.
Buckeye Mfg. Co., 7th Reg. Armory. Main floor 20.
Buckeye Mfg. Co., First Regiment Armory A-1.
Bugmobile Co. of America, Basement 4.
Byrne, Kingston & Co., Gallery 75.
C V. I. Motor Car Co., Basement 41-43.
Cadillac Motor Car Co., Annex O-2 and 3.
Cartier, Chapman & Co., 7th Reg. Arm. Gal F.
Central Rub. Co., 1st Reg. Armory, Gallery 38.
Chase, L. C. & Co., Second Floor Annex 1344.
Chicago Battery Co., Gallery 22.
Chicago Coach & Carriage Co. First Reg. Armory, E-1 West 1-2.
Chicago School of Motoring, Basement 5.
Chicago Wind Shield Co., Basement 52.
Class Journal Co. (The), 1st Reg. Arm. Gal. 29.
Cleveland Motor Car Co., 1st Reg. Armory C-1.
Columbus Buggy Co., First Reg. Armory A-2.
Colt Runabout Co., 7th Reg. Arm. Main Floor 26.
Commercial Motor Truck Co., 7th Reg. Armory, Main Floor 15.
Conn. Tel. & Elec. Co., 2nd Floor Annex 114.
Cooks, Adam Sons, Gallery 6.
Cook's Standard Tool Co., Gallery 70.
Coppock Mot. Car Co., 7th Reg. Arm. Main floor 17.
Corbin Mot. Veh. Corporation Annex Q-4 and 5.
Cornish-Friedberg Motor Car Co., Basement 36-40.
Consolidated Mfg. Co., Second Floor Annex 130-131
Continental Caoutchouc Co., 1st Reg. Arm. Gal. 3-4
Continental Motor Car Co., 7th Regiment Armory, Main Floor 27.
Couple-Gear Freight-Wheel Co., 7th Reg. Armory, Main Floor 10.
Cowles, C. & Co., Second Floor Annex 96.
Wm. Cramp & Sons. S. & E. Bldg., Gallery 20.
Curtis, C. H. Mfg. Co., 2nd Floor Annex 126.
Cycle & Automobile Trade Journal. 1st Regiment Armory, Gallery 17.
Dayton Electrical Mfg. Co., Gallery 29.
Dayton Motor Car Co., Main Floor D-1.
De Luxe Motor Car Co., 1st Reg. Armory D-2.
Diamond Chain & Mfg. Co., Gallery 55.
Diamond Rubber Co., Gallery 34-35.
Diamond Rub. Co., 7th Reg. Armory. Gal. 34-35.
Diamond T. Motor Car Co., 1st Reg. Armory, Main Floor F-2.
Dietz, R. E. Co., Gallery 28.
Diezemann Shock Absorber Co., 2d floor annex 115
Dixon Crucible Co., Jos., Second Floor Annex 87.
Dolson Automobile, First Regiment Armory E-3.
Dragon Automobile Co., Annex N-1.
Duff Mfg. Co. (The), Second Floor Annex 83.
Duplex Coil Co., (The), Basement 48.
Edmunds & Jones Mfg. Co. (The), Gallery 74.
Elec. & Mechanical Development Co., 1st Reg. Armory, Gallery 36.
Electric Storage Battery Co., Gallery 12.
Electric Vehicle Co., Main Floor A-4.
Elmore Mfg. Co., Main Floor C-3.
Empire Auto Tire Co., 2nd Floor Annex 92.
Excelsior Mot. & Mfg. Co., 2nd Floor Annex 129.
Excelsior Supply Co., 1st Reg. Armory. Gal. 25-28.
Firestone Tire & Rubber Co., Gallery 67-68.
Firestone Tire & Rub. Co., 7th Regiment Armory, Gallery 67-68.
Fisk Rubber Co., Gallery 53-54.
Fowler-Manson-Sherman Cycle Mfg. Co., Second Floor Annex 127.
Franklin, H. H. Mfg. Co., 7th Regiment Armory, Main Floor 4.
H. H. Franklin Mfg. Co., Main Floor D-4.
Franco-American Auto. & Supply Co., 1st Regiment Armory, Gallery 15-16.
G & J Tire Co., Gallery 38-39.
Gabriel Horn Mfg. Co., 2nd Floor Annex 142.
Gaeth Automobile Works, Basement 31-32.
Gearless Transmis. Co., 1st Reg. Armory B-4.
Gemmer Mfg. Co., Second Floor Annex 104.
General Vehicle Co., 7th Reg. Arm. Main Floor 21.
Gifford-Pettit Mfg. Co., 7th Regiment Armory, Main Floor 19.
Goodrich, B. F. Co., Gallery 47-48.
Goodyear Tire & Rubber Co., Gallery 59-60.
Goodyear Tire & Rubber Co., 7th Reg. Armory, Gallery D.
Gray & Davis, Gallery 43.
Gray-Hawley Mfg. Co., 2nd Floor Annex 99.
Ham, C. T. Mfg. Co., 2nd Floor Annex 143.
Hancock Mfg. Co., Gallery 78.
Hardy, R. E. Co., Second Floor Annex 86.
Harley-Davidson Mot. Co., 2nd Floor Annex 124.
Harris, A. W. Oil Co., Gallery 44.
Hartford Auto Parts Co., 7th Reg. Arm. Gal. C.
Hatfield Motor Vehicle Co., Basement 33.
Hartford Rub. Wks., 7th Reg. Arm. Gallery 30-31.
Hartford Rub. Works Co., Gallery 30-31.
Hartford Suspension Co., Gallery 19.
Haus, Edmund E. Co., 1st Reg. Arm. Gal. 33-34.
Haynes Automobile Co., Main Floor F-4.
Healey Leather Tire Co., 1st Reg. Arm. Gal. 31.
Heinze Electric Co., Second Floor Annex 106.
Heitger Carburetor Co., 1st Reg. Arm. Gallery 30.
Hendee Mfg. Co., Second Floor Annex 122-123.
Hoffecker Co., (The), Second Floor Annex 95.
Holsman Automobile, First Reg. Armory G-1.
Hornecker Mot. Mfg. Co., 2nd Floor Annex 141.
Horseless Age, 1st Reg. Armory, Gallery 22.
Hotchkin Mfg. Co., Second Floor Annex 80.
Hyatt Roller Bearing Co., Galery 50.
Igniter Appliance Co., 2nd Floor Annex 138.
Imperial Brass Mfg. Co., Gallery 8.
Imperial Motor Car Co., Annex P-2.
Indestructible Steel Wheel Co., 7th Reg. Armory, Gallery 7.
Indestructible Steel Wheel Co., Gallery 7.
Jackson Auto. Co., First Reg. Armory D-3.
Jeffery, Thos. B. & Co., Main Floor H-1.
Jeffery-Dewitt Co., Basement 45.
Jones, Jos. W., Gallery 56.
K. W. Ignition Co., Basement 1.
Kinsey Mfg. Co., Gallery 1.
Kissel Mot. Car Co., 1st Reg. Armory G-5.
Knight & Kilbourne, 1st Regiment Armory A-3.
Knox Auto. Co., 7th Reg. Armory. Main floor 25.
Knox Automobile Co., Main Floor A-5.
Kokomo Electric Co., Gallery 76.
Lauth-Juergens Motor Car Co., Basement 11-13.
Lear, Oscar, Auto Co., 7th Reg. Armory. Main Floor 5.
Oscar Lear Automobile Co., 1st Reg. Arm. E-2.
Leather Tire Goods Co., Gallery 79.
Light Mfg. & Foundry Co., 2nd Floor Annex 128.
Limousine Carriage Mfg. Co., 2nd floor Annex 146.
Lipman Mfg. Co., (The), Second Floor Annex 100.
Locomobile Co. of America. Main Floor A-2.
Logan Construction Co., 7th Regiment Armory, Main Floor 23.
Longdin-Brugger Co., Basement 49-50.
Long Mfg. Co., Gallery 52.
Lorraine Automobile Mfg. Co., Basement 27-28.
The Lozier Motor Co., Main Floor C-5.
M. A. A. M. Inc. Office, Gallery 69.
McCanna Mfg. Co., 1st Reg. Armory, Gallery 18.
McCord & Co., Gallery 13.
McMullen, Roger B., Basement 21-22.
Manhattan Screw & Stamping Co., 1st Regiment Armory, Gallery 23-24.
Matheson Motor Car Co., Main Floor E-3.
Maxwell-Briscoe Motor Co., Main Floor E-4.
Meiselbach, M. A. D. Motor Wagon Co., 7th Regiment Armory, Main Floor 12.
Merkel Motor Co., Second Floor Annex 132-133.
Michelin Tire Co., Second Floor Annex 102-103.
Midgley Mfg. Co. (The) Second Floor Annex 85.
Mitchell Mot. Car Co., 7th Reg. Arm. Main floor 13.
Mitchell Motor Car Co., Main Floor K-1.
Moline Auto. Co., 1st Reg. Armory E-6.
Monarch Mot. Car Co., 1st Regiment Armory E-5.
Moon Motor Car Co., 1st Regiment Armory C-2.
Morgan & Wright, Gallery 26-27.
Morgan & Wright, 7th Reg. Arm. Gallery 26-27.
Morrison, McIntosh & Co., 1st Reg. Arm. Gal. 21.
Mosler, A. R. & Co., Second Floor Annex 147.
Motor, First Reg. Armory, Gallery 9.
Mot. & Accessories Mfgrs., Inc., Gallery 69.
Motor Age, 1st Reg. Armory. Galery 24-A.
Mot. Car Specialty Co., 2nd Floor Annex 112.
Motor Way (The), 1st Reg. Armory, Gallery 2.
Motsinger Device Mfg. Co., Gallery 24.
Motz Clincher Tire & Rubber Co., First Regiment Armory, Gallery 20.
Muncie Auto Parts Co., 2nd Floor Annex 121.
Nat. Battery Co., 7th Reg. Armory. Gallery A.
National Battery Co., Second Floor Annex 101.
National Carbon Co., Gallery 45.
Nat. Motor Vehicle Co., Main Floor H-2.
Nat'l Oil Pump & Tank Co., 2nd Floor Annex 145.
Neely, Edw. & Co., 1st Reg. Armory, Gallery 13.
Never-Miss Spark Plug Co., Gallery 5.
Newmastic Tire Co., 1st Reg. Armory, Gallery 14.
N. Y. & N. J. Lubricant Co., Gallery 65.
Nordyke & Marmon Co., 1st Reg. Armory F-2.
Norris Auto. Co., 1st Reg. Armory, Gallery 37.
Northern Motor Car Co., Main Floor C-2.
Norton Company, Basement 3.
Oakland Motor Car Co., Basement 56.
Olds Motor Works, Main Floor C-4.

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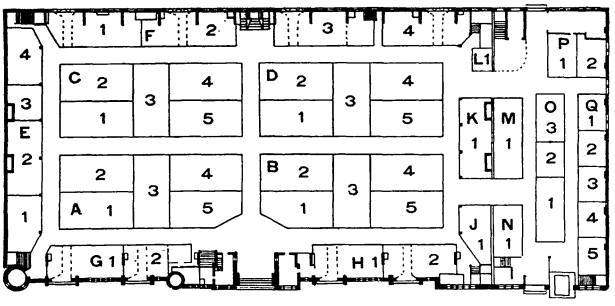
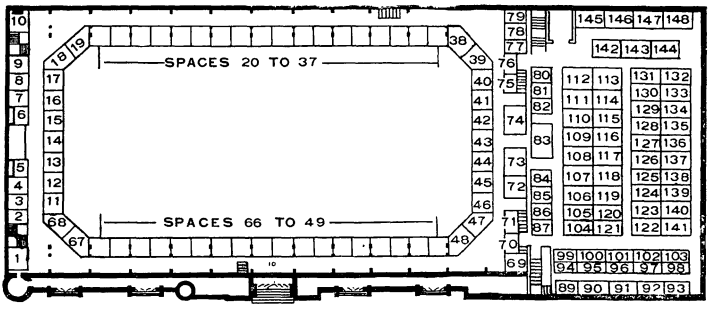
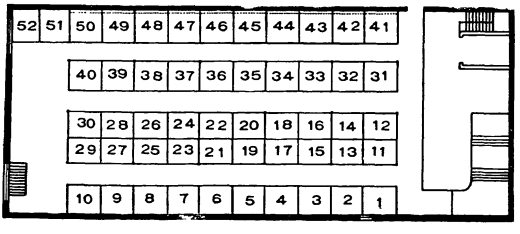


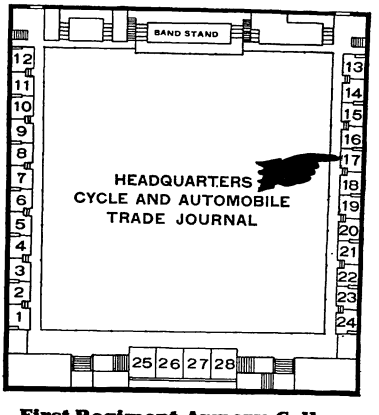
Coliseum Main Floor



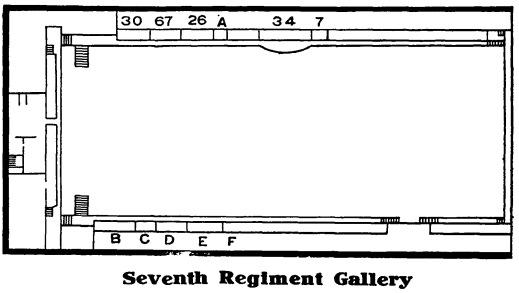
Coliseum Gallery and Second Floor Annex



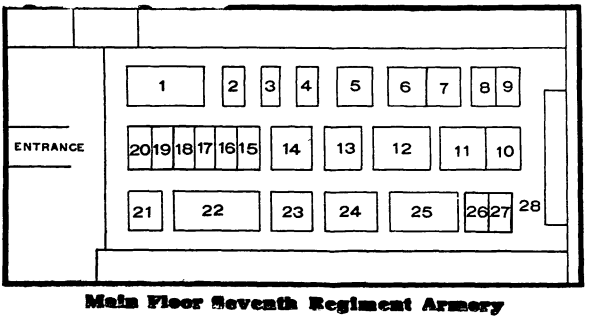
Coliseum Basement



First Regiment Armory Gallery



Seventh Regiment Gallery



Main Floor Seventh Regiment Armory

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Oliver Instrument Co., 2nd Floor Annex 108.
Ovington Motor Co., Basement 24-26.
Packard Motor Car Co., Main Floor A-1.
Pantasote Co., (The) Gallery 62.
Peerless Motor Car Co., Annex Q-2 and 3.
Peerless Motor Car Co., Annex P-1.
Pennsylvania Rubber Co., Gallery 18.
Pfanstiehl Electrical Laboratory, Basement 51.
Pierce, The Geo. N. Co., Main Floor F-1.
Pierce Engine Co., First Regiment Armory C-3.
Pittsburg Mot. Vehicle Co., 7th Reg. Armory, Main Floor 6.
Pittsfield Spark Coil Co., 2nd Floor Annex 144.
Pope Mfg. Co., Main Floor D-3.
Pope Motor Car Co., Main Floor D-2.
Pope Mot. Car Co., 7th Reg. Arm. Main Floor 2.
Precision Appliance Co., Second Floor Annex 117.
Premier Motor Mfg. Co., Main Floor E-2.
Prest-O-Lite Co., (The) Gallery 10.
Prosser, Thos. & Son, 1st Reg. Arm. Gallery 11.
Pullman Motor Car Co., Basement 29-30.
Pungs Finch Auto. & Gas. Eng. Co. Main floor L-1.
Rainier Co., (The), 1st Reg. Armory G-3 and 4.
Randall-Faichney Co., Basement 6.
Rands Mfg. Co., Second Floor Annex 139-140.
Rapid Mot. Vehicle Co., 7th Reg. Armory. Main Floor 1.
Rauch & Lang Carriage Co., 1st Reg. Arm. B-1.
Reliable Dayton Mot. Car Co., Basement 17-20.
Reliance Motor Car Co., 7th Regiment Armory. Main Floor 24.
Remy Electric Co., Gallery 66.
Reo Motor Car Co., Main Floor B-2.
Republic Rubber Co., Gallery 9.
Robinson & Son Co., 2nd Floor Annex 107.
Rose Mfg. Co., Gallery 46.
Ross Gear & Tool Co., Second Floor Annex 93.
Royal Motor Car Co., Main Floor G-2.
Safir Auto. Co., 7th Reg. Armory, Main Floor 18.
Sager, J. H Co., Second Floor Annex 94.
Alden Sampson Co., 7th Reg. Arm. Main floor 28.
Sayers & Scovill, 7th Reg. Arm. Main Floor 16.
Schacht Mfg. Co., Basement 15-16.
Shaler, C. A. Co., Basement 2.
Shelby Steel Tube Co., Gallery 51.
Sherwin-Williams Co., 2nd Floor Annex 148.
Shoemaker Automobile Co., Basement 12-14.
Smith Automobile Co., 1st Regiment Armory G-6.
Smith, R. H. Mfg. Co., Gallery 21.
Spicer Universal Joint Mfg. Co., Gallery 37.
Splitdorf, C. F., Gallery 49.
The Sprague Umbrella Co., Gallery 2-4.
Stackpole Battery Co., 2nd Floor Annex 135.
Standard Lamp & Mfg. Co., First Regiment Armory, Gallery 1.
Standard Roller Bearing Co., 2nd Floor Annex 111
Standard Varnish Wks., 1st Reg. Arm. Gallery 19.
Staver Carriage Co., First Regiment Armory E-1, East ½.
F. B. Stearns Co., Main Floor B-5.
Stevens-Duryea Co., Main Floor F-3.
Stewart & Clark Mfg. Co., 2nd Floor Annex 88.
C. H. Stratton Carriage Co., 57.
Streator Motor Car Co., 7th Regiment Armory, Main Floor 9.
Studebaker Auto. Co., 7th Reg. Arm. Main floor 22.
Studebaker Automobile Co., Main Floor B-3.
Swinehart Clincher Tire & Rub. Co., Gallery 64.
E. R. Thomas Motor Co., Main Floor B-4.
E R. Thomas Co., 7th Regiment Armory 7.
Timken Roller Bearing Alxe Co., 7th Regiment Armory, Gallery B.
Timken Roller Bear'g Axle Co., Gallery 32-33.
Tincher Mot. Car Co., 1st Regiment Armory C-4.
Triple Action Spring Co., Basement 47.
Troy Carriage Sun Shade Co., First Reg. Armory, Gallery 40.
Uncas Specialty Co. (The) 2nd Floor Annex 119.
Valentine & Co., Gallery 11.
Veeder Mfg. Co., Gallery 42.
Vehicle Top & Supply Co., Basement 10.
Ventilated Cush. & Spring Co., 1st Regiment Armory, Galley 12.
Vesta Accumulator Co., 2nd Floor Annex 137.
Vivax Storge Battery Co., Basement 53.
Waltham Mfg. Co., Main Floor E-1.
Warner Clutch Co., Basement 46.
Warner Gear Co., Gallery 57.
Warner Instrument Co., Gallery 63.
Wayne Automobile Co., Main Floor A-3.
Wayne Works (The) 1st Regiment Armory G-2.
Weed Chain Tire Grip Co., Gallery 77.
Welch Motor Car Co., Annex Q-1.
Western Malleable Steel Co., 2nd Floor Annex 84.
Western Tool Works, 1st Reg. Armory B-2.
Wheeler & Schebler, Gallery 25.
White Co., (The) 7th Reg. Armory. Main Floor 13.
White Co., (The) Main Floor 14.
Whiteley Steel Co., 2nd Floor Annex 109.
Whitney Mfg. Co., Gallery 23.
Winton Motor Carriage Co., Main Floor G-1.
Witherbee Igniter Co., 2nd Floor Annex 120.
Woods Motor Vehicle Co., Main Floor B-1.
Worth Motor Car Mfg. Co., 7th Reg. Armory, Main Floor 11.
Wray Pump & Register Co., Gallery 15.

Directory of Chicago Show Exhibitors

(Classified According to Location)

Coliseum—Main Floor.

A-1 Packard Motor Car Co.
A-2 Locomobile Company of America.
A-3 Wayne Automobile Co.
A-4 Electric Vehicle Co.
A-5 Knox Automobile Co.
B-1 Woods Motor Vehicle Co.
B-2 Reo Motor Car Co.
B-3 Studebaker Automobile Co.
B-4 E. R. Thomas Motor Co.
B-5 F. B. Stearns Co.
C-1 Apperson Bros. Auto Co.
C-2 Northern Motor Car Co.
C-3 Elmore Mfg. Co.
C-4 Olds Motor Works.
C-5 The Lozier Motor Co.
D-1 Dayton Motor Car Co.
D-2 Pope Motor Car Co.
D-3 Pope Mfg. Co.
D-4 H. H. Franklin Mfg. Co.
D-5 The Bartholomew Co.
E-1 Waltham Mfg. Co.
E-2 Premier Motor Mfg. Co.
E-3 Matheson Motor Car Co.
E-4 Maxwell-Briscoe Motor Co.
F-1 The George N. Pierce Co.
F-2 The White Company.
F-3 Stevens-Duryea Co.
F-4 Haynes Automobile Co.
G-1 Winton Motor Carriage Co.
G-2 Royal Motor Car Co.
H-1 Thos. B. Jeffery & Co.
H-2 National Motor Vehicle Co.
J-1 Babcock Electric Carriage Co.
K-1 Mitchell Motor Car Co.
L-1 Pungs-Finch Auto & Gas Engine Co.

Coliseum Annex.

M-1 The Autocar Co.
N-1 Dragon Automobile Co.
O-1 Baker Motor Vehicle Co.
O-2 & 3 Cadillac Motor Car Co.
P-1 Peerless Motor Car Co.
P-2 Imperial Motor Car Co.
Q-1 Welch Motor Car Co.
Q-2 & 3 Peerless Motor Car Co.
Q-4 & 5 Corbin Motor Vehicle Corp.

First Regiment Armory—Main Floor.

A-1 The Buckeye Mfg. Co.
A-2 The Columbus Buggy Co.
A-3 Knight & Kilbourne.
A-4 American Locomotive Auto. Co.
B-1 The Rauch & Lang Carriage Co.
B-2 The Western Tool Works.
B-3 The Aerocar Co.
B-4 Gearless Transmission Co.
C-1 The Cleveland Motor Car Co.
C-2 Moon Motor Car Co.
C-3 Pierce Engine Co.
C-4 Tincher Motor Car Co.
D-1 Austin Automobile Co.
D-2 De Luxe Motor Car Co.
D-3 Jackson Automobile Co.
D-4 American Motor Car Co.
E-1 Chicago Coach & Carriage Co.
E-1 Staver Carriage Co.
E-2 Oscar Lear Automobile Co.
E-3 Dolson Automobile Co.
E-4 The Acme Motor Car Co.
E-5 Monarch Motor Car Co.
E-6 Moline Automobile Co.
F-1 Auburn Automobile Co.
F-2 Diamond T. Auto Co.
G-1 Holsman Automobile Co.
G-2 The Wayne Works.
G-3 & 4 The Rainier Company.
G-5 The Kissel Motor Car Co.
G-6 Smith Automobile Co.

Coliseum Basement—Autos and Accessories.

1 The K. W. Ignition Co.
2 C. A. Shaler Co.
3 Norton Company.
4 Bugmobile Company of America.
5 Chicago School of Motoring.
6 The Randall-Faichney Co.
7 Auto Goods Co.
8 T. Alton Bemus.
9 American Aluminum Coating Co.
10 Vehicle Top & Supply Co.
11-13 Lauth-Juergens Motor Car Co.
12-14 Shoemaker Automobile Co.
15-16 Schacht Mfg. Co.
17-20 Reliable Dayton Motor Car Co.
21-22 Roger B. McMullen.
23-25 Aurora Motor Works.

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24-26 Ovington Motor Co.
27-28 Lorraine Automobile Mfg. Co.
29-30 Pullman Motor Car Co.
31-32 Gaeth Automobile Works.
33 Hatfield Motor Vehicle Co.
34-35 Atlas Motor Car Co.
36-40 Cornish-Friedberg Motor Car Co.
41-43 C. V. I. Motor Car Co.
44 Automobile Topics.
45 Jeffery-Dewitt Co.
46 Warner Clutch Co.
47 Triple Action Spring Co.
48 The Duplex Coil Co.
49-50 Longdin-Brugger Co.
51 Pfanstiehl Electrical Laboratory.
52 Chicago Wind Shield Co.
53 Vivax Storage Battery Co.
56 Oakland Motor Car Co.
57 C. H. Stratton Carriage Co.

Coliseum Gallery—Accessories.

1 Kinsey Mfg. Co.
2-4 The Sprague Umbrella Co.
5 Never-Miss Spark Plug Co.
6 Adam Cooks Sons.
7 Indestructible Steel Wheel Co.
8 The Imperial Brass Mfg. Co.
9 The Republic Rubber Co.
10 The Prest-O-Lite Co.
11 Valentine Co.
12 The Electric Storage Battery Co.
13 McCord & Co.
14 Auto Improvement Co.
15 Wray Pump & Register Co.
16-17 Aurora Automatic Machinery Co.
18 Pennsylvania Rubber Co.
19 Hartford Suspension Co.
20 The Wm. Cramp & Sons S. & E. Building Co.
21 The R. H. Smith Mfg. Co.
22 Chicago Battery Co.
23 Whitney Mfg. Co.
24 Motsinger Device Mfg. Co.
25 Wheeler and Schebler.
26-27 Morgan & Wright.
28 R. E. Dietz Co.
29 The Dayton Electrical Mfg. Co.
30-31 The Hartford Rubber Works Co.
32-33 Timken Roller Bearing Axle Co.
34-35 The Diamond Rubber Co.
36 Brown-Lipe Gear Co.
37 Spicer Universal Joint Mfg. Co.
38-39 G & J Tire Co.
40-41 The Badger Brass Mfg. Co.
42 The Veeder Mfg. Co.
43 Gray & Davis.
44 A. W. Harris Oil Co.
45 National Carbon Co.
46 Rose Mfg. Co.
47-48 The B. F. Goodrich Co.
49 C. F. Splitdorf.
50 Hyatt Roller Bearing Co.
51 Shelby Steel Tube Co.
52 Long Mfg. Co.
53-54 The Fisk Rubber Co.
55 Diamond Chain & Mfg. Co.
56 Joseph W. Jones.
57 Warner Gear Co.
58 Ajax-Grieb Rubber Co.
59-60 The Goodyear Tire & Rubber Co.
61 Baldwin Chain & Mfg. Co.
62 The Pantasote Co.
63 Warner Instrument Co.
64 The Swinehart Clincher Tire & Rubber Co.
65 N. Y. & N. J. Lubricant Co.
66 Remy Electric Co.
67-68 Firestone Tire & Rubber Co.
69 Motor & Accessories Mfgrs Inc.
70 Cook's Standard Tool Co.
71 Oliver Mfg. Co.
72-73 S. F. Bowser & Co., Inc.
74 The Edmunds & Jones Mfg. Co.
75 Byrne, Kingston & Co.
76 Kokomo Electric Co.
77 Weed Chain Tire Grip Co.
78 Hancock Mfg. Co.
79 Leather Tire Goods Co.

Coliseum Annex—Second Floor.

80 The Hotchkin Mfg. Co.
81-82 Auto Accessories Mfg. Co.
83 The Duff Mfg. Co.
84 Western Malleable Steel Co.
85 The Midgeley Mfg. Co.
86 R. E. Hardy Co.
87 Jos. Dixon Crucible Co.
88 Stewart & Clark Mfg. Co.
89 Atwater-Kent Mfg. Works.
92 Empire Auto Tire Co.
93 Ross Gear & Tool Co.
94 J. H. Sager Co.
95 The Hoffecker Co.
96 C. Cowles & Co.
97 Breeze Carburetor Co.
98 The Auto Pump Co.
99 Gray-Hawley Mfg. Co.
100 The Lipman Mfg. Co.
101 National Battery Co.
102-103 Michelin Tire Co.
104 Gemmer Mfg. Co.
105 Briscoe Mfg. Co.
106 Heinze Electric Co.
107 Wm. C. Robinson & Son Co.
108 Oliver Instrument Co.
109 Whiteley Steel Co.
110 Atwood Mfg. Co.
111 Standard Roller Bearing Co.
112 Motor Car Specialty Co.
113-114 Conn, Telephone & Electric Co.
115 Diezemann Shock Absorber Co.
116 Avery Portable Lighting Co.
117 Precision Appliance Co.
118 Kilgore Mfg. Co.
119 The Uncas Specialty Co.
120 Witherbee Igniter Co.
121 Muncie Auto Parts Co.
122-123 Hendee Mfg. Co.
124 Harley-Davidson Motor Co.
125 Armac Motor Co.
126 G. H. Curtis Mfg. Co.
127 Fowler-Manson-Sherman Cycle Mfg. Co.
128 The Light Mfg. & Fdy. Co.
129 Excelsior Motor & Mfg. Co.
130-131 Consolidated Mfg. Co.
132-133 Merkel Motor Co.
134 L. C. Chase & Co.
135 Stackpole Battery Co.
136 American Electrical Novelty & Mfg. Co.
137 Vesta Accumulator Co.
138 Igniter Appliance Co.
139-140 Rands Mfg. Co.
141 The Hornecker Motor Mfg. Co.
142 Gabriel Horn Mfg. Co.
143 C. T. Ham Mfg. Co.
144 Pittsfield Spark Coil Co.
145 The National Oil Pump & Tank Co.
146 Limousine Carriage Mfg. Co.
147 A. A. Mosler & Co.
148 Sherwin-Williams Co.

First Regiment Armory—Gallery.

1 Standard Lamp & Mfg. Co.
2 The Motor Way.
3-4 Continental Caoutchouc Co.
5-8 Eugene Arnstein.
9 Motor.
10 Acetyvone Co.
11 Thos. Prosser & Son.
12 Ventilated Cushion & Spring Co.
13 Edw. Neely & Co.
14 Newmastic Tire Co.
15-16 Franco-American Auto & Supply Co.
17 Cycle & Automobile Trade Journal.
18 McCanna Mfg. Co.
19 Standard Varnish Works.
20 The Motz Clincher Tire & Rubber Co.
21 Morrison, McIntosh & Co.
22 The Horseless Age.
23-24 Manhattan Screw & Stamping Co.
24A Motor Age.
25-6-7-8 Excelsior Supply Co.
29 The Class Journal Co.
30 Heitger Carburetor Co.
31 Healy Leather Tire Co.
32 Auto Parts Co.
33-4 Edmund E. Haus Co.
35 F. A. Brownell Motor Co.
36 Electrical & Mechanical Development Co.
37 Norris Auto Co.
38 Central Rubber Co.
39 Robert Bosch, New York, Inc.
40 The Troy Carriage Sun Shade Co.

Seventh Regiment Armory—Commercial Vehicles.

1 Rapid Motor Vehicle Co.
2 Pope Motor Car Co.
3 American Motor Truck Co.
4 H. H. Franklin Co.
5 Oscar Lear Auto Co.
6 Pittsburg Motor Vehicle Co.
7 E. R. Thomas Co.
8 Brush Runabout Co.
9 Streator Motor Car Co.
10 Couple - Gear Freight-Wheel Co.
11 Worth Motor Car Mfg. Co.
12 A. D. Meiselbach Motor Wagon Co.
13 Mitchell Motor Car Co.
14 The White Co.
15 Commercial Motor Truck Co.
16 Sayers & Scovill.
17 Coppock Motor Car Co.
18 Safir Automobile Co.
19 Gifford-Pettit Mfg. Co.
20 Buckeye Mfg. Co.
21 General Vehicle Co.
22 Studebaker Automobile Co.
23 Logan Construction Co.
24 Reliance Motor Car Co.
25 Knox Automobile Co.
26 Colt Runabout Co.
27 Continental Motor Car Co.
28 Alden Sampson Co.

Accessories.

30-31 The Hartford Rubber Works Co.
67-68 Firestone Tire & Rubber Co.
26-27 Morgan & Wright.
A National Battery Co.
34-35 The Diamond Rubber Co.
7 Indestructible Steel Wheel Co.
B Timken Roller Bearing Axle Co.
C Hartford Auto Parts Co.
D The Goodyear Tire & Rubber Co.
E Automobile Utilities Co.
F Cartier, Chapman & Co.
Atlas Mfg. Co.

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Trade Changes and Removals

Acme Spring Check Company has removed its offices from the Motor Mart to 1717 Broadway, New York, N. Y.

Ayres' Gasoline Engine and Automobile Works, formerly located at Saginaw, Mich., is now located in Rochester, N. Y.

Akron Manufacturing Company, of Akron, O., has increased its capital from $50,000 to $150,000.

Anderson Forge & Machine Company, of Detroit, Mich., has filed a notice of an increase in capital stock from $150,000 to $200,000.

Angier Company, The, noted in the September number as having been succeeded by the Butler Auto Supply Company, was the Angier Automobile Supply Company, 222 Elliott street, Boston, and not the Angier Company, of 735 Boylston street, Boston, and 9-11 Dorance street, Providence, R. I.

Abet Manufacturing Co., 1112 Great Northern Building, Chicago, Ill., has been succeeded by Metal Specialties Co., 18-24 W. Randolph street, Chicago.

Brownell-Trebert Co., 634-666 Lexington avenue, Rochester, N. Y., has been succeeded by the F. A. Brownell Motor Co., incorporated with a capital of $400,000.

Bryte, Coates & Campbell, of San Francisco, Cal., has changed to Coates & Campbell, Mr. Bryte having retired.

Buffman Automobile Company, Abington, Mass., bankrupt, purchased by Bicknell Hall, of Taunton and will be operated as the Hall Mfg. Co.

Crescent Cycle Company, The, Evansville, Ind., has been incorporated with $10,000 capital.

Drake Electric Company, 1344 Michigan avenue, Chicago, Ill., has been succeeded by the Midland Supply Co., 1218 Michigan avenue.

E. H. V. Company, of Middletown, Conn., will change its name to the Eagle Motor Co.

Fischer Special Manufacturing, of Cincinnati, O., spark coil and plug department, has been separated from the other business, and will be conducted under the firm of Fischer Ignition Co., formed for that purpose.

Hartford Rubber Works Company's Philadelphia branch has removed from 138 North Tenth street to 1425 Vine street.

Hatfield Motor Vehicle Company, has removed from Cortland, N. Y., to Miamisburg, Ohio.

Henshaw Motor Car Company, of Boston, Mass., formerly located at 286-288 Columbus avenue, is now situated at Massachusetts avenue and Newbury street.

Hanna Cycle Co., of Tampa, Fla., has removed from its old quarters on Lafayette street, to 1435 Franklin street.

Haynes Automobile Company, Chicago, Ill., branch has moved from 1420 Michigan avenue to 1702 Michigan avenue.

Hokanson Automobile Company, of Madison, Wis., has made an amendment increasing its capital stock from $21,000 to $30,000.

Ideal Carriage Washer Co., Rochester, N. Y., has removed from 152 Lenox street to 383 Main street.

King Top & Mfg. Company, of Dayton, Ohio, has been purchased by W. E. Barton, of the Barton Mfg. Co., Springfield, Ohio, and in the future the business will be united. The two plants will be run separately until the King company's new plant is completed, when the entire will be consolidated and the Springfield plant closed up.

Kirchberger & Co., M., has removed from 44 Park Place to 339 Broadway, New York City.

Lende Automobile Company has removed from Granite Falls, Minn., to Minneapolis, Minn.

Moon Motor Car Company, St. Louis, Mo., recently incorporated under the State laws for $175,000, has purchased the automobile department of the Jos. W. Moon Buggy Co., and will be conducted as a separate organization.

Mirroscope Company, The, 38-40 W. 62nd St., New York City, has been succeeded by the J. Alexander Company, of 1931 Broadway, New York.

Meyer, Morris F., manufacturer of wind shields, has removed from Detroit, Mich., to Port Huron, Mich., and formed the Morris F. Meyer Company.

Owen & Company, R. M., of New York City, general sales agents for Reo and Premier cars, has removed from 40 W. 60th street to 1759 Broadway.

Oliver Instrument Company, 719 Hennepin avenue, Minneapolis, Minn., has changed its name to the Index Speed Indicator Co.

Overland Automobile Company, The, has moved into its new factory at Indianapolis, Ind.

Pittsfield Spark Coil Company, of Dalton, Mass., has increased its capital from $20,000 to $100,000.

Pontiac Buggy Company, of Pontiac, Mich., has formed the Oakland Motor Car Company, of Pontiac, Mich., which will place on the market an automobile.

Rainier Motor Car Company, of New York City, will, if reports are correct, move on January 1 from its present location, Broadway and Fifteenth street, to Broadway and Fifty-sixth street, now occupied by the Hol Tan Company.

Standard Roller Bearing Company, of Philadelphia, has increased its capital from $3,500,000 to $5,000,000.

Shoemaker Automobile Co., has removed from Freeport, Ill., to Elkhart, Ind.

Zoar Storage Battery Co., of Zoar, O., has changed its name to Zoar Battery Company.

Fires, Judgments and Failures

Acme Automobile Company, St. Louis, Mo., garage was damaged by fire to extent of $50,000.

Aerocar Company, of Detroit, entire business, including plant, material and bills receivable was purchased by Homer Warren & Co., for $96,500.

Adams, Frank, at 485 Lake avenue, Rochester, N. Y., was damaged by fire to the extent of $15,000.

Berkshire Motor Car Company, Pittsfield, Mass., has shut down and will not resume unless local capital is proffered to induce them to do so.

Botteril, Tom, garage 62 W. Third South street, Salt Lake City, Utah, recently suffered a fire, damaging the place to the extent of $1,500.

B. L. M. Motor Car Company, Brooklyn, N. Y., is unable to pay debts amounting to $30,000. Jesse Watson has been appointed receiver.

Bedford garage, located at 1291 Bedford avenue, Brooklyn, N. Y., was damaged by fire on September 26th.

Bay State Automobile Company, 112 Norway street, Boston, Mass., has made an assignment for benefit of creditors.

Brown & Schmidt's garage on Paterson street, Paterson, N. J., was badly damaged by fire.

Central Park Auto Storage Co., which maintained an immense garage at 110th street and Central Park West, New York, has filed schedules in bankruptcy showing liabilities of $15,572 and assets but $2,732.

Copen Motor Car Company, 4743 McPherson avenue, St. Louis, Mo., was slightly damaged by fire recently.

Dolson Automobile Company, of Charlotte, Mich., was petitioned in involuntary bankruptcy on November 15.

Diezeman Shock Absorber Co., 420 East 106th street, New York City, manufacturers of shock absorbers, has been petitioned in bankruptcy. W. H. Smith appointed receiver. Liabilities over $32,000 and assets $7,500.

Deere Clark Motor Car Co., of Moline, Ill., bankrupt, has been purchased by E. H. Pope for the sum of $37,500.

Detroit Auto Vehicle Company, defunct; assets will be sold at public auction at the Wayne County Court House, Detroit, Mich., on December 3.

Elbridge Motor & Tool Co., of Utica, N. Y., has been petitioned in bankruptcy.

Ellicott Motor Car Company, of Buffalo, N. Y., has been petitioned in bankruptcy by the Standard Oil Company. In the petition the debts are estimated at $889.89.

Frederick Company, W. A., 16 Columbus avenue, Boston, Mass., agents for the American car, was damaged by fire to the extent of $1500 on October 30.

Grout Brothers Automobile Co., Greenfield, Mass., plant has been purchased by William L. Grout, and will be operated by him hereafter.

Holmes Motor Vehicle Company, H., and E., Boston, petitioned into involuntary bankruptcy Aug. 13, has filed schedules. Liabilities, $38,261, and assets only $308.

Jonas Automobile Co., 726 National avenue, Milwaukee, Wis., storage building damaged by $2000 fire.

Kinsey Manufacturing Co. and the Dayton Motor Car Co., both of Dayton, O., and located in the same building were damaged by fire on October 29 to the extent of $25,000 and $5,000, respectively. Loss fully insured.

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Kansas City Motor Car Co., of Kansas City, Kan., has been petitioned in involuntary bankruptcy. Liabilities estimated at $300,000 and assets $150,000.

Manufacturers' Motor Car Co., schedules in involuntary bankruptcy, show liabilities of $11,692 and assets of $8,233.

Napier Motor Co., of America, Jamaica Plain, Boston, Mass., fire of an unknown origin on October 31, in the stock and tool room, caused a loss of $1500 to the building. Loss on the contents of the building is not known.

National Garage on Telegraph avenue, near Twentieth street, San Francisco, Cal., damaged by fire.

Okey Motor Car Co., of Columbus, O., has been placed in hands of receiver, who was authorized to borrow $2000 and continue business.

Providence Motor Car Company Garage, at 11 Walnut street, Providence, R. I., was damaged by fire September 18, to the extent of $15,000.

Peterlin, Charles E., of Grand Rapids, Mich., manufacturer of bicycle grips, suffered a fire loss of $2,500 on September 28.

Royal Motor Car Co., of Cleveland, O., Superior Savings & Trust Company appointed receiver.

Reo Motor Car Company, 1032 Euclid avenue, Cleveland, O., fire in storage room destroyed ten automobiles.

Shoemaker Automobile Company recently removed to Elkhart, Ind., from Freeport, Ill., is now in the hands of the receiver, the receivership having been assumed voluntarily by the company.

Seiler, C. A., bicycle shop on North Carolina avenue and Eighth street, Washington, D. C., slightly damaged by fire. Loss, $25.

Smalley Motor Co., of Bay City, Mich., plant was purchased by G. W. Ames for $26,000 at receiver's sale.

Snutsel Company, Inc., Paul N., 1534 Broadway, New York City, adjudged bankrupt. This state of affairs was brought about by a wholesale theft on the part of certain employees who abstracted spark plugs from packages and substituting pieces of lead and in similar ways, until discovered.

Smalley Motor Company, Grand Rapids, Mich., has filed schedules. Assets, $134,418.84, and liabilities, $112,854.33.

Tremont Garage, 541 Tremont street, Boston, Mass., damaged by fire September 21.

Tileston & Co., Inc., C. A., dealers, at 1776 Broadway, New York City, has been petitioned in bankruptcy.

Winchester Speedometer Co., New York City, has been petitioned in bankruptcy. Irving Washburn was appointed temporary receiver. Liabilities, $4977, and assets, $1712.

Legal and Legislative

ALABAMA.

The Blackmon automobile bill, which passed both Houses, but was not approved by the Governor.

CALIFORNIA.

Sacramento.—Authorities are enforcing the law which requires the horn to be sounded as an automobile passes street crossings.

Los Angeles Council has past the following schedule governing the hire of public automobiles: "Autos for five passengers, $5 an hour for less than ten hours and $3.50 an hour for more than ten hours; seven passengers, $4 an hour for less than ten hours, and $2 an hour for more than ten hours; two passengers, $3 an hour for less than ten hours and $2 an hour for more than ten hours."

DISTRICT OF COLUMBIA.

Washington.—Among the regulations now under consideration is one forbidding sight-seeing vehicles to stand longer than fifteen minutes at a time at any place other than a public hack stand, nor at such place again until the expiration of an hour. Another rule is that no proprietor of a sight-seeing automobile shall have more than two offices within the city, and that only one car at a time shall be permitted to stand in front of each office.

PENNSYLVANIA.

Philadelphia.—Announcement was sent out by the Director of Public Safety that the city ordinance requiring automobilists to secure local licenses would be enforced. Visiting autoists from other cities are given forty-eight hours grace while in Philadelphia.

SPECIAL NOTICE

We are now revising and correcting the 8th Annual "Buyers' Guide," which will appear in the January number of the CYCLE & AUTOMOBILE TRADE JOURNAL. If you have not returned the "pink sheet" sent you duly corrected, do so promptly. If you have not received one of these pink sheets and are manufacturing anything for the trade, advise us promptly, giving full particulars of your product.

CYCLE & AUTOMOBILE TRADE JOURNAL

Market & 49th Sts., Phila.

Date of Ormond Beach Carnival Chosen

At the meeting in New York City, on October 29, of representatives of the Florida East Coast Automobile Association, definite action was taken regarding the sixth annual winter Florida tournament. Following the belief of many that the former dates were too early the last week in March has been selected.

Many radical changes will be made in the program of races at the coming meet.

Reduction in Rubber

Owing to the reduction in the price of crude rubber the Swinehart Clincher Tire & Rubber Company, of Akron, O., announces a reduction in the price of its tires to take immediate effect. Crude rubber to-day sells at 35 cents per pound less than it did a year ago. This is the lowest price at which rubber has been sold since November and December, 1903.

September Exports

The automobile export statistics for the month of September show a perceptible falling off, while for the nine months ending September there is an impressive increase.

AUTOMOBILES AND PARTS OF.

Exported to—	September 1906. Values.	September 1907. Values.
United Kingdom	$69,365	$39,321
France	33	4,130
Germany	4,092	5,338
Italy	4,747	655
Other Europe	7,434	9,816
British North America	110,088	50,250
Mexico	61,199	25,583
West Indies and Bermuda	1,728	12,589
South America	19,050	31,514
British Australasia	12,956	19,004
British East Indies	2,722	1,748
Other Asia and Oceania	12,654	10,379
Africa	841	1,438
Other countries	850	108
Total	$307,759	$211,873

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Booklets, Circulars, Etc.

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Do You Want Suggestions :: :: and Estimates? :: ::

CHILTON PRINTING CO.

Market and 49th Streets :: PHILADELPHIA

JAMES ARTMAN, Pres. GEO. H. BUZBY, Vice.Pres. C. A. MUSSELMAN, Sec.-Treas.

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nsport,. Pa., U. S. A., was incorporated 1907 to take over the business of the liamsport Engineering Company, which a high-power, high-class car on the d in January, 1907.

: is the present intention of this com- y to confine its production to one single ssis only, fitting this one chassis with ee-seat and four-seat roadster bodies, devoting all its talent and energies to king these Imperial Roadsters the als of any cars of the same class built where in the world believing that the duction of the best motor car demands

capable of producing excellent work.

DESIGN FEATURES.

These Second Imperial Roadsters a designed along the best lines of conse vative motor car engineering, with fu recognition of the latest advances in th art controlled by a rigid determination t place no component in the Imperial chass except such as extended road work ha shown to be highly efficient and thorol reliable.

THE "DOUBLE DROP" CHASSIS FRAME.

Raising both ends of the chassis fram above the level of its middle part is

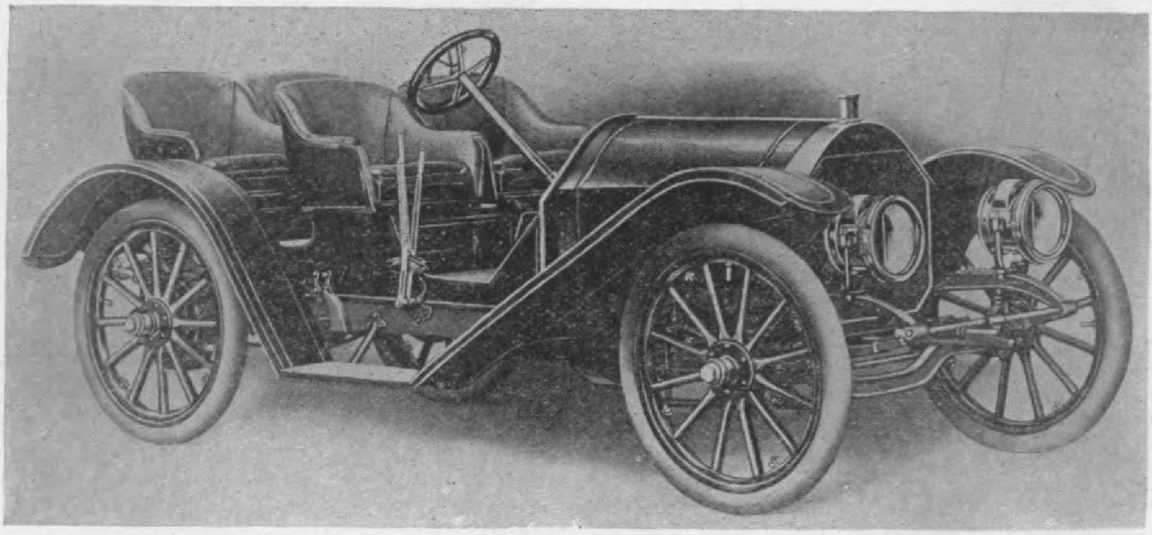
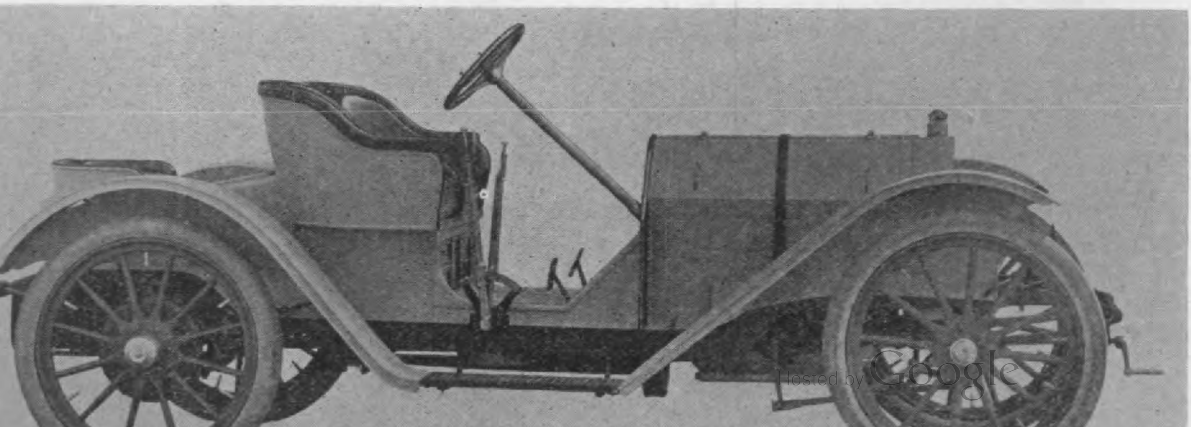


Fig. 1. Second Imperial Roadster, 1908 Model. Four-passenger body, wheel-base 108 hes, gage 56 inches. Tires all 36x4 inches. Motor, four cylinders, 4½x5¼ inches, 35 H. P. ding gear, 3-speeds forward and a reverse, with bevel gear to full-floating divided rear axles. ble ignition, Eisemann magneto. Weight of Second Imperial Roadsters, 2450 pounds. Price, 50, including two acetylene lamps, one oil lamp, mats, horn and tools, all ready for the road.

focusing of the entire abilities and urces of the constructor on a field of ted area.

ne Imperial factory is a fine brick ding constructed specially for the pur- e, in Williamsport, and equipt with fully selected best American machine

valuable new improvement in motor ca design, is original with the company an appears in no other motor car chassi either American or Foreign built. Thi raising of both ends of the chassis fram obtains the important advantages of givin axle clearance and lowering the center o



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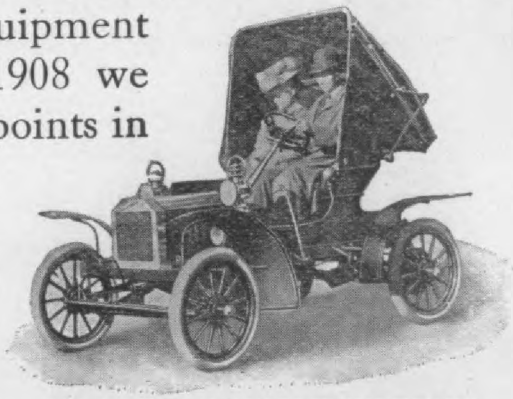
Brush at the Show

Chicago, November 30 - December 7

Every dealer owes it to himself to see the Brush Runabout line. The little "one lunger" has uncovered a demand and a market so enormous that previous figures on automobile consumption must be revised. Those who thought that a successful low priced car must be a cheapened imitation of the high priced one have missed their guess so far as we are concerned. While the demand for sport automobiles is still great, the demand for the utility car is many times greater. The bare announcement of the Brush Runabout has brought out a tidal wave of inquiries and orders. Some people of course don't want it, but others do, and in such numbers that we have been swamped. This type of car seems to have uncovered the biggest market yet. As we are now absolutely without competition, we have it all to ourselves. For the balance of this year, we can take on new trade only to the extent of samples, but our increased equipment is almost completed and for 1908 we expect to cover all important points in this country.

The $600 Package Cart Shown at Chicago



THE LITTLE SINGLE CYLINDER

PRICE LIST:

Single Cylinder Runabout	Solid Tires,	$500.00
Pneumatics $50.00 extra		
Single Cylinder Package Cart	" "	$600.00
Two Cylinder Runabout	Pneumatic Tires,	$750.00
Detachable Tool Box and Rumble Seat, $50.00 extra.		
Detachable Tool Box and Double Surrey Seat, $100.00 extra		
Two Cylinder Delivery Wagon	Solid Tires,	$800.00

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ssis frame, but the Second Imperial he only car yet shown in which all the vantages obtainable from varying the levels of the chassis frame are secured. The axles are from special Imperial de-

The motor bearings are white-bronz plain. The line and side shafts are c roller bearings. The bevel pinion sha and balance gears all on roller bearing with disk ball bearings to take thrusts.

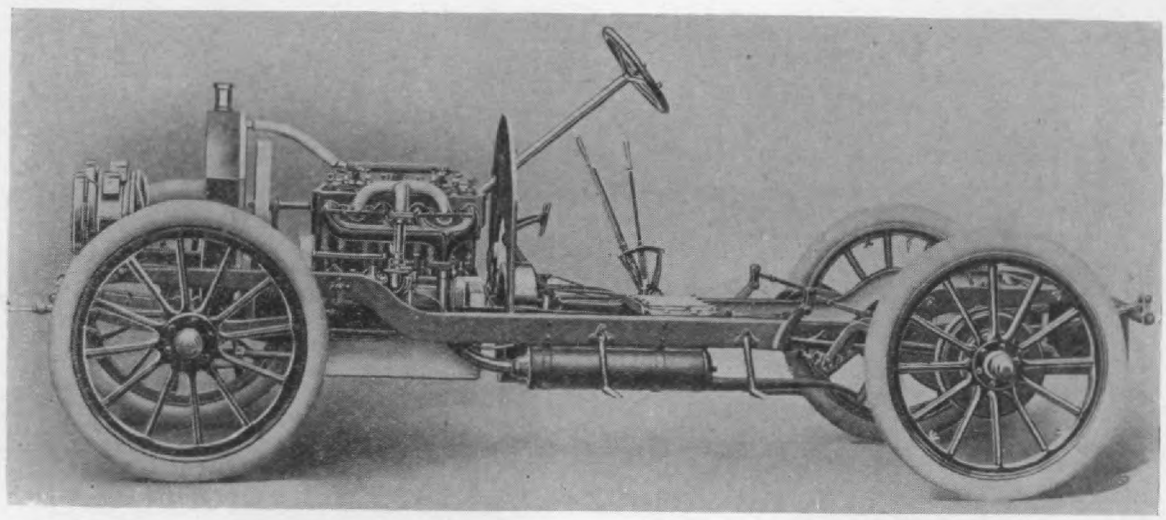

Fig. 3. Second Imperial Roadster chassis, 1908 Model, side elevation. The rise of the assis frame at each end, commonly spoken of as the "double drop," seats the passengers low, d-so obtains a low center of gravity, and also makes it convenient to drop the sub-frame rying the motor and gear-box to such a plane as will bring the propeller-shaft about horital when the springs carry their normal load. The low center of gravity and the very small peller shaft angle are highly desirable features.

s, built by the Long Arm System Com- y, Cleveland; the rear axle is a tubular l construction, with a steel casting housing and full floating divided live s. Both struts and torsion arm are d, the rear springs being linked at ends to the chassis frame.

ll the springs are half-elliptics. The

The propeller shaft is fitted with Spice Universal joints, and the double rise c the chassis frame sides brings this sha about horizontal with a medium load c the springs.

THE MOTOR.

The cylinders, 4-cycle, water-cooled, a dual-units, 4½x5¼ inches, 35 H. P. Th

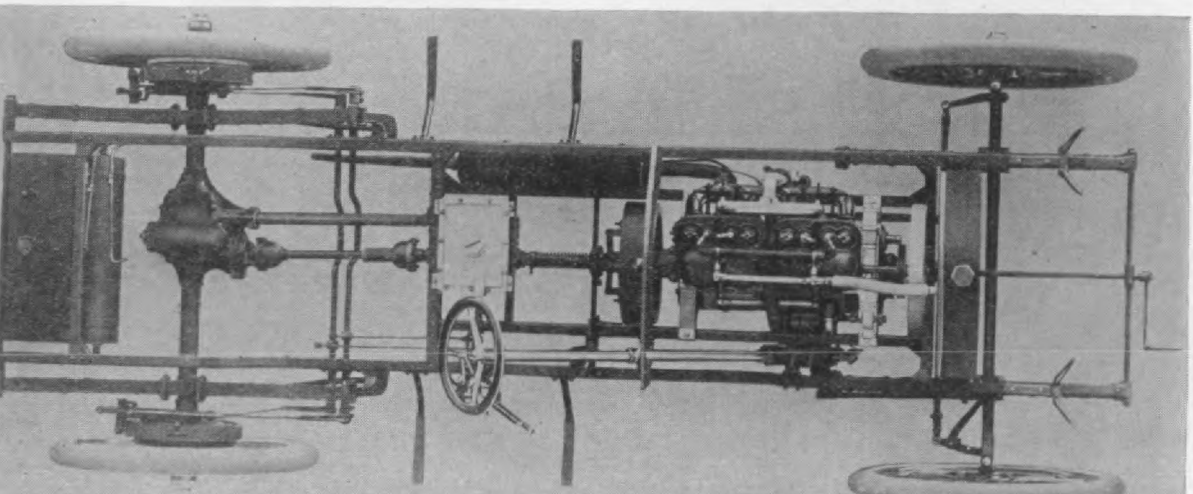

Fig. 4. Second Imperial Roadster chassis plan. The chassis frame sides are parallel, avoid- all reinforcing and the dangers of failure from bent sides. The sub-frame is substantial gives ample support to the motor and gear-box. The brakes are applied thru wire cables, ped thru tubular steel rock-shafts. The front springs are under the frame sides and the rear ings are outside of the frame sides. The full tank, 18 gallons, is carried in the rear.

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MICHELIN

FRANCE ENGLAND
ITALY AMERICA

MANUFACTURERS can now AFFORD TO EQUIP THEIR CARS WITH MICHELIN TIRES AND THEY CANNOT AFFORD NOT TO DO SO.

The high import duty and heavy transportation charges have been eliminated through the erection of our American Michelin factory.

The tires made here are exactly identical with the outputs of our other factories in France, England and Italy—the same famous Michelins that have been used on winning cars in all the world's greatest races for the last six years, and which made th victories possible.

Michelin Tires are the standard of the world. They will be used on a large number of America's highest-priced 1908 cars, and they will be the standard equipment of leading cars in other classes. These manufacturers, by the use of Michelins, are stamping their cars as embodying in EVERY FEATURE THE BEST that money can buy.

By equipping with Michelins the manufacturer gives his agents a se ing proposition of tremendous power; he gives the purchaser confide that his cars are, in every particular, the best that can be bought for t price—the purchaser DESERVES to be given the best tires the manuf turer can afford—and he CAN afford Michelins.

WHAT MANUFACTURER CAN AFFORD TO IGNORE THE INTERESTS OF HIS AGENTS —THE INTEREST OF HIS CUSTOMERS?

CLINCHER TYPE.
Round, Flat and Anti skid.
American and Millimeter Sizes.

QUICK DETACHABLE TYPE.
Round and Anti-skid.
American Sizes O

All the above can be used on any of the well-known Quick Detachable Rims.

At Importer's Salon, Boston and Chicago shows.

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tice. The weight is light, with ample power, and these cars can easily make 60 miles on a good road.

THE CLUTCH AND BRAKES.

The Second Imperial clutch is 5 disks, three of gray-iron and two of bronze with cork inserts; these coacting friction surfaces are pinched together by toggle-actuated bell-cranks, having temper-screws fitted to their free ends, to permit exact pressure equalization.

The brakes are exterior and interior, on and in prest steel rear hub drums, 12 inches diameter. The exterior bands are camel's hair faced. The interior, steel-casting, jointed brake-shoes, bronze-faced, are toggle expanded, metal to metal contact. No line-shaft brake is fitted.

SPRINGS.

The springs are special material, very carefully treated, and are all half-elliptics, lipped and banded. The spring specifications are, front, 38x2 inches, 8 leaves, jointed to the chassis frame in front and linked in the rear.

The rear springs are 48x2 inches, 7 leaves, linked both front and rear to the chassis frame, thus permitting a perfectly free spring action in connection with the struts and torsion arm.

The steering is the Gemmer right and left screw threads action, locked and capable of adjustments for taking up lost motion. The spark and throttle levers, ratchet retained, are on top of the hand wheel. No throttle pedal is used.

There are two pedals on the foot-board. That at the left releases the clutch only. The right pedal, when pushed forward, applies the rear hub internal brake-shoes only.

There are two levers at the driver's right. The outside lever is pulled backward to first release the clutch and then apply the rear-hub, exterior, emergency brake-bands. The inside hand-lever works the selective change gear.

Economy Test of Atwater-Kent Spark Generator

In order to demonstrate to the public the enormous mileage possible from the ordinary dry cells when used in connection with the Atwater-Kent Spark Generator, its manufacturer, the Atwater-Kent Manufacturing Co., of Philadelphia, arranged an official sealed test. A glass case was provided in which was placed an Atwater-Kent Spark Generator connected to four spark plugs, and driven by an electric motor so geared that the number of sparks would correspond to those of an automobile four-cylinder engine, the machine being geared three to one with 34-inch wheels, and averaging about 23 to 25 miles per hour. The spark gap was made approximately 7-64ths of an inch, being large in order to be the equivalent of a shorter spark gap working under compression. With this gear ratio and a Jones Speedometer-Odometer, it was possible to make a record of the exact equivalent running in miles. The entire apparatus was personally sealed by Albert W. Jacobi, representing the Automobile Club of America. The Speedometer-Odometer was approved by Joseph W. Jones, and the sealing was witnessed by members of the technical staffs of several of the automobile papers. The test was started at the Grand Central Palace Show, and run during the day and shut off during the night. The Speedometer at the time of starting indicated twenty-three miles an hour and the mechanism ran for upward of two weeks. At the close of the Palace Show the Odometer registered over 1,700 miles, and at the end of the test, which was finished at the Madison Square Garden Show, the Odometer reading was 4,249.3 miles. Six-inch Columbia dry cells were used, and showed at the beginning an average of 16 amperes, and at the close tested 6.5 amperes.

Seven Perfect Scores Made in New Jersey's 24-Hour Run

Fourteen of the twenty-two starters in the New Jersey Automobile and Motor Club's twenty-four-hour run, November 15 and 16, survived the contest, seven of these holding perfect scores.

The contest covered a distance of 472 miles over roads varying in condition from fine macadam to a mere path across a swamp.

The drivers were required to keep going continuously for 24 hours over a five-lap circuit from the club house in Newark thru Bloomfield, Glen Ridge, Montclair, Verona, Caldwell, Pine Brook, Parsippany, Danville, Dover, Kenvil, Mount Freedom, Morristown, Bernardsville, Far Hills, Bedminster, Somerville, Bound Brook, Plainfield, Springfield, Irvington, and back to the club house.

Penalization was imposed as follows: Two points for every minute over three minutes that a car is allowed to be ahead or behind the schedule at controls, 3 points per minute for stoppage of motor between controls without making an adjustment or repair, 3 points per minute for stopping car on last circuit without making repairs or adjustments, 4 points per minute for motor stop for repairs, 2 points per minute for repair or replacement with motor running, and 2 points for driving car in circle to delay passing final control. Double penalties were imposed for accepting assistance in making repairs.

The following are the seven perfect score survivors, and will be presented with silver loving cups:

Car.	Driver.	
Matheson,	John B. Ryall.	Touring car.
Haynes,	R. G. Kelsey, J. Calhoun.	Runabout.
Oldsmobile,	Ralph Owen.	Touring car.
Locomobile,	R. A. Greene.	Touring car.
Ford Six,	A. T. Purcell.	Runabout.
Franklin,	F. C. Hinni, Jr.	Touring car.
Thomas,	Montague Roberts.	Touring car.

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AUTOMOBILE BRAND

THE WORLD'S RECORD BROKEN

Aluminum Castings **Bearing Metal Castings**

The orders received for

AUTOMOBILE BRAND MANGANESE BRONZE

DURING THE PAST TWELVE MONTHS HAVE BROKEN ALL RECORDS.

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An Ignition Department Suggested

We would direct the attention of our readers to the following communication, and in reference to same would say that if our readers want us to inaugurate a department of this character we will make every effort to meet with their views. We therefore hope to hear from all those interested in this subject.

November 5th, 1907.

Cycle and Automobile Trade Journal, 49th and Market streets, Philadelphia, Pa.

Dear Sirs:—We take the liberty of writing to you to ask consideration of a subject which seems to us one of great importance to the automobile industry, in fact to all gasoline engine industries. It is that you will have a Department of Ignition in your magazine. This ignition question is the one which is causing the most trouble and dissatisfaction of all the problems of automobiling. And we believe that it is entirely possible of early solution by very simple methods. That is that it needs only to be "understood," really understood, to be solved. This understanding can only follow a study of results of tests, experiments, records, etc., made for the express purpose.

There is no science in existence which covers the ignition question. There are no text books which are reliable guides. Ohms law, which is looked upon as the Alpha and Omega of electricity, does not apply to ignition conditions. It cannot be reconciled to the workings of batteries and coils. The science of ignition is not formulated, but it should be without delay, and you may accomplish an immense amount of service to the industries concerned by undertaking the task, and its importance is not second to anything.

We do not mean that you open a department for publishing letters from Tom that he finds dry batteries perfect; from Dick that he finds dry batteries absolutely the cause of all his troubles; from Harry that he had wonderful results from some unheard of combination of coils, batteries, timers and wiring. That would lead to nothing, for the conditions of use which brought the results reported by correspondents would be unknown, consequently the results not possible of interpretation. And when we refer to dry batteries merely, do not understand that we mean the department to be confined only to that detail. All details of ignition should be studied both individually and in connection with each other.

We would suggest that you organize such a department with some man in charge who has the mental equipment for investigation, experimentation and weighing of results. And by all means not one who has a firmly established opinion to be "unlearned" or even one of scientific education, for he would be unfitted by such education to undertake the discovery of a new science. He would be prejudiced with the view that science is supreme and sacred and must not be attacked. That is a good and proper clew "when science has been formed." But all sciences are based on experiments and experience. They are not created full grown.

His duties would be the collection of "facts," then experimentation under his own direction, and the tabulation and study of results obtained from definite conditions. He should have a laboratory with proper equipment, altho such equipment would be quite simple and not of large expense to start with, and we believe that the manufacturers of such articles as he would test will be glad to do their share by contributing their goods without charge. We know he will be only too pleased to furnish him with our goods. His department should not be used for the benefit or prejudice of any article, but the results which he obtained from time to time should be published for the benefit of all and regardless of benefit or injury. It may be done without reference to particular articles, we mean only general rules. For instance he could determine and settle the proper size of battery to use with jump sparks coils and the proper size for primary coils. The proper adjustment of vibrators, conditions of wiring, grounding on engine, qualities and arrangements of timers. In fact, a lot of "reliable information" where exists today a conflict of ideas and opinions and "blamings-on-the-other-fellows."

It would be of great value to all concerned; the public, the manufacturers of the details, as well as the makers of the machines, and the experts who are studying to improve conditions wherever they exist.

Yours truly,
THE SEMI-DRY BATTERY COMPANY,
Per Jackson.

Too Good to Pass By

The following letter was received by the editorial department of the Cycle and Automobile Trade Journal from the Rockford Automobile and Engine Co., Rockford, Illinois in answer to a letter for matter for the Dealers' Department:

In answer to your favor of November 1st, will state that for good and varied reasons we do not see fit to favor you with the data requested, and will state a few reasons why. We are not in the business for our health. We are making a success of the automobile business thru knowledge which we have gleaned from the school of experience. We have never copied after methods of others in conducting our business, nor have we imitated others in the style or model of the products which we manufacture.

We are quite original in our way of doing business. We make a success of same by attending strictly to it. There is too much competition in the automobile business to-day to warrant us in making public peculiar features of same which we think lead to success. We are also too busy to take an active part in a correspondence business college. We will, however, favor you with three sugestions which make for the betterment of the conditions for the agent.

1st advertise.

2nd advertise in the Cycle & Automobile Trade Journal.

"Last but not least," read the Cycle & Automobile Trade Journal.

We sincerely hope that some day in the future after we have elevated ourselves above the aggregation of intellectual giants now in the manufacture of automobiles we will be able to look down upon them from the high plane of success, and be glad and willing to reach down and lead them over the road which we are traveling.

The name of this firm you will find above. It is under the management of

Yours very truly,
JOHN F. WATERS, Secretary,
Rockford Automobile & Engine Co.

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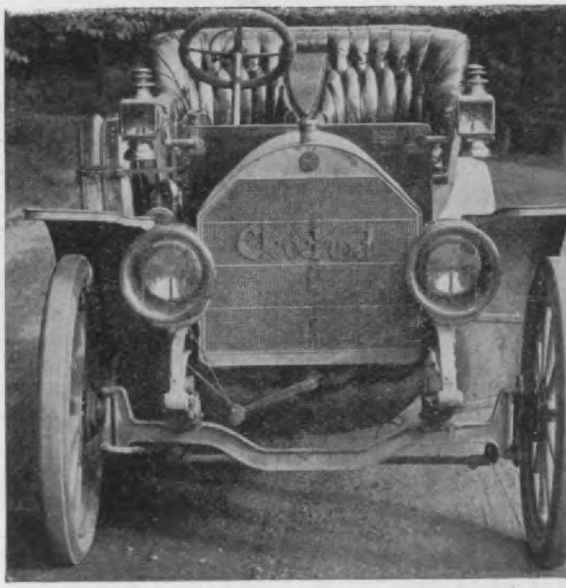
described. The line of cars offered for 08 with general specifications was given our issue of October, page 93, but com- ete details were not obtainable at that me. The price of the touring car and adster, the chasses of which are iden- cal, is $3500.

SPECIAL FEATURES.

The clutch of the multiple disk type is ew, and is housed in the forward end of e change speed gear case. This clutch nsists of 52 effective steel plates of 1-16 ch thickness, made of high carbon duc- le stock; the peculiarity of these plates is at they are stampt into a conoidal shape, e surface being slightly different from e true cone, as it is somewhat curved. his arrangement causes the plates to en- ge very gradually, and when released the ring of the curved portion of the plates parates them regardless of the kind of bricating oil used, the company claiming at the clutch will disengage as readily hen run in heavy oils or even greases when the lighter oils are used. Under nning conditions, the same lubricant, nsisting of one-half heavy oil and one- lf grease, that is used in the change eed gear is used in the clutch.

The rockers for engaging and disengag- g this clutch are provided with steel llers at the ends, the plates being en- ged by a helical center spring, of ap- oximately 300 pounds tension, the ten- on being adjustable. This clutch is self- ntained, and gives absolutely no end rust, except for the period when dis- gaged, at which time the end thrust of e spring is taken on an F & S annular ll bearing of liberal size. The change eed gear is of the four speed and re- erse sliding type, being operated on the lective principle, by a lever working in H slot. The direct drive, however, is the third speed with accelerated tail aft on the fourth. This arrangement ermits of the use of the direct drive actically all the time, and also allows an extremely high speed, with the tail aft running faster than the engine, when esired. Annular ball bearings are used nd the shafts are milled, forming four tegral splines for the sliding gear mem- ers. At the rear of the change speed ear case is a 14-inch wheel with heavy tchet teeth, so arranged that it can be gaged by a plunger pawl, the device king the place of a sprag. The base the pawl is an accurate sliding fit into cylinder, thus forming a sort of dash pot.

end over which fits the rear portion of housing, this rear end being provided w an internal annular recess containing strip of felt. This felt comes in cont with the spherical portion of the forw part of the case, thus making a dust ti but flexible joint. The rear univer joint is so arranged that the driving ef is transmitted by the outer ends of a fitted with bronze shoes, which are f to slide longitudinally in suitably sha semi-circular grooves of considera length in the outside casing, which is to the bevel pinion shaft. The casing of steel, and has a long hub taper ke to the integral bevel pinion shaft, bevel pinion being supported both fr and back by large F & S annular ball be ings.



1908 Cleveland Touring Car. A new multiple clutch, the plates being conoidal in shape is used; four sp and one reverse sliding change speed gear direct on third, a large ratchet wheel sprag is fitted just back of gear case. The touring car and roadster are each $350

A CLEVER ADJUSTING DEVICE.

An adjusting device is provided so the bevel pinion and its shaft can moved slightly in a longitudinal direct bringing the teeth into or out of m with the large bevel gear. This is acc plished in the following manner: The nual bearing in front of the bevel pinio held against a collar on the bevel pi shaft on one side and a nut on this s at the other side, so that if this bearin moved in either direction the bevel ion and shaft must move with it. On exterior of the annular ball race threads into which or upon which an side band or collar is screwed. This

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vented from rotating, and is retained rigidly in position by means of a tight fitting yoke, which presses upon it when bolted in position. This collar also bears on the outside annular ball race, thus clamping the combination rigidly in position, but an adjustment can easily be made by simply loosening the yoke and turning the collar.

THE DIFFERENTIAL AND AXLE CONSTRUCTION.

A differential of large sized bevel gears of five pitch is used, well supported in annular ball bearings. The rear axle is of the floating type, driving the wheels by means of lug clutches at the ends. This axle is also well braced by a liberal sized truss rod, ⅝-inch in diameter at the smallest section, and considerably larger where threaded for the turn buckles; in fact, the 1908 Clevelands are noticeable for the liberal sized parts used. An "I" beam torsion rod is provided, and radius rods are also fitted, their rear ends being revolvably mounted upon split bronze bushings, which are clamped around the steel rear axle housing, thus bringing all the wear on the bushings and not on the housing. These bushings also serve for the swivel mounting of the rear spring seats. The front axle is an I beam drop forging, without weld. The steering knuckle pivot is mounted on ball bearings and the cross link or tie rod is in a protected position at the rear of the front axle. The steering gear is of the screw and nut type.

BRAKES.

The brakes are both internal expanding in separate drums on the rear wheels, the external brake being 16 inches in diameter by 3 inch face. These brakes are both metal to metal, the drums being prest steel, while the bands are manganese bronze, cam operated in the usual way. A single-tree type of equalizer is used on the foot brake, which is the outside band; the other brake is operated by the usual side lever. The muffler is constructed entirely of prest steel, and is provided with a cut-out operated by a short foot pedal. All points where there is any motion whatever are provided with grease cups and the brake rods and spring eyes are fitted with spring oilers. The muffler rod, sprag operating rod, brake rods, etc., are arranged so that they have a direct pull, and are not put in on the bias.

THE MOTOR.

The motor is of the standard four-cylinder vertical type, water cooled cylinders cast in pairs, valves on one side, and two independent systems of ignition are used. Both systems are of the jump spark type, one consisting of a high tension magneto, and the other being a distributor and single vibrating coil, current being supplied by storage battery. A double set of plugs is used, these being placed over the valves. An aluminum-bladed bronze hub, ball bearing fan, is mounted close to the rear of the radiator, the hub forming a cap so that no dust can get into the ball bearings. The fan is driven by a flat belt from an aluminum pulley at the forward end of a horizontal gear driven shaft, the rear end of which drives the centrifugal pump and magneto. The dash is mahogany with brass edges, while the floor boards are aluminum, being supported by an aluminum casting which rests on the steel frame and rigidly braces the dash, and also forms a solid support for the steering column.

The spark and throttle levers operate on an aluminum sector on the steering wheel, each lever being provided with a small hard rubber thumb button which releases it when the lever is grasped, but which locks it in position when the hand is removed. The steering wheel is of large diameter, the arms being of aluminum channel section, and having a continuous integral rim. The rear ends of the chassis side frame members are bent upward into an arch so that in case of going over an excessive bump, there will be no chance for the frame hitting the axle and no necessity for bumpers.

The gasoline tank is of 22 gallons capacity, made of copper and placed under the front seat, pressure feed being used, altho this is only necessary when the tank is almost empty. A large strainer is interposed in the gasoline line between the tank and Schebler carburetor. The tank filling hole is about 6 inches in diameter, and the cover is held by a removable yoke, making it not only easy to fill the tank, but possible to clean it out thoroly.

Delaware County Good Roads Convention

About two hundred and fifty autoists and enthusiasts gathered at Strath Haven Inn, Swarthmore, Pa., on Saturday, October 26, as guests of the Good Roads Association of Delaware County, to discuss the various phases of improved highways.

The meeting was a very enthusiastic one, and was called to order by President J. W. Weeks, of the Delaware County Automobile Club, who occupied the chair. State Senator Sproul, after whom the present good roads law of Pennsylvania is named, urged the people, the township and boroughs to take hold of the problem at once, and not wait for help from the State, altho he admitted that Pennsylvania would eventually be forced to follow the example of New York in the building and maintenance of main highways.

The recent annual election of the Automobile Club of Maryland resulted as follows: President, James Stone; vice-president, Dr. H. F. Rowe; secretary, E. A. Dolle; treasurer, Ernest J. Knabe.

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The Hol-Tan Company, New York City, ill offer for the season of 1908 two, all ew American models of motor cars, a even-passenger, tonneau body, called the Hol-Tan Special," together with a five-assenger touring car, the "Hol-Tan tandard." The standard chassis will also e fitted with two, three or four-passenger oadster bodies.

tonneau and enclosed types of body, li sine, couple, landaulet, or cab as may preferred. These bodies will all be plied to special order by Locke, Qui or Demarest, of New York. A 110-i wheel-base chassis, tires 34x3½ inc front and 4½ inches rear, same motor, cylinders, 4½x4½ inches, will be fi with either a 5-passenger tonneau b

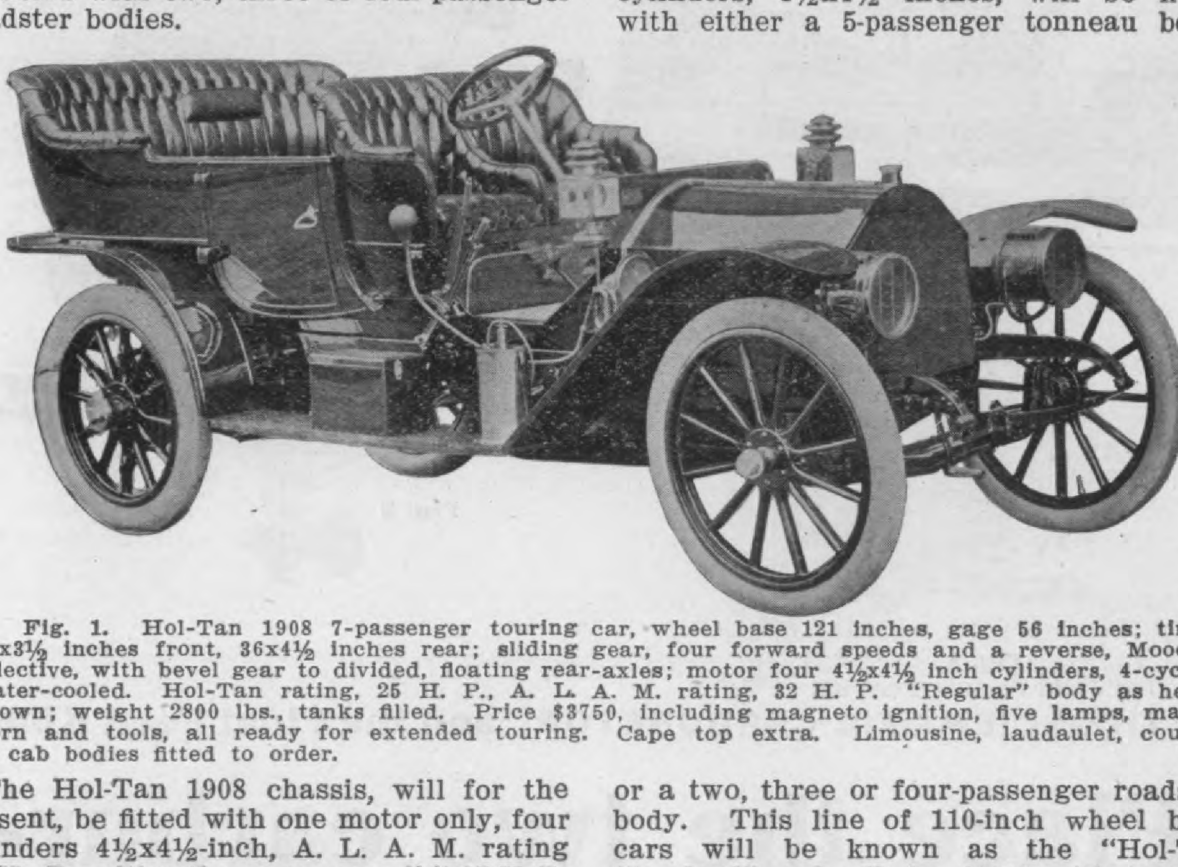

Fig. 1. Hol-Tan 1908 7-passenger touring car, wheel base 121 inches, gage 56 inches; ti 36x3½ inches front, 36x4½ inches rear; sliding gear, four forward speeds and a reverse, Moo selective, with bevel gear to divided, floating rear-axles; motor four 4½x4½ inch cylinders, 4-cyc water-cooled. Hol-Tan rating, 25 H. P., A. L. A. M. rating, 32 H. P. "Regular" body as h shown; weight 2800 lbs., tanks filled. Price $3750, including magneto ignition, five lamps, ma horn and tools, all ready for extended touring. Cape top extra. Limousine, laudaulet, cou or cab bodies fitted to order.

The Hol-Tan 1908 chassis, will for the resent, be fitted with one motor only, four linders 4½x4½-inch, A. L. A. M. rating H. P., altho the company call it 25 H. P. wo lengths of wheel base will be made, 21 inches with 36-inch tires, 3½-inch

or a two, three or four-passenger road body. This line of 110-inch wheel b cars will be known as the "Hol- Standard" and will be fitted with reg aluminum bodies, as shown in the illus tions herewith.

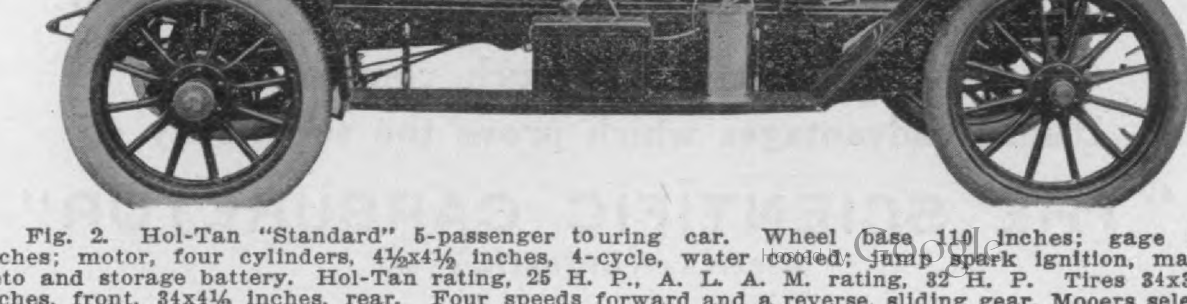

Fig. 2. Hol-Tan "Standard" 5-passenger touring car. Wheel base 110 inches; gage nches; motor, four cylinders, 4½x4½ inches, 4-cycle, water cooled; jump spark ignition, ma neto and storage battery. Hol-Tan rating, 25 H. P., A. L. A. M. rating, 32 H. P. Tires 34x3 nches, front, 34x4½ inches, rear. Four speeds forward and a reverse, sliding gear, Mooers sel

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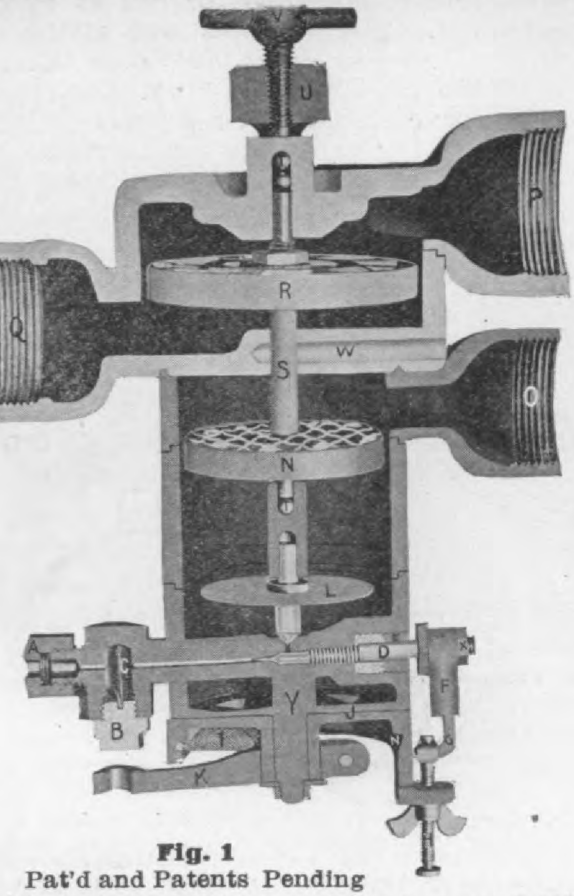

Fig. 1

Pat'd and Patents Pending

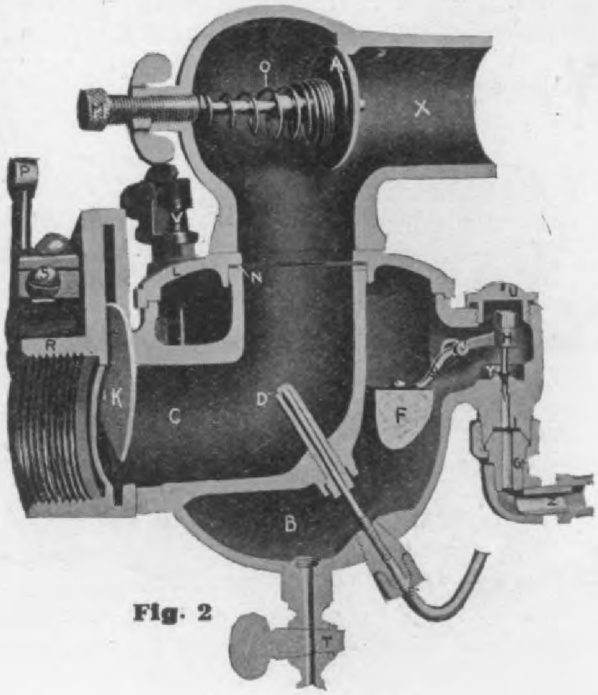

Fig. 2

"THE SCIENTIFIC CARBURETOR" and the Float Feed Kind

Place the two carburetors side by side

VIZ:

"THE SCIENTIFIC CARBURETOR" and a prominent one of the float feed variety

What is the result of such comparison?

Distinct advantages which prove the superiority of

"THE SCIENTIFIC CARBURETOR"

(DETAILS ON OPPOSITE PAGE)

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Suppose very fine particles of dirt or foreign matter get lodged on the seat of the gasoline valve Y (Fig. 2). It floods, doesn't it? This is liable to happen at any time, isn't it?
Notice the strainer gauze C in **"THE SCIENTIFIC CARBURETOR."**

Your Engine when running, is of course, constantly exploding; that means vibration. The wheels of your car are constantly coming in contact with irregularities, however slight, in the road surface; that's vibration. If you think that any light cork float, (F, Fig. 2) which keeps bounding up and down in response to waves in the float chamber B can keep the "level" of the gasoline anywhere near the proper distance of ⅛" below orifice of the spraying nozzle D, place a cup of water on the floor of your car and see how long any one level is kept.

No Vibration of the engine or car can affect the feeding of the fuel in **"THE SCIENTIFIC CARBURETOR"**, for, when the jump valve L (Fig. 1) rises, upon the suction stroke of the engine, the unvarying pressure caused by the head of gasoline in the tank, forces the amount of gasoline allowed to pass the point of the needle valve D directly into the currents of air then rushing past with the result that a given quantity of air measured by the throttle opening, and a certain amount of gasoline, measured by the needle valve are always constant and proportional to each other.

In the float feed carburetor (Fig. 2) in order to mix the gasoline with the air of the charge the following requirements are necessary: The main air opening to the carburetor X is closed by the valve A prest against its seat so strongly by the spring O that a pressure, in some cases equal to six lbs. is required to open it, and, because of this restriction, the engine, upon its suction stroke creates a vacuum in the chamber C, and the liquid in the float chamber B being under atmospheric pressure, rushes thru the spraying nozzle D by which it is transformed into small drops, in which state it is supposed to more easily mix with the air of the charge. Of course the makers of this type of carburetor claim that the valve A will open when the pressure becomes excessive by the speed of the engine being increased, but nevertheless, it is obvious that any restriction in the inlet pipe of the engine, whether it be of the straight Venturi Tube form introduced immediately around the jet as used by one maker, the air inlet valve restriction shown above, or the curved Venturi Tube form of restriction having in the lower side of the bend a puddle of gasoline over which the air of the charge is drawn, as used by another prominent maker in his latest model; nevertheless the passage must be restricted in order to accomplish the breaking up of the gasoline into fine drops, and to accomplish this, altho ridiculous it may seem, it is nevertheless a fact that the users of the most advanced types of float feed carburetors are tolerating a throttling of their engines in many cases to the extent of 50 per cent. by the carburetor.

In "THE SCIENTIFIC CARBURETOR"

(Fig. 1) there are no restrictions to throttle the engine as the wire mesh covered fan wheel N accomplishes the duty of breaking up the gasoline and thoroly blending it with the air in the charge far more perfectly than any spraying nozzle form of vaporizer can ever do, and the charge is forced into the cylinder by contact with the rapidly moving vanes of the fan wheel N, rather than introducing any obstruction to their flow. ¶ *By the use of the turbine wheel R, alone, in further reducing the amount of exhaust gases left in the cylinder from the previous explosion, we are able to increase the power of an engine 15 per cent.*

These are only four *of the 28 reasons why the users of* **"THE SCIENTIFIC CARBURETOR"** *are able to secure 25 per cent. to 50 per cent. more speed, flexibility to a degree that will enable them to run their car at a slow walk on the high gear, have a 30 per cent. cooler engine, save from 30 per cent. to 50 per cent. of the fuel generally used, have no more smoke, smell, sooted spark plugs, miss-fires or ever experience a lack of ability to "pick up" instantly at any speed.*

THE E. W. STEVENS COMPANY **East New Market, Maryland**

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ordered the purchaser pays a contract
e as agreed upon.

he Hol-Tan Standard line prices will
$3000 for the 5-passenger tonneau body
ring car, or for either style of roadster

of highways in America, that Continent
cars do not meet our mud, sand and wate
breaker conditions, no matter how we
they may do on good macadam.

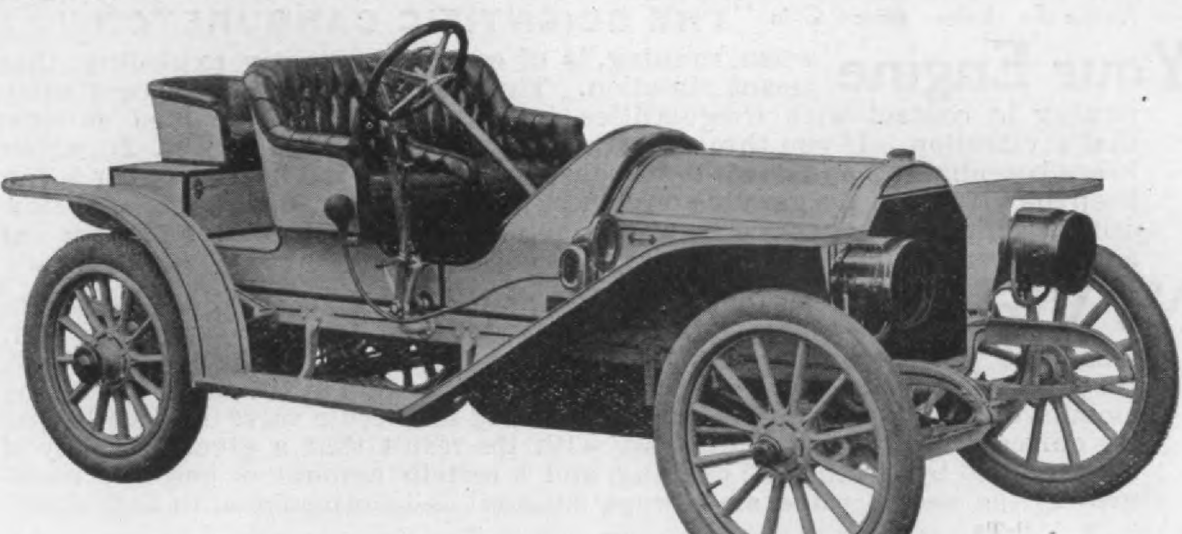

Fig. 3. Hol-Tan standard 110-inch chassis, fitted with standard aluminum roadster bod
carry two, three or four passengers. Roadster weighs about 2300 lbs. Prices same as tourin
ar, $3,000, with same double ignition and equipment.

ly, all bodies of aluminum, standard
ms, nothing in the way of special bodies
ng fitted to the standard chassis.

The Hol-Tan Company was formed in
5 to continue the American exploitation
the "Fiat" cars, which was begun by
incorporators of the company in 1902,

There has never been any question
to the excellence of American machine
signers or carriage builders, and this co
pany, in its turn from foreign to hor
production, has selected a distinctly Am
ican car created by Mr. Louis P. Mooe
original designer of the Peerless car a

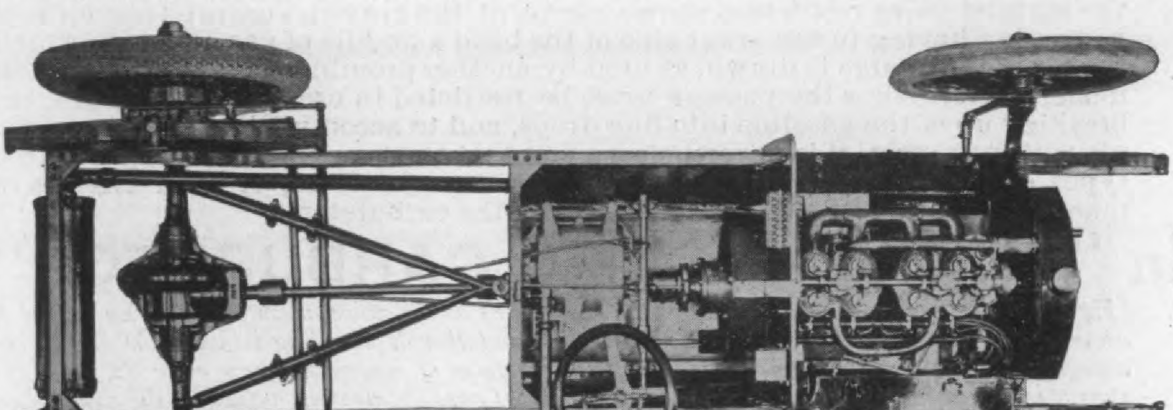

Fig. 4. Hol-Tan 1908 Mooers design chassis plan. This chassis is made with either 121
10-inch wheel-base, with 36 or 34-inch tires. Chassis general construction features same
oth models. The motor and gear-box are set on a sub-frame. The chassis frame sides a
arallel, no sidewise bends, but are raised 3½ inches over the rear axle. The rear axle a
races form a rigid triangle, globe-jointed forward to the chassis frame cross-girt, to take th
ace of both struts and torsion arm. The sliding gear is Mooers selective type.

d has continued to handle the Fiat only

of the cars brought out by the Moon Mo

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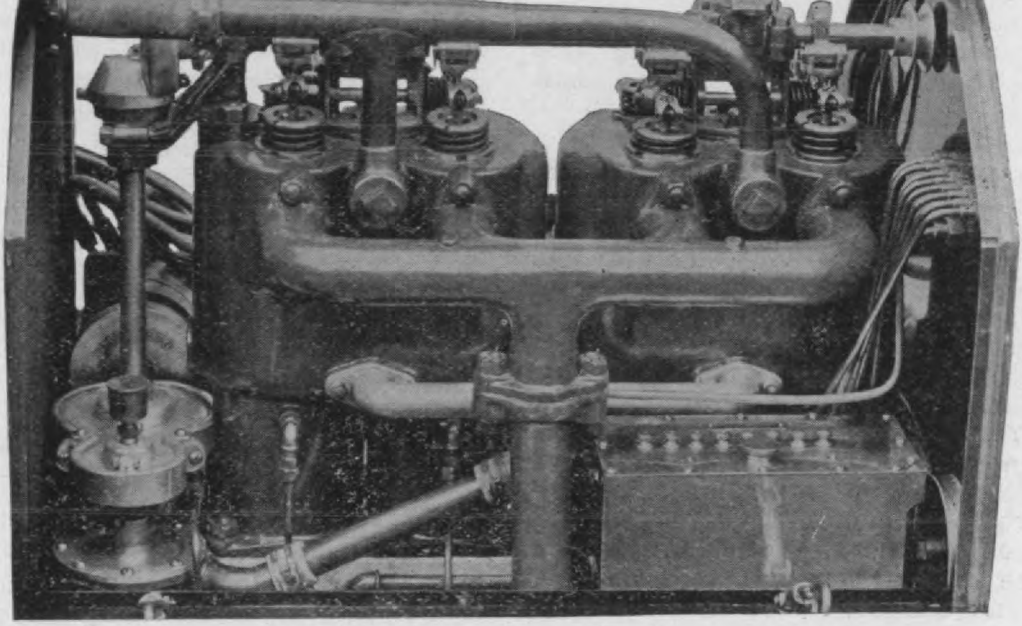
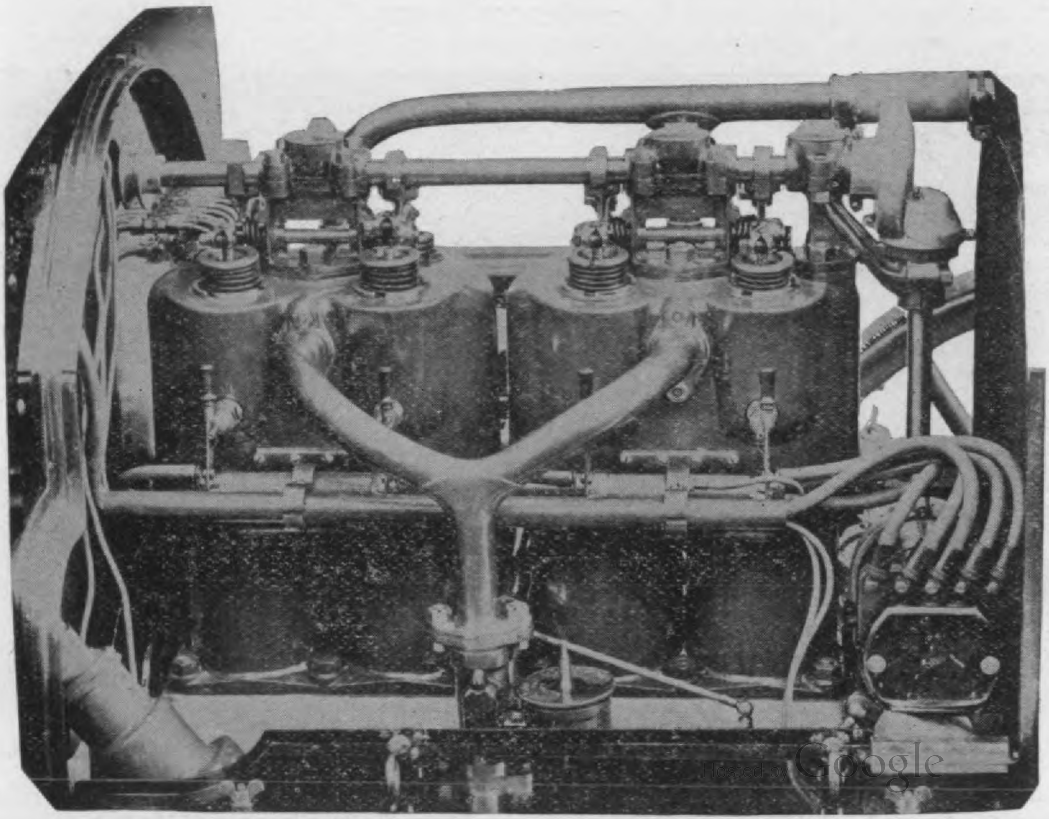


Fig. 5. Hol-Tan four-cylinder motor, in pla ce in chassis. Left hand side, showing dual-u cylinders, with vertical valves in the cylinder heads, overhead cam-shaft, vertical shaft cam-shaft and water-pump drive. Eight-lead, force-feed, single-plunger pump lubrication sy tem at the right hand. Design by Louis P. Mooers.

AXLES.

The front axle is an I-beam section, steel op forging. The front wheels and float- g rear axles are on 2-point, adjustable ll bearings. The stub-axle steering arms tend to the rear. The rear axle is a steel casting gear housing, divided so to permit removing the entire gear sembly. Spur balance gear is fitted. T steel tube axle sleeves are in rigid ass bly with a steel tube triangle which tern ates in a globe forward, and serves



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rings surrounding the outward ends of axle sleeve-tubes. The floating axle fts are on adjustable 2-point ball rings.

STRUTS AND TORSION ARM.

Neither struts nor torsion are fitted, the be-end triangular rear axle structure re-ing torsion and transmiting the driving ct to the chassis frame. This avoids necessity for strut adjustment, and avoids the inevitable discrepancy be-en spring movement and strut move-nt.

THE SPRINGS.

The front springs are half-elliptics, nted in front and linked in the rear. e rear springs are full elliptics, scroll-d, revolubly mounted both on the rear e and at the chassis frame brackets on . The springs are all tongued and oved and banded.

THE BRAKES.

These are exterior and interior on and the steel castings rear hub brake-drums, ich are of ample diameter. The exterior ke band is Gandy belting faced and 3-e lever applied. The inside shoes, also ndy, belting faced, are jointed, and are gle-expanded. The brake pull equalizers Mooers 1908 design, full length steel es, reaching all the way across between brake links, and having a universally whole brake action is perfectly equaliz perfectly free to follow the rear whe lift and drop at either end, and is powerf well designed and thoroly built.

THE CLUTCH.

The clutch is of the multiple disk ty with a sufficient number of flat disks, corrugations, to give a gradual engageme with a strong slipping drive and to tra mit the maximum motor power with co paratively light spring pressure. Th clutch it is claimed gives complete sat faction, requires no attention and is ve easily operated.

The steering action is the Gemmer, rig and left screw threads, self-locking, pow ful and capable of adjustment to elimina lost motion.

CONTROL.

The spark and throttle levers are ratch retained on top of the hand wheel, and accelerator pedal is fitted which opens t throttle independently of the hand lev adjustment. There are two large pedals the foot board. The left pedal releases t clutch only. The right pedal applies t exterior rear hub drum brake band. the two hand levers, that on the outsi is pulled to apply the internal emergen brakes only. The inside lever works three planes to shift the Mooers selecti gear change.

Luncheon given by the American Motor Car Manufacturers' Association at the Hotel Ma hattan on October 29th, 1907.

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roit, Mich., offer for the season of 1908, hree models, the single cylinder $500 runbout, a single cylinder package cart on he same chassis, and an entirely new nodel known as the two-cylinder runbout, on the chassis of which is also to e made a large sized delivery wagon. All f these models retain the unique running ear features, as described in our March, 907, issue, page 115, being in the main he use of spiral springs and wood frame nd axles.

This new model has many features are identical with those of the single inder runabout, the running gear, frame, spring suspension and transmis being the same except that the wheel is 88 inches. The motor is a distinct elty in gas engine construction. It i the two-cylinder vertical type, 4x4 inc 4-cycle, 12 H. P., both pistons being the same crank and moving up and d together, but the cylinders exploding ternately. This motor, it is claimed,

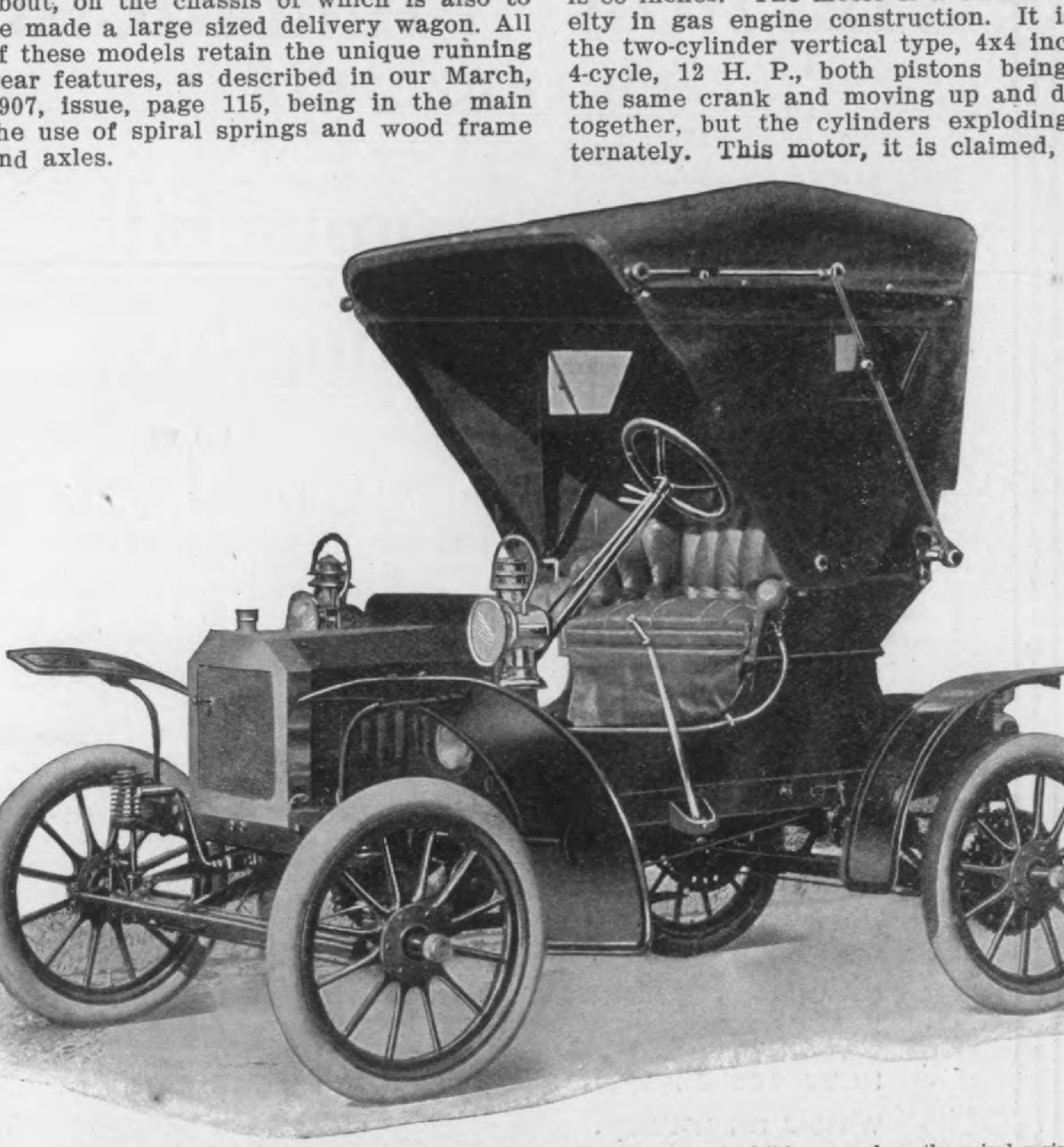

Fig. 1. Single Cylinder 1908 Brush Runabout. The special features of this car such as the spiral sprin suspension, the wood frame and axles and the vertical single cylinder motor are retained but a planetary chan speed is now used. Thermo-syphon circulation has been adopted. Price $500.

CHANGES IN THE RUNABOUT.

The transmission used for 1908 is an internal gear planetary, housed in a stationary case, with metal cone clutches instead of brake bands. The same transmission is used on all models. Other refinements have been made, such as the use of thermo-siphon circulation, improved oiling system using crank case

sesses three distinct advantages. Fi is more accessible than the horizonta cylinder head and valve arrangemen ing the same as on the single cyli The cylinder head can be unscrewed removed, the valve caps, one of them taining the spark plug, come out b screwing a wing thumb nut, and the case is laid open by removing a pla

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THE NORTH AMERICAN

PHILADELPHIA

Leads in Automobile Advertising

There is probably no other business in this country that entails as great an investment of capital as the manufacturing and marketing of automobiles. The automobile man deals in "futures" —he must plan ahead for the business that will come largely of the advertising he is doing now.

He must know where to place his money to the best advantage and what newspapers will produce the greatest sales.

The local agent—the man who comes in contact with the purchaser—must understand conditions. He must know the best medium to reach the purchaser. His advertising expenditures are charged against him, and in these he wastes no money.

To properly present the claims for their cars before the public, automobile manufacturers and dealers engaged 59,737 lines of space in the Show Editions of Philadelphia newspapers, Nov. 9th and 10th, apportioning that space as shown on the opposite page.

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The North American 23,146 Lines	The Press 12,149 lines

The Inquirer 7294 lines	The Record 5964 lines	The Ledger 4725 lines	The Telegraph 4670 lines	The Bulletin 1879 lines

This pre-eminence of **THE NORTH AMERICAN** is not an accident. It has won for itself the respect of the investing interests of the country by its square deal policy, by barring fake financial advertising and exposing the illegitimate. Its readers believe the character of the paper is behind its advertisements.

Motor car advertisers see the advantage of this prestige. Some of the most successful place the bulk of their appropriations with **THE NORTH AMERICAN** for this reason. In the treatment of automobile news

THE NORTH AMERICAN

Surpasses Any Other Paper in Philadelphia

Endurance runs, hill climbs, cup races and similar tests are presented with all the realism of the contest by the news expert in charge of the automobile columns. **THE NORTH AMERICAN'S** automobile news has the attention of every motorist in the city, and the manufacturers and dealers recognize this fact.

To reach the people who are interested in automobiles YOU must advertise in **THE NORTH AMERICAN.** Rates on application.

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heretofore constructed has been notor-
s for bad balance and gave excessive
ration. This, it is claimed, has been
rely overcome by a special balancing
ngement.

HOW IT IS BALANCED.

here are two distinct kinds of vibra-
; the mechanical, due to the starting
stopping of the piston weight, both
ons moving together; and the torque
side thrust, from the force of the ex-
ion when the connecting rod is at an
le. As the ordinary crank shaft coun-
weight revolves, it pulls sidewise as
as up and down, due to centrifugal
on. Such a counter-weight therefore
ely takes out about half of the up and

One feature of the Brush line is havi
the steering wheel and control on the le
side instead of on the right. Mr. Bru
argues that in stopping at the sidewalk
the right side of the street, which is ever
where compulsory in this country, th
arrangement allows both passenger a
driver to descend without having to be
Japanese acrobat in order to climb ov
steering wheels, levers, extra tires, et
or get off in the mud and walk arou
the car. Furthermore, in crowded traff
where the driver is continually endeavo
ing to get ahead of slow moving vehicle
and gain place further along in the lin
it is very convenient for one steering
the left to look out ahead and see what
coming in the opposite direction. Aga

Fig. 2. The New Two-Cylinder Brush Model. A two-cylinder vertical specially balanced motor is under the hood at the front, both pistons on the same crank and moving in unison but exploding alternately, cylinders 4x4, 12 H. P., same change speed, frame, spring construction as the runabout, wheel base 88 inches. Price $750.

vibration, and puts in about an equal
int of side vibration. This kind of
ter-weight is employed as usual, but
cond counter-weight on a side shaft
eared to the crank shaft with the
ht so placed that it is claimed it
s care of the up and down vibration
to the still unbalanced weight of the
ng parts, but as the two counter-
hts revolve in opposing directions,
neutralize the lateral vibration of
other, and it is said, completely bal-
the engine as far as vibration due to
lanced weight is concerned.
e torque causes a diagonal rocking
t, but the center of the counter-
nt shaft is not on a level with the
shaft, and these two weights in re-
ng also set up a rocking tendency

in passing vehicles going in the opposit
direction, it is safer and easier to judg
passing distances when sitting on th
left. The British representative of th
Brush Company after signing up for th
British Isles noticed this feature and in
sisted that for the English trade th
steering wheel be placed on the right
for the reason that in England the rule o
the road is to pass on the left when meet
ing, just the opposite of this country.

The two-cylinder model is put out as
runabout for two passengers, but extra
are supplied in the way of a rumble sea
or a double surrey seat for the rear deck
these being readily interchangeable o
detachable. This car is very speedy, an
may be geared so that it will do close u

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y tools and that, the detachable tool and rumble seat are $50 extra, and double surrey seat is $100 extra.

are retained without the weight, cost, ad additional parts and upkeep expense o the 4-cylinder car.

The "Thor" Six-Cylinder Motor

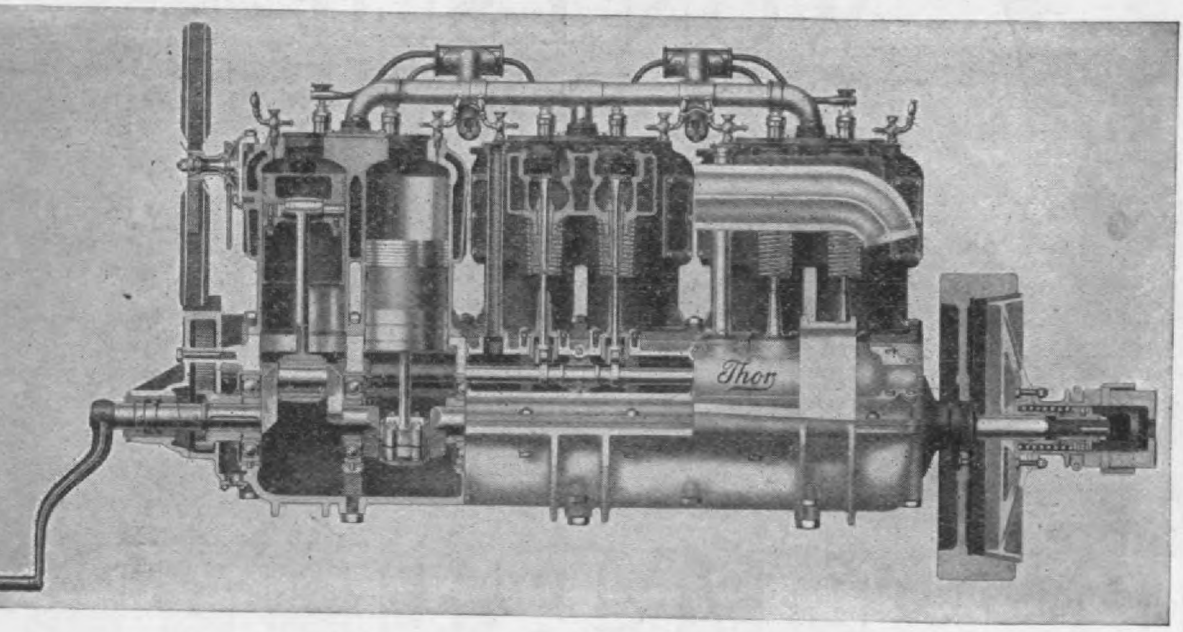
HUGH DOLNAR.

e Aurora Automatic Machinery Co., ra, Ill., U. S. A., Brandenburg & Co., ng agents, No. 85 Lake street, Chi-, Ill., and 103 Reade St., New York, S. A., offers the 6-cylinder "Thor" r to the 1908 trade, as here shown described.

e rapidly increasing demand for six-der motors and the care shown in the n and construction of this new six-der, which is so recent a production the first, and, as yet, the only "Thor in existence is that exhibited at the ce and Garden 1907 Shows, gives first story of the Thor Six decided est.

which is shown herewith partially in section, was designed with the sole in tention of producing the very best six cylinder, 4-cycle, water-cooled motor pos sible, with no regard to either labor or materials cost.

The Thor cylinder bore and stroke are the same, 120 mm., about 4 7-10 inches and this motor, it is claimed, shows 60 B. H. P. at 1500 R. P. M. The weight, as shown, with fly-wheel and cone-clutch com-plete is 730 pounds. The ignition is by one set of jump spark plugs with both high tension magneto and battery current supply. The cylinders are cast in dual units with integral water jackets. The



The "Thor" Six-Cylinder Automobile Motor.

Aurora Automatic Machinery Com-was incorporated in 1894 to manu-e and sell the now well-known " Bicycle Components, and took up notorcycle motor, a single cylinder, e, air-cooled 1⅝x3¼ inches, nominal P., as its first gas engine venture, in The "Thor" pneumatic tools were nt out in 1904, and the Aurora Man-ring Company is now working about

water circulation is by a centrifugal pump, driven from the cam shaft gear.

The cylinders are symmetrical, valves on both sides, all valves alike; the valves and stems are integral forgings, 35 per cent. nickel steel; valve faces 45 degrees angle; all ports 1 13-16 inches diameter.

The valve action is direct from two cam shafts, about 1 inch diameter. All dimen-sions here given are in inches, corre-sponding to English inch translations to

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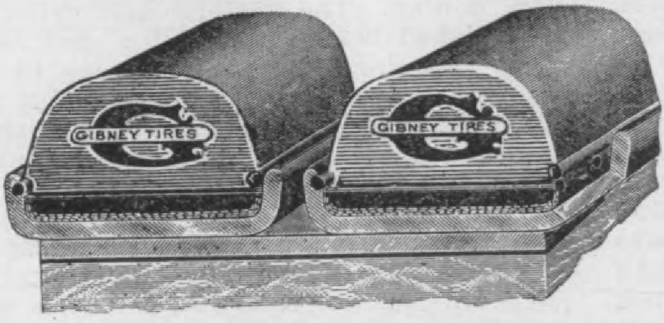
GIBNEY TIRES

and BEST

GIBNEY TIRES



The new Gibney Solid Tire and Sidewire Endless Motor Tire.

These new tires are the result of years of close study and research int the best methods of European and American tire manufacturing processe They combine resiliency and durability to a degree equalled by no oth solid tire yet constructed. They are made of purest Para rubber b skilled workmen of the highest grade, and will give you perfect satisfactio

GIBNEY

We are agents for the celebrated

Continental Auto-Skid Tires,

The ideal winter equipment.

We also carry a full line of

Everything For The Automobile

The Standard American goods as well as the most approved forei supplies,—**FUR COATS, CAPS, GLOVES, BOOTS and ROBES** all grades.

Our line of Accessories is unsurpassed.

We are manufacturers of the

Auto Eleck-Trick Vulcanizer.

Every car owner should have one. These vulcanizers pay for the selves in less than six months.

Send for illustrated catalog.

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JAS. L. GIBNEY & BRO.

The cams and cam shafts are exact reproductions and will interchange. The cam shaft material is nickel steel, 3½ per cent., and the cams are completed by local case hardening. The cam lifters, all cylindrical and all hardened, have forked lower ends, which take hardened cam rollers, about 8-10 diameter; the valve springs, tempered steel, are of the volute form, and have their lower ends bent across and passed thru slots in the valve stems. The valve action here shown has no length adjustment, but a micrometer length adjustment will be fitted in the regular commercial Thor Six. The cam shafts are on plain bearings. The cam shaft drive is from an applied steel pinion keyed on the crank shaft, direct to pure fiber cam shaft gears, not laminated with metal. The pump and magneto are driven by pinions meshed with the cam shaft gears, one on each side, in about the same relative positions. The carburetor is of the float feed type, with single standpipe, and provided with an auxiliary air intake valve.

THE CYLINDERS.

The cylinders are cast from a fixt analysis gray iron mixture, and are finished by boring, grinding and lapping; the boring and grinding are with everything machine held; the lapping is with a free, expanding, lead lap, quartz abrasive used with light mineral oil. The cylinders are finished to accurate diameter by lapping; the grinding is 2-1000ths under finished size, and the final 2-1000ths of diameter is gained by lapping with a free, lead lap, quartz and light mineral oil freely applied to the lap, which hand-traversed in the cylinder bore during the lapping operation.

THE THOR SIX-PISTON.

The grey iron pistons are cylindrical, and made in three diameters; the piston head diameter above the rings is 20-1000ths below the cylinder diameter; the two body ends of the piston are each 2-1000ths under cylinder diameter, and the relief, in the middle of the piston, is 40-1000ths below the cylinder diameter. The 3 piston rings are eccentric, 35 degrees angle cut, and are finished so as to exactly fill the cylinder, with no opening at the ring joining. The pistons and cylinders are finished before assembling, and there is no "running in" by belt-driving of the assembled engines. The piston pins are about 8-10 inches diameter, tool steel, hardened and ground, and have split ends, with taper pin and screw retention.

The symmetrical connecting rods are nickel steel drop forgings, with hardened and ground steel bushes on the piston pins, full marine type split, 4 screws with castelated nuts and split pins and flanged split anti-friction metal boxes on the crank wrists, with one-piece brass liners between the box halves, no closing possible without taking metal off the liners.

THE CRANK SHAFT.

This is nickel steel, heat treated and tempered, wrists and bearings 1 21-32 diameter. The crank shaft bearings are imported, annular ball bearings, 13-16 balls.

THE THOR SIX BASE.

The motor base is a four-piece aluminum casting, one for the motor base proper, two for the cam shaft housing, and one for the oil basin below, which has 3 oil pits, with one overflow stand-pipe in each. The lubrication is splash, and the clutch is a 9½ degree cone, 15½ inches large diameter, leather faced, with cork inserts.

The machine work of this motor as shown at the Palace and Garden, 1907, is of the very best quality.

Track Racing Question Remains Unsettled

The question as to whether automobile racing on horse tracks is to be or is not to be continued, is still undecided. The special committee appointed by the American Automobile Association made a report in which it gave no definite decision in the matter.

The report seems to be much of a straddle inasmuch as a large majority of the organizations affiliated with the A. A. A. voted against sanctions, while comparatively few voted for sanctions.

Automobile track racing if continued under the sanction and approval of the A. A. A. will be completely revolutionized in respect to methods of conducting such events and restrictions imposed.

The publication known as The Power Wagon, which is published in Cleveland, O., will hereafter be located at Chicago, Ill., with offices at 21 Metropolitan Block.

A continual decline is shown in import statistics from month to month. The month of October shows a shrinkage of $217,586.15 in comparison with the imports of the corresponding month of last year. The number of automobiles entered was 202, or 18 less than October, 1906, the appraised value being $591,466.84, as against $809,052.78.

The January number of the Journal will be the 'Great Buyers' Guide Special," containing as it will a directory of makers of motor cars, motor boats, parts, accessories, etc. All firms listed in the directory will appear under suitable headings according to their products, all makers of each particular product appearing in alphabetical form under that heading. No extra charge is made for this valuable feature, and single copies of the January number may be had for 20 cents, or we will start subscriptions with the January number for all who remit $2.00 promptly before the edition is all bespoken.

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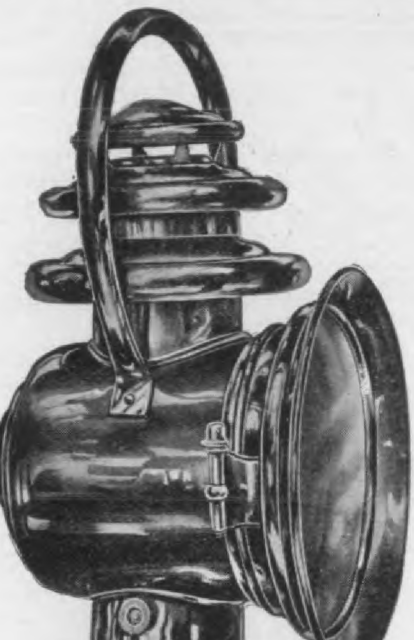
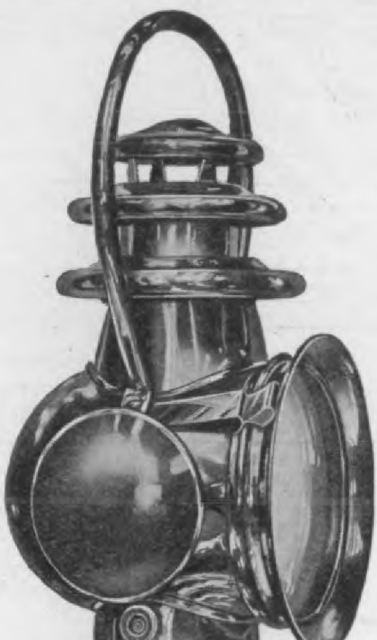
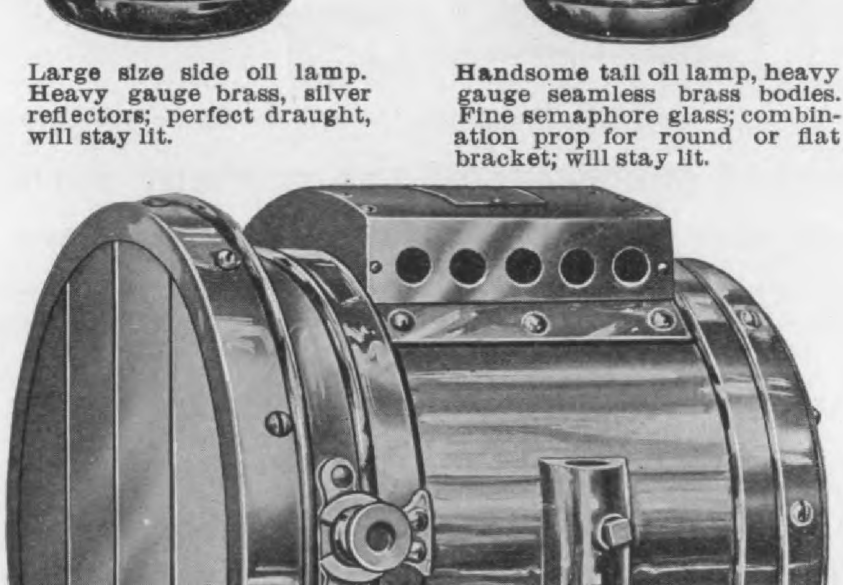


Large size side oil lamp. Heavy gauge brass, silver reflectors; perfect draught, will stay lit.



Handsome tail oil lamp, heavy gauge seamless brass bodies. Fine semaphore glass; combination prop for round or flat bracket; will stay lit.

Very handsome squ lamp, heavy gauge b silver reflector, per draught; will stay lit.



$\frac{1}{16}''$ brass body, reinforced with extra bands $\frac{1}{8}''$ thick. Full size Bausch & Lomb Mirror, Adjustable Focus

Double Generator, Heav Gauge brass, Automati cut off Valve; wate jacket cast base.

If you select any of these lamps you will make no mistake, because they are the acm onstruction and finish.

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A Strong Statement—but a True One about the

The distinguished successes of the present automobile season, you can name on a very few fingers. And however you name them, the Elmore must come first.

First, we mean, in point of swift sales; the quick clean-up of the entire output; the call for more cars than our big plant could build; and the magnificent satisfaction which every Elmore in use is giving its owner.

Each Elmore season has surpassed the previous one---each year has seen its prestige grow greater and greater and greater.

In 1908, we promise you that the Elmore will be the most perfect car of its class in America.

THE ELMORE MFG. CO.

1004 AMANDA ST., CLYDE, OHIO,

MEMBERS A. L. A. M

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MECHANICAL AND TECHNICAL DEPARTMENT

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.

Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

WHAT IS THE LIMIT OF ENGINE SPEED?

Provo, Utah.

Enclosed you will find a sketch of a 6 by 4 in. cylinder for either a 2 or 4-cycle engine, with a 6 in. between centers connecting rod. Will you kindly answer the following questions:

1. Is there a limit to the speed of a gasoline engine? Why are not speeds above 2000 used?
2. Why is large bore and short stroke not used?
3. Why would this increase the ratio of power to weight?

T. J. NEUBAUER.

Your question is quite a pertinent one. Most builders have assumed that things are impossible because they have not been done before. Gas engines have usually been heavy and with small bearings and so would not stand the speeds at which steam engines were run. Daimler and De Dion abroad and the Duryeas on this side of the water simply cut loose from tradition and produced the light engine now so common in auto service and without which the high speeds and great flexibility needed could not be secured. But I do not believe that we have reached the limit. With better steels it is possible to go much farther. Their use in themselves permit both lighter weight and higher speeds. I see no near limit if the engine is designed correctly. We hear of engines running up to 3000 R. P. M., and why it should not be a regular thing I do not know. The piston speed is assumed to be the limiting factor, but with better oils than in the past even this is less true. Formerly 600 ft. per minute was considered fast enough, then 750 was assumed to be about the right thing, but now the H. P. formulas are based on speeds of 1000 ft. per minute. 6-inch bore and four-inch stroke was used and gave good service on a Lambert auto this last year. They have increased the stroke to four and a half for next year, but have another with 5 in. bore and 4 in. stroke, so it is quite evident that they do not regard it as bad in any way. Several other makers use strokes shorter than the bore. Precedence is the only thing I can think of that keeps the short stroke from being used more. It makes a very short and light engine and gives greater flexibility than a longer stroke engine. It must be made more carefully, for it is evident that with a larger circumference the leaks will be more if the fits are not good. High speeds also require better carburetors than common and good carburetors have been hard to get in the past. People have put much money into needless things like speedometers and neglected the very thing that saves most time by furnishing a proper mixture so the engine can do its work well. Proper sparking is pretty well understood, but the carburetor has not until lately been considered enough to result in much betterment. Yet it is vital to a high speed engine, for if the mixture is not right it cannot burn quickly and so no power follows. Practically all carburetors require a higher vacuum at high speeds than at low, but at high speeds the great trouble is to get in a full charge and so the vacuum should not increase. Some engines do not get half a charge at high speeds and this is largely why the power does not increase as does the speed. Some engines have the charge forced into them, and these certainly can get a much higher speed than common. However, your connecting rod of only 6 in. in length is too short for the bore and would give excessive side thrust in the cylinder.—C. E. D.

TO REMOVE CARBON DEPOSITS.

Milwaukee, Wis.

Finding your department in the Auto Cycle & Trade Journal indispensable, I beg leave to inquire how I can clean cylinders in a 2-cylinder opposed motor, same being carbonized? Have used kerosene, but too late, as the carbon has already become hard. I find my engine knocks at times, so I suppose this is the fault coupled with that of the timer, as I have to keep the spark down.

A. T. HOFF, JR.

There is no known and practical solvent for carbon. When it is baked in place the best way is to scrape it off with a table knife or some tool of this kind. Some makers like the Marmon, have kept this method of cleaning in view in designing and have made the heads of the cylinders easily removable so as to facilitate cleaning. Kerosene is good before the carbon has baked in place, for it cuts the heavy oil and lets the solid particles wash away. A good part of the so-called carbon is often road dust which has been sucked into the cylinders thru the intake and is caught by the oil on the walls. The intake pipe should have a large area of knit or loosely woven cloth to cover its entrance, and this should be washed frequently so as to prevent its becoming so completely filled with dirt as to add much resistance to the passage of the air.—C. E. D.

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BEARINGS WORK LOOSE.

Doniphan, Neb.

Will you answer thru your excellent journal the following questions: I have a 5 in. x 7 ii. opposed double cylinder auto engine that is giving me lots of trouble. What I would like to know is, would it make the engine run better if I changed the stroke to 6 in.? At present it is almost impossible to keep the bearings tight on the crank shaft end of the connecting rods which are bushed with babbitt metal. I have tried several kinds but get no better results. They will pound loose in a few hours. I never run the engine over 800 R. P. M. and less on the road under load. I sometimes think the compression is too high. Would that have a tendency to make it pound or is the stroke too much for bore of cylinder and speed of same.

HARRY WILSON.

I cannot tell from your description whether the fault is too high compression or whether it is in some other part of the construction. Possibly the bearings are too small and too short. The piston speed is not unduly high. If the pistons are very heavy it increases the load on the bearings. See that your cooling system is in good order so that there are no pre-ignitions. If there are pre-ignitions it puts a very heavy load on the bearings, and this probably causes you the trouble. If you have no pre-ignitions, then you need not think of lowering the compression by shortening the stroke. I think you can lower compression by putting plates under the cylinders so as to make them stand farther apart. If the fault is in the bearings, several things that are less cost than a new shaft can be done. First be sure that the crank pins are parallel with the crank shaft, for if they are not they do not take the load evenly all over the bearings and one part cuts while another is not even bearing. A smaller true pin will serve better than a large untrue one. A few small oil grooves in the bearings parallel to the shaft and not diagonal as is common, will often remedy the trouble. Bronze bushings instead of babbitt will often stand up under abuse that the babbitt has not sufficient strength to take. If you still fail to make it stand up as it should, there are two or three tricks that will help. Bore out the bearing for a pin of ¼ in. greater diameter and put in a loose bushing ⅛ in. thick. This will more than double the bearing surface and the bushing will travel around at some intermediate speed and by reducing the speed of the surface contact will stop some of the wear. If you do not have room to bore out the bearings so much a thinner bushing will do. I have used bushings of thin spring steel so thin that altho formed in a single piece they could be sprung into place on the pin. These stopped the trouble because they divided the work between two surfaces.—C. E. D.

WANTS FORMULA FOR RATIO OF ENGINE TO REAR WHEEL SPEED.

Ashtabula, Ohio.

Will you give me a rule in your next issue to find the ratio of gearing engine to wheels, engine steam 40 I. H. P.? Wheels, 36 in.; weight of car 3000 or 4000 lbs.

ENGINEER.

I do not remember any rule for your purpose. You can approximate what you want as follows: Assume a draw bar pull of 50 lbs. per ton for good macadam roads and two to five times that for worse roads. If you expect high speed, an addition must be made for wind resistance; 4000 pounds will require 100 lbs. pull at the top of the wheel to propel the vehicle. If you want 30 miles per hour you must pull that wheel a mile in two minutes, or 2640 ft. in one minute. This distance multiplied by the pull required, is the foot pounds per minute that your engine must develop; 264000 divided by 33000 gives 8 as the H. P. required. If your engine gives 40 H. P., it does not mean that you can go five times as fast, but that you can go on roads that are so bad you require a draw bar pull of 250 lbs. per ton, without changing gears. Of course the friction of the engine, vehicle bearings and similar losses must be taken into account, all of which reduce the figures. You can select sprockets of such size as seem most suitable. If the rear sprocket is half the size of the rear wheel the chain pull will be 100 lbs. per ton, and if the engine is to turn twice as fast as the rear wheel the front sprocket must be half the size of the rear. I do not see how I can make it any plainer. And when you have figured it all out, it is still nothing but a guess and of little value unless you have had experience in such things and know about what to allow for each factor that you are obliged to consider. On this account the best way is for the new man to select the vehicle that is most nearly like what he wants to build and copy it, making such allowances as any preferred changes seem to require. The safest engineers are the most conservative ones and they stick closest to what has been done before and use formulas only when they cannot get the actual example, and even then they remember that the average formula is only an aid to guessing.—C. E. D.

A REVERSIBLE 8-CYLINDER MOTOR.

Detroit, Mich.

I am designing an eight cylinder gasoline engine with the cylinders set at an agle of 90 degrees with each other, arranged four on a side, with the connecting rods of opposite cylinders working on one crank. The crank shaft I expect to make with cranks set at 90 degrees apart. What would be the order of firing the cylinders? They will fire at intervals of a quarter of a revolution. Also by using a cam shaft arranged to move horizontally to bring in another extra set of cams, can this engine be made to reverse without first stopping? I figure that a fly-wheel will not be necessary. The engine, of course, will be four cycle.

C. G. HERBERT.

The order of firing can be arranged several ways. It cannot be determined until the crankshaft shape is determined. I presume that you will use a regular four cylinder shaft and that the four cylinders on one side will fire as does the usual four cylinder engine and the four on the other side will fire just the same but one-quarter of a revolution earlier, or later. If you number the cylinders on one side even and on the other odd and fire each as a four cylinder, viz., 1, 2, 4, 3, with the cylinders on the opposite side in the same order, you will fire as follows, 1, 2, 3, 4, 6, 5, 8, 7. Or you can just as readily fire them thus, 1, 8, 5, 4, 7, 2, 3, 6. Figure it out for yourself. It is better mental training than a game of checkers. The engine might be made to reverse, but of course would necessarily have to come to a momentary stop first.—C. E. D.

GASOLINE VERSUS STEAM

Godfrey, Ill.

Kindly answer, if you can, the following questions in the next issue of the Journal: What are the advantages and disadvantages of a steam automobile? And can they be compared with the gasoline machines, or are they more difficult to operate?

C. D. FLACK.

Get the catalogs of two or three of the most prominent makers of steam vehicles and you will get about all there is to be said in their favor. Contrast the good points with the good points of the gasolines as set forth in the catalogs of their makers and you have the best answer to your question possible, for the reason that what I consider a good feature may be by you thought to be a bad one. We are not all alike and on this account the varieties of autos are sure to increase each year. This very fact will kill

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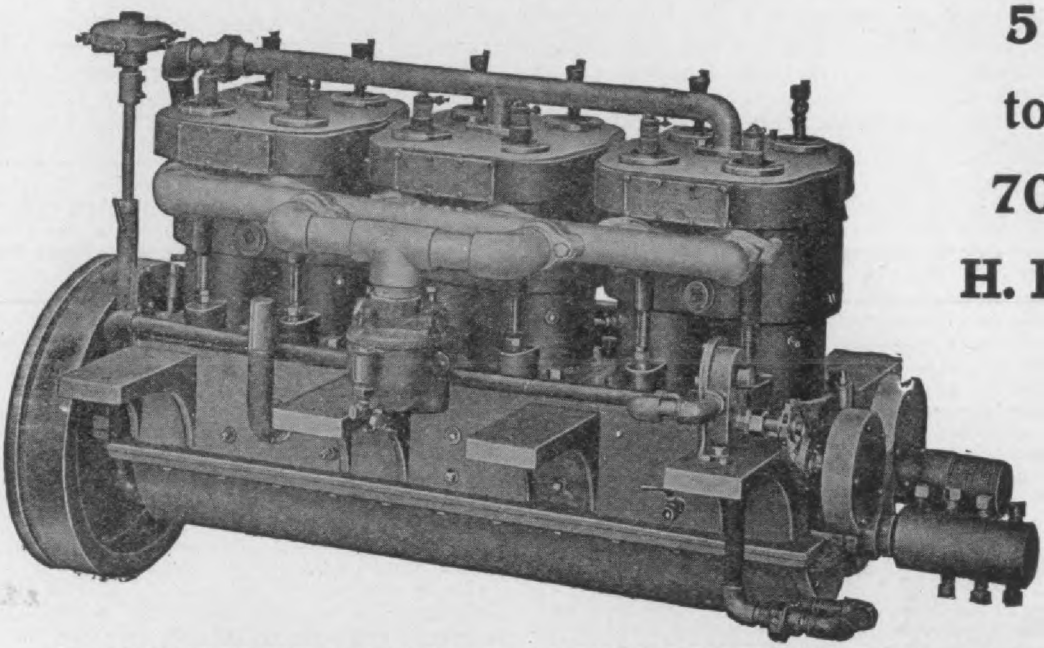
TRANSMISSIONS and CLUTCHES for AUTOMOBILES and MOTOR BOATS

Motors

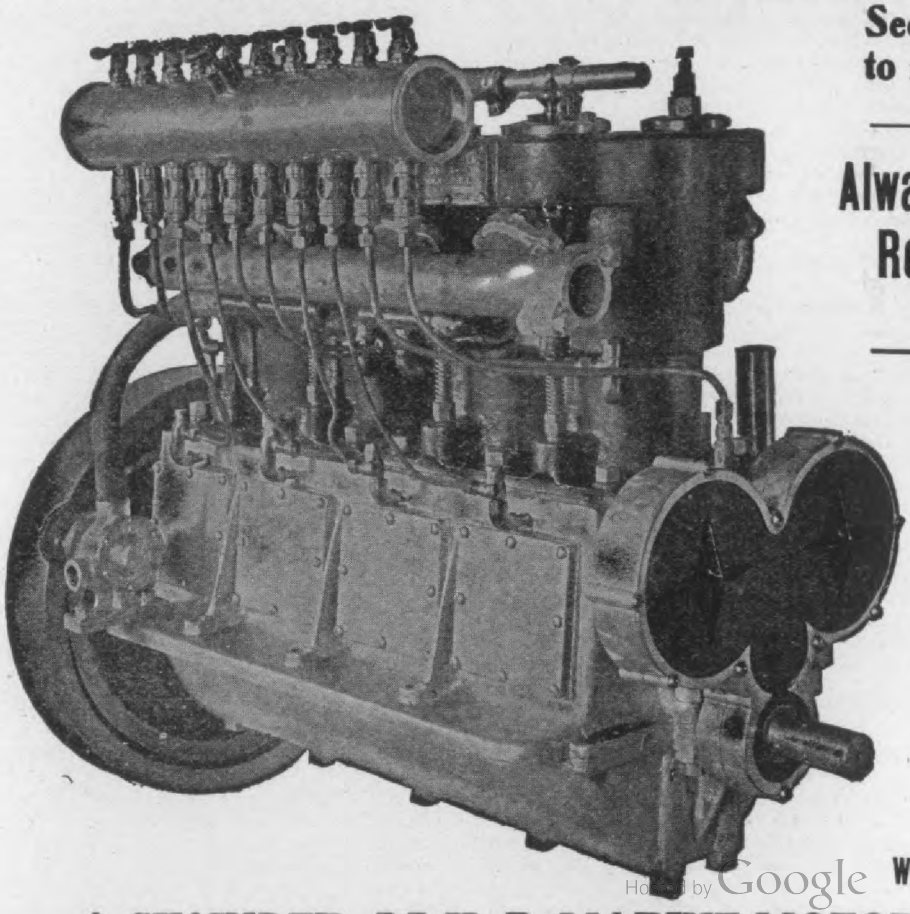
5 to 70 H. P.



6 CYLINDER, 45 H. P. AUTOMOBILE MOTOR.

Second to none.

Always Reliable



Write for Catalog and Prices.

Air and Water Cooled

4 CYLINDER, 35 H. P. MARINE MOTOR

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the styles and then the auto will be a thing of utility and not a fad, as it has largely been in the past.

Steam vehicles use more water and fuel for the same power, have more parts, require more time to get ready, have an open flame that may be a source of fire, must have better water and cannot use a non-freezing solution or get along without water, as does the air-cooled gasoline engine, and the intense flame is often quite destructive to the boiler, with the result that more care is required usually to keep it in order. On the other hand, they are self-starting when steam is up, are quiet, can be reversed, have a much greater flexibility so they need no or less speed changes than a gasoline car, can pull hard from a standstill, can be driven slowly without stopping, and are like some little girls, very good when they are good. The steam vehicle got a black eye by being "high financed" when it was young. If the early steamers had been developed as slowly and carefully as the early gasoline vehicles were, there would never have been a boom in the business, but many more would have been in use to-day. Some users will have nothing else, but in the long run the steam engine will lose out. It has had its best day. The possibilities of the internally fired engine are so much greater and are just becoming to be realized; which means that in the near future we will have still simpler and better ones and the steam engine will be left further behind in the favor of the public.—C. E. D.

WHICH CAR FULFILLS THE CONDITIONS?

New York.

Will you kindly state which valve you think is better and reasons, the bevel seat used on most American cars, or the flat valve used on the Mercedes and Bianchi?

Do you know of an automobile engine combining the following features and will you please express your opinion as to whether they are good or bad?

(1) Six cylinders, cast separately. (2) Valves on opposite sides and mechanically operated. (3) Make and break ignition, with magneto and battery. (4) Water cooled, pump and fan. (5) Governor, and hand and foot throttles. (6) Engine supported at 3 points. (7) Horsepower about 35. Engine to be used in connection with multiple disc clutch and selective transmission.

I shall look forward to your next issue in hopes that it will contain an answer to the above. WM. E. WARDLAW.

The bevel seat is best because it offers a more nearly straight path for the gases. It is also slightly smaller and lighter. Many forms of seats have been tried and some are made spherical, but there is little gain to pay for the additional trouble. Any are good if the size and workmanship are right. I do not remember such an engine as you suggest. You may find one at the shows, which will be nearly over before you get this. Six separate cylinders are all right if you want that many. I prefer less. I do not favor opposite valves because they require two ports, and one is necessary evil enough. I can run an engine as fast as I think it should be run without lifting the inlets mechanically and so can see no use in adding this complication. For special work, like racing, where every ounce of power and speed is wanted, it is all right. A little larger charge can be introduced if there is no valve to be sucked open. Your ignition suggestion cannot be beaten, altho there are plenty of good jump spark devices now. There is no use for a governor, for you can set the throttle where wanted and the engine will not vary much if your carburetor is good. The finest adjustment can be done by hand, so a hand throttle is preferable. A foot throttle necessitates sitting in a fixed position and makes driving more fatiguing than it need be. Your remaining suggestions are all right.—C. E. D.

TEMPERATURE OF PRE-IGNITION OF VARIOUS FUELS.

St. Louis, Mo.

Through the medium of your journal, kindly inform me at what pressures per square in and at what temperatures Far. pre-ignition will take place in the cylinder of an internal cumbustion engine when said engine is using the following fuels: gasolene, kerosene, alcohol? A. V. REYBURN, JR.

No stated pressure and temperature can be given, and even if they were, they would only apply to the exact conditions under which they were found. A different design of engine would change the result and render the information of little value. I do not have a report at hand just now, but you doubtless know that gasolene pre-ignitions are quite common in engines that use pressures of 75 pounds or more. Kerosene ignites easier and so ought not be worked at over 60 pounds or thereabouts; while alcohol will stand pressures twenty or thirty pounds higher than gasolene. These pressures apply to water-cooled engines. They are lower for air-cooled and vary of course with the temperature of the compressed charge. The Diesel engine starts with a cold charge, and I understand uses pressures up to 500 pounds.—C. E. D.

FORMULA FOR DRY CELLS.

Gloucester, Mass.

Having been a subscriber to your magazine for several years, I desire to know if the formula used in making dry batteries is secret? If not, will you kindly publish the same in some future edition of the Journal?—E. S. T.

Most dry cell makers have a formula of their own that they like to consider as secret. Dry cells are simply galvanic cells, and are not essentially different except in the quantity of moisture. If perfectly dry they furnish no current, and this is one reason why old cells are not so good as new ones. Ordinarily zinc, carbon and sal ammoniac are the essential features. Black oxide of manganese is used as a depolarizer, and this is usually mixed with granulated carbon which much increases the carbon surface while a little graphite insures conductivity. A zinc cup is lined with a porous cup of blotting paper, the carbon put in the middle and the mixture described, moistened with a solution of sal ammoniac, is packed tightly and evenly around the carbon, filling the cup tightly nearly to the top. A layer of melted pitch and asphalt is poured on top to hold the mixture in, and generally a hole or two is left for the escape of gases. Great care should be taken to get a good metallic connection with the top of the carbon. Pure sal ammoniac and pure zinc are advisable. Solder inside starts local action, and soon ruins the cell. A strong solution gives a large output for a short while. Some cells are moist enough to leak when laid on their sides. Water is formed in use, and a short circuit is often indicated by the cell running over.—C. E. D.

Several changes have recently been made in the executive committee of the A. L. A. M. F. L. Smith, of the Old Motor Works, has succeeded M. J. Budlong and F. A. Babcock, Babcock Electric Carriage Co., has succeeded C. Arthur Benjamin as director. B. F. Everitt, Wayne Automobile Company, and C. G. Stoddard, Dayton Motor Car Company, were elected to membership in the association.

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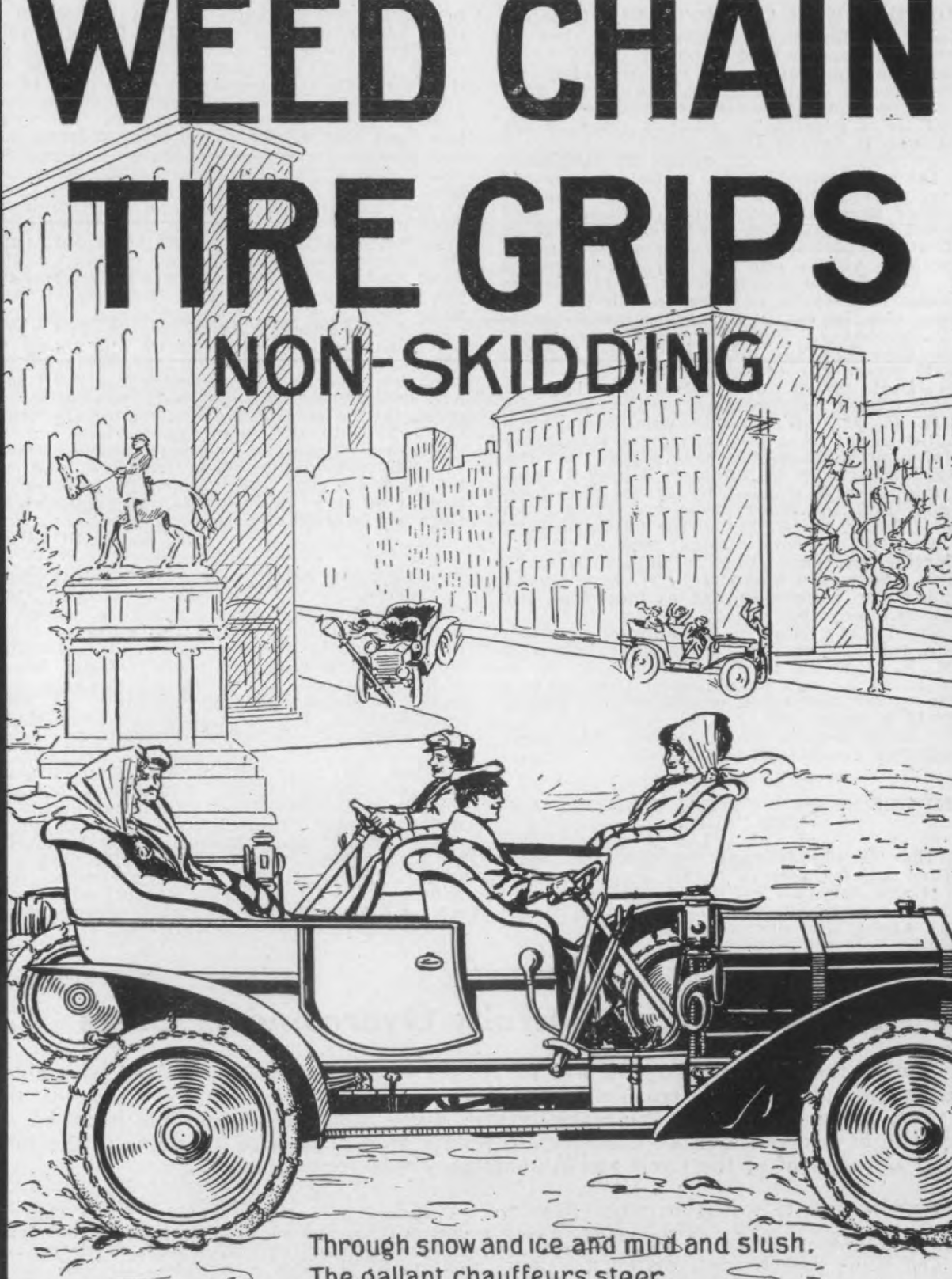
WEED CHAIN TIRE GRIPS

NON-SKIDDING



Through snow and ice and mud and slush.
The gallant chauffeurs steer.
No skidding as they onward rush.
WEED GRIPS on front and rear.

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WEED CHAIN TIRE GRIP CO.

2 Cycle Engines

HUGH DOLNAR.

HORSE POWER OF OPPOSED MOTOR.

Please pardon my troubling you, but I knew of no one, who I thought would know as well as yourself, about the following:

What is the highest H. P. that a 4x4 double opposed engine, water cooled, will develop? Is it possible or what is more to the point, can it deliver 18 H. P.?

JOHN P. BATES.

It takes 2 cylinders to make an opposed motor, consequently a double opposed motor would of necessity have four cylinders, and four 4x4 cylinders, four cycle, can give 28 or 30 H. P., or perhaps something more if made with large valves and given full charges of fuel. You do not specify 4-cycle. If you are thinking of 2-cycle engines, 4-cylinders 4x4, 2-cycle can be made to give from 50 to 60 H. P., probably. If you mean a pair of opposed cylinders 4x4 in., 4-cycle, as I guess you do mean, the ordinary rating is from 12 to 14 H. P. With large valves, full cylinder charges, high compression, say 90 lbs., and 2000 R. P. M., all possible conditions, such a motor might have 130 lbs. square inch mean effective pressure which would give 1625 lbs. on each piston by 500 effective 4 inch strokes per minute and divided by 12 to give foot-pounds, and by 33,000 gives 8.35 H. P., for each cylinder, or 16.7 H. P. for two cylinders, 4x4 ins., 90 lbs. compression, 2000 R. P. M., neglecting friction, which is high in a small engine, and would make 14 B. H. P. a liberal estimate for a pair of 4x4 cylinders at 2000 R. P. M., 4-cycle.

I should say that a 4x4 opposed cylinder motor, might, possibly, be made to show 18 B. H. P. I would also say that 12 B. H. P. is as much as can be expected from such a motor under favorable condition of actual work in a motor car, on the road.

Of course, 2-cycle would double this, same superlative conditions.—H. D.

HENDERSON TWO-CYCLE ENGINE ANTEDATED.

Los Angeles, Cal.

In the "Trade Journal" of Oct. 1st, there appears what purports to be a new system of portage for two cylinder engines devised by Mr. Henderson. There are a number of points about this device which are certainly new and novel, such as the admission of pure air into the top of the transfer tube, and the pivoting of the connecting rod in the upper end of the piston. The idea of the transfer tube attached to the top of a piston and discharging at the upper end of the combustion chamber is not new, as the writer has used this device for several seasons, and the results have been highly satisfactory. While the engine has seen actual service, it has not been marketed in a commercial way as yet. neither did I have an opportunity of carrying my exhaust ports clear around the cylinder, as I took an old Sintz engine, using the original exhaust ports, casting a new head and piston for the purpose of working out the idea in practical service. I have since constructed a machine using the lower end of the cylinder as a compression chamber with the tube transfer to the top of the cylinder. I have had no trouble whatever from back fire, strictly speaking, altho I have had considerable trouble with premature explosions due to the overheating of the transfer tube and the port projections on the cylinders. I am now experimenting with a view to remedying these troubles, and will be glad to give the "Journal" readers the benefit of my experiments, if I get results that are worth reporting.

JAS. M. SHUCK.

NO ADVANTAGE IN MOVING CYLINDER.

San Francisco, Cal.

I have designed a 2-cycle motor where the piston is stationary and the cylinder moves on slides as in steam practice. Is this objectionable in a gasoline motor? I can see no objection except in weight of cylinder compared to piston as a moving part. If this is no drawback, I have a perfect 2-cycle motor. Please answer through the Trade Journal.

A. PHINNEY.

What do you gain by a stationary piston and moving cylinder? You would certainly lose in every direction, so far as I can see. A large steam engine built in Chicago, moved both cylinder and piston incorrectly supposing that they would gain double power by using the cylinder head pressure. Your scheme seems to have no recommendation at all. Of course, the Chicago engine was a misconception and a failure.—H. D.

Difficulties Successfully Overcome by Users

Under the above heading we will be pleased to publish how *you* solved *your* automobile difficulties. Many troubles have been successfully overcome by means of the answers in these columns. We earnestly urge those who have been thus benefited or any who have overcome such difficulties to send a brief account of the same to the Editorial Department of the Cycle and Automobile Trade Journal.

AN EXPERIENCE WITH PISTON RINGS.

Lampases, Tex.

The "Journal" has been of great interest to me, and much valuable information has been found in your Mechanical and Technical Department.

I read not long ago a question and its reply therein relative to the proper space that should exist between the ends of piston rings in small gas engines. Here let me say that I do not wish to criticize Mr. Duryea's recommendations, for I am aware that what might work to great satisfaction in one engine might not give any kind of satisfaction when applied in another engine. What I wish to do, is merely state certain experiences that I have had in the fitting of rings in gas engine cylinders, and if any one is benefited I shall be satisfied.

The engine in question was a 4-cycle low compression multiple cylinder affair that ran hotter than usual on account of the design given it by the maker, which, so they claimed, made it more economical in fuel, and I cannot dispute this claim, for it seems to do more work than others I know of with equal fuel.

When the auto containing the engine had traveled 1384 miles there was next to no compression in one of the cylinders, which I shall hereafter refer to as cyl. No. 1. Being a machinist by trade, having had some experience in fitting packing rings and having facilities for making a good set of rings, I determined to depart somewhat from what I believe is the general rule.

Ordinarily piston rings are so fitted that the ends are apart from 1-64 inch to 1-16 inch. I reasoned that the more space between the ends, the more leakage, for while the origi-

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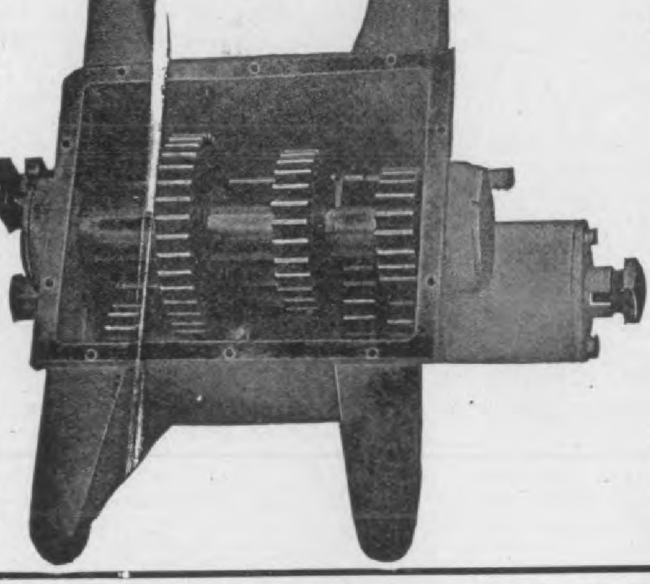
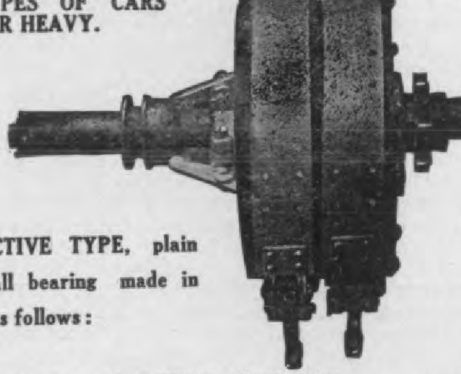


ALL TYPES OF CARS
LIGHT OR HEAVY.



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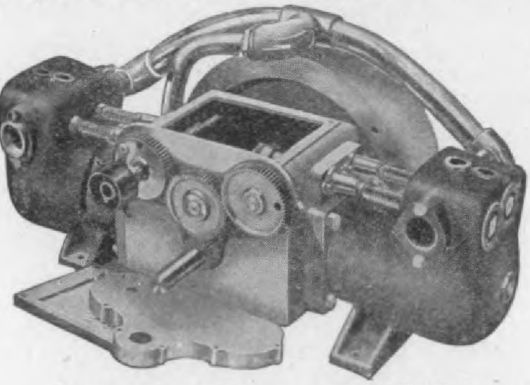
No. 3 for cars up to 2,000 lbs. Shaft Drive.
No. 3½ for any size motor up to and including cylinder 5x5.
No. 4 shaft drive and double chain drive, built for largest types of pleasure and commercial cars and trucks.
PLANETARY GEARS. Made in two sizes: No. 3, for up to 1850 lbs. No. 4, for the heaviest types of pleasure commercial cars. Let us quote you prices.

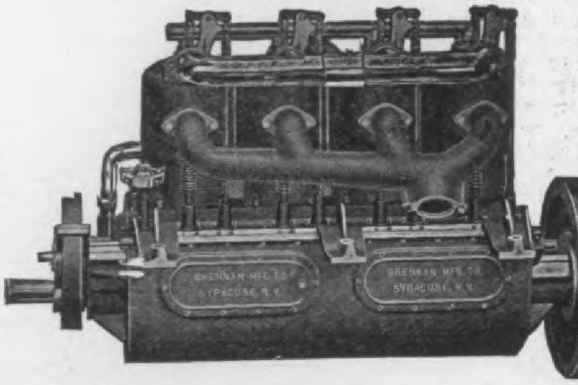
SYRACUSE GEAR CO., - Syracuse, N.

BRENNAN STANDARD
Motors and Transmission

vill solve the power problem for you. We have models to suit equirements of the automobile builder.



Our horizontal ball-bearing mo two cylinder, 5½x5, 20-24 H. P. is pecially adapted for shaft drive or ch drive. The two cylinder 5x5 engin an ideal equipment for runabouts.



For touring cars of from five to seven passengers, the standard type is our four cylinder, 5x5, 40 H. P. motor. This is a triumph in motor building, being powerful, silent-running and reliable.

For high-powered runabouts or light touring cars, as the A car, Pope Hartford, Etc., our four cylinder, $4\frac{9}{16}$ in. bore x 4 stroke is unsurpassed.

We furnish Motors and Transmission Gears complete on steel frame or pre

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nal rings seemed to open out and fit the cylinder walls good and snug, yet there was a blowing of the compression past them where the ends of the rings were even when the engine was hot. The piston was taken out and the cylinder carefully measured with an inside micrometer, and it was found that the cylinder had worn tapering, largest at the end nearest the cylinder head. I found that the head end was nearly 0.004 inches larger than the other end. Expecting that rings might eventually have to be made for all the cylinders, I made a simple arbor chuck for holding the rings while the sides of same were being finished, which was done in a universal grinder, thickness of rings not varying more than one-half of a thousandth inch. Another arbor chuck was made that held the rings by their edges after they had been compressed till their ends came together. This chuck was for holding the rings while they were being finished on the periphery, which operation was also done in the grinder. The arbor chuck was held between dead centers, hence it was possible to remove the chuck and try the ring in cylinder, if desired. With ends of the ring as close together as they could be drawn the periphery of the ring was ground off till it would just slide into the cylinder easily and come to a stop when it had slid down 1-16 inch farther into the cylinder than the piston would carry it. On account of the slight taper of cylinder, 0.004 inches in about 5½ of length, the chuck containing ring would easily slide in, as nothing but the ring touched the cylinder, until the ring reached that part of the cylinder whose diameter it equalled. Then it would go no farther. Each ring was fitted to pass into the cylinder the distance that it would be carried when in its groove in the piston, plus 1-16 inches.

The emery wheel used, trued with a diamond pin, left a fine finish, and while very true and smooth, yet there were fine marks visible to good eyes. Of these marks I speak later, and they must have been less than 0.0001 inch in depth. I had some misgivings as to how the rings would work when fitted so closely to the cylinder, with their ends touching each other, and was very careful at first, just running the engine long enough for it to get warm, next time ran it a little longer, and longer each time after until I thought it might be safe to take a short ride without danger of the rings striking and ruining a cylinder. But never did those rings offer to stick.

After running the vehicle 2293 miles the rings in another cylinder no longer held compression as they should (will call this cylinder No. 2) and as such good results had been obtained from the rings in cylinder No. 1, cylinder No. 2 was fitted with a set of new rings in a similar manner. All rings ground till they would just slide into the cylinder 1-16 inch farther than the piston would carry them. At 2293 miles the rings in cylinder No. 1 were examined, cleaned and washed in gasoline. Tho they had run the vehicle 909 miles, yet the very fine marks made by the emery wheel were still visible over the entire surface of all three rings. To anyone familiar with finishing by grinding I will say that the finishing wheel was a Norton vitrified wheel, No. 120 grit, work speed and feed the best I knew for producing the most accurate surface. The rings in cylinder No. 2 were used as in the first case and no trouble at all resulted from the close fitting of the rings in either cylinder. At 3328 miles the rings in a third cylinder were replaced. At 3329 miles the rings in cylinder No. 1 showed the small emery wheel marks over at least 2-3 of their surfaces and had been used to drive the vehicle 1945 miles. Rings in cyl. No. 2 showed the small emery wheel marks over their entire surfaces and had run the vehicle 1036 miles.

I am of the belief that the metal of which the rings were made was of slightly harder iron than that in cylinders, tho the difference, if any at all, was very little. Each time the rings were taken out and wear noticed, the cylinders were carefully measured and compared with the original measurements, and in each instance the difference was found to be negligible, never more than 0.001 inch increase in cylinder diameter.

At 4785 miles a tour was contemplated and everything was desired to be in best shape for starting out. As the engine was known to need scraping to remove accumulated carborn, it was cleaned. Rings in cylinder No. 1 still had emery wheel marks on at least 1-3 their surfaces, rings in No. 2 showed even less wear than rings in No. 1 after a corresponding use, and rings in No. 3 had emery wheel marks on at least 3-5 their surfaces. As the compression seemed all that could be desired, I didn't take the trouble to measure and compare the wear that had taken place in the cylinders, but don't think it had been any more than had occurred formerly from corresponding use.

This proves to me that in some cases piston rings can be fitted very closely to cylinder walls, in fact much closer than is done ordinarily, and give satisfaction. It does not prove that the same satisfaction would result in all cases. Five months after putting in the rings in No. 2 I had a job fitting rings in all the cylinders of another engine, which was of same make as my own, and tho supposed to be of same dimensions, I found that the cylinders had been originally about 1-10 inch larger in diameter. After advising with the owner, I fitted similar rings. After using his car for several hundred miles he wrote the rings were satisfactory.

The stroke and bore were equal, 4½ inches each, rings were 4.72 inches in diameter before cutting, which was straight diagonal cut of 45 degrees done on the grinder in order to get ends square and true, rings eccentric, and all ⅝ inch wide. At 4785, after rings in cyl. No. 1 had run vehicle 3401 miles, I revolved piston in cylinder till the ends of lowest ring showed at a hole in which an oil cup screws. The space between ends of rings was measured with a thickness gage and found to be less than 0.008 inches. The mileage given is actual, as read from an odometer.

TOM HULING.

A PECULIAR PREDICAMENT.

The writer while taking a short pleasure drive not more than twelve miles out of the city, upon one occasion encountered one of those long hills built on the installment plan, and as each sharp rise seemed to be the last was congratulating himself upon the manner in which the small 4-clinder air cooled motor was "doing itself proud," when another and steeper incline presenting itself, the clutch apparently began to slip and the car refused to take the grade, altho the motor was running well. The low gear was thrown in, but with unsuccessful results, as there appeared to be a decided slip somewhere, altho at times the car would start ahead.

It was decided to readjust the clutch, which was of the leather faced cone type, and this was done. Another attempt was then made, but with the same result. We then removed the foot boards and after inspecting the clutch decided that it was in as good working order as usual, in fact that it was gripping very hard and after the nature of many of its kind altogether too suddenly. As the universal joint, there was but one, seemed intact and likewise the change gears and as far as could be determined the cardan shaft, I decided to watch the car from the ground while my companion again essayed the hill. To my surprise I found the hub of the right rear wheel turning around while the spokes and rim remained practically stationary. Others who have been in a similar predicament know the cause, a defective hub casting which had cracked completely around close to the barrel leaving only the flange securely bolted to the spokes.

The question of getting home now presented

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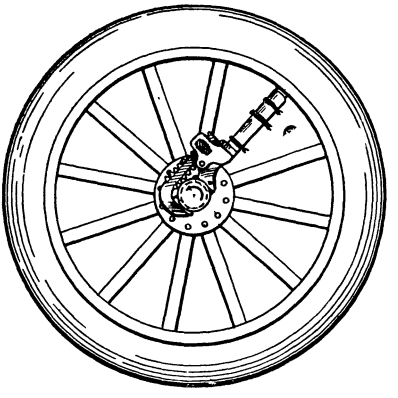
itself, as of course the other wheel would not drive. Two solutions offered themselves, first, wedge the differential so it could not act and drive with one wheel, but as the differential was anything but accessible this was abandoned; second, the wheel spokes could be gripped to the hub—but how? From the tool box a large Stilson pipe wrench was obtained and gripped onto the hub and then the handle securely wired to one of the spokes as shown. The rotation of the hub being such that it continually tightened the Stilson's grip on the hub. The direction of the hub rotation is shown by the arrow.



Stilson lashed to wheel hub for driving.

After all was in readiness the car was pushed by hand to start it, so there would not be too much strain on the wrench, but the "fierce" clutch was the rock upon which we split, and so did the Stilson, for the handle was broken short off by the sudden twist when the clutch engaged. However, as we were now headed down the hill we managed to keep moving, and by the use of the low gear when on the level and the fact that the slight wobble of the wheel wedged the hub sufficiently so that it drove occasionally, we managed by avoiding the hills to reach the city. It is needless to say a new hub was supplied by the makers free of charge.

E. STILLMAN.

EFFECTIVE ANTI-FREEZING SOLUTIONS.

As the cold season approaches the usual quest for good non-freezing solutions increases. The following are some that have been used with success; equal parts of alcohol and water, and as alcohol can be obtained in quantity for 37 cents per gallon this removes the chief objection to its use as a non-freezing agent, the previous high cost as it will gradually evaporate and needs replenishing. However, it is now cheap and cleanly. Ordinary commercial glycerine one-third, alcohol one-third and water one-third has given excellent results. Three-firths glycerine and two-fifths water works very well, but care must be taken when using glycerine that the pipes, tank and radiator of the motor system are clean and free from alkaline substances possibly left from former non-freezing solutions. Such foreign matter will affect the glycerine and cloud or thicken it. The general opinion seems to be in favor of alcohol and glycerine in preference to alkaline solutions, altho many have used these with success. The "Trade Journal" will be pleased to hear from its readers in regard to non-freezing solutions, and will place in this department with or without your name as desired such information as may be sent.

A large contract by the Maxwell Briscoe Co. for denatured alcohol has been closed with a Tacoma firm which is beginning the manufacture of industrial alcohol out of sawdust that is obtained practically without expense in the lumber regions of Washington.

REMEDY FOR A SLIPPING CONE CLUTCH.

Nearly every automobilist at times is troubled with the slipping of the clutch, and some have been known to use dust from the road, others rosin, chalk, etc. A very good, in fact, about the best remedy is to apply the residue from the calcium carbide tank. This powder is usually to be had and answers the purpose admirably without any injurious effects.

Drivers who are troubled with cold feet from contact with the cold metal of the foot levers will find that ordinary tire tape wound around the pedals will overcome this difficulty and at the same time provide an excellent adhesive surface upon which the feet will not slip.

COPPER AND ZINC ALUMINUM ALLOYS.

Fostoria, Ohio.

There seems to be a general controversy regarding the alloy of aluminum known as No. 12 and the zinc alloys. This is rather amusing, but unnecessary, as each has some advantages peculiar to itself. No. 12 is light, and No. 31, (a copper and zinc alloy) is strong. Where lightness is the first consideration No. 12 would naturally be preferred, and where strength is of greater importance No. 31 would be preferred. No. 12, as is known, is an alloy consisting chiefly of copper and aluminum. Copper in aluminum makes it hard, and when used in excess makes an extremely brittle casting. Zinc toughens aluminum, but when used in excess acts somewhat like an excess of copper, making a brittle casting.

The alloy which we have accepted as our standard is an alloy which contains both copper and zinc in proportions to give a casting which is strong and which has a moderate degree of lightness. We make any mixture, however, that a customer may desire.

A word or two may also be said of crystallization. We have never had a casting made from our alloy break because of crystallization. In fact, breakage of any kind has been an extremely rare occurrence. There is such a thing as crystallization in aluminum castings. It is a peculiarity of many substances. The crystallizing of aluminum alloys is not due to the alloy, but to not understanding, or to an improper understanding of the melting and mixing of the alloys. It is supposed by some that a slight knowledge of melting metals is all that is required to cast aluminum. Nothing could be further from the truth. To properly handle this metal requires years of experience, both in moulding and in mixing and melting. This experience is ours, as the heads of our departments have made aluminum castings for six years.

One very common fault with aluminum castings is that they are often filled with blow holes. There is very little excuse for this, as they can be almost entirely avoided by properly handling of the metal and by properly making the moulds. Overheating and "burning" the metal is one cause of blow holes and improper ventilation of moulds another. More poor castings are made through "burning," however, than from any other cause.

Aluminum has come to be a standard product, not only in the automobile industry, but in many other industries where brass was formerly used. In many cases, such as name plates and other small articles it is often superior to brass, as it can be made to take a very high and lasting polish. It is also cheaper because lighter in weight. Boat fittings particularly launch fittings, cleats, chocks, post lights, etc., might be cast in aluminum instead of brass. One property of aluminum which might well be made use of is its resonance. We have not yet made any aluminum bells but think that they ought to prove very successful.

THE FOSTORIA ALUMINUM MFG. CO.

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35 H. P., 4 cylinder, King of Belgium Body.

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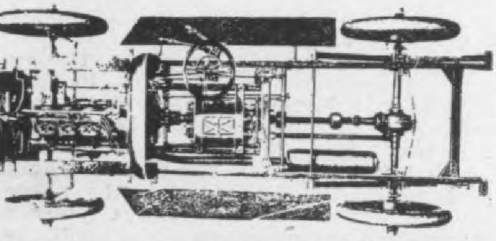
Transmission, Axles, Hubs, Pressed Steel Frames, Radi tors, Steel Dashes Curved, Hoods, Rutenber 4 cylinder, 4 x 5 Engines, Bodies in the white, Fenders, Steering Device Splitdorf Coils, 4 cylinder, Hill Precision Oilers and nume ous other parts.



Speed Reverse Transmission, 4 cylinder Rutenber ngine, 4½ x 5. Multiple Disc Clutch. Bevel Gear rive, 34 x 4 in. Wheel.

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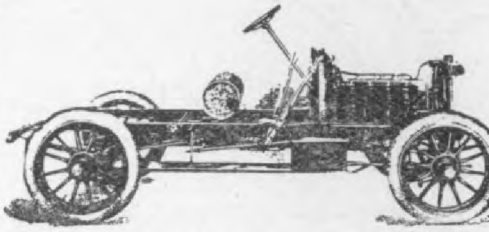

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rnish testimonials from parties who have these cars in use for over a year and we will also demonstrate car to any one coming to S uis and will pay their expenses if car is not as represented. Don't wait you may be too late.

For Renting Service this would be an ideal investment. For Re-Selling, a good profit could easily be realized. For Your Own U u would enjoy the use of your machine much more if you assembled it yourself and knew every part in detail. For a Racing Ty anabout this would be an ideal machine—make your body to your own design.

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See Cuts for Illustration of Parts. Dimension Sent on Request.

	Our Net Price	Actual Cost Wholesale
30 American Ball Bearing Front and Rear Axles with spindles	$125 00	$144 00
30 Pressed Steel Frames assembled with Spring Hangers, Steps and Sub Frame to take Rutenber 4½ x 5 Engine	45 00	58 00
50 Hussey Universal Joints—2 needed at $7.50	15 00	10 25
8 Briscoe Honeycomb Radiators	29 50	42 50
30 Bonnets or Hoods	5 50	7 00
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30 Gasoline Galvanized Iron Tanks, divided into two parts, with Valve and Filler Cap, 12 in Diameter, 30 in. long	5 75	7 00
17 Hussey Steering Gears, with Lever Controls on top, up-to-date in every respect	28 50	32 50
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15 Bodies, made out of the best material, and Al workmanship in the white, 33½ in. wide over all and 86 in. front to rear	65 00	75 00
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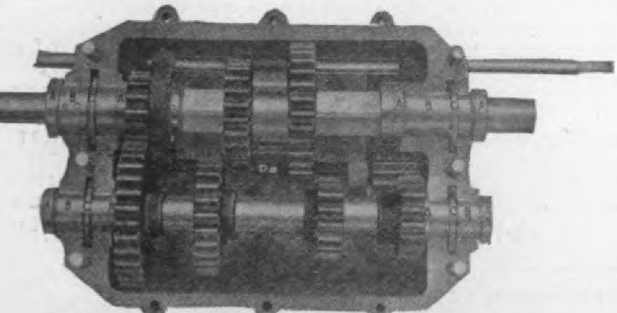

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Dr. Dyke published the first Books on automobiles. DR. DYKE'S BOOKS. Dr. Dyke's "Diseases of a Gasoline Automobile and How to Cure Them." 225 pages—thousand sold. Price $1.00, DR. DYKE'S "Anatomy of the Automobile," 709 pages. If both books are pur-

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50-30 x 3½ Clincher Tires $15.

After this lot is sold this will be all at this price. While our line of tires which we sell comprises the latest and most up-to-date guaranteed tires, such as Diamond, Goodrich and Morgan & Wright and while we sell principally these makes of tires and save our customers money on same, we have had calls for a cheap tire to carry as an extra or to economize on cost, and for this reason we put in a few "cheap" tires to meet the demand. The tires at $15—30 x 3½ size are certainly bargains—they are worth the money.

We have sold a great number of these tires and fitted them with the Woodworth Leather Tread, (1908 model) and our customers were more than pleased with results.

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On INNER TUBES and good ones oo you would be surprised.
On HIGH GRADE TIRES mention he make you want and size and let us uote you.

	PRICE CASE ONLY	PRICE CASE AND WOODWORTH TREAD.
30 x 3½	$15 00	$27 50
28 x 3	15 75	25 50
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32 x 4	18 00	32 40

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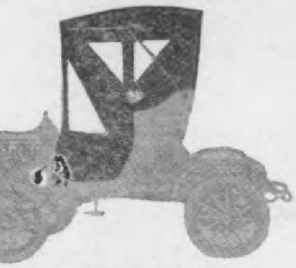

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Special Top Prices, $14.50 to $75.

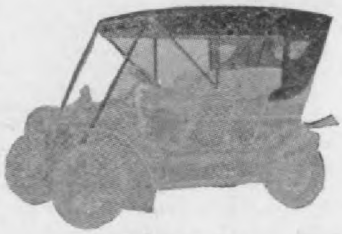
Not a cheap top but a HIGH GRADE Top made to order to fit your car at LOW PRICE.

1—Top made of glazed or dull finish leather substitute (samples sent on request) complete with side curtains and a front curtain with celluloid inside and front. Front to roll up—all ready to fit. PRICE $25. Genuine Pantasote extra $5 00. NOTE—We can supply cheap buggy style tops made to dimensions as low as $14.50

Dr. Dyke's Touring Car Top

Made of same material as Runabout Top, complete with side curtains, etc.

	ALL CARS UNDER 90 INCH WHEEL BASE	ALL CARS OVER 90 INCH WHEEL BASE
Leather Substitute	$50 00	$55 00
Genuine Pantasote	67 00	75 00



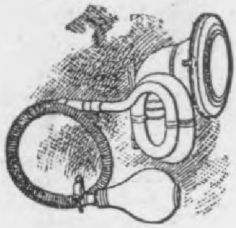
TOURING CAR TOP.

N. HIGH OVER BAIL. 10 IN. G & 10 IN. ACROSS FRONT

25 Imported Lamps at $7.90 each.

These lamps sold retail $25 each—as we bought them at a Receivers Sale at low price will sell them at low price of $7.90 each, or will give you 2 of the lamps and a late model Solar generator for $22.50, including feet of tubing.

Lamps are double lens (bull's eye) open front and back, heavy brass, bevel glass—high grade in every respect. Only a few left.



25 Genuine German Imported Horns, $4.50.

With screen and tubing—deep resonant tone. Formerly sold for $12.50 Only a few left.

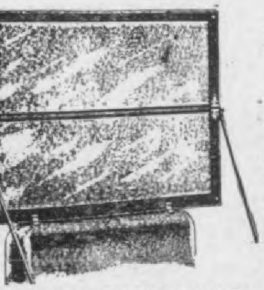
2 Search Lights and Generator, $14.00.

These are not the highest priced, nor have these lamps the highest priced lens, but our customers tell us they give about the same results as lamps costing twice the price. Copper back and front, mirror lens.

Outfit No. 133 { 2-6½ inch Search Lights, 1-Square Generator, 8-ft. Tubing } **$14.00**

If Solar Generator is desired, which we believe is worth the difference, add $2.50.
If 7¼ inch lamps are wanted, add $2.50.
Price, lamps alone, $4.25 each. Lamp Brackets, per pair, $2.75.

uarantee—all material guaranteed to please you, or we will take same back and refund noney. Our business is to buy high grade material at bargain prices and sell them accordingly.



R. DYKE'S GLASS FRONT

LOOK! Dr. Dyke's Glass Front, $18 and $20

Folding style in center—made to fit all dashes. Give us the make of car, that's all. All fronts made in proportion to size of the car Finished in polished brass and guaranteed to please you.

PRICE

No. 1—Folding, straight across bottom - - - - $18 00
No. 2—Folding, made with filler to fit dash - - - 20.00

Don't fail to get our new Catalogue.
Read Dr. Dyke's Books on Autos.
Diseases of Auto and How to Cure Them, 225 pages, $1
Anatomy of the Auto, 700 pages, $1.50.
Both Books when purchased at one time, $2.00.

DR. DYKE'S GLASS FRONT

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m, Mass., U. S. A., has had a very suc-
sful 1907 season with the Waltham 16
d 20 H. P., air-cooled runabouts, two

this chassis, variously equipt as indicat
having been delivered up to and includi
the date of this writing, November

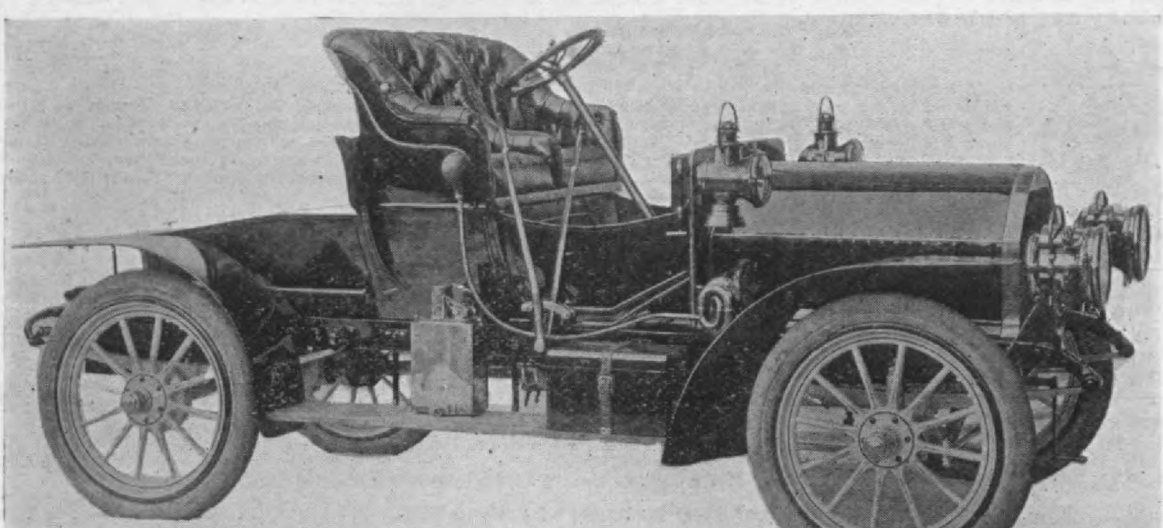

Fig. 1. Waltham 1908 Model D. L. R. Runabout. Wheel base 96 in. Gage 56 in. Tire
x3½ in. Motor, 4-cyl., air-cooled, 4x4¼ in., 20-H. P. Sliding gear speed change, three forwar
peeds and a reverse, bevel gear to divided rear axles. Two-passenger runabout body with de
chable tonneau option. Weight 1850 lbs. Price $1750, including 5 lamps, mat, tools and horn
l ready for the road. Price with solid tonneau $1800. Price with detachable tonneau and rea
ck for runabout $1850.

dels with four-cylinder motors, priced
pectively at $1250 and $1750.

n point of numbers the Waltham two-
inder, air-cooled 8 H. P. chassis, wheel

1907.

Of the well-known Waltham "Bu
board," single cylinder, air-cooled, 4
P. motor, two-passenger and 500 poun

Fig. 2. Waltham 1908 open delivery car on chassis 178. See Fig. 6. Wheel bare 92 in. Gag
in. Tires 32x3 in. Motor opposed cylinders 4⅜x4 in., water-cooled, 14-H. P. Bevel an
aversing friction drive to counter-shaft, motor and drive on independent motive assembl
ame. Side-chains to rear wheels. Weight, 1400 lbs. Paying load 850 lbs., exclusive of drive
1,000 lbs. driver's weight included. Price $1375, including 3 lamps, mat, horn and tools. Th

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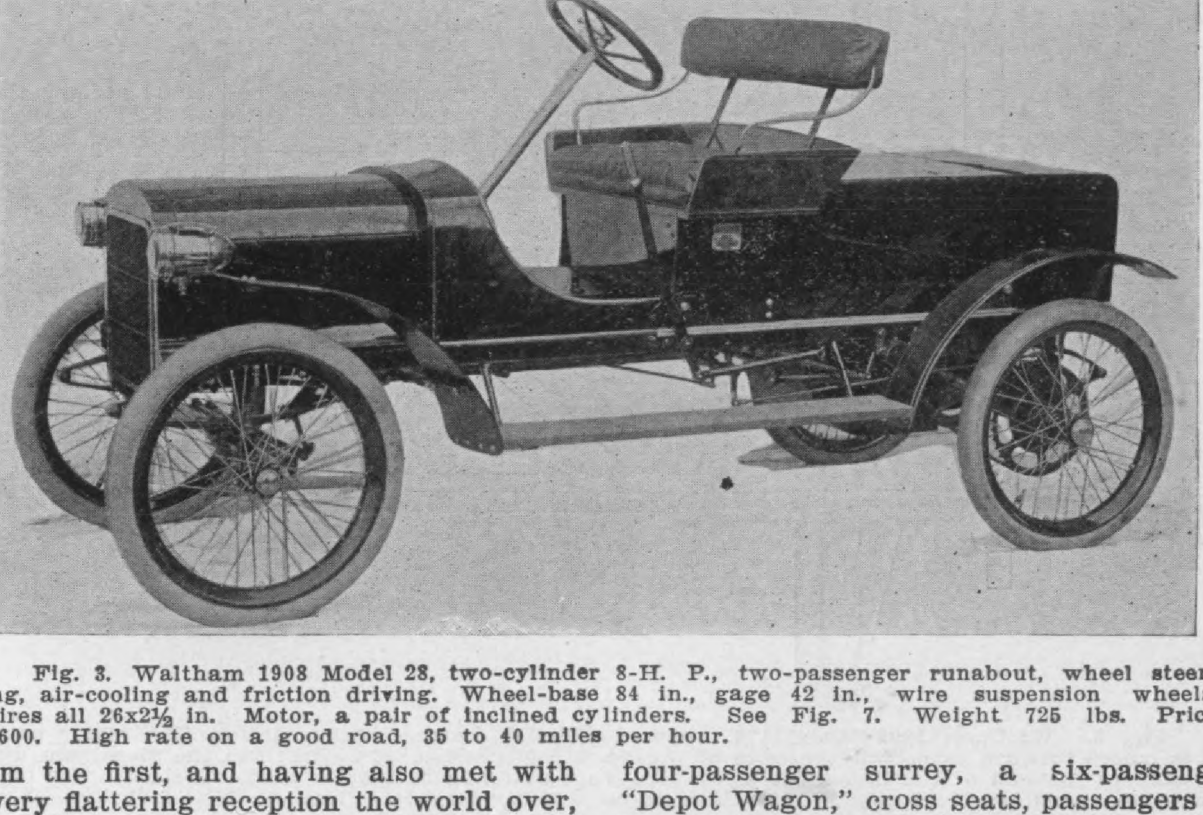

Fig. 3. Waltham 1908 Model 28, two-cylinder 8-H. P., two-passenger runabout, wheel steer
g, air-cooling and friction driving. Wheel-base 84 in., gage 42 in., wire suspension wheel
ires all 26x2½ in. Motor, a pair of inclined cylinders. See Fig. 7. Weight 725 lbs. Pric
600. High rate on a good road, 35 to 40 miles per hour.

m the first, and having also met with
very flattering reception the world over,
se little cars having found purchasers

four-passenger surrey, a six-passeng
"Depot Wagon," cross seats, passengers
facing forward and four different styl

Fig. 4. Waltham 1908 new chassis, Model 178, right oblique view, showing bevel frictio
nd traversing fiber wheel drive with opposed cylinders motor in position just forward of th
enter. The wheel-base is 92 in., gage 56 in. The motor, radiator, friction drive and counter
haft are all carried on a rigid sub-frame, four point suspension from the chassis frame. Th
ermits independent assembling and testing, and is of great manufacturing value. In deliver
ar work, a spare power plant on its independent frame can be placed in any chassis, and s
ave the economic effect of a complete car held in reserve, by exchanging the sub-frame an
notive plant, a very great advantage in mechanical delivery service.

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every civilized country on the face of

of delivery wagon bodies, all the sa

complete car prices are from $1375 to $1450.

The Waltham 1907 Model DLR, 96-inch wheel base, 20 H. P., 4-cylinder, 4x4¼-inch, air-cooled, will be continued for 1908, fitted with a standard two-passenger runabout body at $1750, or to order with a five-passenger tonneau body, price for the complete car $1800.

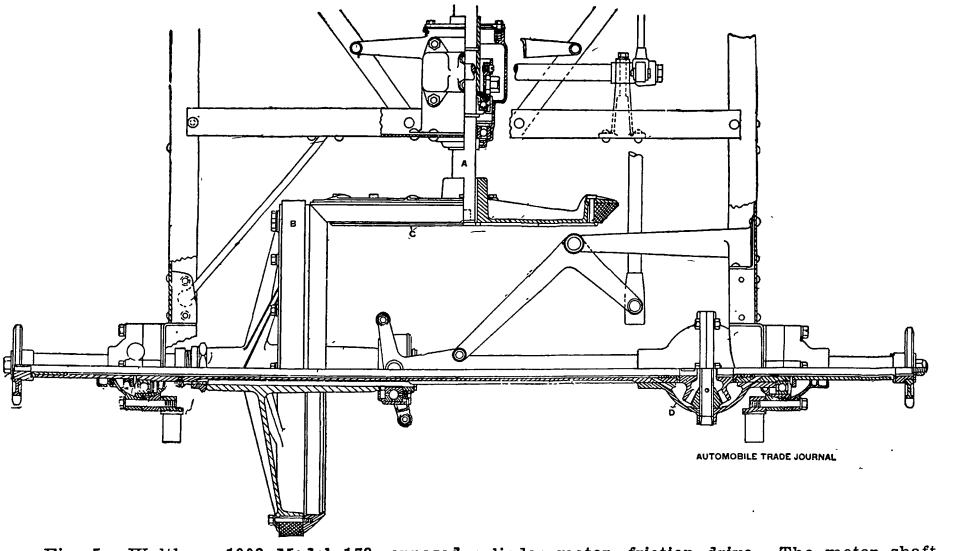

Fig. 5. Waltham 1908 Model 178, opposed cylinder motor, friction drive. The motor shaft A is pulled forward to permit the edge of the leather fiber wheel B to traverse the aluminum disc C fixed to the end of the line shaft which is always clutched to the motor crank shaft. For high speed the bevel surfaces engage and there is no slip of this bevel friction drive save in case of overload. The differential is on the counter shaft at one end as shown at D.

The only other Waltham 1908 chassis has either a single vertical cylinder motor or a pair of inclined cylinders, 3¼x4¼, air-cooled, each cylinder 4 H. P., making the pair of cylinders 8 H. P. The wheel base is 84 inches, weights of complete cars 700 pounds, single cylinder, and 725 pounds with the pair of cylinders, prices $400 for the single cylinder car, Model 18, and $600 for the double cylinder, Model 28.

This second 1908 Waltham chassis will be fitted with regular two-passenger runabout bodies, tiller steering for the single cylinder and wheel for the double cylinder.

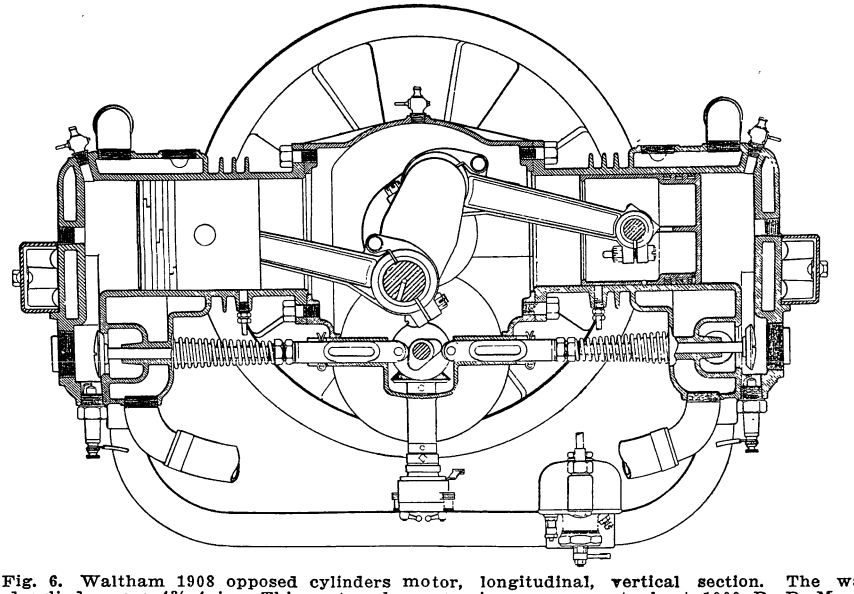

Fig. 6. Waltham 1908 opposed cylinders motor, longitudinal, vertical section. The water-cooled cylinders are 4⅜x4 in. This motor shows maximum power at about 1000 R. P. M. The weight is 285 lbs.

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LR.

All the other 1908 models offered by the Waltham Company will have a friction rive, five forward speeds and one reverse. his friction drive is the Waltham Company's own design, patent applied for, for

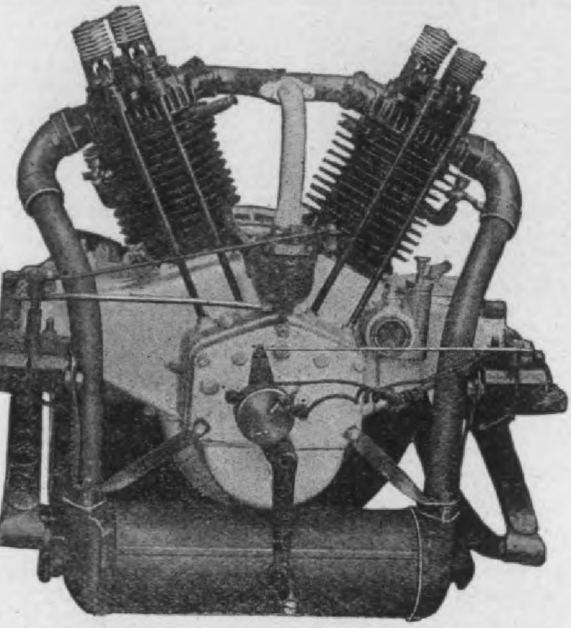

Fig. 7. **Waltham 1908 inclined cylinders motor,** linders air-cooled, 3¼x4 in. nominal 8 H. P. is motor is cooled by fan-vane flywheel arms ly, no separate fan being used. The friction ive shown in Fig. 11 is used with this Fig. 7 otor. This motor air cools well, is strong at 00 R. P. M. The total weight of this motor here shown is 180 lbs.

e Model 178 chassis. This drive is a rrect bevel friction drive, coacting mem-rs nearly equal diameter on high speed, d an aluminum disc with a fiber wheel, afts at right angles, for the intermediate eeds and the reverse. The high speed ive is thus without any transmission p or friction in Model 178, and has, of urse, the ordinary aluminum disc and er wheel friction for the other speeds Model 178, and for all speeds of the odels 18 and 28.

It was for a long time believed that the ction disc and paper or fiber faced co-ting wheel, shafts at right angles, had large loss of power thru detrimental p inseparable from this form of speed ange. Practice has now shown conclu-ely that this silent, simple and durable rm of friction drive can transmit as ich power from the motor to the driving heels as any form of toothed-gear speed ange, and the use of the friction gear types of speed change mechanism c bined.

BRAKES AND SPRINGS.

The brakes are all rear hub prest s drums, with internal, expanding f faced shoes, save for Fig. 3, in which brake shoes work metal to metal, Fig. 1, in which a line shaft brake dr is used with the sliding gear drive.

The axles are all steel tube, the c pany's own design and construction.

The springs are half-elliptic in fr and full elliptic in the rear in all 1 Waltham cars, save Models 18 and which have full elliptics both front rear.

CONTROL.

Model DLR, Fig. 1, has two outs hand levers, usual arrangement. T outer lever is pushed forward to dis gage the clutch and apply the brake the inner hand lever shifts the ge There are two pedals on the foot-boa

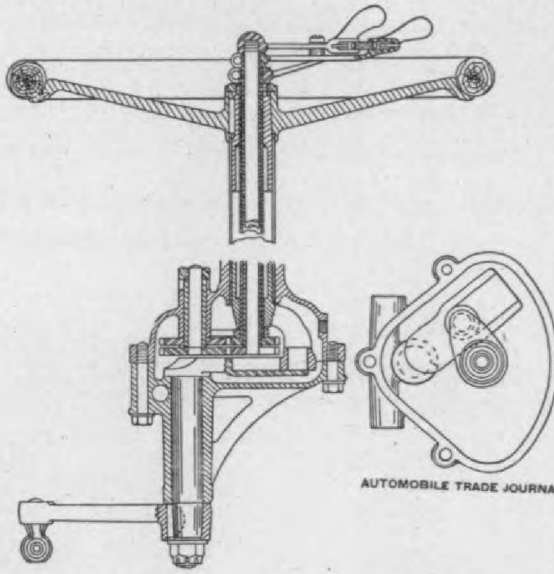

Fig. 8. Waltham 1908 new slotted arm crank steering action. This is a hand wheel a steering sleeve which has a short crank f to the sleeve lower end. The wrist of this cr works in a slotted arm fixed to the top of steering rocker, which has the globe-wrist st ing arm fixed by key and nut on the tape lower end of the vertical steering shaft. T action is peculiar in being free straight ah and increasing in power as it is moved to eit side, and being locked at its fixed greatest st ing angle if carried to the extreme. The st ing crank-radius is 1¼ in. The steering sh center is 1⅞ in. from the steering sleeve cen

The left pedal disengages the cone clu only. The right pedal is pushed forwa to first disengage the clutch and then ply the line-shaft brake.

The January number of the Journal will the "Great Buyers' Guide Special," con-

each particular product appearing in phabetical order under that heading. extra charge is made for this value

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lis country, announces that no radical
ges have been made in its 1908 pro-
. The line of cars for the coming sea-
will consist of three different types of
ses of 30, 45 and 60 H. P., respective-

$3000, and be known as Model "W." Th
engine is of the regular Haynes type, hav
ing 4¾x5-inch bore and stroke, respective
ly. A double system of ignition fro

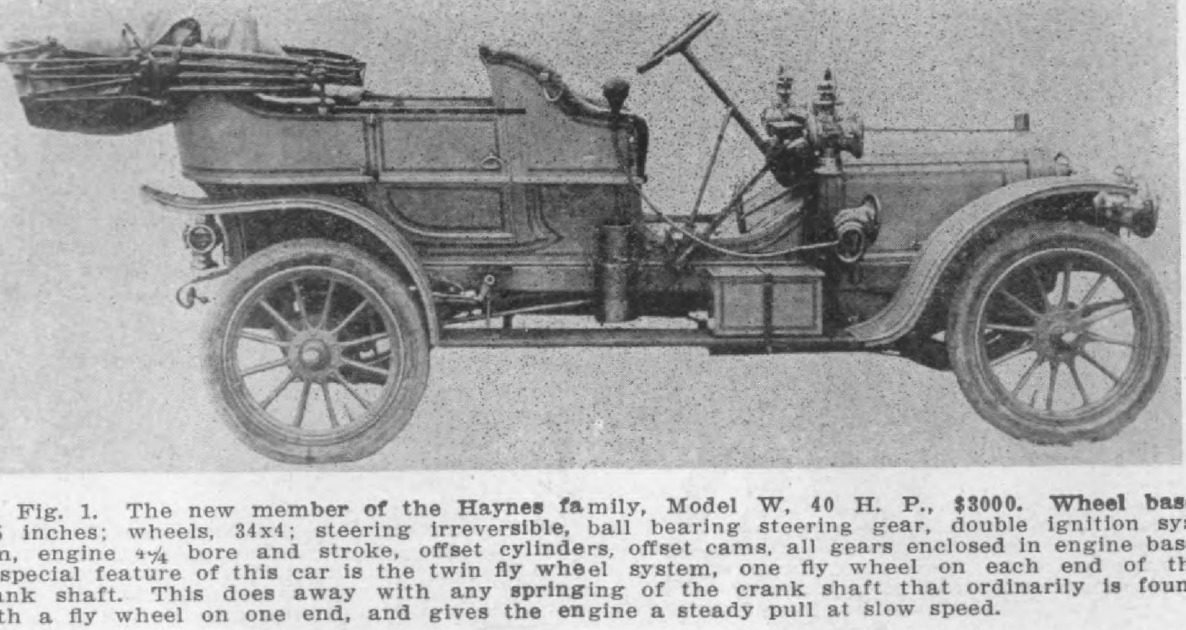

Fig. 1. The new member of the Haynes family, Model W, 40 H. P., $3000. Wheel base,
5 inches; wheels, 34x4; steering irreversible, ball bearing steering gear, double ignition sys-
n, engine 4¼ bore and stroke, offset cylinders, offset cams, all gears enclosed in engine base.
special feature of this car is the twin fly wheel system, one fly wheel on each end of the
ank shaft. This does away with any springing of the crank shaft that ordinarily is found
th a fly wheel on one end, and gives the engine a steady pull at slow speed.

Various bodies, including a very hand-
e landaulet and limousine, are fitted
the 45 and 60 H. P. machines. As
ed these cars show no radical changes

magneto and storage batteries is supplie
The car is of comparatively light weig
and ample H. P., and the company stat
that at no time in its history has it pr

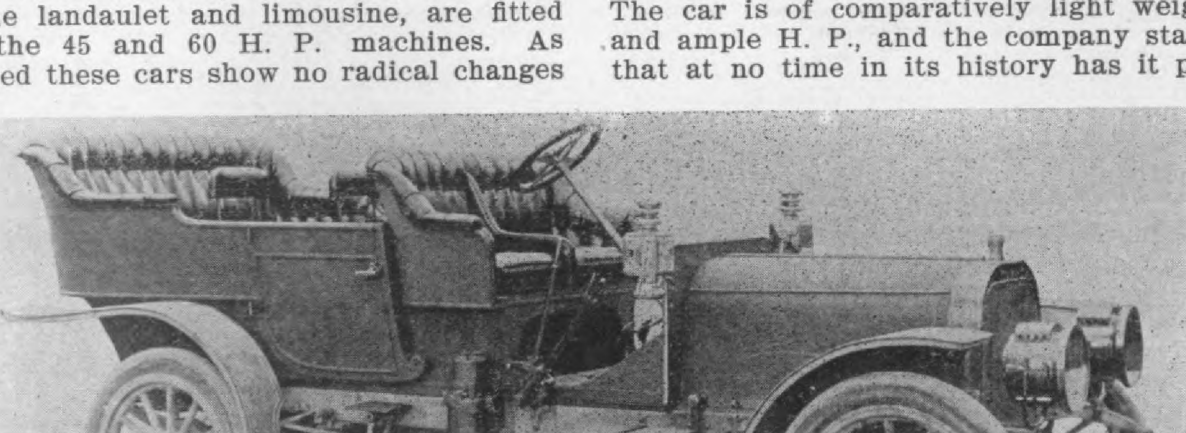

Fig. 2. Model U, 60 H. P., Haynes; 118 inches wheel base; $3750; wheels and tires 36x4½
me steering as the Model W. Double fly wheels at each end of the crank shaft. Engine, 5½
bore and stroke. The car seats seven passengers comfortably. The same features are re
ined in this car as have been the features in the former cars, including the Haynes ratche
stem, which prevents stripping of the gears, the Haynes clutch, and also the Haynes rolle
nion drive at rear axle, which takes the place of the bevel gear.

their general construction, the few
nor deviations from last year's models
ng in the direction of improved details,

duced machines more thoroly tried o
and great stress is laid on the fact th
all parts of the car are manufactured fr
the raw material in its own works.

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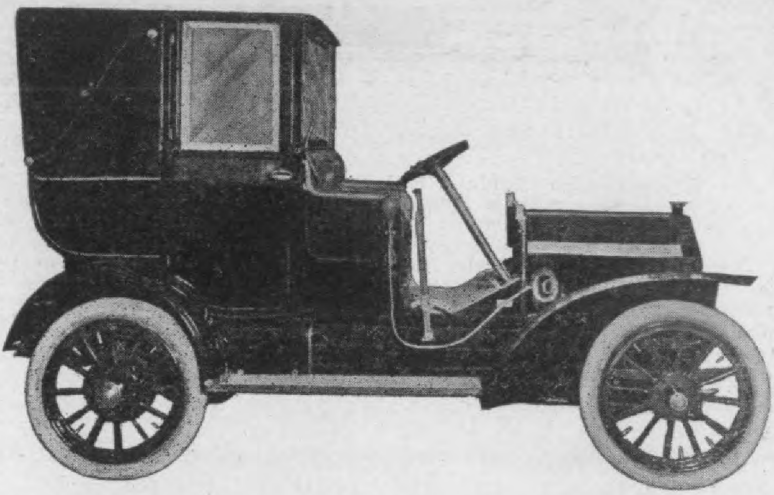
Garford



IF a Parliament could be called of all the expert automobile builders in the world to vote on the detailed specifications for an orthodox gasolene car, we believe that the composite of their judgment would be an exact duplicate of the Garford.

Some would quarrel with the majority on one detail, some on another.

But a Garford car would be the net result.

The Garford avoids "original" features. There is probably nothing in the car which is not in the majority of other successful cars all over the world.

ADDRESS

Eastern Inquiries: GARFORD MOTOR CAR CO. OF N. Y.
No. 1540 BROADWAY, NEW YORK CITY

Western Inquiries: GARFORD MOTOR CAR CO. OF CLEVELAND
No. 1372 EAST 12TH STREET, CLEVELAND

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ss., formerly the Knox Motor Truck Co., placing on the market for 1908 a com- e line of Atlas two-cycle cars. The suc- s of the Atlas runabout described in

of units, and the double folding rum- seated runabout for 1908 is provided wi three cylinders, as shown in the accor panying photograph of the engine, a

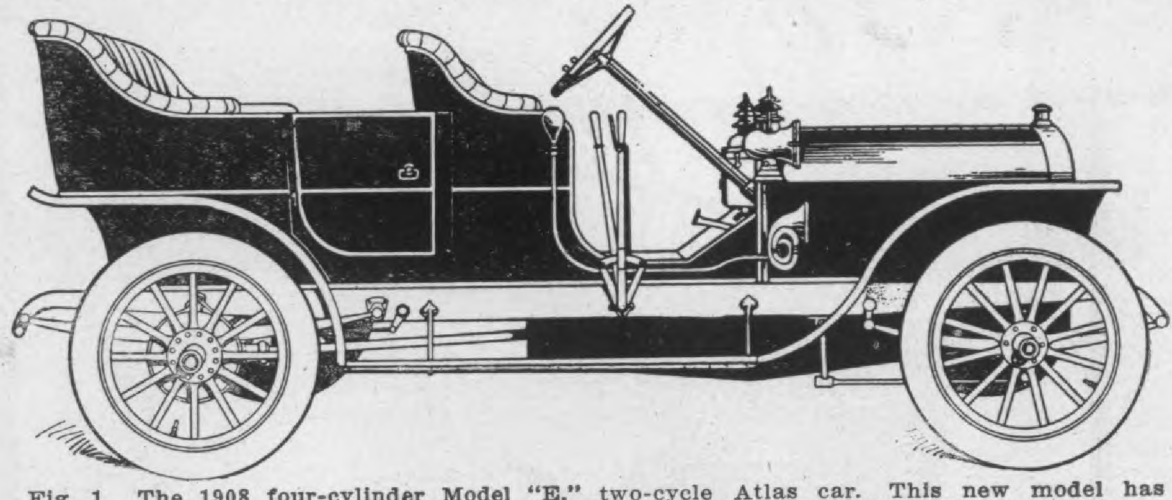


Fig. 1. The 1908 four-cylinder Model "E," two-cycle Atlas car. This new model has a uminum body arranged to seat five, a four-cylinder, two-cycle motor, 4½x4½ inches, with it a valve or gear of any kind, the timer being on the main shaft of the engine; cooling is b hermo-syphon circulation, so that no pump is required; jump spark ignition is used, curren eing supplied by storage or dry cells; the motor is rated as 40 H. P., but it is claimed will ac ually develop over 46. The clutch is of the cone type; drive is by shaft, and a three spee iding change speed gear operated on the selective principle is used. The wheel base is 11 ches, gage standard, and both the front and rear wheels are fitted with 34x4-inch tires. Th heels are mounted on roller bearings and the change speed gear on Hess-Bright bearings. Th ar with complete equipment sells for $2400.

r July, 1907, issue, page 81, was the sis for the present increase in their line cars. The two-cylinder vertical, two- cle runabout with practically only five ving parts in the motor is carried over 1908, without change. The only im-

will carry from two to four passenge The extreme simplicity of this mot which gives the uniform torque of a s cylinder engine, is very apparent. Therm syphon circulation, the connecting pi being aluminum and of graded diameter,

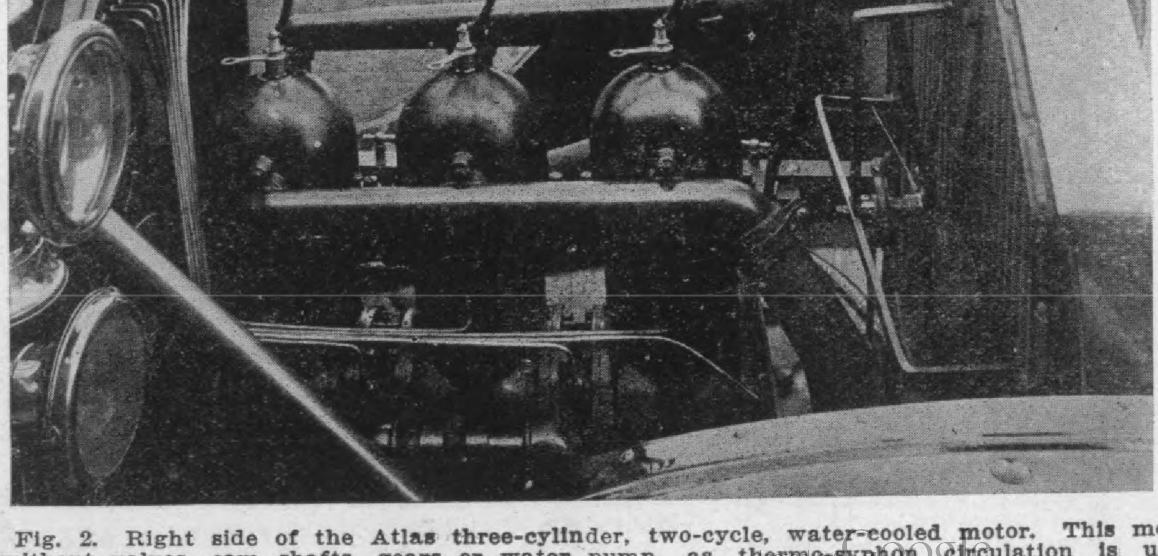
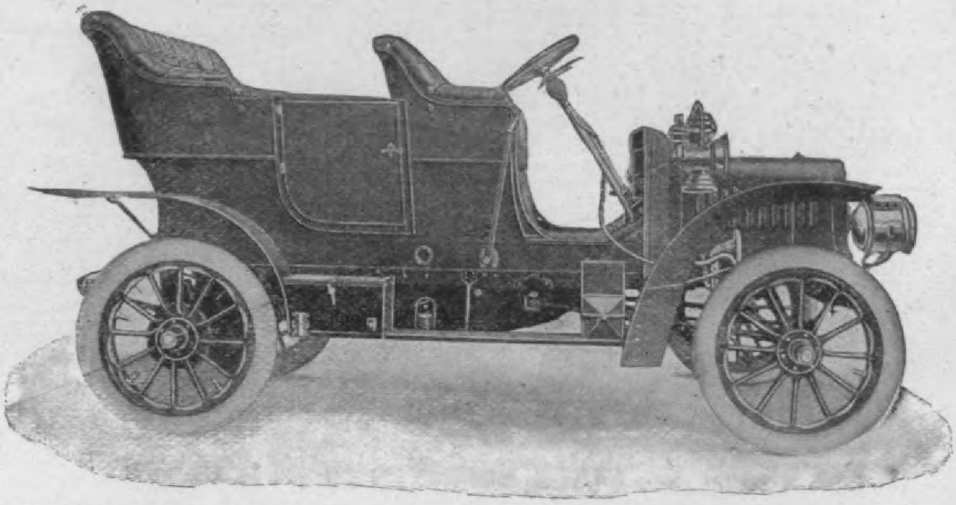


Fig. 2. Right side of the Atlas three-cylinder, two-cycle, water-cooled motor. This mot s without valves, cam shafts, gears or water pump, as thermo-syphon circulation is use The cylinders are 4½x4½, and the motor is rated at 34 H. P.; force feed lubrication for the c nders and main bearings is used. Note the large size and the gradual increase in diame

MOLINE



THE "MOLINE" for 1908 is attractive to every one interested in the purchase of automobiles. Each machine of the line is a distinct leader in its respective class. Last season's MOLINE cars are giving their owners absolute satisfaction. The 1908 cars are the same general styles, with such changes made as have been proven to be absolute improvements. The MOLINE policy is to build cars that will give satisfactory service, and not simply to bring out a new Model for each season's Show.

Model "A", Four Cylinder, 35 Horse Power, 5 Passenger, $2500.00
Model "S", Four Cylinder, 24 Horse Power, 5 Passenger, $2000.00
Model "H", Two Cylinder, 20 Horse Power, 5 Passenger, $1250.00

Model "A" is an extremely well proportioned, high powered touring car. The wheel base is 110", the tires are 34"x4", the motor develops good liberal 35 H. P., the springs are exceptionally well proportioned, making the car easy riding, and the painting, upholstering and general lines of the car are high class in every particular. It is a car well worth $500 more than the price asked.

Model "S" is a medium powered five passenger touring car. It is the half between car. It is distinctly the machine for the man who wants something better than a two cylinder rig, and yet who does not want to pay the price of a high powered car. It is truly an every day car for the whole family. It has plenty of power for the weight, and weight enough to insure strength to carry five passengers.

Model "H" is positively the best value in the two cylinder car market. It is the result of five years of two cylinder car building. It is a larger car and more powerful than any of the earlier MOLINE two cylinder cars. The past season's use has proven it absolutely reliable in every way. Every one that goes out sells another. The success of this particular Model has been phenomenal. It is without doubt absolutely the best value in the market at the price.

All three styles of MOLINE cars are on exhibition at the Chicago Show, beginning November 30th.

Catalogue giving cuts and full particulars on request.

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Moline Automobile Company

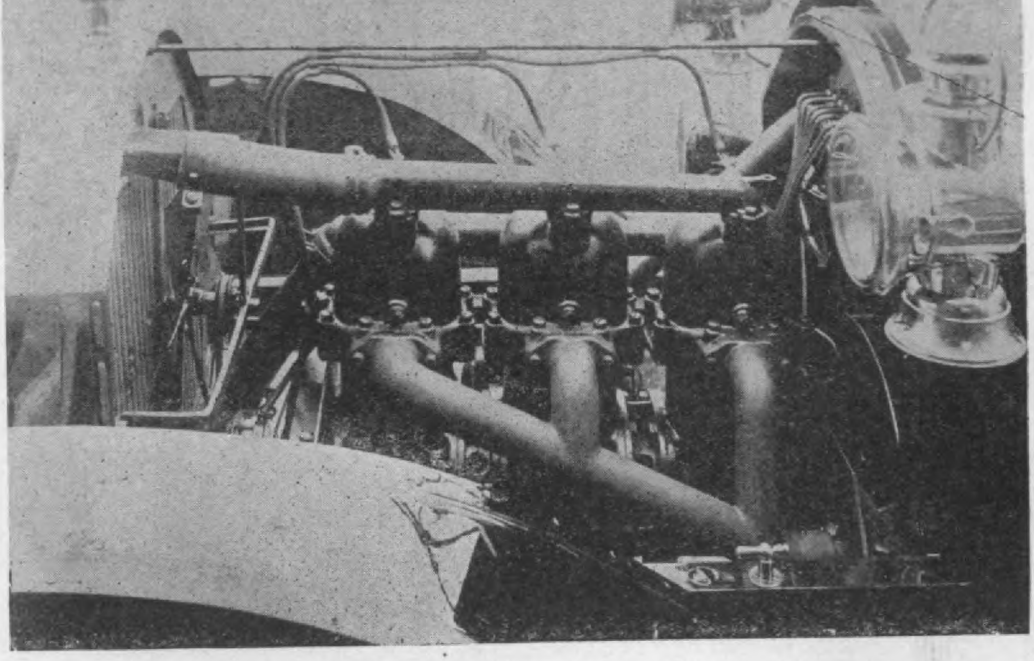

Fig. 3. Left side of the three-cylinder, two-cycle Atlas motor. In this view the well arged exhaust manifold which receives the spent gases from an annular exhaust chamber surding the lower portion of each cylinder is shown. A complete description of the two-cycle ciple as used in the Atlas motor was given in our July, 1907, issue, page 81.

n tires, and the motor is rated at 34 P. It is claimed to be capable of 50 es per hour and sells for $1900. The ll two-cylinder car is 90 inches wheel e, with 30x3½ inches tires, and is rated 22 H. P., and sells for $1400, the same in 1907. A large four-cylinder model, engine being built up of the same cyler units, is the latest addition to the as line. The cylinders are 4½x4½, and motor is rated at 40 H. P. The car is own as Model "E," and sells for $2400. e wheel base is 114 inches and the gage ndard; the front and rear wheels are ed with 34x4-inch tires; semi-elliptic ings are used all around, and ignition by jump spark, current being supplied dry batteries or storage batteries. All the cars are shaft driven, the small about having a planetary gear, while two larger models are provided with ling, change speed gears, operated on selective principle, and giving three eds forward and one reverse. All of motors are provided with bronze crank ft bearings, and the wheels are fitted h roller bearings, while the transmisns are all mounted on Hess-Bright anar ball bearings. The general arrangent other than the engine of this fourinder, two-cycle car follow what has en accepted as good practice. The lies of all three cars are of aluminum, d all the material and workmanship are

gave out interesting facts regarding th Long Island Parkway. According to M Pardington thirty-two miles straight awa have been secured and surveyed, and wi be constructed at once. The balance the sixty miles is practically secured ni miles in one stretch and eleven in a other, having been obtained. The Par way Commission has already let co tracts for the office building at Mineol

Stock Touring Car Race Postponed

The great international road race f stock touring cars, the first to be held this country, has been postponed by i promoters until next April. This is we however, because the season is pretty f advanced, and the early coming of t shows found our makers busy preparin them. Besides that, it takes a long tin to get out entry blanks and arrange the necessary details of the planning a final execution of a great road race.

The race will be promoted, it is said, the Metropolitan Automobile Associati of New York, aided and abetted by m who write the automobile copy for t great metropolitan dailies and such pron nent men as Robert Lee Morrell, Job Hedges and others will act as committ chairmen.

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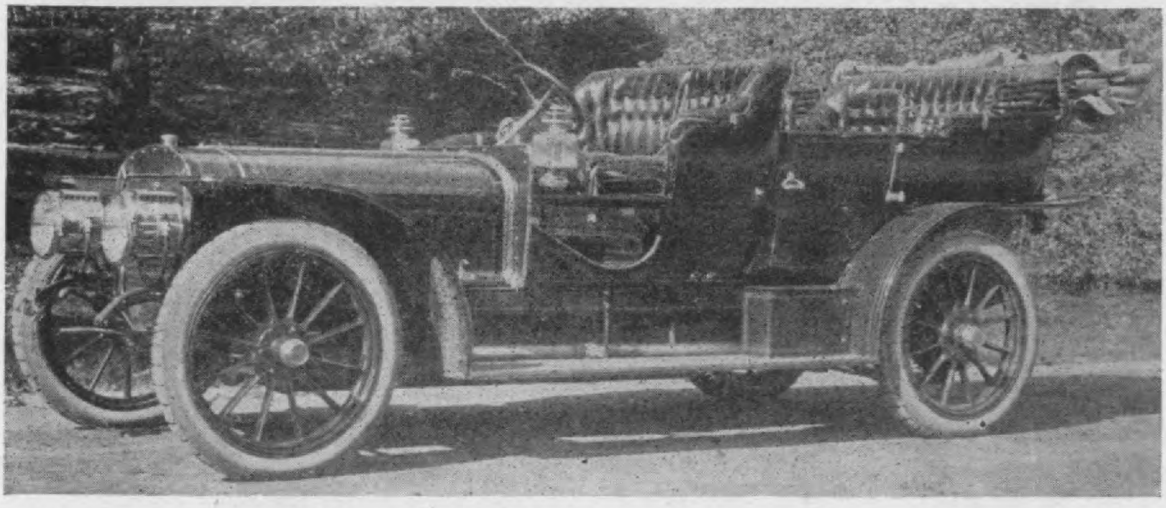
The Chicago Automobile Club is ke

er machine, known as the "Sextuplet." 'he general specifications of this car are: Vheel base, 126 inches, and tread, 56½ nches. The cylinders are cast separately, nd have a bore of 4½ inches and a stroke f 5 inches, the H. P. rating being 45, this, owever, is said to be very conservative. 'he engine is water-cooled by a centrifu-al gear driven pump and lubricated by a ill precision oiler. Ignition is of the high ension type, using Eisemann magneto nd Lacoste timer; also a separate set of atteries. The wheels are fitted with 36x ½-inch tires, the choice of any American nake being given. The car has a clear-nce of 10 inches, and weighs 3500 pounds. 'he frame is of the usual prest steel, chan-el section type, and semi-elliptic springs, 4 inches in length by 2¼ inches in width,

size and without welds. Cooling is centrifugal gear driven pump in con tion with a horizontal, flanged tube iator. The radiator and hood are dist Acme types. A 23-gallon gasoline tan provided. A perpetual guarantee as to fective parts is given with each car. Acme Company makes the broad cl that in addition to the mechanical ex lence of the "Sextuplet" it is the n complete and fully equipt car on the r ket.

THE 1908 ACME TOURING CAR.

The touring car for 1908, which sells $4000, and seats five or seven passeng has not been materially changed. motor is 4½x5 inches, and rated at 30 P. Double ignition system is suppl with current supplied by Eisemann



The 1908 Acme "Sextuplet." This 1908 six-cylinder model has a wheel base of 126 inch and a tread of 56½ inches, a four speed and one reverse selective sliding gear direct on t hird speed is used. Driving is by side chains to the rear wheels. The motor cylinders a cast separately, and are 4½x5 inches, being rated at 45 H. P., double ignition system, by Eis nann; magneto and battery are supplied. The clutch is a leather faced cone with cork inser The change gear is direct on the third speed, and the gears are chrome nickel steel mounted Hess-Bright bearings. The car has 10-inch clearance and weighs 3500 pounds, and sells f $4500, including top, two acetylene headlights, two side oil lights, tail lights, horn, tool kit a gas tank. The choice of any American lamp and speedometer are given.

e used. Two contracting band brakes d two bronze expanding brakes are used the rear wheel drums. A leather faced utch with cork inserts is used in con-ction with a four speed selectively oper-ed sliding gear, which is direct on the ird speed. These machines will seat seven ssengers comfortably, and sell for 500. The equipment consists of top, two etylene headlights, two side oil lights, l light, horn, tool kit and gas tank. The cice of any American lamp and speedo-eter is allowed the purchaser.

The cylinders are cast separately with e usual arrangement of inlet and ex-ust valves, which are interchangeable. e carburetor is a special Acme product

tension magneto and batteries. All bra are on the rear wheels, there being t separate sets, internal and external. T clutch change speed gear and method driving are the same as in the six-cylin model. The wheel base is 118 inches, a the tread is standard. This car has a 10 inches clearance and weighs 3 pounds. It is furnished with the sa equipment as the large car for $4000.

THE ACME 1908 ROADSTER.

This three-passenger model has same engine as the touring car and same general arrangement of the chas Its wheel base is, however, 102 inches, a its weight 2500 pounds. The springs

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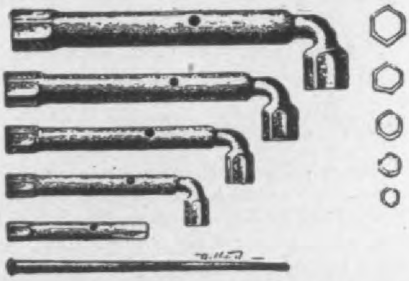
A Few of Our Imported and

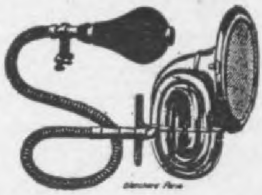
Socket Wrenches



Imported telescoping socket wrenches. Their no el construction especially adapts them for automobile use.

Set C, four pieces and lever handle, $5.00
" D, five " " " " 6.00

Blanchard Horns



THEY HAVE THE SOUND that made Imported horns famous. Made in 21 different styles. Our line of horns is very complete and we are prepared to meet the most exacting taste.

Copper Gaskets

We carry a large line of copper asbestos gaskets in sizes ranging from one-half to three and one-half inches inside measurement, and are in a position to quote interesting prices to the trade.

Spark Plugs

Bougie A. V.

An indestructible plug which can be easily taken apart. No. 159 Metric or half-inch.

Price $2.00.

Pirrelli Cable

A well tested and tried cable which is used by nearly all leading European Automobile Manufacturers.

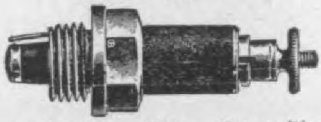
154 light primary rubber.
174 heavy " "
194 light secondary "
214 medium " "
234 heavy " "
154 bis cambric cover
194 " " "
214 " " "
234 " " "

Goggles

We carry in stock a complete line of the highest grade of imported goggles.

Spark Plugs

French Mica.



Amber Mica Plug. Composition platinum points ensure positive spark. Suitable for autos or motorcycles.

No. 160—½ in. and metric price 90c.

English Compound Pumps

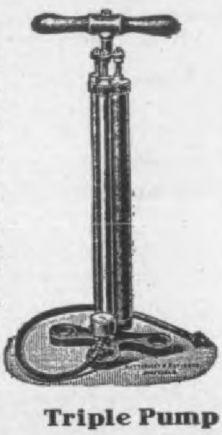
Double Pump

Reduce Your Tire Bills

Pumps your tire up in less time and with less exertion than any other pump made. Air is forced into the tire on both the up and down stroke. Pumps are equipped with gauges indicating amount of pressure being pumped into the tire.

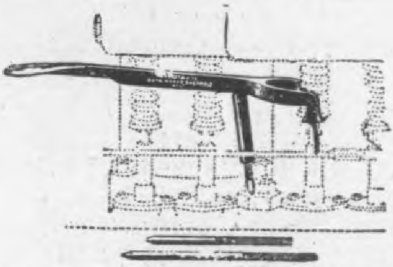
Price of Double Compound Pump, $12.00.

Price of Triple Expansion Pump, $18.00.



Triple Pump

Valve Spring Remover



Designed to facilitate the removal and replacement of Valve Springs and is fitted with three fulcrum screws of various lengths, so as to fit all makes of engines.

Price including three screws, $1.50.

The dealer who desires to handle the BEST line of Automobile Specialties would do well to investigate our line of splendid and profitable goods. Our 128 page catalog will be sent upon request.

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Domestic Auto Specialties

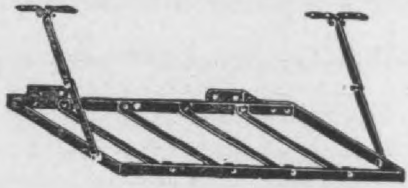
Adjustable Tire Holders

Will fit any car and any size tire.

Made of a fine quality of brass. Will hold either one or two tires Set consists of two long and one short piece.

Price per set, $7.00

Luggage Carriers



Made in stationary and folding styles. Th braces on the folding carrier are provided wit knuckle joints so that when rack is not in us it can be folded away.

Price stationary - - - - - $9.00
" folding - - - - - 16.00

Robe Rail

Useful to hang robes or clothing on. Ready to attach to tonneau. Made of heavy brass.

Price 24 in., $1.50.
" 30 in., 1.75.
" 36 in., 2.00.

Gasoline Separator

A simple device to eliminate the trouble of autoists and boat owners. Gasoline is filtered through a fine gauze net which allows nothing but pure gasoline to enter the carburetor. Furnished in ⅛ in. and ¼ in. size Price $2.50.

Oil Guns

Good substantial oile well made with curve spout. Heavy grip handle No. 125, length 16″.

Price 50c.

Foot Rest

Neat and useful adjustable foot rest 32 in. long Made of solid brass, each part being finely finished and polished. Price $5.00.

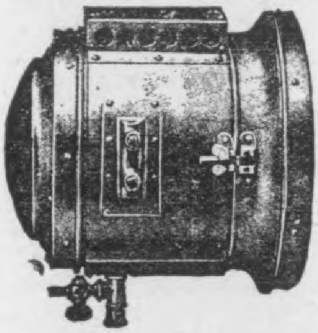
Royal Screw Jack

Especially adapted for heavy American and foreign cars. Is indespensable for garage use. Capacity 5000 pounds.

Price $4.75.

The Phare Continental

Flare Front Search Light.



Made entirely of extra heavy brass. The mirror lense has great projecting power and a focusing attachment enables the adjustment of the range of light as desired. Made also with swivel attachment.

Prices from $15.00 to $25.00.

The Royal Single Tire Holder

Consists of two long and one short piece. Will hold one tire. All parts are made of extra heavy highly polished brass and equipped with strong straps for holding tire.

Price, complete set, $6.00.

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he dealer who desires to handle the BEST line of Automobile Specialties would do well to investigate

he National Motor Vehicle Co., of Inapolis, Ind., are offering for 1908 an eased line, consisting of four distinct sses equipt with touring car and ousine bodies as against two distinct sses the past season. These models are ollows:—

4-cylinder 4⅞x5, known as Model K, 00; and 4-cylinder 5x5, Model N $3700. Little Six 4½x4¾, $4200, and the Big cylinder car 5x5, $5000.

bronze. The upper end of this housing arranged to form a sort of stuffing bo and has felt in it, which prevents di from working in and oil from working ou The pistons are larger for 1908, and ar considerably longer in proportion to the diameter. The heads are slightly dome and four diagonally cut eccentric ring are used, two broad oiling grooves ar used at their lower ends. The cylinder are cast separately with valves on opposit

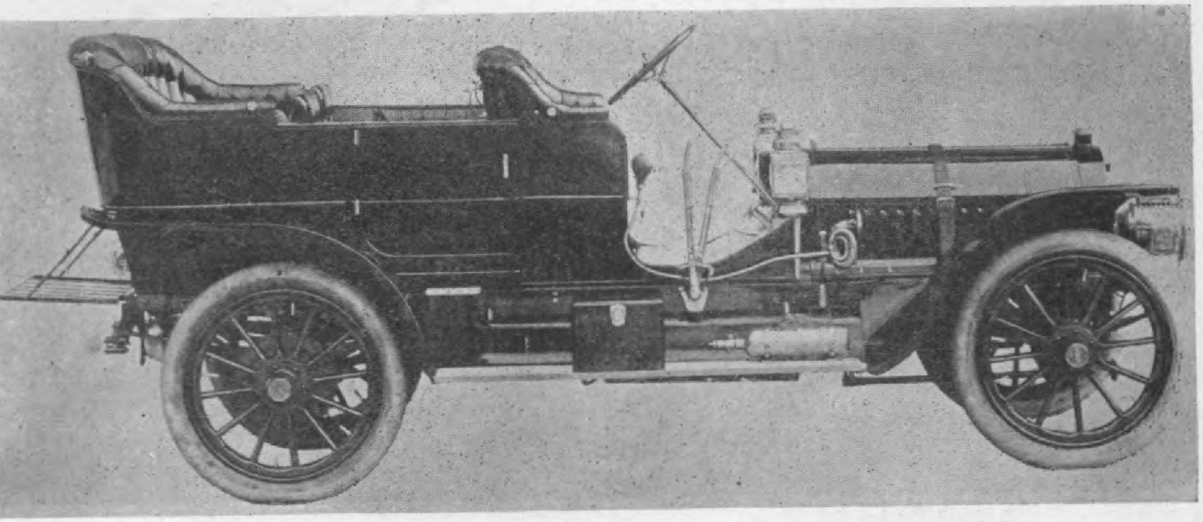

Fig. 1. Model R, National, with 6-cylinder motor. This car is only 4 inches larger than the cylinder models, being 116 inches wheel base. The crank shaft is on annular ball bearings d the cylinders are flattened making a very compact power plant. Weight 3150 pounds assis arrangement about the same as the 4-cylinder models. Tires 36x4½ inches. Hess-Bright arings are used thruout. Price $4200.

he Model K is 1907, Model H improved engine details and in spring suspension. 1907 semi-eliptic front and rear were d, while the coming season semi-eliptic used in the front only, and platform ings are placed at the rear.

he engine changes are in minor details y, such as the arrangement of the fan ring, an increase in the size of the buretor, and a new arrangement of the ing. These models differ mainly in ard to the engines, the chassis arrangeit being very similar, but having differ- wheel bases. The Model N has an irely new motor. This motor altho owing to a large extent the lines of years 4-cylinder engine has been someat modified, spiral bronze gears have en the place of the spur gears at the ward end, the cam shaft and crank shaft both mounted on annular ball bearings the cams are increased in size. The ve lifting rods and their guides have been changed. These rods are of el, hardened and ground, the bearings ng at the enlarged cylindrical lower

sides and are flattened on the front ar back, the water jacket being covered b brass plates, which not only make a co

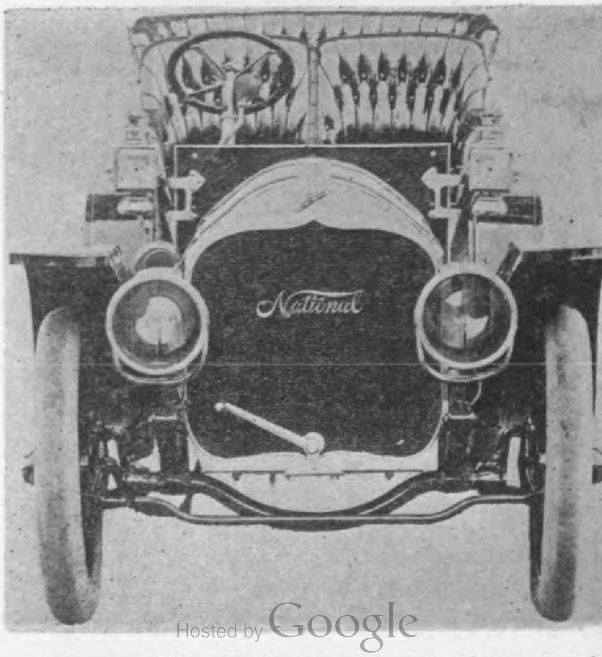

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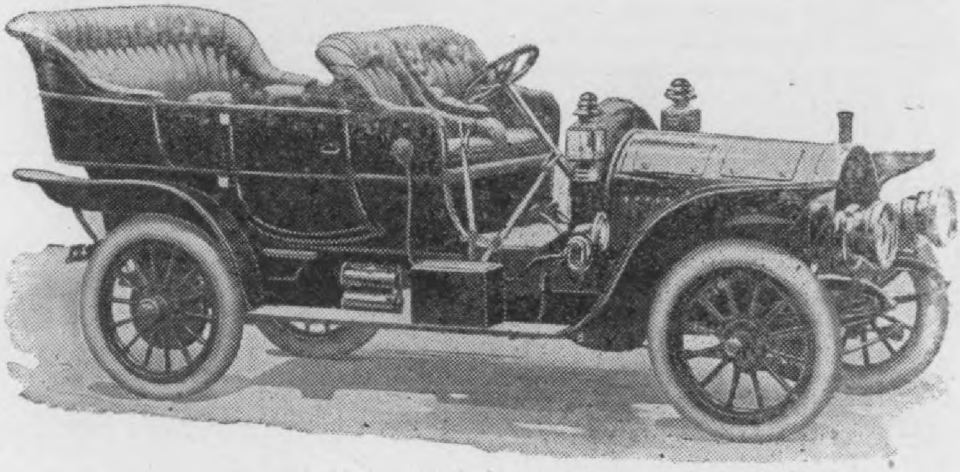
Fig. 2. 1908 National, showing the new st

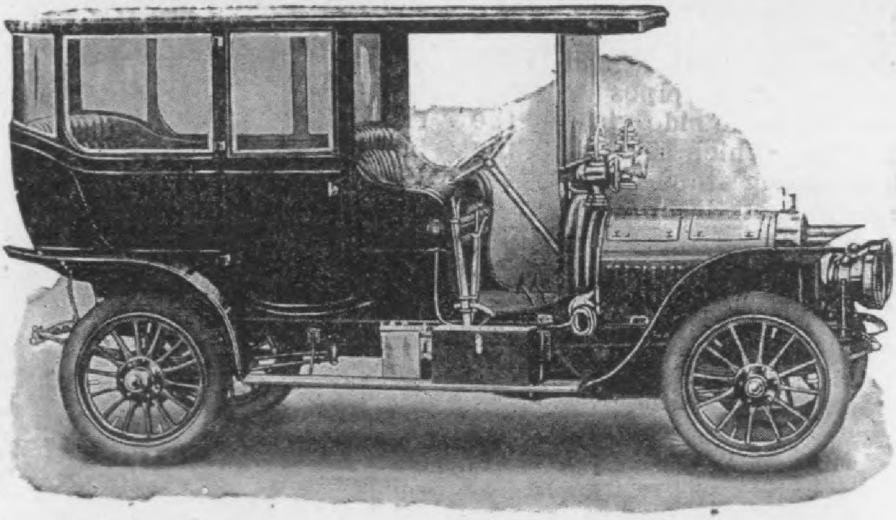
ROYAL TOURIS



1907 MODEL G—SERIES 2

Touring Car, $4,000 **Limousine, $5,00**

Both Seven Passenger and Forty-five Horse-power.



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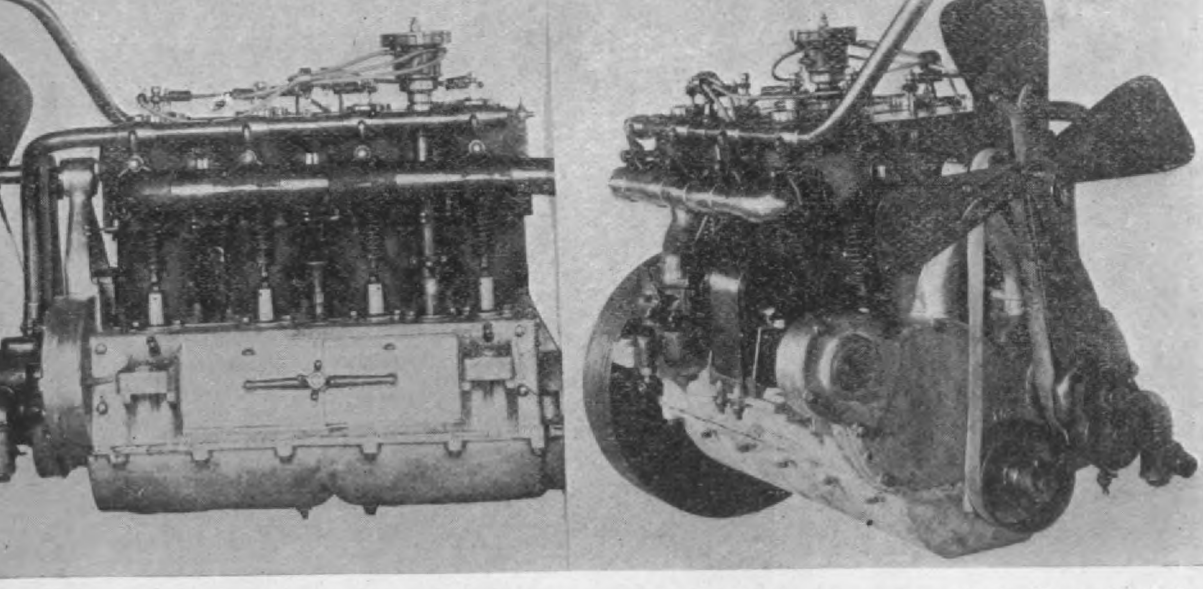

Fig. 3. Two views of the 1908 4-cylinder 5x5 Model M National motor. Note the compact ngement of the cylinders due to the flattened water jackets, also the rigid support of the in an eccentrically mounted bearing, by means of which the belt tension can be regulated. exhaust pipes are arranged to allow the joints to act as slip joints thus taking care of nsion without loosening the connections to the cylinders. The half time gears are of bronze spiral teeth.

chambers are made with a valve like seat, so that an accurate ground joint be maintained without the use of ets.

ecial care has been taken in the od of attaching the water, inlet exhaust pipes. These pipes are held okes, as shown in the side view of the e, the portion which fits into the der casting being tapered so that the use of gaskets is eliminated; at ame time a tight joint is maintained.

engine cylinders. The fan runs on ball bearings, the end of the fan stud being supported in an eccentric bearing, which can be turned slightly to increase the fan belt tension. This stud is supported rigidly on a forked column which forms an integral part of the aluminum housing of the two to one gears. The 1908 Schebler carburetor is used and ignition is by Simms Bosch high tension magneto, while an entirely separate set of plugs are supplied with jump spark from an accumulator, sin

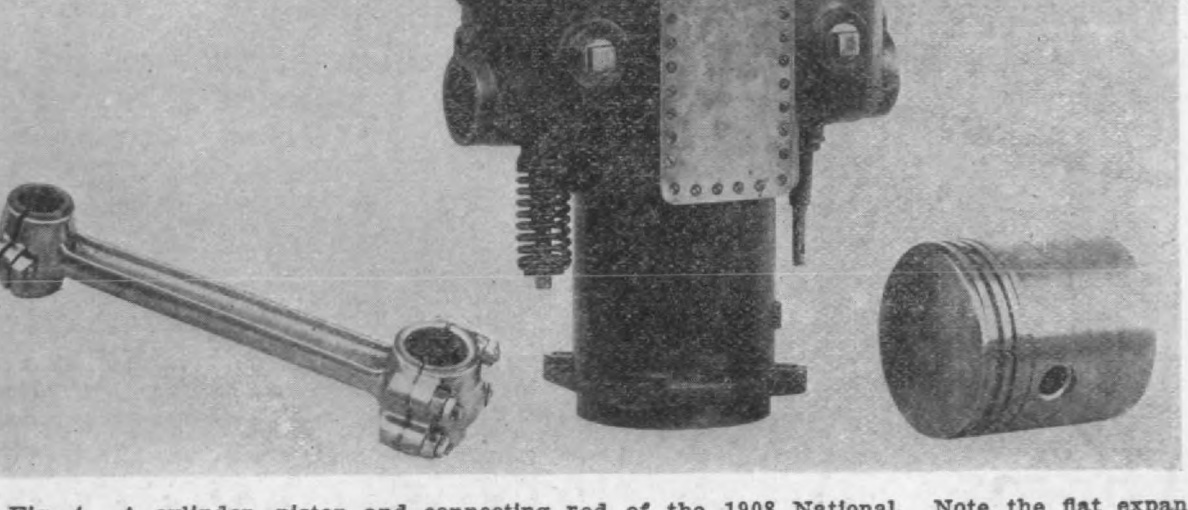

Fig. 4. A cylinder, piston and connecting rod of the 1908 National. Note the flat expan- plate over the side of the water jacket. This allows the cylinders to be placed very close ether, makes a thoro cleaning of the jacket possible and prevents cracking the cylinder in e of freezing. The connecting rod bearings are adjustable at both ends and the lower cap

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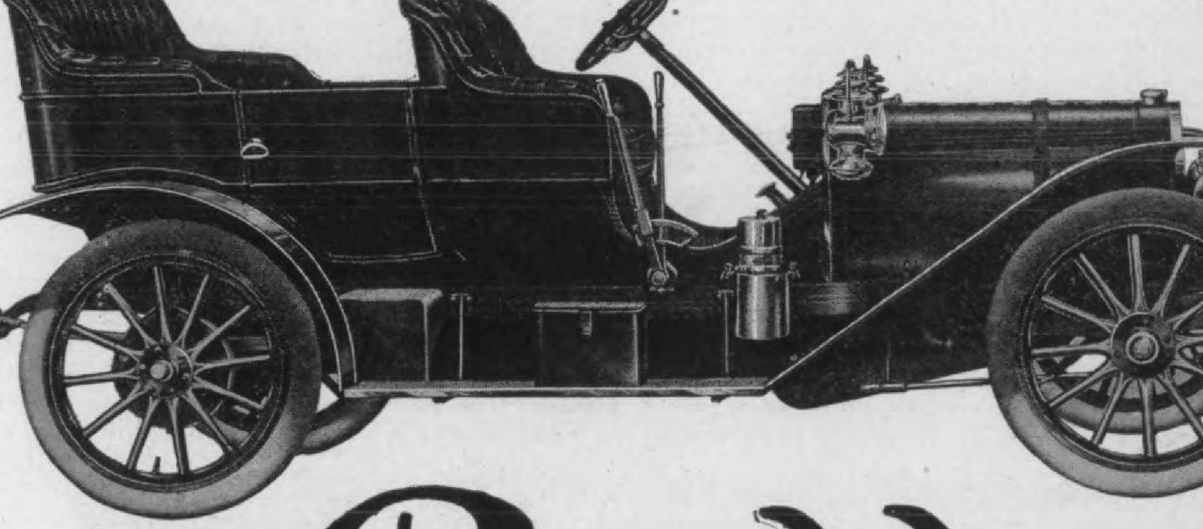

Model 34 Rambler

$2250

IN THIS CAR is embodied every modern feature that h withstood the severe test of practical service and each h been refined and developed to the highest degree mechanical perfection.

Through the offset crank shaft, straight line drive, direct from transm sion gear to rear axle without an intervening joint, and ball or roller bearin at every point in the transmitting system, every ounce of cylinder pressu is delivered to the road wheels with the lowest possible loss in efficienc

Equal improvements have been made in accessibility, comfort and outwa appearance, and we guarantee this car to be equal in practical value to a car in the market, regardless of price.

We invite your most thorough examination, positive that it will convin you of the superiority of our product.

Our advance catalog, describing in detail this car both as touring car and roadster and the new utility car, Model 31, is at your disposal; write for it now.

Thomas B. Jeffery & Compan

Main Office and Factory, Kenosha, Wis.

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Iodel K, single instead of double cross ecting links are used in the steering The front axles are still tubular, but rger section and the steering pivots lso larger and mounted on ball bear-

new type of radiator, in place of the known circular front, is offered as tion this season. This radiator is of removable square tube type and is ed in enamel instead of polished , and has an eliptical shaped filling f large enough size so that water can oured into it without spilling. The system remains the same, consisting

ders being in pairs and the crank shaft mounted on ball bearings. The car weighs but 50 pounds more than the 4-cylinder touring car, the weight being 3150 pounds. On this model, the chassis arrangements are practically the same as on the 4-cylinder car, the ignition, piping, etc. being identical, but a centrifugal pump is used for water circulation instead of the gear pump of the other models. The tires are 36x4½ and a particular point is made of the fact that every part of the car is mounted on Hess-Bright ball bearings, including the change speed gear.

The steering gear is this year of the

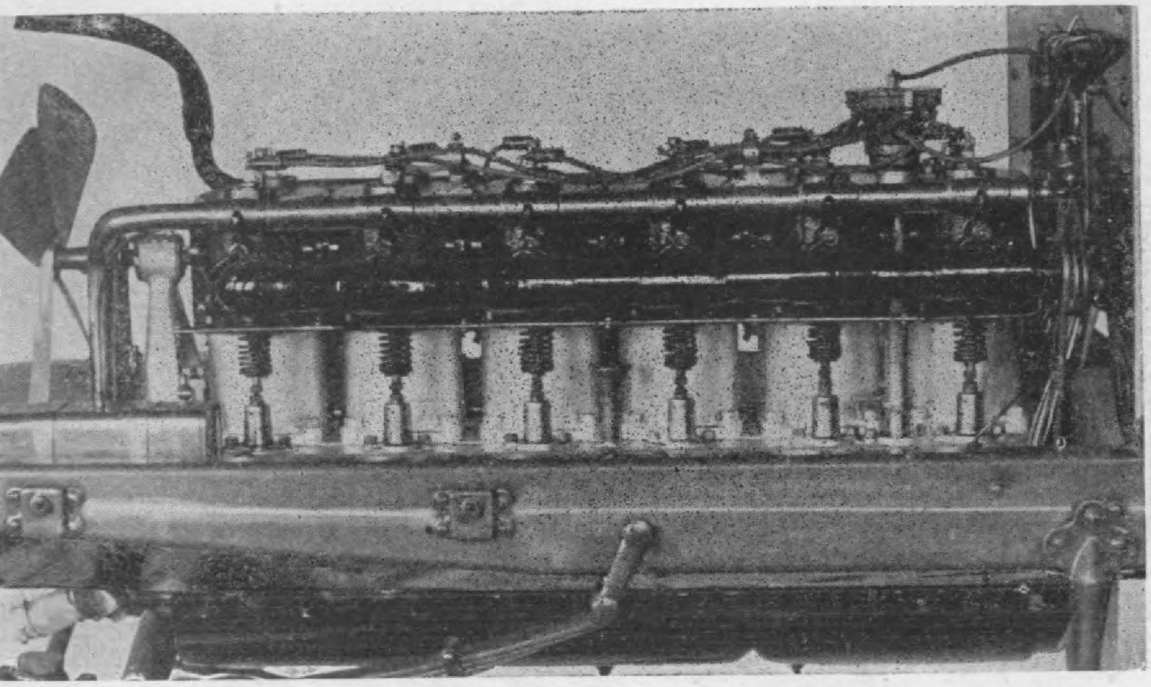

Fig. 5. Exhaust side of the Model T 6-cylinder National motor. The cylinders are cast rately and are similar to those of the 4-cylinder engine, having flattened water jackets red by expansion plates. The bore is 5 inches and stroke 5 inches. The sections of the aust pipe are free to slip in the short tubes connecting them. The water pipes and exhaust held by easily removable three pronged yokes, the pipe ends being tapered and held into taper s in the cylinders.

gear driven force feed Crandle oiler, oil passing thru sight feeds on the the leads being carried to each of ylinders, also into the crank case for h and to the clutch transmission and axle housings, thus doing away with ge number of individual grease cups. e hood design has been slightly altered it the new radiator. It has shutters is held by a large strap, there being echanical fastening devices, the hood y coming down into the proper posi- as located by dowel pins. A choice odies is offered either in curved lines n are of cast aluminum, or in the ght line effects which are sheet

worm and sector type, and the control levers on the top of the wheel are now friction retained by means of small disks somewhat similar to the construction of multiple disk clutches. This takes the place of the stationary notched sector previously used. The amount of friction is adjustable by means of a small thumb nut. The brake arrangement gear shifting levers, etc., have not been altered.

All the National Touring Car Models for 1908, seat seven passengers. The prices include a complete equipment of lamps, head lights, generator, tools and tire repair kit, etc.

This chassis is also fitted with a Roadster body and is known as Model N Road-

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WILL BE THE
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¶ It will be the largest number of a trade paper ever published.

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THE JANUARY NUMBER will be the EIGHTH ANNUAL "BUYERS' GUIDE SPECIAL." *The great importance of this number as an advertising medium has become universally recognized.* The Edition of last January contained 420 pages of advertising, (a record breaker) and every advertiser was satisfied, because the "Buyers' Guide Special" is the year book of the trade and is kept for handy and frequent reference by buyers everywhere. In addition to the Directory feature (which is the classified list of manufacturers and jobbers, and their products), the advertisements are so complete and comprehensive that they practically make this edition a condensed catalog of the entire industry.

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¶ If you send us $2.00 and this advertisement before February 1, 1908, we will send you the

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for TWO years instead of one year and will guarantee to start your subscription with the "Buyers' Guide Special," or January number (which is alone worth the price of an annual subscription). The annual subscription price is $2.00, so this offer is a great bargain.

What is the "Buyers' Guide?"

¶ It is a classified list of manufacturers and their products—a detailed directory of the manufacturing and wholesale trade—a guide for buyers, as all articles they wish to purchase are classified with the names and addresses of manufacturers appended.

The Buyers' Guide

in book form sold for a dollar a copy. The January issue of this Journal will be included in a two years' subscription for two dollars. The edition, though large, is nevertheless limited, and the demand will be immense. Better send in your subscription at once.

CHILTON PRINTING CO., Market and 49th Streets, Philadelphia

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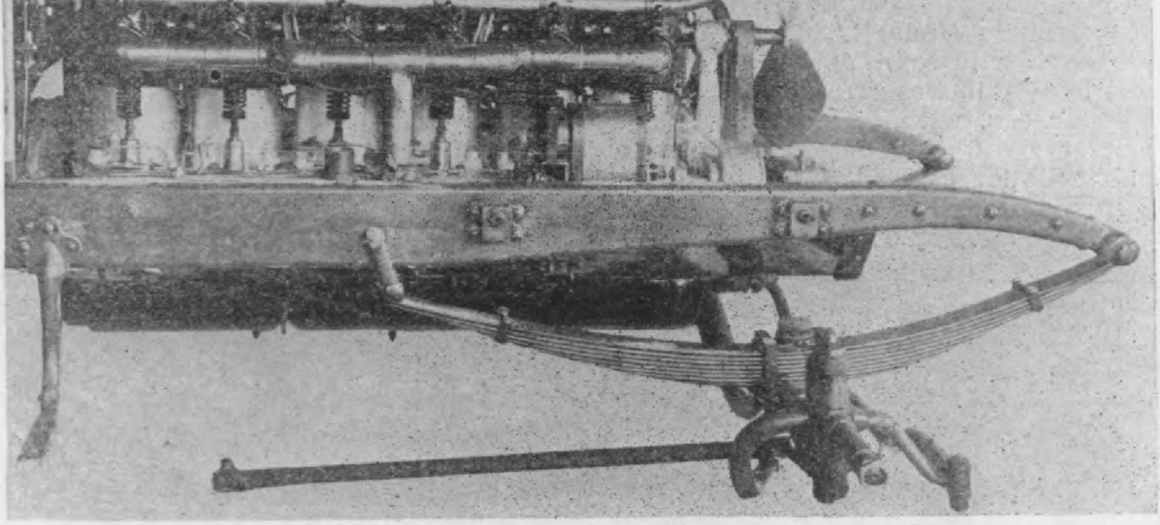
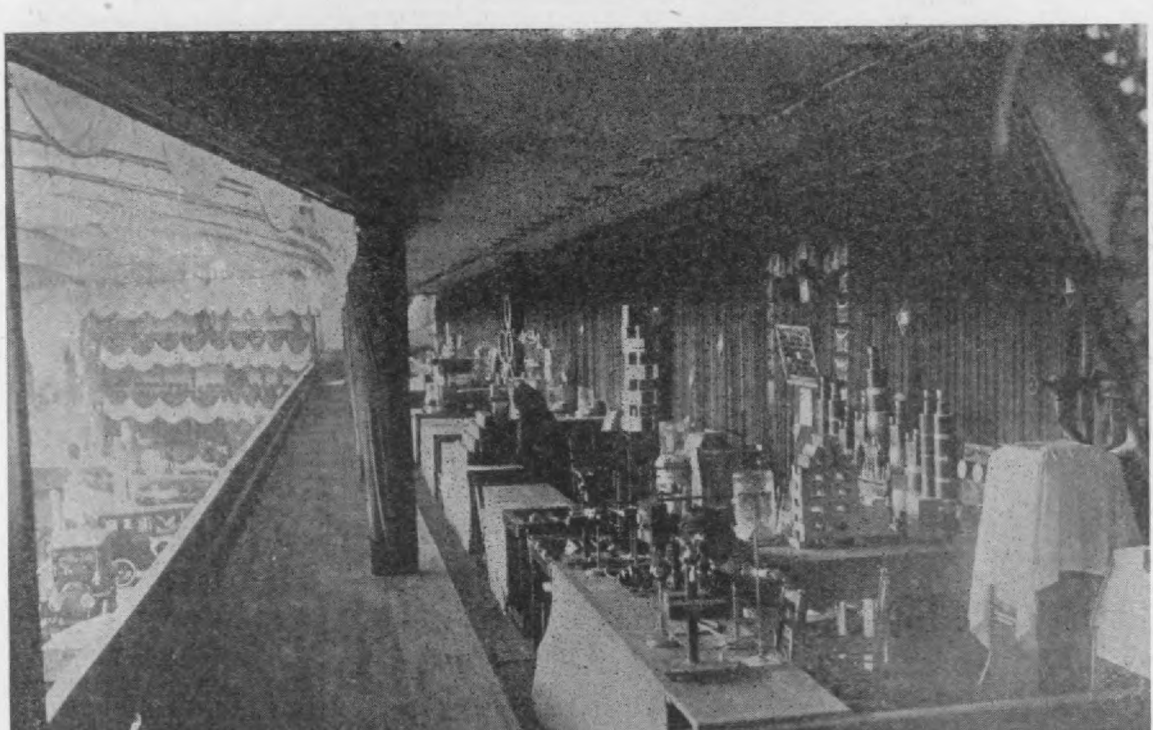


Fig. 6. Inlet side of the National Model T 6-cylinder motor showing the magneto and di ributor of the double ignition system and also the front spring and steering knuckle arrang nent. Double cross connecting links, one in front and one in the rear of the tubular front axle a sed.

nensions are increased. The motor has e same cylinders as the four-cylinder gine, the flat plates on the sides make also a very compact piece of mechanism. e tires are 36x5, the wheel base is 127 ches. The engine is supported in a sub-frame by six integral arms of the cra case. This model is furnished with a la luxuriously fitted and upholstered, c aluminum, curved line body, swivel se being arranged in the tonneau. It s with complete equipment for $5000.



Madison Square Garden Show—View of the second gallery exhibits composed entirely sundries and accessories.

S. A. E. Postpones Annual Meeting

Owing to the short space of time that d elapsed since the mid-summer meet-

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he George N. Pierce Company is man-
cturing four models, a 30 H. P. four-
nder car, with cylinders 4¼ inches
meter by 4¾ inches stroke; a 40 H. P.
r-cylinder car, with cylinders 5 inches
diameter by 5½ inches stroke; a 40
P. six-cylinder car, with cylinders 4¼
nes in diameter by 4¾ inches stroke;
a 60 H. P. six-cylinder car, with cyl-
ers 5 inches in diameter by 5½ inches
oke.

steel crossbars, the front one forming th
radiator support. The sub-frame has bee
dispensed with. The transmission ge
case is bolted direct to the underside
the two center crossbars. The engine
supported on two 'I" beam cross girder
which form two extra crossbars, this b
ing far superior to casting long feet on th
crank case, which is of aluminum, thes
having a tensile strength of over 65,0

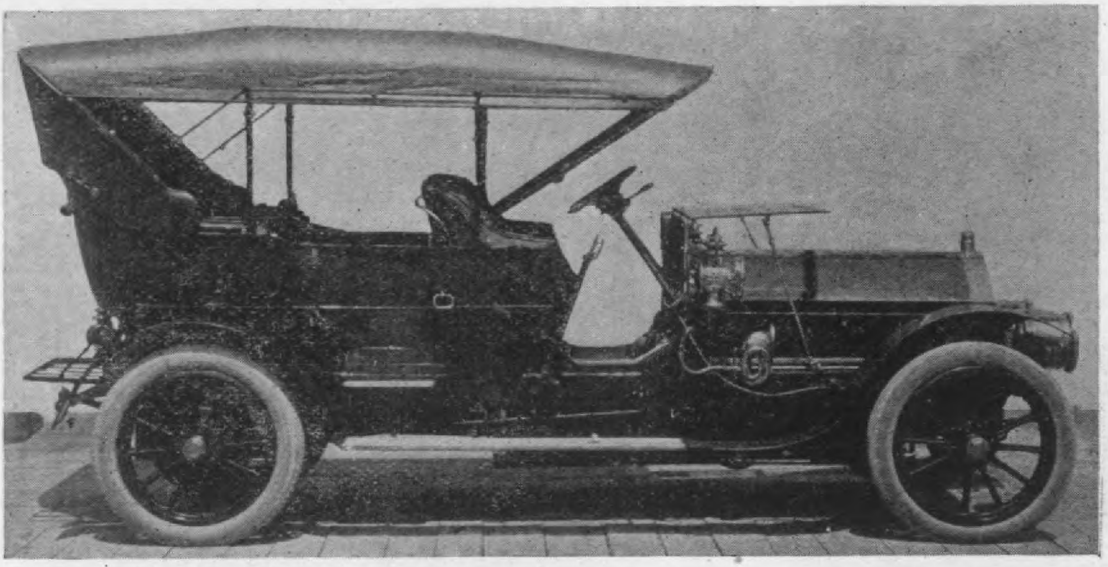
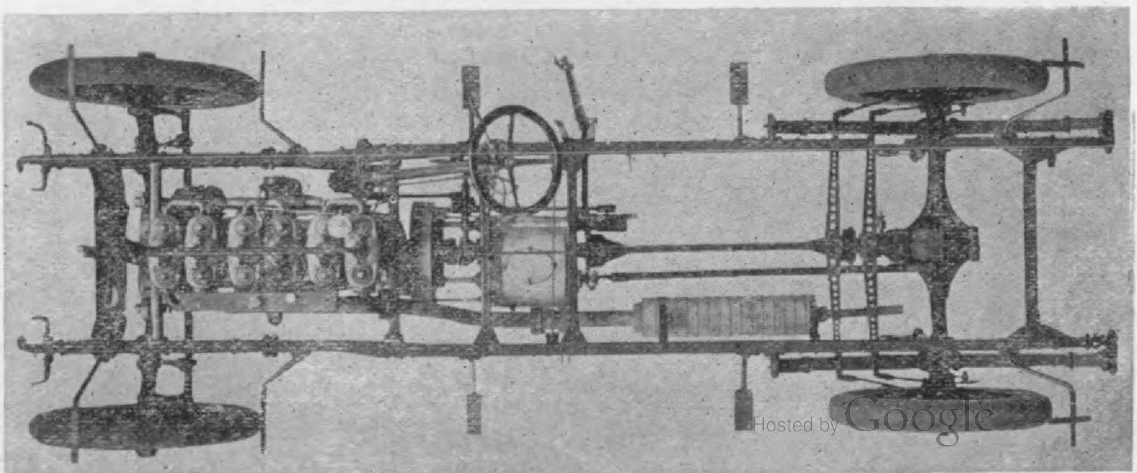


Fig. 1. Six-cylinder, 60 H. P., 1908 Pierce Great Arrow. Cylinders, 5-inch diameter, 5½
roke. The sub-frame has been dispensed with and the engine rests directly on two "I" beam
oss girders, which form two extra cross members to the chrome nickel prest steel frame
e change speed gear is bolted directly to the under side of the two centre cross bars. The
nt cross bar supports the radiator, and can be removed from the frame after the radiator
ving complete access to the motor. Semi-elliptic springs of very liberal length are used. Sever
osphor bronze bearings are used in the six-cylinder engine. The automatic carburetor ha
en improved for 1908, and the mixing chamber is jacketed with hot water. A double system
ignition is provided, each being entirely independent, and having its own set of spark plugs
heel base, 135 inches. This car, fitted with a suburban type of enclosed body, sells for $7750
d with touring body, $6500.

n all these models, the special alloy
els have been extensively used wher-
r desirable. The under frame is con-
ucted of chrome nickel prest steel of

pounds to the square inch. A double un
versal joint is provided between the e
gine and the transmission case, so th
any disalignment will not affect the bea



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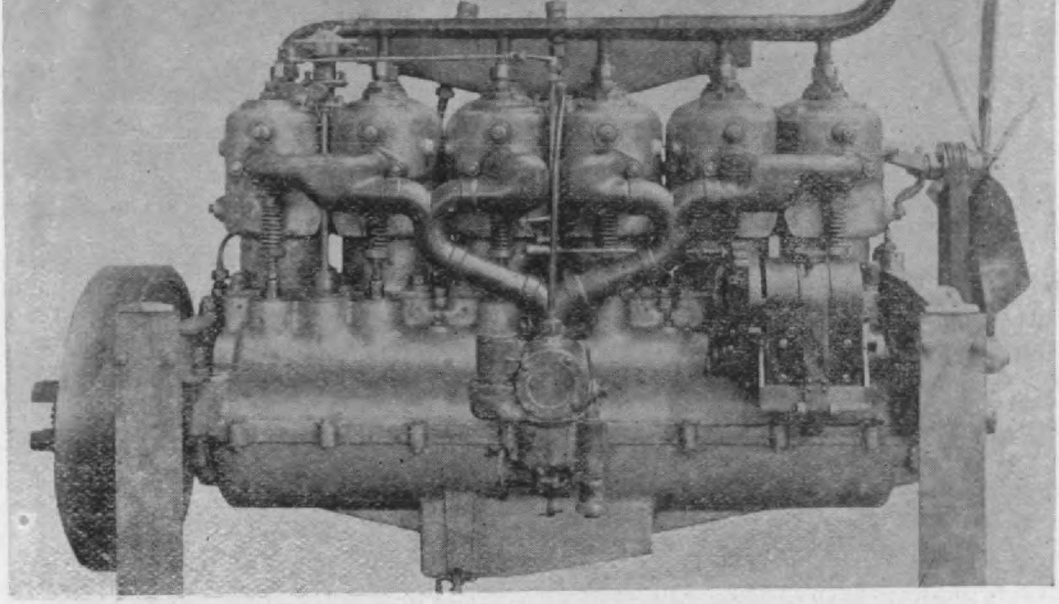
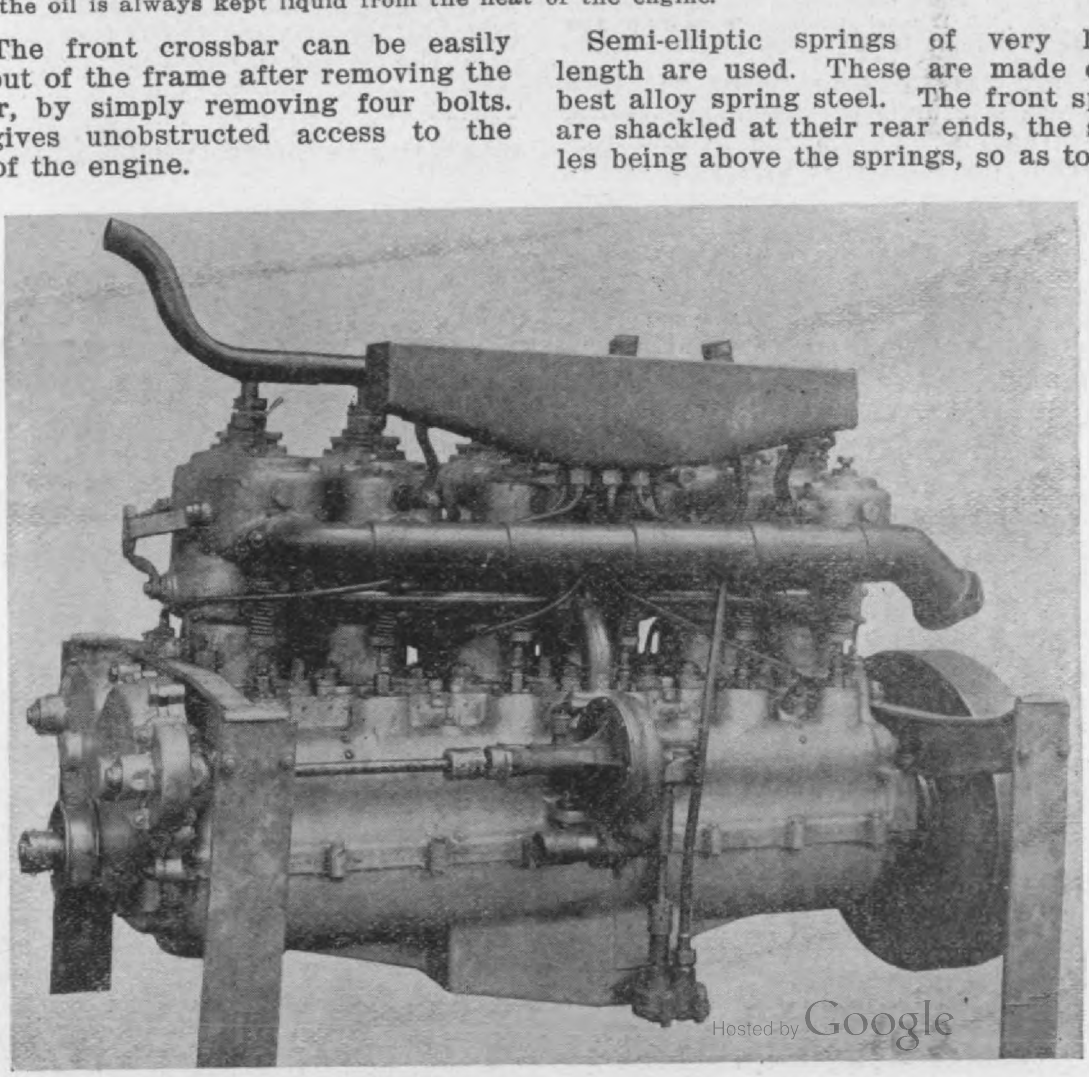


Fig. 3. Inlet side of the six-cylinder 40 H. P. Pierce Great Arrow motor, showing the pecu ar arrangement of the inlet pipes, which are provided with enlarged chambers, the water jack ed careburetor, the location of the magneto and the method of holding the same by a quickl movable band, and the oil tank which feeds by gravity, and is located above the cylinder here the oil is always kept liquid from the heat of the engine.

gs. The front crossbar can be easily ken out of the frame after removing the liator, by simply removing four bolts. is gives unobstructed access to the ole of the engine.

Semi-elliptic springs of very liber length are used. These are made of t best alloy spring steel. The front sprin are shackled at their rear ends, the shac les being above the springs, so as to wo



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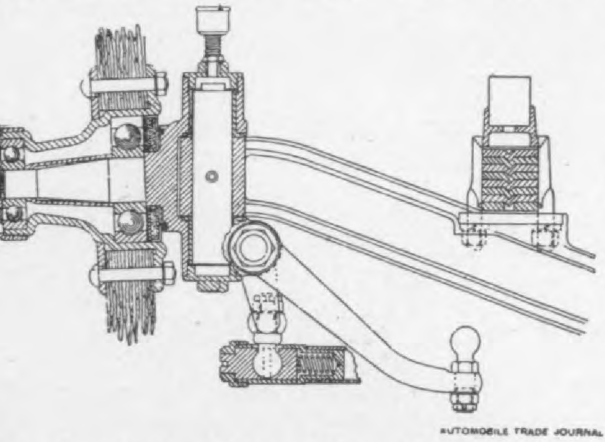
sitively connected to brackets in front d shackles at the rear ends. These



ig. 5. Detail of the Pierce Great Arrow, nt axle end steering pivot and stub axle. e the large Hess-Bright ball bearings di- ly in line with the wheel spokes. The steer- pivot has long bearing surface, and is not unted on ball bearings. This view also shows method of connecting the steering links to steering knuckle, and the arrangement on an gral spring saddle of the spring leaves. These ts are nickel steel forgings. The cross steer- rod, of nickel steel tubing, is behind the nt axle, where it is protected.

ings are fixt to spring seats that are e to oscillate upon the axle, thus giving fect freedom. The whole of the tor- n strain on the rear axle casing is en by extra strong torsion rods. Truf- lt-Hartford shock absorbers are fitted the front and the rear springs.

The drive is by propeller shaft and el gears and a torsion rod is provided take the reaction of the drive and the brakes. Rubber buffers are provided limit the deflection of the springs.

The steering knuckles and the steering ndles are made from nickel steel forg- s, and they are of very liberal dimen- ns. The front wheels run on large ball rings. The steering rod connections e large ball joints with a spring which omatically takes up lost motion. The ss steering rod is behind the front axle, s preventing damage to the steering r due to striking an obstruction. These s are made from nickel steel tubing.

THE MOTOR.

The motor is of the vertical type, the inders being separate. They are ground ooth and accurately after machining. s has been the method employed by the npany for over five years. The water kets, valve chambers and cylinder ds are all cast integral with the cylin- proper. The jackets are cast flat on side of the cylinder to permit of bring- the cylinders close together. At the

ened and ground. The forged steel c necting rod is fitted with phosphor bron bushes at both ends. The crank shaft a solid forging of nickel steel, giving tensile strength, after special treatme of over 110,000 pounds per square in All the bearings are acurately ground.

The crank shaft is supported by th adjustable phosphor bronze bearings the four-cylinder cars, and seven bearin in the six-cylinder cars. The engine controlled by a hand throttle in conn tion with the automatic carburetor. T has been improved, the mixing chamb being jacketed with hot water.

A double system of ignition is provid each being entirely independent of t other, and each having its own set spark plugs. The first system is means of a storage battery and individu unit Autocoils. The second system is means of an improved Bosch high tensi magneto.

The radiator is set over the front ax A positively driven, centrifugal wat pump of great capacity forces the wat thru the cylinder jackets, and an i proved fan, driven by a flat belt, is plac behind the radiator. The gasoline is f by gravity to the carburetor, which is l enough to be supplied even on a very ste grade and with an almost empty tank.

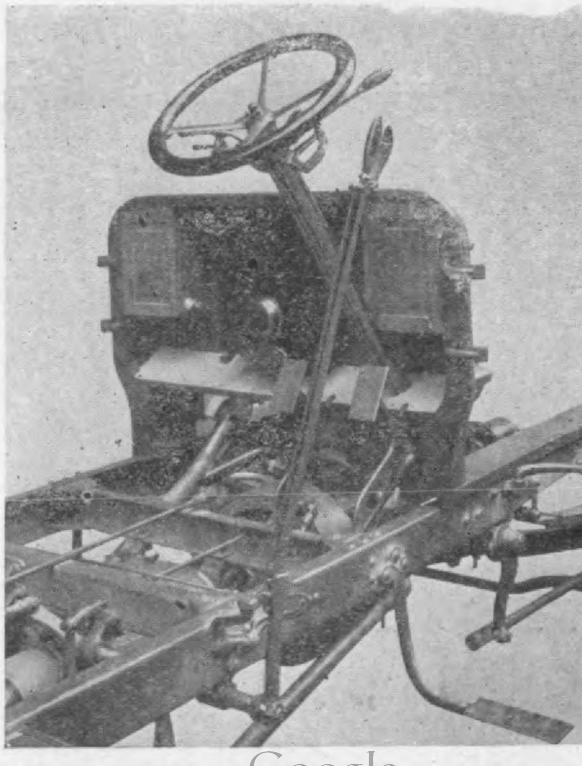


Fig. 6. Rear of Dash 1908 Pierce Great A row, showing the clutch and brake levers, char gear lever under the steering wheel, the eme

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nduct the oil from it to the main crank aft bearings. The crank shaft journals d the short arms of the crank shaft are illed thru their centers, and the ank shaft is also provided with radial oles at the center of the journals, so as provide a passage for the oil from the ain journal bearings to the crank pin earings. A pump operated by worm earing on the exhaust cam shaft drains e engine crank case, and returns it, af- r filtering, to the oil reservoir.

The commutator for the battery ignition of the roller type. This is placed on a ertical shaft between the third and the urth cylinders, and is actuated by a pair bevel gears from the inlet cam shaft.

The change speed gear gives three peeds forward and one reverse, with a irect drive on the high gear. It is fitted ith Hess-Bright ball bearings. All the ears are made from chrome nickel steel. he conical friction clutch is of aluminum, ith a leather face, and fitted with cork nserts. These effectually prevent burn- ng of the leather and admit of a more radual engagement.

AXLES AND BRAKES.

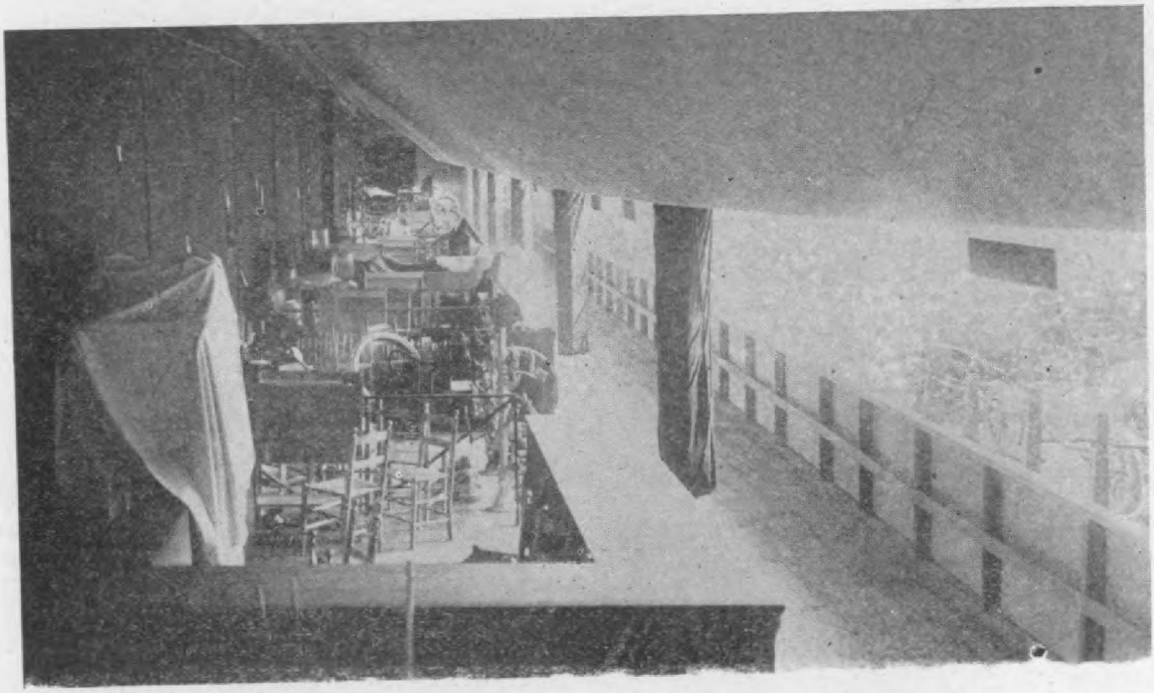
The front axle is a solid, one-piece drop orging of "I" beam section, made from a pecially heat-treated steel of great tough- ess. There are no welds in this piece, nd instead of having the usual drop in

The rear live axles are made of chrome nickel steel, as also are the co pensating gear and bevel gears. The closing tube around the live axles is nickel steel. The live axles run on la ball bearings, as also the bevel pin shaft.

Double brakes are provided. The br drums of large diameter are attached the hubs of the rear wheels. The h brake operates on the outside of the dru and the foot brake on the inside. latter is interconnected with the clut the former is not. Both sets are eq ized. The material of the body and dash is cast aluminum.

The front seats are of the individ type. The side entrance doors are ex wide, and the rear seat is ample for th passengers, with abundance of leg ro The 30 H. P. body is seated for five sengers. The 40 H. P. and the 60 H bodies are seated for seven passeng the two extra seats in the tonneau bo especially comfortable. These are m so that they can be revolved or folded cording to choice.

The smaller four-cylinder car is $4 the larger four-cylinder car is $5000, 40 H. P., six-cylinder, 130-inch wheel car is $5500, and the 60 H. P., six-cylin 135-inch wheel base car is $6500. prices with the special suburban encl bodies are somewhat higher.



Madison Square Garden Show—View of the first gallery, which was added this year the first time to the exhibition space.

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scriber to the Journal, send $2.00 at

of 1908 two models with similar assis specifications with the exception the motor and bodies. Both of these

the six-cylinder car has 34-inch whee with 4-inch tires. This larger model known as the 6-30. The cylinders are 3

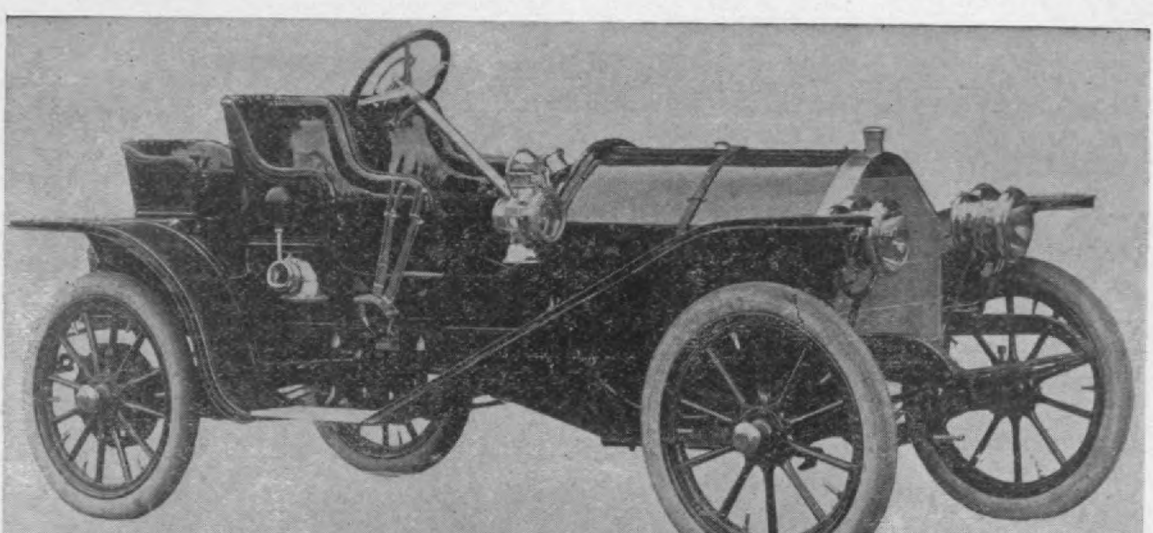

Fig. 1. Right side of the 1908 six-cylinder Marion water-cooled runabout known as the 6-30 ylinders 3¾x4 inches, wheel base 102 inches, tread 55½ inches, tires 34x4 inches. The steering ear, change speed gear in a case integral with the rear axle housing and the double rear whee akes are 1908 features. The body is finished in dark green with red upholstery, and the diator and fittings are finished in nickel instead of brass.

dels are runabouts of high power, fitted h single or double rumble seats, placed top of a steamer trunk at the rear, trunk in each case forming the base these rumble seats.

x4 inches, the motor being extremely co pact, rests directly on the side fram members, no sub-frame being used. Mercedes type, german silvered radiato is used on both cars, all the fittings a

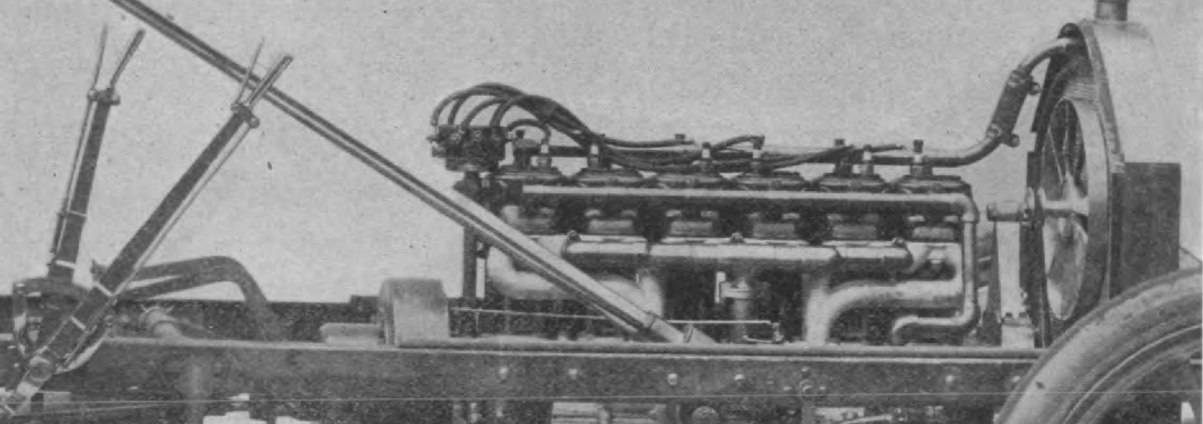

Fig. 2. Right side of 1908 Marion 6-30 Runabout chassis, showing the compact six-cylinder ter-cooled motor, double exhaust pipes, accessable location of the distributor and the large ke to the steering column.

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odel 8 has a four-cylinder, 4x4, 24 H.

trimmings are nickled instead of bras

The frames are of the usual prest steel annel section, and the step hangers are so of the same material. The rear rings are full elliptic with scroll ends, d are shackled at each end. They have e leaves, and are perched on top of the les. The front springs are semi-elliptic, so five leaves, perched on top of the les. No ribs or bands are used.

trolling the clutch, while the right op ates the internal rear hub brake. T emergency brake is controlled by ratchet retained side lever of the p type. The change gear lever is also a sector on the side, and operates p gressively, there being but two speeds f ward, and one on the reverse.

Both models are furnished with a co

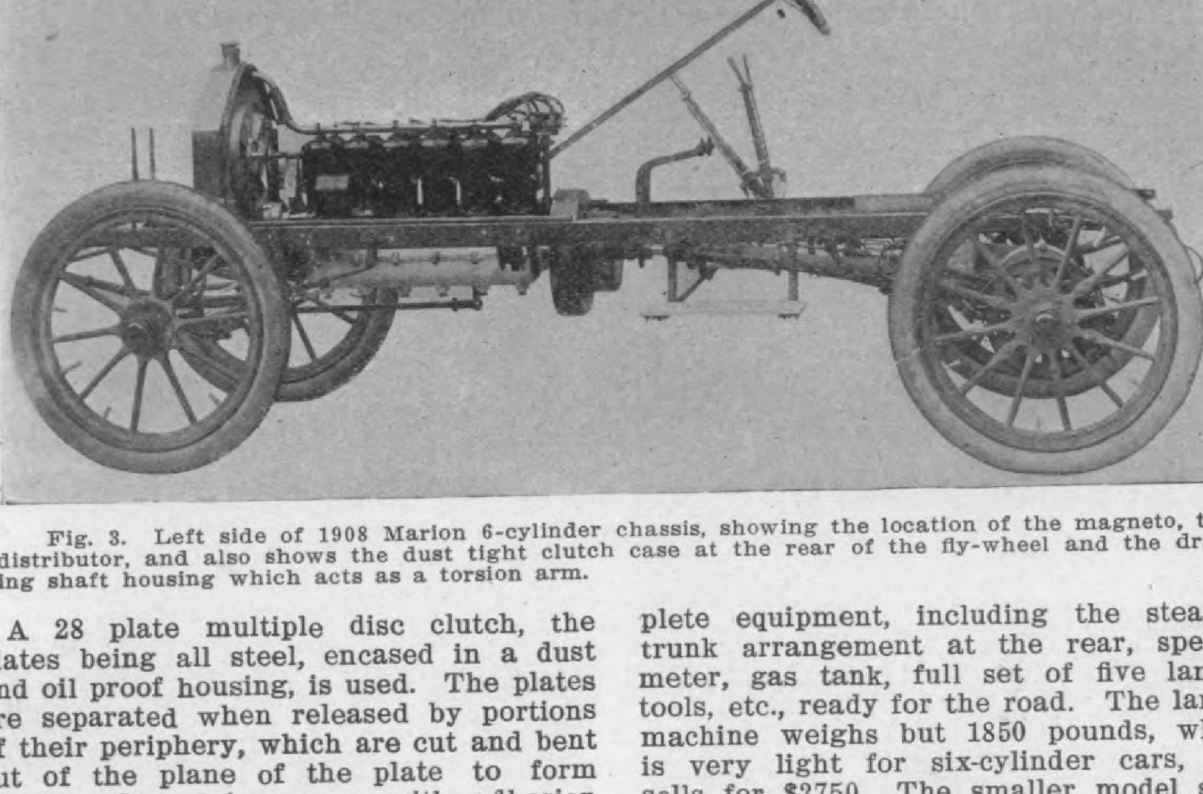

Fig. 3. Left side of 1908 Marion 6-cylinder chassis, showing the location of the magneto, t distributor, and also shows the dust tight clutch case at the rear of the fly-wheel and the dr ing shaft housing which acts as a torsion arm.

A 28 plate multiple disc clutch, the lates being all steel, encased in a dust nd oil proof housing, is used. The plates re separated when released by portions f their periphery, which are cut and bent ut of the plane of the plate to form prings, thus doing away with adhesion etween the plates due to the oil. The lates are engaged by means of the usual orm of helical spring of about 250 pounds ension. The driving or cardan shaft uns directly to a change speed gear of he sliding progressive type, the case of hich is incorporated as a part of the ear axle housing. One universal joint nly, placed at the forward end, is used. his change speed gear is very light, trong and compact, and gives two speeds orward and one reverse. A double set f brakes is supplied on the rear hub rums, the internal brake being expand- ng and faced with camel's hair belting, hile the external brake is of the usual ontracting band type. The steering gear s also new, being one of the company's ecent constructions, and is of the adjust- ble nut and screw type. It is pivotally

plete equipment, including the stea trunk arrangement at the rear, spe meter, gas tank, full set of five lar tools, etc., ready for the road. The lar machine weighs but 1850 pounds, wh is very light for six-cylinder cars, sells for $2750. The smaller model s completely equipt for $2250.

Mr. Robert Lee Morrell, together the following well-known automobi Charles J. Glidden, C. Jerome Edwa R. Harry Croninger and others have come greatly interested in aerial nav tion. Mr. Croninger is reported as ha purchased a baloon and Mr. Morrell in the near future add an airship to motoring equipment.

Herman Boker & Co., 101-103 Du street, New York City, are offering automobile trade a new metal called tra" steel, which is an intermediate between high speed steel and carbon steel. Great toughness and durabilit claimed for this steel and tools of "In steel, a very complete line of whic

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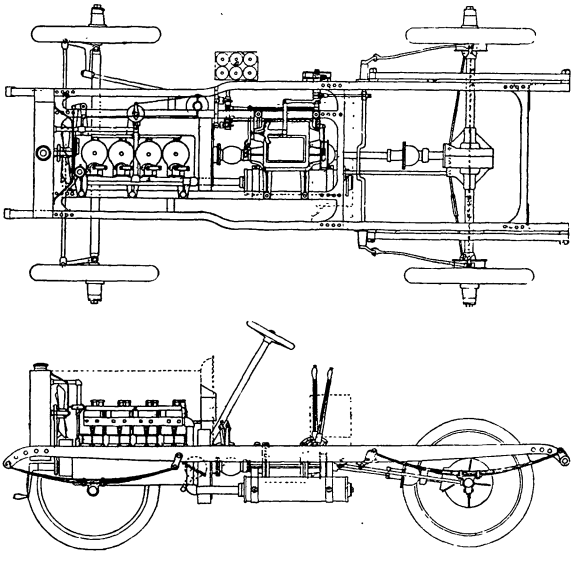
"Brennan" 1908 Motors and Transmissions

With 9 years experience back of Brennan motors and transmissions it is not surprising that the manufacturers, Brennan Motor Co., Syracuse, N. Y., find no need for radical changes in their constructive features for 1908. These products are therefore offered without material changes and the few changes made are but detail refinements to obtain increased efficiency. The Model 7, 2-cylinder special, now has a ball bearing crank shaft and a new design of crank case with the secondary gears in a separate gear housing on the outside of the case. The company has thoroly tested out this model for a year past and is satisfied that the ball bearing crank shaft and new design of crank case constitute a decided improvement over its earlier models. Two cam shafts are used, one for the valves of each cylinder.



Plan and Side Views of Brennan Chassis furnished with 20 H. P. plant at $1800, with 24 H. P. plant at $2000 and with 35 H. P. plant at $2700.

The Brennan No. 10 sliding gear transmission now has the operating lever inside, and is provided with a double set of ball bearings at the clutch end of the shaft.

A 6-cylinder Brennan vertical motor is included in the 1908 line. This motor has a bore of 4 9-16 inches, and a 5-inch stroke. The crank shaft has seven bearings.

The Brennan Company is also furnishing complete chasses with Brennan vertical motors and transmissions, or the motor and transmission assembled on a subframe if desired. We show herewith plan and side views of one type of Brennan chassis which is furnished in three sizes. The smallest size has a wheel base of 96 inches and is fitted with a 20 H. P. motor. Wheels are 30-inch in diameter. This chassis lists at $1800. The next larger size has a 24 H. P. motor, a 100-inch wheel base and 32-inch wheels. Price is $2000. The largest size is fitted with a 35 H. P. motor, a wheel base 108 inches long and 34-inch wheels. Price is $2700. All three of these chasses have three speed and reverse change gears, shaft drive, honey comb radiators with fans, foot and hand brakes. The change gear is of the selective, sliding gear type and has annular ball bearings. Ball bearings are also used in both axles. Double sets of brakes are used and cable equalizers are employed to assure coincident application of both brakes of each set. Under the sub-frame carrying the motor and change gear a drip pan is provided on these chassis. These chassis are shaft driven.

Three sizes of another type of Brennan chassis are also offered, rated at 45, 50, 60 and 80 horse power respectively and listing at $3000, $4000, $5000. The power plant of this type is also furnished separately mounted on a sub-frame if so desired. These chasses have prest steel frames; semi-elliptic springs, I-beam front axles; roller or ball bearing wheels; double set of brakes; honey comb radiator; prest steel dash and hood; 120-inch wheel base; 12-feed mechanical oiler; sliding gear, three speed and reverse change speed gear; jack shaft and side chain drive or shaft drive on special order.

Wm. H. Ganschow Company, 12 and 14 South Clinton street, Chicago, is doing gear cutting for the automobile trade from blue prints, drawings or complete specifications and is also prepared to furnish gear blanks. It will shortly move into a new and larger plant at Washington Boulevard and Morgan street, where with increased facilities it will be in a position to handle a much larger amount of work.

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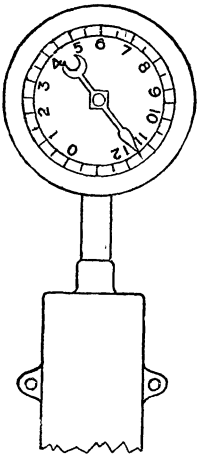
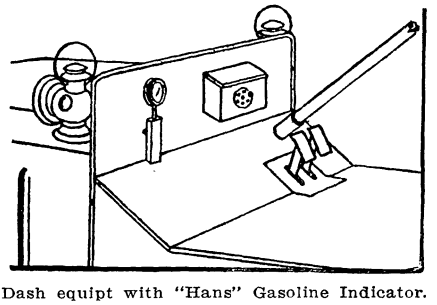
Hans Gasoline Indicator

Edmund E. Hans Co., Minneapolis, Minn., is marketing the Hans gasoline gage illustrated by one of the drawings herewith, and also shown on the dash of a car. The operating mechanism of this indicator consists mainly of a metallic float, a cord connecting this float with a pulley and a clock spring which serves to keep the card wound up upon the pulley as the float rises in the column.



The "Hans" Gasoline Indicator.

The shaft which carries the pulley is parrallel to the shaft carrying the indicator hand and has at once end a pinion which meshes with a gear on the indicator hand shaft. As the float falls in the rectangular column in the tank the cord turns the pulley and its shaft and, consequently the indicator hand shaft. This winds up the clock spring and when the gasoline level is again raised the spring unwinds, causing the indicator hand to turn back



Dash equipt with "Hans" Gasoline Indicator.

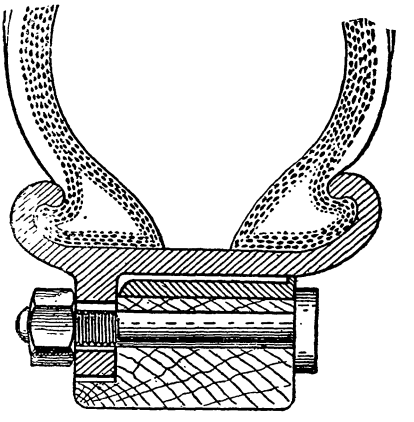
to the proper point, and also causing the pulley to revolve and take up the cord.

The gasoline is admitted to the rectangular column from the tank thru a small opening, and therefore any disturbance in the gasoline in the tank does not affect the float in the column.

A feature of this indicator is the fact that it can be placed on the dash where it is in plain view of the operator who is thus kept informed at all times of the amount of fuel in the tank.

Diamond Demountable Rim

Diamond Rubber Co., Akron, Ohio, has put out a new demountable rim for the 1908 season. One of the best features of this rim is its simplicity. The rim proper is of the usual clincher type and the tire is mounted on it in the usual manner excepting that stay bolts and valve stem come flush with the surface of the rim. This rim is simply slipt over the wheel and held by means of six small nuts and bolts



Cross Sectional View of the Diamond Demountable Rim with Tire Applied.

that extend thru the felloe transversely. From the cross sectional view herewith it will be noted that the rim proper does not come in contact with the rim on the wheel felloe, hence the two cannot become rusted together. A wrench is furnished for removing the nuts. Any regular clincher tire can be used on the rim, which is furnished usually in sets of five, one for each wheel on the car and one for a spare tire for emergency use. Prices of single rims range from $6.12 to $7.50, and for complete sets from $58.52 to $67.90. An extra charge is made where the Diamond Company applies the rims to the wheels.

H. T. Kehew, formerly auditor of the Crucible Steel Company of America, has resigned that position to accept the office of secretary and treasurer of the Pittsburg Automatic Vise & Tool Company, of Pittsburg, Pa., makers of the Pittsburg swivel vise.

The "Stick Tite" Bow Separator, which we described in our September, 1907, issue, page 172, is now manufactured by W. J. Decker, 10 West street, Utica, N. Y. He advises us that he is the inventor of this separator, and that he was formerly connected with the Michigan Top Co., but is now in business independently. Sample sets of these separators are furnished at $1.75 in brass and $1.25 in Japan finish. In lots of ten or more, prices are $1.50 and $1.00, respectively, for the brass and Japan finishes.

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The Unterberg and Helmle High Tension Magneto

HUGH DOLNAR.

The J. S. Bretz Company, Times Building, New York City, are the sole American agents for this new appliance, which is manufactured at Kalsruhe, Germany, and is the latest and most complete development of the hight tension magneto.

All the Unterberg and Helmle magnetos produce an arc-flame, instead of a single instantaneous spark, this flame being the most efficient charge-ignition agent now known.

HIGH TENSION MAGNETO REQUIREMENTS.

The arc-flame producing magneto must meet three requirements. (a) The armature must have a sufficient velocity while passing between the fields when starting, irrespective of the motor crank-shaft velocity; (b) The primary current must be broken when the armature is passing at high speed between the fields, and (c) the primary current conductors must terminate in a condenser to avoid a detrimental spark at the primary break.

After a start is effected, the armature must, of course, have a fixt ratio of revolution to the turns of the crank-shaft.

SPEED RATIO OF CRANK-SHAFT TO ARMATURE SHAFT.

The armature windings pass under the pole pieces twice in each turn, and each time a spark may be produced; hence if the armature shaft is given even turns with the crank-shaft the possible two sparks can fire the 4-cylinder motor charges as required. For six cylinders the armature shaft must make one and one-half turns to each turn of the crank-shaft.

THE DISTRIBUTOR.

Having obtained a suitable number of secondary current effects per turn of the crank-shaft, it only remains to provide mechanism for conducting these secondary electrical effects to the respective spark plugs in suitable sequence to complete the possibility of correct ignition of the motor charges by the arc-flame.

The commutator, or distributor, which directs the current to the proper spark-plug is combined in one structure with the magneto, as shown in the illustrations herewith. This distributor consists of a revolving brush which is charged with the high-tension current and delivers this current to stationary terminals, each wired to its own spark-plug, as the brush comes into successive contacts with these fixt terminals.

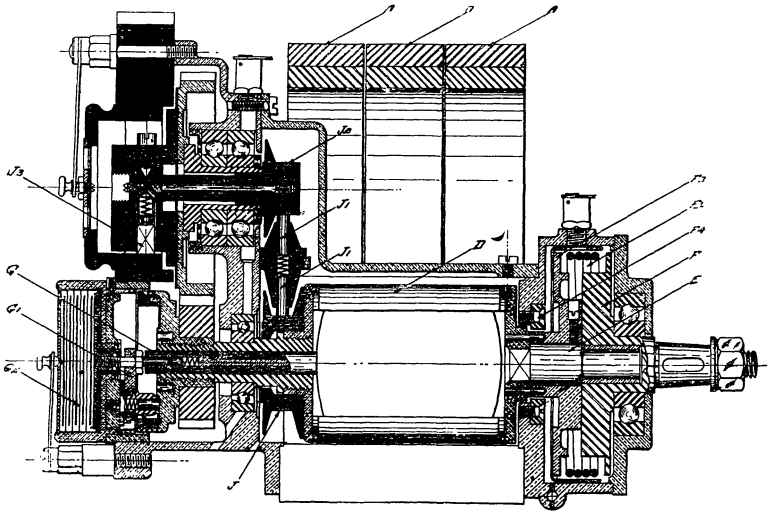

Fig. 1. The Unterberg and Helmle Magneto longitudinal, vertical section save the Armature, which is shown in exterior view. A, Magnets; B. Fields; C, Field-gaps; D, H-armature; D. P., Primary winding; D. S., Secondary winding; E, Armature shaft; F, Armature driver; F 1, Coupling spring; G, Primary conductor; G 1, Interruptor block; G 2, Condenser; J, Armature collecting ring; J 1, Brushes; J 2, Distributor collecting ring; J 3, Revolving distributor brush. The device at the right end allows the armature to rotate at the proper speed when driven by the engine, but when cranked by hand the armature is snapt by the maximum current points by a spring, thus giving an arc-flame even at the slowest speeds.

The current generator consists of the compound permanent magneto, A, standing upright, (see Fig. 2) and having the two fields, B, B, fixt to the two lower ends of the three compound magneto, A, made in 6 pieces for convenient construction. The fields, B, have curved inside faces to conform to the path of rotation of the H-armature D, and C, C, mark the gaps between the fields. The primary coil is marked D, P, and the secondary coil D, S,

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THE NEW STARTING FEATURE.

The novel feature of this magneto, the starting device is shown in three positions in Fig. 3, that at the left being the starting position; the middle, the releasing position, and the right, the running position. The armature shaft, E, is not geared

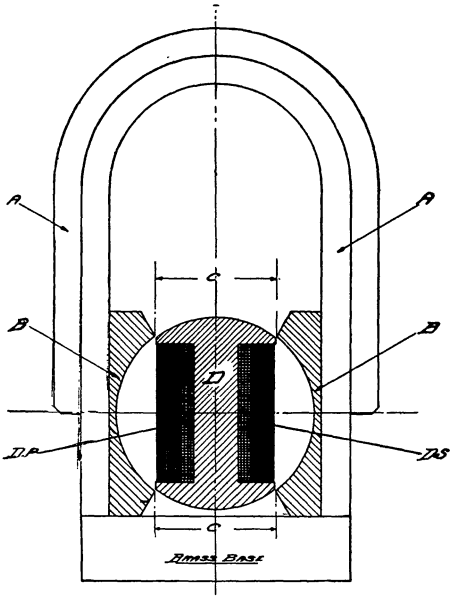

Fig. 2. The U. and H. high-tension magneto, vertical cross-section, thru the magnets, fields, H-armature and the low-tension and high-tension coils, the coil wires being shown as of much larger diameters than those actually used. A, Magnets; B, Fields; C, Field-gaps; D, H-armature; D P, Primary winding; D S, secondary winding.

directly to the motor crank-shaft, but is driven thru devices which hurry the armature in passing the field-gaps when cranking the motor to start; as soon as the motor starts the accelerating devices are automatically made inoperative and the armature shaft is then driven at its ratio speed so long as the motor continues to run itself. This "starting device," is found in this U. H. magneto only, and makes ignition certain no matter how slowly the motor crank-shaft may be turned by the starting-crank.

This starting device consists of a driver, F, geared to the motor shaft to turn at proper ratio, a coupling spring, F 1, which is a coil of strong wire having one end fixt to F, and the other fixt to F 2 a flange which is fixt to the armature-shaft. F 2 has a radical slot in which a ⅜ diameter steel ball F 3, is free at all times to move up and down, save for gravity and centrifugal force; when F2 is at rest with the ball-slot vertical, the ball F 3 lies at the bottom and can strike a projection on the coupling spring F 1, in tension, until the stop-ring F 4, so as to lock F 2 from turning while F continues to turn, placing a depression F 5, in the left face of F reaches the ball F 3, when the ball moves to the right, relasing F 2 and the spring F 1 rapidly snaps the armature past the pole-gap and the speed of the armature is of course independent of the speed at which the crank is turned. When F is turned at sufficient speed the ball F 3 flies out to the outer end of the ball-slot, outside of the ball-stop and stays there where it cannot touch the ball-stop, so long as the motor runs.

The top of the ball-stop is a wedge which lifts the ball in its slot when F is turned the wrong way, so that no stress can be placed on the spring F 1.

The effect of this combination is to snap the armature past the field gap at high speed by spring tension when the motor crank-shaft is turned slowly and to drive the armature at its regular speed when the motor runs, so that the arc-flame is produced at all speeds of the crank-shaft; all other magnetos must be turned at a certain rate of speed before the arc-flame can be produced, which is often difficult with hand cranking.

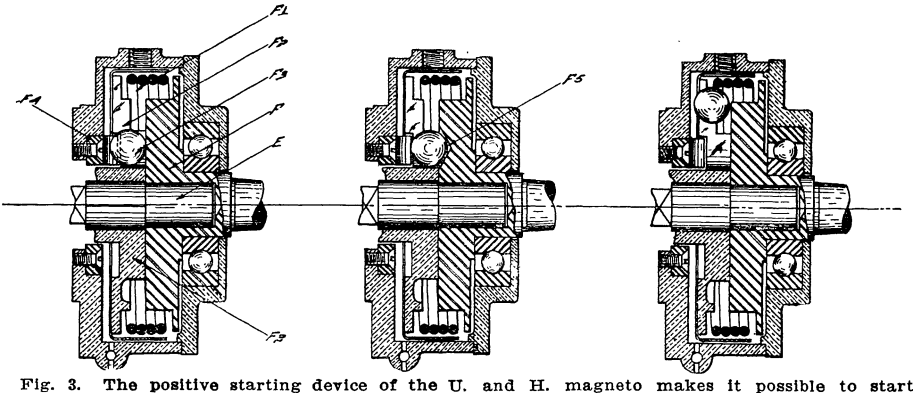

Fig. 3. The positive starting device of the U. and H. magneto makes it possible to start the motor with a half turn of the starting crank. The device is in operation only while the motor is being started, being automatically disengaged the instant the motor picks up speed, as described in the text. The rate of speed of the armature during this partial revolution is entirely independent of the speed at which the motor is being cranked, the quality of the spark, therefore, being a constant.

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il being grounded on the armature. This imary conducter G, tends thru suitable sulation to the interrupter block G 1, hich breaks the primary current at the oper times, and the condenser G 2, at e left, the other end of the interrupter well as that of the condenser being ounded to complete the circuit.

THE HIGH TENSION CIRCUIT.

One end of the secondary coil is con-cted to the ground of the low tension ll. The other end of this secondary coil connected to the armature collector-ng, J, whence the ceurrent is taken by e brushes, J1, to the distributor collector-ng, J 2, which is, in turn, connected to e revolving distributor-brush, J 3, by hich the high tension current is trans-rred to the proper spark-plug connection.

BACK-FIRING IMPOSSIBLE.

As is well known, many persons have en seriously injured from "back-firing," the too early ignition of the charge. e described action of this U. H. magneto

A difference of 30 degrees in spark ti is made by swinging the arm which c trols the action of the primary current terrupter.

All the rotating elements of the U. magneto are on F. S. annular ball bearin with lubrication provisions where e needed.

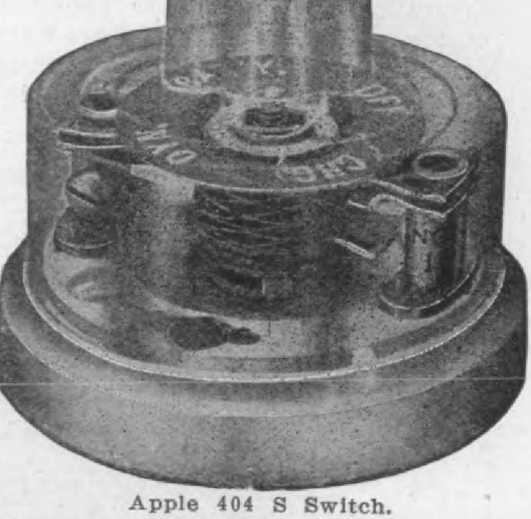
The self-start, the interrupter and individually detachable, so as to give rea distributor are all separately capt a access wherever desirable. The weight a dimensions are about the same as for other well-known magnetos.

ADVANTAGES.

This is the only magneto which is eff tive at all speeds of the hand-crank, a the only one with which premature ig tion is impossible. Besides these hig important unique features, the U. H. m neto is built in the best possible mann is readily accessible everywhere, and wear is so slight that no renewals are pected.

Apple Indicating Snap Switches

Dayton Electrical Manufacturing Com-ny, Dayton, Ohio, have added to their e of ignition apparatus two indicating p switches, one, No. 404 S, is for use ere both dynamo and storage battery employed in the ignition system of tomobiles and the battery used for rting. The other is known as No. 405 and is for use where the dynamo is used



Apple 404 S Switch.

charge the battery. Both of these tches have the same general appear-e and construction, but have different nections on account of their different poses.

he No. 404 S has four indications, viz.:

charge the battery while the engine ignited by the battery current. This swit can also be used where dry cells are e ployed for starting, but of course, "charge" position is not then employed

No. 405 S also has four indicatio "Off," "Battery," "Off," and "Charge." the first of these all connections broken; on the second the battery only connected; on the third the connections again broken, and on the fourth the dy mo is charging the battery, the curre being taken from the battery to ignite engine. No. 404 S is recommended touch spark ignition systems, and No. 4 S for jump spark work. The price of ea switch is the same, $2.

Besnard-Solar Lamps

Badger Brass Mfg. Co., Kenosha, Wi lately secured the sole right to manufa ture acetylene lamps under the Besna patents which cover a new system of lig reflection. In the Besnard lamps lo distance rays are projected strongly ahe by means of the new type of reflector use and short rays are diffused immediate in front of the car. In the foreign ty of this lamp a metallic reflector is use but the Badger Company used a Mang Mirror Co.'s reflector which is made Bausch & Lomb. This special short foc Mangin mirror, the makers state, has focus shorter than the Navy standard, a is especially strong. A special method

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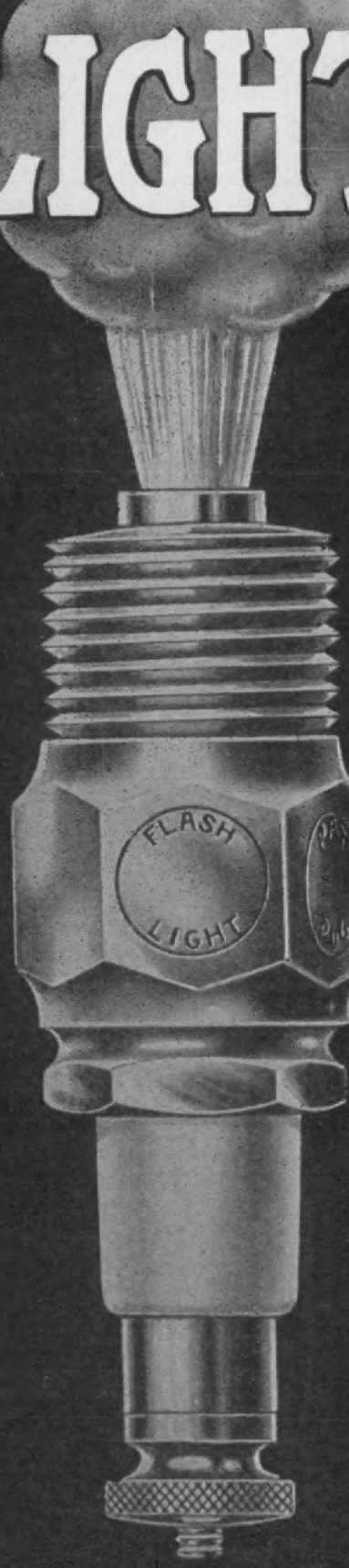
FLASH-LIGH

,000 MILES
Vithout Cleaning

t is what users of **Flashlight Plugs** tell If the spark plug was the only part of the ne to go wrong every car fitted with **Flash-ts** would have successful sealed bonnet con-s. Strong statements these, but facts are k of the claims and the proofs which we offer onvince you are the record of users through-the country. Every mail brings us letters of se. Do you want to see copies of these? ¶ If are not using the **Flashlight Plug** it is ent that you have not tried it and not having d it is due to the fact that you have heard of nany "world beaters" that you have been id to make the test. Don't let this prevent r enjoying a great improvement. Remember, are willing to show you that the **Flashlight g** is superior and that the words of praise are n those who have purchased plugs and not se who sell them.

Vrite for particulars and put an end to your rk plug troubles.



NNEY, STEINMETZ & CO.
PHILADELPHIA

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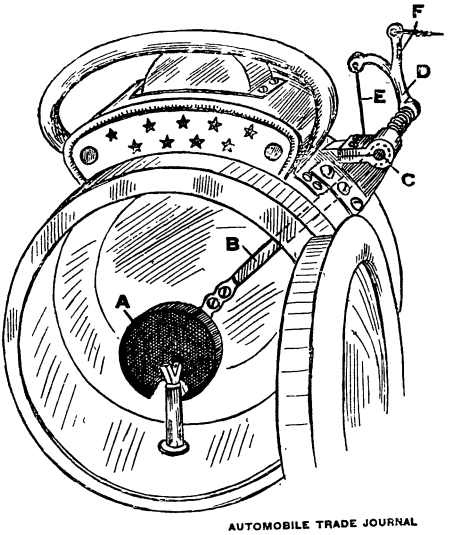
which is a plano convex or lenticular form, by which the rays are focused and refracted in long parallel rays as illustrated in the diagrams. The combination of the hyperbolic curve of the reflector and the lenticular form of the lens, a lens of large diameter can be used on a small lamp for to produce the same effect without this combination would require, it is claimed, a lamp three times as long.



AUTOMOBILE TRADE JOURNAL

Fig. 1. Front view sketch of the Besnard Lamp to show the "Eclipsing" mechanism; A is a black disc connected to a lever B, which is in turn connected to the shaft C upon one end of which is fastened arm D. Arm D has two extensions, one of which is connected with a wire E, the other, F, connects with the lamp on opposite side.

The short distance rays are those produced in front of the flame and thrown directly on the lens. These rays, magnified and rendered much clearer by the lens, diffuse naturally at the sides of the vehicle as illustrated by Fig. 3.

To eclipse the long distance rays the lamp is provided with a black disk or shutter (A, Fig. 1) which can be dropt between the flame and the reflector instantly by means of the lever (B), shaft (C)

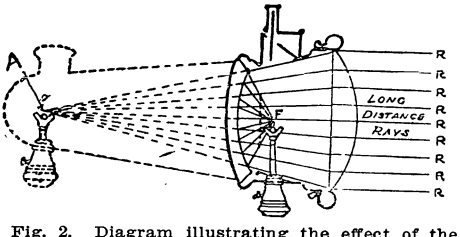


Fig. 2. Diagram illustrating the effect of the Besnard system of light reflection. The effect of the Besnard system is the same as would ordinarily be obtained with a flame back at A.

and arm (D), which are actuated by a Bowden wire (E) from any convenient point. Where two of these lamps are used the disks of both can be dropt instantly, an extension (F) of the arm (D) being provided for interconnecting the two.

Two styles of these lamps are offered, one called the "Autoclipse" and the other the "Solar clipse," each being furnished in two sizes 9 and 10½-inch diameter lens, and either with or without the disk or shutter. Prices range from $45 for the 9-inch "Autoclipse" without shutter, to $70 for the 10½-inch "Solarclipse" with shutter. The Bowden for operating the shutter lists at $10.

The "Solar" line of lamps are improved for 1908, and new designs are offered. One of the most notable improvements is in the method of putting the Solar lamps together. They are assembled without

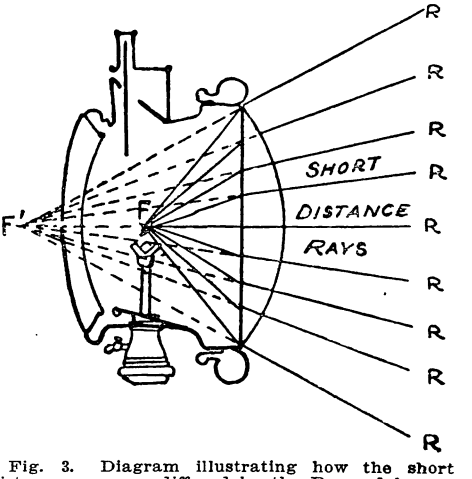


Fig. 3. Diagram illustrating how the short distance rays are diffused by the Besnard lamps.

solder and are held together by interior screws, leaving the exterior surface perfectly smooth. Should a lens mirror be broken, it can be removed and replaced without sending the lamp to the factory.

Another feature of the 1908 Solar line is a new black finish which is given some of the lamps, these black finish lamps having been brought out to fill the demand for lamps that do not require the attention and care that highly polished brass lamps need. The process used causes this black finish to penetrate the pores of the metal and actually become integral with it, and the effect is very rich.

The 1908 Solar Lens Mirror Headlight is made in several sizes, ranging in price from $10 for Model 856, to $28.50 for Model 859. The former is 6⅞-inch in diameter, and the latter 10⅛-inch.

The annual meeting of the Diamond Rubber Company resulted in the re-election of the old board of directors and officers.

The R. M. Owen Company was recently advised by James L. Farmer, secretary of the Jury of Awards of the Jamestown Exposition, that a gold medal had been awarded the Reo No. 33 for the 500-mile non-stop dash which it made from New York to Jamestown immediately after finishing the 1907 Glidden tour with a perfect score.

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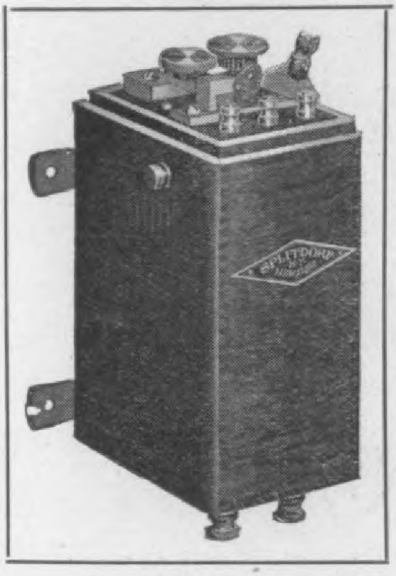
One of the Other Attractions

at the New York Shows was the new

SPLITDORF

Synchronized Distributing Coil



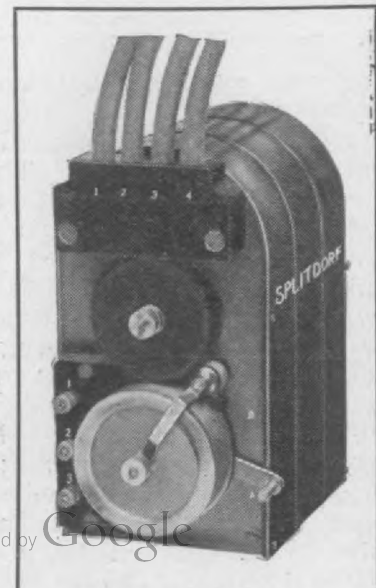
By means of this Coil the firing of a multi-cylinder engine is accomplished in each cylinder at the proper time without any of the detrimental effects usually experienced with a single coil.

This Synchronizer can be used in conjunction with any make of non-vibrating or vibrating coil by simply screwing down the adjusting screws on the vibrators so as to short-circuit same.

THE DEMAND FOR THE

SPLITDORF HIGH TENSION MAGNETO

by reason of its efficiency is so great we can hardly keep up with our orders, although the season for equipping cars is about over. A significant feature is the fact that we are replacing many foreign magnetos with this machine.



Don't fail to see our exhibit at the CHICAGO SHOW—Space 49 Coliseum Gallery.

C. F. SPLITDORF

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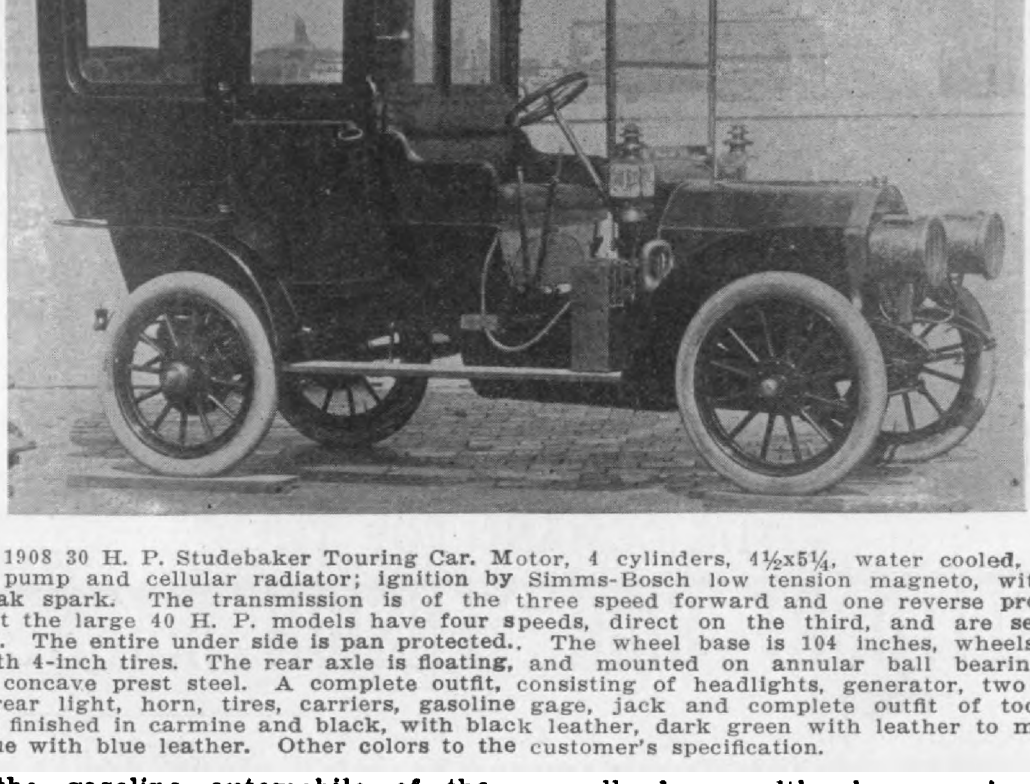
ıels, besides a complete line of elec-
s, both pleasure and commercial, for
3. The gasoline cars follow standard
s.

he policy of the Studebaker Company
ıot to bring out yearly models, but to
ke at any time such changes or im-
vements as are found necessary. In
, the production of its different models
neither delayed nor precipitated by
ndar dates. The policy of the com-
y can perhaps be summed up as fol-
s: "From the viewpoint of the en-

timed. The magneto is so arranged th
it can be taken off without disturbing an
other part of the mechanism.

The two chasses are very similar. Th
40 H. P., seven-passenger, touring car
equipt with a selective type of transmi
sion, running on annular ball bearing
while the lighter 30 H. P. car has th
progressive type of transmission, whic
has proven so sucessful on this mod
that no change was found desirable.

The lubrication is by a mechanic
oiler. The brakes on both models are u



The 1908 30 H. P. Studebaker Touring Car. Motor, 4 cylinders, 4½x5¼, water cooled, by cen-
ıfgal pump and cellular radiator; ignition by Simms-Bosch low tension magneto, with make
d break spark. The transmission is of the three speed forward and one reverse progressive
pe, but the large 40 H. P. models have four speeds, direct on the third, and are selectively
erated. The entire under side is pan protected.. The wheel base is 104 inches, wheels, 34 in-
es, with 4-inch tires. The rear axle is floating, and mounted on annular ball bearings. The
sh is concave prest steel. A complete outfit, consisting of headlights, generator, two oil side
hts, rear light, horn, tires, carriers, gasoline gage, jack and complete outfit of tools. The
rs are finished in carmine and black, with black leather, dark green with leather to match, or
rk blue with blue leather. Other colors to the customer's specification.

eer the gasoline automobile of the
ent-day does not differ radically
n a type that was accepted as standard
ost three years ago. The problems
confront the manufacturers of to-day
of an educational nature. The day of
usive features, which have been
ıght up by clever salesmen and
wn at prospective customers as 'talk-
points' is rapidly passing. The auto-
ile of to-day does not depend upon
ationalism for its sale."

he motor used in the 1908 models is
he now standard four-cylinder vertical
er-cooled type, the cylinders being cast
airs with water jackets integral. The
ulation is effected by a gear driven
rifugal pump. The 40 H. P. engine is

usually large, altho here again a sligh
change of construction is noted. On th
30 H. P. chassis the foot brake operate
on the drum of the transmission, whil
the side lever operates an emergenc
brake on the drums of the rear wheel
On the 40 H. P. chassis both sets of brake
are operated on the rear drums, being o
the usual constricting and internal ex
panding type.

The front axles are of nickel steel,
beam section. The rear axles are of th
floating type. The rear axle on the 4
H. P. car is reinforced by a pair of sid
jack rods in connection with a centre to
sion rod.

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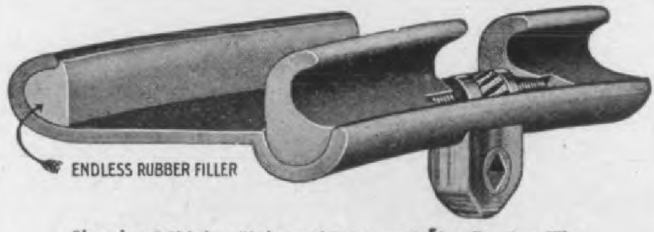
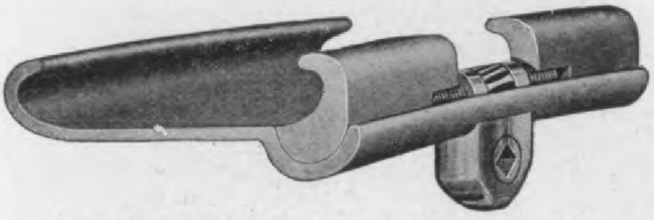
A feature in connection with the 40 H

The Answer Points The Morai



Showing Midgley Universal Rim ready for Dunlop Tire



Showing Midgley Universal Rim ready for Clincher Tire

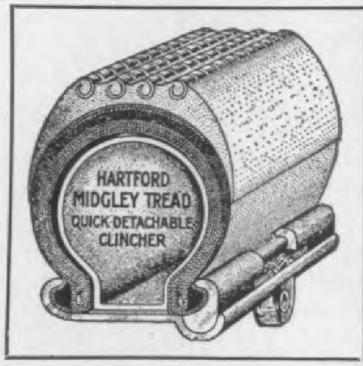
AT the recent New York Madison Square Garden Show why were 21½ per cent. or 42 of the 197 cars equipped with Midgley Universal Rims?

¶ Why were the most talked of cars at the same show not only equipped with Midgley Universal Rims marketed by the Hartford Rubber Works Co., but also fitted with Hartford Midgley Tread Tires made by the same company?

¶ We believe the best answer is found in the Rims and Tires themselves—in their ability to perform perfectly under every conceivable kind of test.

¶ We *know* that Hartford Tires—both plain and made with the famous Midgley Tread—are quality tires beyond question. They are made of the right materials—in the right way. Their long life and splendid service are only a matter of consequence.

¶ It will pay you to investigate further into the matter. Write us for the booklets "How to Drive without Skidding"—and "How to put on a Clincher Tire." And let us tell you all about the new Hartford Quick Detachable Clincher Tire which fits any make of detachable rim; or better still—see the nearest of our branches or agencies for a demonstration.



THE HARTFORD RUBBER WORKS COMPANY

HARTFORD : : : : CONNECTICUT

NEW YORK, 88 Chambers St. and 1769 Broadway; CHICAGO, 83 Michigan Ave.; Boston, 494 Atlantic Ave. and 1020 Boylston St.; CLEVELAND, 1831 Euclid Ave.; DETROIT, 256 Jefferson Ave.; DENVER, 1564 Broadway.; PHILADELPHIA, 138 North 10th St.; BUFFALO, 725 Main St.; ATLANTA, GA., 55 Auburn Ave.; LOS ANGELES, 1505 South Main St.; SAN FRANCISCO, 423-43

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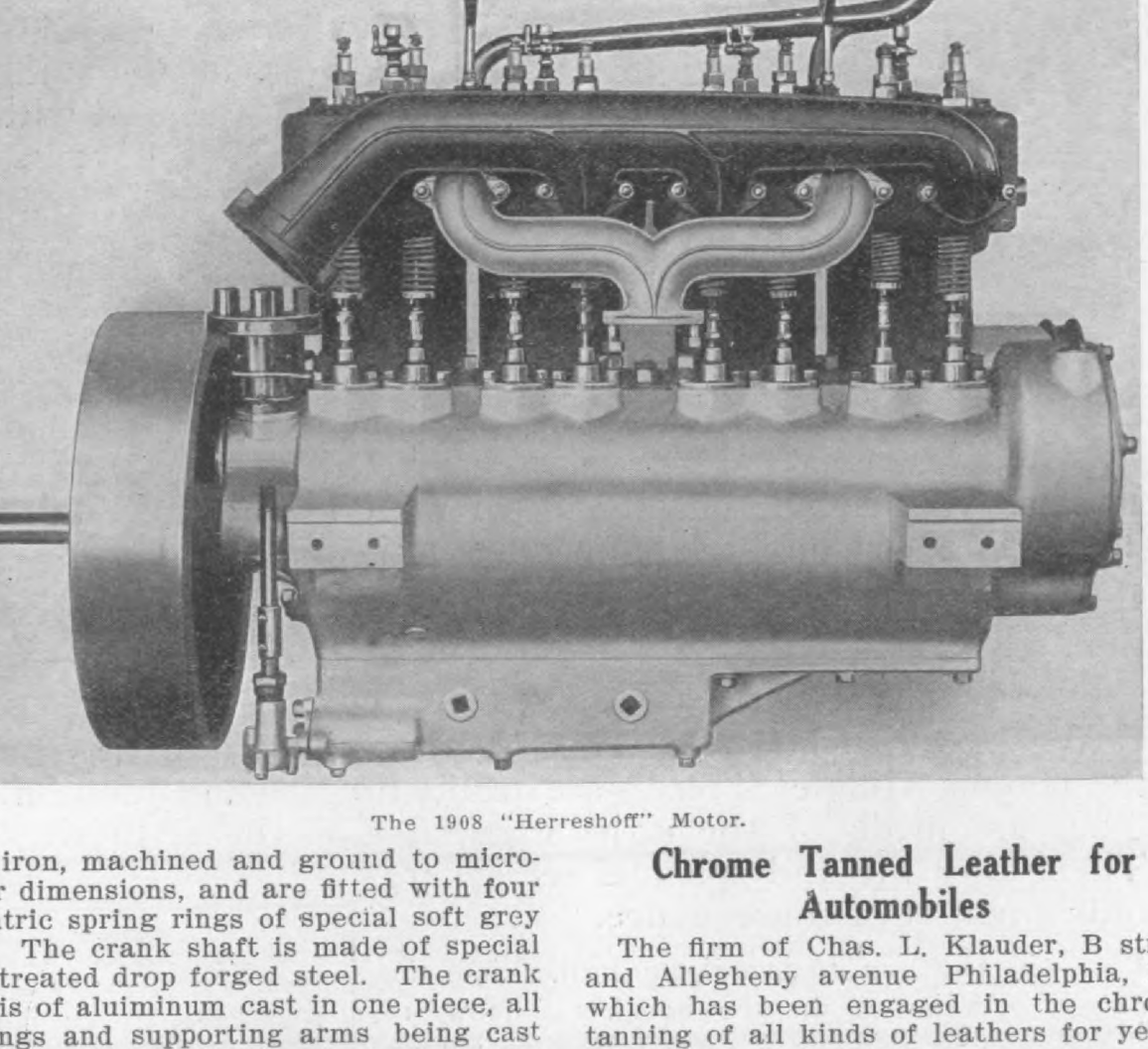
ely by the E. R. Thomas, Detroit
f Detroit, Mich., in its 1908 cars.
e 40 horse power motor, contains 4
lers cast in pairs, 5x4¾ inches water
l. The pistons are of special soft

The manufacturers also build 4-cylinder, 80 horse power; 6-cylinder, 60 horse power and 4 to 6-cylinder 20-24 horse power motors, of both automobile and marine types.



The 1908 "Herreshoff" Motor.

iron, machined and ground to micro-
r dimensions, and are fitted with four
tric spring rings of special soft grey
The crank shaft is made of special
treated drop forged steel. The crank
is of aluiminum cast in one piece, all
ngs and supporting arms being cast
ral. The cam shaft operates both the
and exhaust valves. It is drop forged
ecial projectile steel. The cams are
ened, ground, keyed and pinned to
haft. The connecting rods are also
forged.

rrent for the ignition is furnished
r by magneto or battery. The splash
m of lubrication is used, the oil being
at a constant level in the crank case
eans of overflow stand pipes and a
pump which draws oil from an aux-
tank below the crank case proper,
integral with it, this tank receiving
surplus or overflow from the crank
The water circulation pump is of
centrifugal gear driven type. The

Chrome Tanned Leather for Automobiles

The firm of Chas. L. Klauder, B street and Allegheny avenue Philadelphia, Pa., which has been engaged in the chrome tanning of all kinds of leathers for years, has recently commenced to chrome tan cow hides for the automobile trade, and are well equipt for this kind of work.

It is claimed that the chrome tannage makes the leather non-absorbent, or water resisting, and also makes it proof against decomposition. This makes it especially recommendable for automobile tops, seats etc.

Our next number, the January Journal will contain as its most important feature a directory of all active manufacturers in this industry, with all manufacturers names and addresses classified according to their products. A glance shows all the makers of any particular product. This

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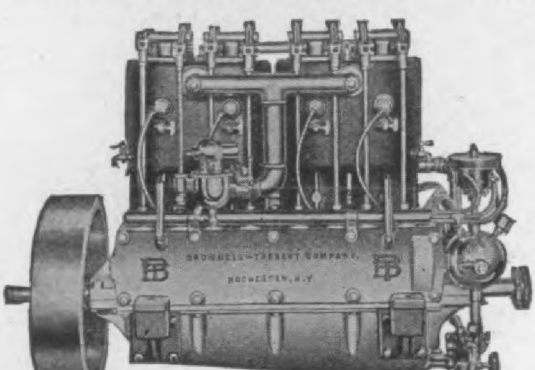
Powerful Reliable

MOTOR OF ACKNOWLEDGED SUPERIORITY

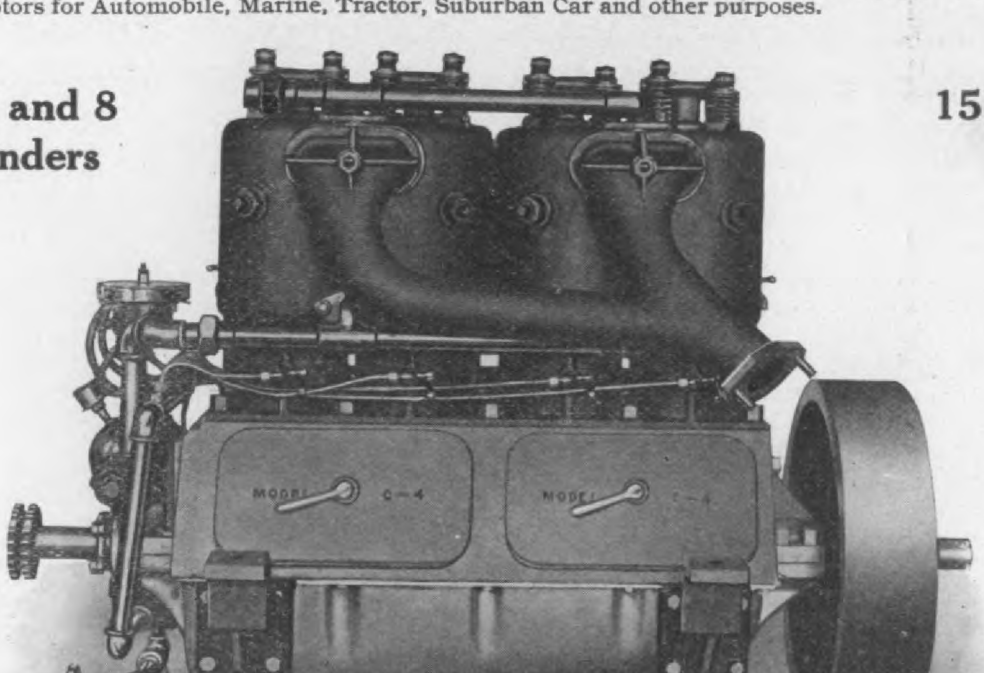


INTAKE SIDE, 4-CYL., 30-34 H. P. MOTOR,

Embodies the most scientific and approved principles of internal combustion engine construction. Motors for Automobile, Marine, Tractor, Suburban Car and other purposes.

4, 6 and 8 Cylinders

15 to 160 H. P.



EXHAUST SIDE.

Transmissions. Light and heavy, for Automobiles and Trucks.

Our CARBURETOR increases efficiency of six cylinder Motors to surprising extent. Let us prove i to you.

Our new circulating water and oil PUMP is so simple, so powerful, so reliable, that—Well, ask us to tell you ALL about it. A postal—a catalogue.

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W. E. Synchronized Ignition System

A new electric ignition system has been brought out by the Western Electric Co., West and Bethune streets, New York City. Perhaps it will be more correct to say that a new combination of well known parts has been made. Essentially, the system consists in the use of a single vibrating coil with condenser, and an interrupter or distributor in the primary circuit, which distributes the current to a series of specially wound cylindical unit coils, one for each plug, these coils being arranged in a tube alongside of the engine cylinders so that a 6-inch secondary lead to each plug is sufficient. The individual coils are non-vibrating and without condensers, making an inexpensive construction. Absolute synchronism is the main feature claimed, and also the fact that there is no length of secondary wiring and no distributor in the secondary circuit. Leakage of the secondary current is practically eliminated, and these wires are connected by means of removable sockets, so that any wire can be instantly disconnected. The short wiring also reduces the cost of installation of the system. The unit coils are interchangeable, and, it is claimed, entirely water and oil proof, the installation being such that they are not in the least affected by the heat of the engine. A small box containing two vibrators and condensers equipt with a combination pole-changing and battery switch, which allows of the use of either vibrator, one being held in reverse, is arranged on the dash board of the car. This switch, as implied by its name, each time it is turned on or off reverses the direction of the current, thus doing away with harmful pitting, and it is claimed causing the vibrator contacts to wear perfectly smooth, so that they do not require filing or further adjustment after once being properly set. Only one low tension wire leads thru the dash to the common terminal of the tubular spark coils.

Altho but one vibrator is used in ordinary running, the second is used as a reserve, and may also be set somewhat heavier while the regular one for running is set very fine. In starting, the heavy spark may be used, and the switch then thrown over from the seat, thus running on as minimum an amount of current as possible, it being claimed under test this system works perfectly with from .2 to .3 ampere. In case of too much oil, improper mixture, etc., the heavier spark can be used with beneficial results until conditions in the engine are rectified.

The pole-changing switch is operated by a special key which can only be removed in the off position, thus forming a means of locking the car. A second lever protrdues downward from the same switch and operates the battery switch. It is so designed that it will connect either of the sets of batteries to the system if batteries are used, or will connect with any other source of current, but has no "off" position, and it cannot be used for starting or stopping the car, thus making the use of the pole-changing switch compulsory.

In the accompanying diagram is shown the wiring system, the upper half representing the vibrator and dash board coil, and the lower half a 6-cylinder engine and the series of unit coils, which are arranged in an enclosed tube, very little larger than the usual tube for carrying the high tension wires to the different cylinders in the ordinary systems of ignition.

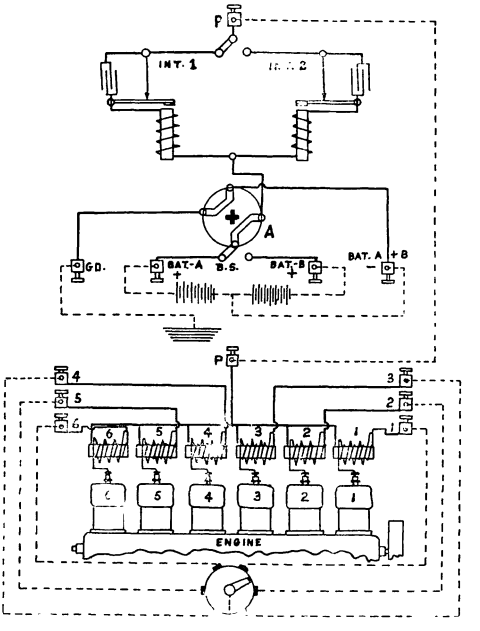

Fig. 1. Wiring diagram of Western Electric Synchronized Ignition System with one vibrator and a system of multiple unit coils. The distributor is in the low tension circuit as shown at the bottom of the diagram and a special switch as shown at A, is so arranged that each time it is used it reverses the polarity.

SPECIAL FEATURES.

There are several features in connection with the coils used. No insulating silk is wound upon the No. 34 gage copper wire of which their windings are composed, its place being taken by a new baked enamel insulation, a special product of the Western Electric Co. This insulating material is much less bulky for the same insulating effect than silk, thus permitting of the use of larger sized wire in the same winding space, or in other words, the same number of turns of large wire can be used without making the coil more bulky than those wound with smaller wire, but with the more bulky insulating material. This, of course, means a les-

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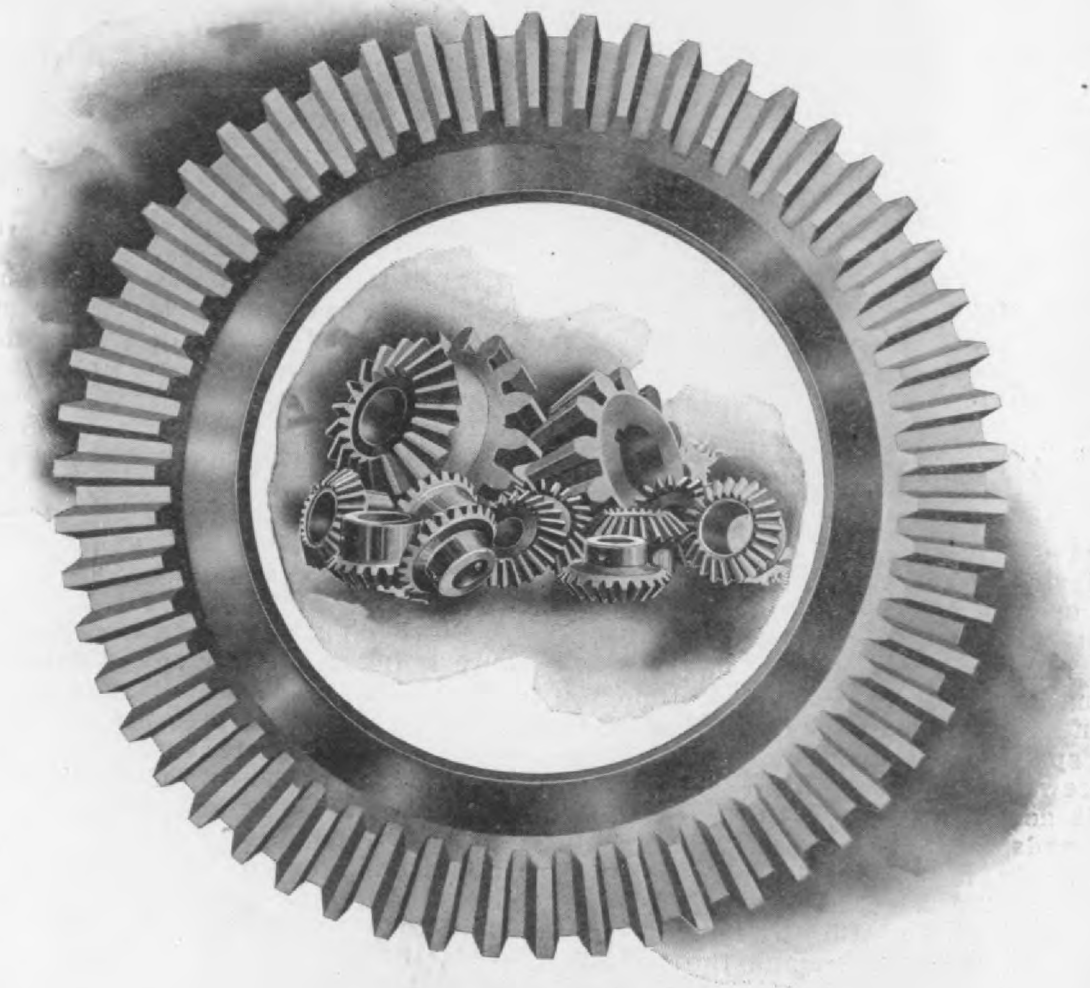
BEVEL GEARS

PLANED

Theoretically Correct



EXHIBIT

Second Floor Coliseum Annex

SPACE 93

Steering Gears and Universal Joints

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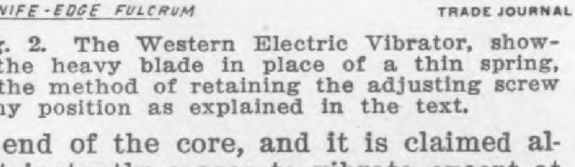
them rigidly in position and in defi- relation to each other, and of course makes them water proof. A layer of ially prepared insulating paper is also ed between each layer of the enameled , making it impossible, it is claimed, reak down the coils by the ordinary ges used in the operation of motor Each condenser is tested with 500 a. c., which is an absolute guarantee nst breakdowns from ordinary volt-

THE VIBRATORS.

e vibrators are also somewhat dif- nt from those generally used. Instead thin spring, the vibrator blade is at one-eighth of an inch in thickness, ed to a knife edge at one end, this resting in a V-shaped groove, the e of course being in a horizontal po- n, and held by a small helical spring. blade is within 1-64th of an inch of



g. 2. The Western Electric Vibrator, show- the heavy blade in place of a thin spring, the method of retaining the adjusting screw ny position as explained in the text.

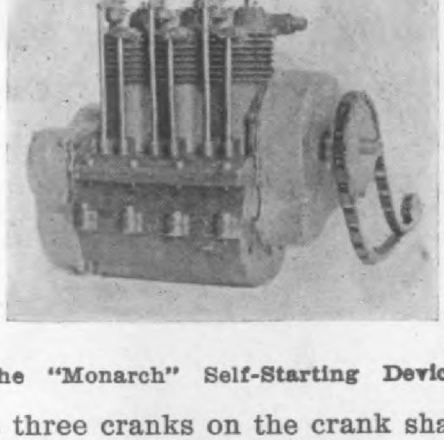
end of the core, and it is claimed al- t instantly ceases to vibrate except at proper times, being held normally nst the upper contact. It thus always ts from the same position, thus in- sing the accuracy of spark time. A neat arrangement, consisting of a ll spring-piece thru which the vibra- screw passes, puts an upward tension this screw, causing sufficient binds in threads, so that the screw will remain nanently in any position or setting, not jar loose.

he equipment of this system is small neat in appearance, and the installa- is comparatively simple. All the ad- tages of a single spark coil, high ten- , distributor system, without any of disadvantages are claimed, it being ed that the system is as simple to ntain as a single vibrator spark coil on ingle cylinder engine.

The "Monarch" Self-Starting Device

he Monarch self-starting device for au-

one of which is an inlet poppet valve on a stem, which carries a collar, and is held up by a spring acting agains the collar. These valves being open, ai is drawn into the cylinder. Each cylinde has also an outlet valve, with guide ex tension.



The "Monarch" Self-Starting Device.

The three cranks on the crank shaft ar set 120 degrees apart, so that there ca not be a dead set. The crank shaft ha a small pinion at one end, and a sprocke wheel at the other, and it engages th crank shaft of the automobile engine b a chain. The air motor is geared two t one of the engine, thereby not diminishin to any considerable degree the powe from the engine. The engine being i operation and engaging the air moto air is pumped and stored in a small hig pressure tank, and when the desired pre sure is obtain the air motor automaticall stops. The pressure tank is tested to 80 pounds hydraulic pressure, but can b filled and adjusted to any require amount of pressure for each individu engine. The pressure can be stored i the tank indefinitely.

The main engine having stopt, if it desired to start it, the operator by mea of a lever releases air from the pressu tank, thru a pipe, to the cylinders of th air motor, and the power is communicate to the automobile engine, thereby aut matically starting the motor.

Unless the pressure in the air tank ha dropt sufficiently, nothing further will e sue in the operation of the starting devic but if at any time while the engine running, whether by use of the air in th tank, or leakage therefrom, the air pre sure falls below a certain point, this w cause the engine to drive the air mot as an air compressor and to re-charge th tank. In all this time, the valves op

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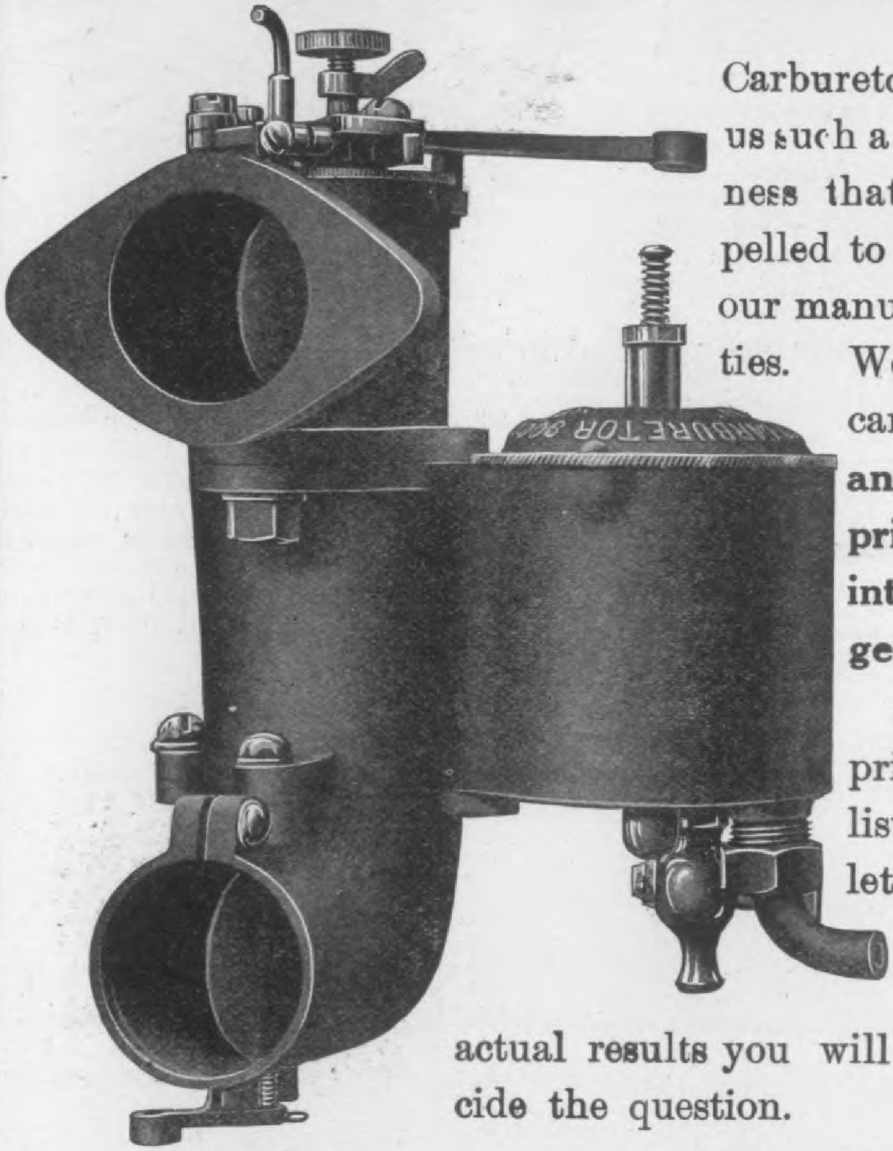

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The Buffalo Carburetor Co., Mfrs.

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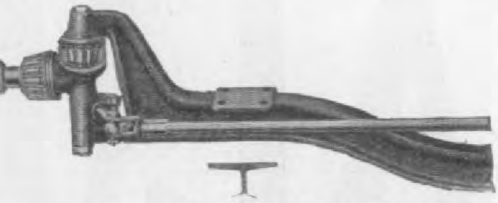
Bearing Axle Co., Canton, Ohio.
Timken 1⅝-inch I-beam front axle
ended for use on high powered tour-
rs, weighing up to 3400 pounds emp-
he axle is fitted with roller bearings
knuckle head. The center is a one-
drop forging. The axle is suitable
or 56-inch gage.



"Timken" 1 5-8 inch I-beam Front Axle; iew, showing Timken Roller Bearings in uckle Head.

Timken Tubular Front Axle is fitted
Elliott Steering Knuckles, Roller
ngs and Hubs. It is made in three
for cars weighing from 800 to 2,500
ls. This axle can be furnished with
ght or drop center. It is made regu-
without truss rod, extra for trussing.
Hedgeland Equalizer which is de-
d to take the place of the differential
own herewith in improved form. It
ranged to give a positive drive to
wheels, regardless of the unevenness
ndition of the road. It occupies the
space in the housing, weighs less
as greater strength than the differen-
When the engine is used as a brake,
transmission or propeller shaft brake
ed, this device it is claimed will

"Timken" Tubular Front Axle, fitted with Steering Knuckles, Roller Bearings and

ce the brake effect on the wheels,
dless of the unequal adhesion of the
It brakes both wheels to an
nt equal to the resistance of the wheel
g the lesser adhesion on the ground.
whole device runs in an oil bath. It
e used in any of the shaft drive rear
made by the Timken people, and
e fitted in place of the regular differ-
l or compensating gear at additional
This device is claimed to be especial-
ficient in jack shafts as applied to
ercial trucks.

DETAILS OF THE EQUALIZER.

details of this device have nearly all

same function as any differential housing. In fact, the sizes are such that the device can be installed on almost any standard

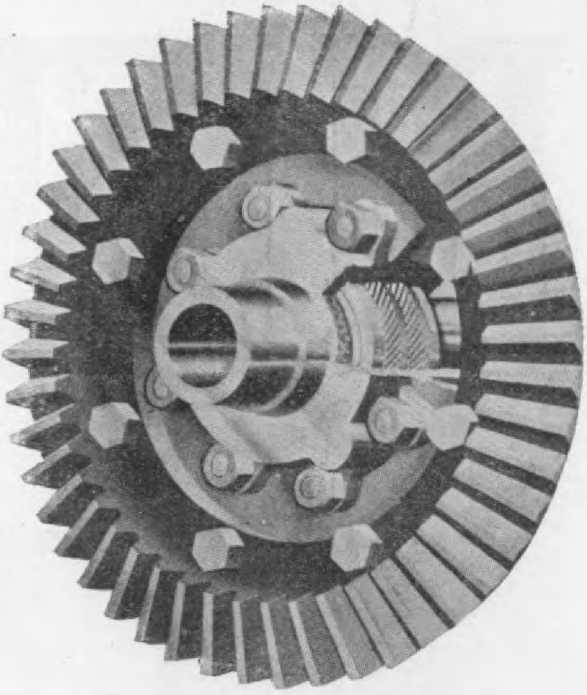


Fig. 1. Hedgeland Equalizer, showing a view of the complete device cut away to show the gripping surfaces.

axle. The interior surface of the case is formed so that the surfaces, B and C, are coned similar to the inside of a fly wheel, and surfaces D and E are also similarly shaped. The divided rear axle ends, F and G, are squared and fit into two nuts, H and J, the exterior of which are worm-threaded. On the outside of nuts, H and

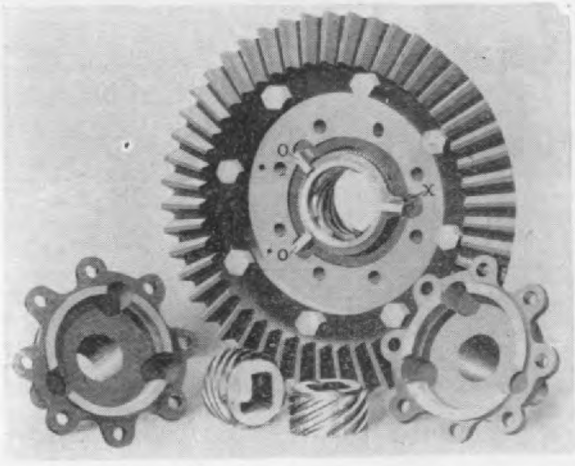


Fig. 2. Hedgeland Equalizer, showing the separate parts. The squared inner ends of the live rear axles fit into the square holes in the worm threaded nuts shown.

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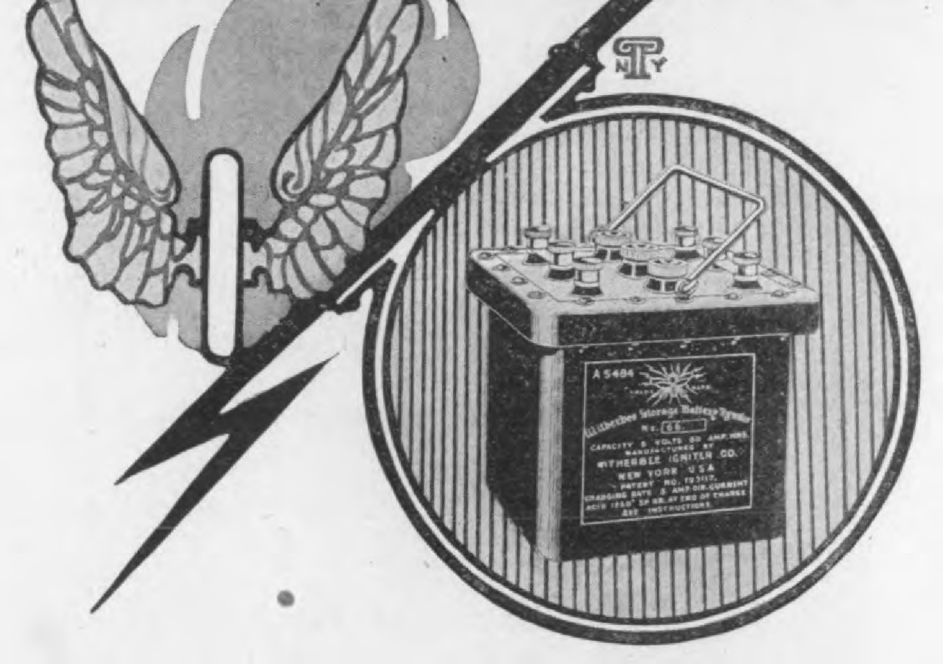
L are the rings, K and L, the interior of



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WITHERBEE IGNITER COMPANY

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CHICAGO **DETROIT**

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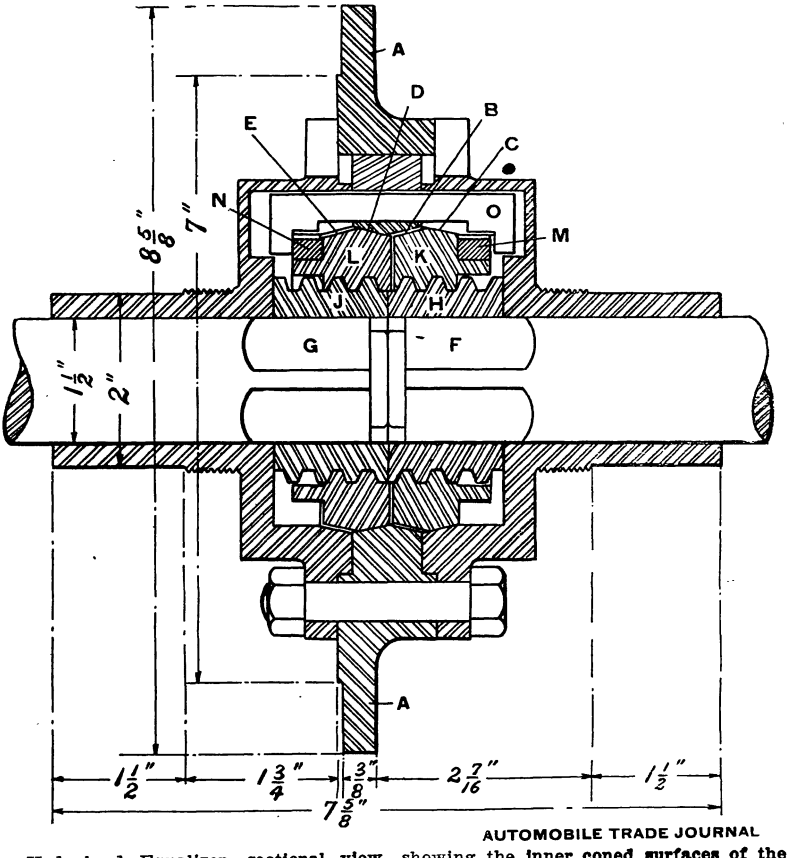
but have a portion of their circumference removed so that they are in reality yokes. Each of these is provided with a lug which fits into a notch in the inner surface of the outer casing, as shown in Fig. 2, at X, so that the bands M and N must of necessity turn with the outer housing, and at two other places they are prevented from spreading or separating too far by the pieces, O, O, one of which is shown in side view at O in Fig. 3. The grip of these bands on the rings K and L is greater than the frictional resistance of K and L in the worm threads, so that if the bands M and N are turned, K and L will turn with them and move either inward or outward on the threaded nuts, H and J. There is sufficient space between K and L so that K could be moved on its thread to the left sufficiently to disengage from C, in which case it would abutt against the ring L, but could not engage the surface B. With these facts in view the action of the device is as follows: When the motor rotates the housing, the rings M and N rotate with it, carrying with them the hardened rings K and L, and as each of these are right hand threaded they move into the positions shown in Fig. 3, engaging the coned surfaces D and C. This action is almost instantaneous, as the distance is so very slight. As the exterior of K and L are extremely hard and the surface serrated or grooved to allow the oil and air to escape, these two members are immediately gript by the coned surfaces C and D, and rotated, but it will be seen that as soon as they are rotated as they cannot screw further on to the threads the nuts H and J are rotated with them, and therefore the shafts F and G leading to the rear wheels are also rotated. The greater the resistance to turning, the more strongly K and L are forced by the threads into engagement with their coned surfaces C and D, so that they cannot slip. The whole mechanism now rotates as one piece. If one wheel, for instance that connected to shaft F, tends to overrun the other, as when making a turn, the nut H, turning with it faster than the outside casing is driving it, immediately screws the ring K toward the left, releasing it almost instantly from the surface C, and as before stated it cannot engage surface B as it comes against the other ring L which is still driving, thus



AUTOMOBILE TRADE JOURNAL

Fig. 3. Hedgeland Equalizer, sectional view, showing the inner coned surfaces of the housing at B, C, D and E; the engaging rings or collars, K and L; the worm threaded interchangeable nuts H and J, and the square ends of the shafts F and G. The action of this device is fully described in the text.

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Don't Ask Us

Ask the men who make good cars their reasons for using

Timken Roller Bearings

and then you will understand **WHY**

of all the cars exhibited at The Madison Square Garden Show **61%** of all the cars exhibited at The Madison Square Garden Show

are equipped with

Timken Roller Bearings

and this in addition to a showing of **49%** of all the makers that exhibited at the Grand Central Palace Show.

Each year sees more and more users added to the list, and the beauty of it is, last year's users are this year's users.

The Timken Roller Bearing Axle Co.

CANTON, OHIO

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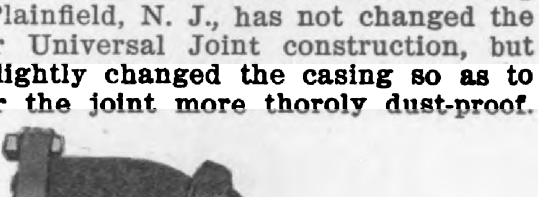
everse of these actions takes place, rive being just as positive. The de- runs in oil, and as the surfaces of ings K and L are extremely hard the inner portion near the threads ch softer, it is claimed the device long life, as demonstrated by many evere road tests, and also such grip- power that in a series of tests, shafts been sheared off without injuring the parts of the mechanism.

far as can be judged by a study of nechanical features this device is ong-sought substitute for the gear ential, as it certainly gives a better and is much more compact.

Hedgeland equalizer is manufac- under license from Hedgeland Man- ring Co., of Canton, O., which owns atents covering this construction.

1908 Spicer Universal Joint

cer Universal Joint Manufacturing Plainfield, N. J., has not changed the Universal Joint construction, but lightly changed the casing so as to the joint more thoroly dust-proof.



New Spicer Universal Joint.

old model the felt packing was on nner half of the casing, and both were finished with smooth rims. 1908 model the outer half of the s flanged and beneath this flange is ned the leather packing.

1908 "Gray" Muffler

y-Hawley Manufacturing Co., 605-9 Fort street, Detroit, Mich., have

that it suits any car regardless of how the muffler is to be located. The spring is oil tempered and very durable. This muffler has four expansion chambers. The inner and outer drums are made double and interlined with asbestos. The outlets are so arranged that the exhaust gases form their own cushion, and no baffle plates or tortuous passages are found necessary. The outer drum is covered with Wellsville polished or aluminum coated steel as desired. Prices run from $5.50 to $7.50 without the cut-out, and from $6.50 to $8.50 with the cut-out. The diameter of the muffler is in all cases 7¼ inches, and the lengths are 14, 20, 24 and 32 inch in the standard size, altho special sizes with special fitings can be furnished on order.

Climax Special Automobile Machine Work

The Climax Machinery Co., Indianapolis, Ind., is making a specialty of clutch disks stampt from high carbon bright stock, and then straightened. The concern believes this method to be better than to grind the disk, as the hard surface is left intact and presents better wearing qualities. They also do a large amount of contract machine work, making such parts as selective and progressive levers, starting cranks, connecting rods and all kinds of large and small automobile parts, excepting cylinders and pistons. Another specialty of theirs is a cast iron crank case covered with sheet steel, riveted in position and then galvanized, thus making a complete oil tight case with no danger of leakage.

Loring Auto Appliance Co., 49 West Sixty-third street, New York City, control the entire output of the Loring Speed Gage Co., 91 Marshall street, Somerville, Mass., makers of the Loring speed indicator, the 1908 model of which was described in our November number, page 205. The interior construction of this instrument is illustrated in this issue.

A complete directory of the entire manufacturing element of the cycle, automobile, motor boat and parts and accessory trade will, as usual, be included in our January number, and no extra charge will be made for this valuable feature, altho the directory once sold at $1.00, bound

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"PATER-NOSTER" The Ideal Shock-Absorber. A perfect spring control. It absorbs all jars coming from whatsoever direction. Self-lubricating. All surfaces hardened. No readjustment required. Used by royalty.

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OSCILLUM—A Spark Gap—A Spark Intensifier. Makes any spark plug spark.

FRENCH COILS—The Cream of the European Market.

HAGEN STORAGE BATTERIES—The best ever made.

STEEL ARMORED IGNITION CABLE—A New Invention—Patented in all countries. Doubles the efficiency of the spark.

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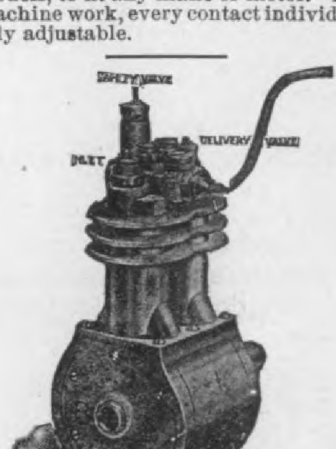
The standard circuit-breaker Europe and America. Friction a wear and tear eliminated, and abs lutely accurate and scientific timi guaranteed. Tool-steel vs. Tool-ste Snap-off contact. Running pack with grease. Made in 20 differe models, to fit any make of motor. machine work, every contact individ ally adjustable.



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It is absolutely against oil or soo solutely self-clea

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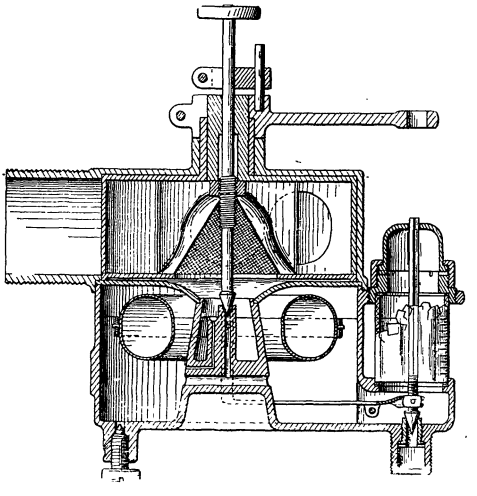
The "E. C. B." Carburetor

The E. C. B. is a double spray nozzle, springless, compensating, float feed carburetor, and is manufactured by the E. Broderick Manufacturing Co., Detroit, Mich. One of the features of this carburetor is that it throttles the inlet air ports rather than the outlet to the engine. There are 3 air inlets, 2 in the vacuum chamber or upper portion of the carburetor, and 1 in the lower portion or gasoline chamber. The two upper ports may be operated together or separately. One of these ports is intended to be piped to the exhaust. These ports can be arranged so as to take all hot air or all cold air or more of one than the other to suit the requirements of the car in any weather or climate.

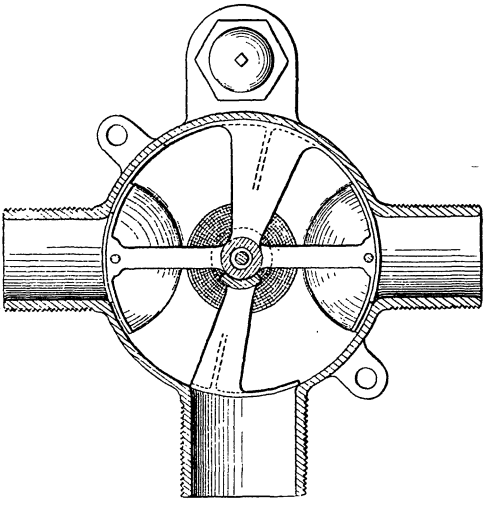
The gasoline nozzle supply hole is above the bottom, as is shown in accompanying cuts, thus grading the gasoline supplying the lightest and most volatile to the spraying point. The level of gasoline when set always remains the same, and is always visible, being shown by graduations on the glass. The level of the gasoline can be adjusted with engine running or at rest by loosening the lock nut that holds the inlet needle stay or guide. By raising the guide till it is out of the slot and turning to left or right, the gasoline level can



Sectional Elevation of the "E. C. B." Carburetor.

be raised or lowered as desired, after which the guide is again dropt into the slot and the guide nut tightened, thereby holding it firmly in place.

A valuable feature of this carburetor is the auxiliary spray starting nozzle which at the top is cup-shaped, and which fills up with gasoline the moment the engine stops, thereby always making it ready for starting again. The hole is so small as only to keep the engine alive while running idle. The main nozzle and air ports are opened with one movement, and the engine gets a graduated amount of air and gasoline, making a positive and flexible control. A raised gasoline inlet needle seat is inserted for two purposes; first, to trap the water, heavy gasoline and dirt, and second, should the seat be marred or destroyed from any cause the carburetor need not be thrown away. This inserted seat is slotted and can be taken out with a screw driver and another put



Plan Sectional View of the "E. C. B." Carburetor.

in. The operating of the inlet needle valve is in full view, which is a decided advantage. The screen shown is a factor of safety in event of a back fire, and has such an area as not to impede or choke the engine in the slightest, while it is somewhat beneficial in further aiding in mixing the gas.

To start the engine any time, especially in cold weather, auxiliary air ports are closed. Both ports in the vacuum or mixing chamber being closed, the air is drawn up thru the central conical air passage, which is contracted to the greatest degree in the immediate vicinity of both nozzles. It draws the gasoline out of the cup-shaped nozzle, thereby starting easily. This carburetor does not need priming.

The Croselmire & Acker Co., 42 Walnut street, Newark, N. J., are producing a line of platinum and platinum-iridium rivets for spark coil construction made from solid bars of platinum. These rivets are made to size down to the thousandth part of an inch, and can be furnished in any size or quantity that the trade might require.

The Midgley universal rim, the 1908 model of which was described and illustrated in our November number, page 192, is marketed not only by Hartford Rubber Works Co., but by Morgan & Wright, Detroit, Mich., and the G & J Tire Co., Indianapolis, Ind., as well, all three concerns holding manufacturing licenses under the patents on this rim.

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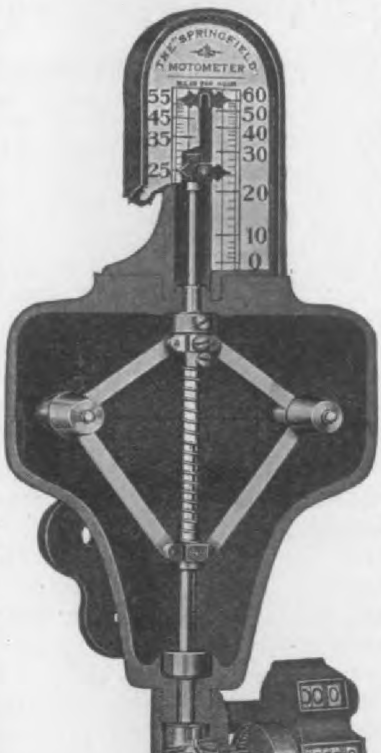
The Springfield Motometer



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These New and Valuable Features:

A Maximum Hand which is Perfection.

Travels up the scale with the regular pointe but remains at the highest speed reached unti released by the pressure of a button when i instantly drops to the point where the regula pointer may be standing at the moment. It ca be made inoperative in an instant, travelin with the regular pointer up and down and bein invisible.

The Handsomest and Most Readable Dial Mad

Large, Symmetrical Figures in jet-blac fired enamel, on a perfectly white enamel ground Read with ease from the back seat of any tonneau It will please all critics of the old one.

New Oil Tempered Spring Steel Reinforce,

at each end of the shaft. Prevents a sho bend. Compels the easy curves necessary t smooth running and long life, which no mak shift in the way of gears can replace.

The Non-Clogging Pinion.

Will not hold mud. A straight-forward an correct mechanical device of absolute efficienc

These are additions, not changes. Wit them the Motometer is even more than befo "The Speedometer For Service."

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50-Mile Model, $45.00. 60-Mile Model, $50.

Either with Maximum Hand, $5.00 Extra.

THE R. H. SMITH MFG. CO

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The "Marvel" Carburetor

A new carburetor has lately been placed on the market by Marvel Carburetor Manufacturing Co., Lock Box 41, Indianapolis, Ind., called the "Marvel." The figured sectional illustrations herewith and their explanatory captions make clear the arrangement of the various essential parts, and the following descriptive data covers the special features of the device.

The body of the carburetor is made of high grade red brass, and the gasoline needle and float valve bearings are made of the finest rolled Tobin bronze. Special attention is called to the bowl (15) in Fig. 1 and the lock nut (22) under the bowl, which permits the gasoline connection (by loosening the lock nut (22) and swinging bowl (15) being turned to any position where the connection can be most conveniently made. By removing the lock nut (22), the bowl can be removed from the lid, and any adjustment in the float or float valve, or any residue removed from the bowl, without changing the adjustment of the carburetor in any way or without disconnecting it from the engine. The carburetor is constructed so that all internal disturbances, such as flooding and bounding are prevented. The float needle is fitted with an equalizing spring, which allows of a floating balance and an ease of movement which prevents all jar resulting from the restlessness of the float. The

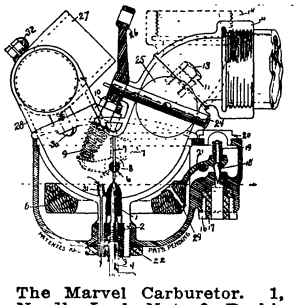

Fig. 1. The Marvel Carburetor. 1, Gasoline Nozzle; 2, Needle Lock Nut; 3, Packing Nut; 4, Adjusting Needle; 5, Float; 6, Air Valve Spindle; 7, Air Valve; 8, Air Valve Lever; 9, Air Valve Spring; 10, Air Valve Adjusting Screw Lock Nut; 11, Intake Connection Lock Nut; 12, Air Valve Adjusting Screw; 13, Intake Connection Stud; 14, Intake Connection; 15, Bowl; 16, Gasoline Union Lock Nut.

removal of the cap (20) allows the adjustment of the float valve. By removing the bowl and loosening one adjusting screw, the entire float valve, needle and all, can be removed with ease and thoroly cleaned and replaced by the most inexperienced.

Particular attention is called to the direct central location of the gasoline spraying needle (4) and the nozzle (1); also to needle lock nut (2) and packing nut (3), forming two distinct guide bearings whereby the needle is held perfectly central in guide nozzle (1). Located closely beside the nozzle (1), Fig. 1, will be seen overflow pipe (31) with two arrows, one entering and one leaving the bottom of the pipe, the object being to prevent in any case the flooding of the tube leading to the engine. Located centrally in the engine connecting tube, and directly over the spraying nozzle (1) will be seen a butterfly automatic valve whose function is the mixing and controlling of the gasoline and air at all engine speeds. Referring to this valve in Fig. 2 it will be observed that an oval shaped expand-

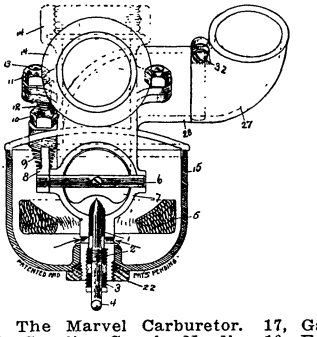

Fig. 2. The Marvel Carburetor. 17, Gasoline Union; 18, Gasoline Supply Needle; 19, Equalizing Spring for Supply Needle; 20, Cap for Gasoline Supply Valve; 21, Float Lever; 22, Bowl Lock Nut; 24, Throttle Spindle; 25, Throttle Valve; 26, Throttle Lever; 27, Hot Air Adjusting Elbow; 28, Hot Air Pipe; 29, Float Lever Attaching Screw; 30, Hot Air Pipe Attaching Screw; 31, Overflow Pipe; 32, Adjusting Screw for Hot Air Elbow.

ing diaphragm is used. The expansive movement of this diaphragm will be seen in Fig. 1, on dotted lines (7). When this valve stands in the vertical position at rest (7), solid lines will indicate the low throttle of the carburetion. At this point the mixture must be regulated by the gasoline supply needle (4), by slightly closing or opening it.

The careburetor can be connected to the engine by releasing two nuts (11), Fig. 2, from studs (13) in Figs. 1 and 2, and simply turning the connection around will permit of either horizontal or vertical connection. Another feature of this carburetor is the hot air pipe connection, which by releasing the screw (30) in Fig. 1 allows it to be turned in either direction to suit the throttle connection. The carburetor is made in ¾-inch, 1 inch, 1¼ inch and 1½ inch sizes, listing at $11.00, $12.00, $13.50 and $15.00.

The directory of automobile, motor boat, motorcycle, part and accessory manufacturers, which constitutes the most important feature of the January Journal, is the most accurate of its kind, and from no other source can you obtain one so complete. Subscribers to the Journal are sure to obtain a copy, as no extra charge is made for this important number. Non-subscribers should, however, remit at once if they desire to have their subscriptions commence with the January number. The yearly subscription rate is $2.00. Single copies of the January number can be had at 20 cents each, same as any other number.

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The "Breech-Block" Plug

is the "cold weather" plug. If you keep your car in "cold storage" in winter, don't crank off your arm starting up in the morning—simply open each breech and squirt in a few drops of the "essence" which settles round the points where the sparks are and she's off with a quarter turn 1000 times out of 1000.

When you come from a run, pick out each breech and pour in a spoonful of kerosene while the engine is hot, then give her a couple of turns. The next time you start, she is free. She will dance on the charge and start off running smoothly and sweetly.

The chambered end of the plug brings the spark deep down in the mixture. The engine runs smoothly on mixtures throttled down to the limit—mixtures that put the open end plugs out of business.

The chambered nipple costs twice as much to make as the open. Its merits are easily proven. The open end kind can be furnished however to the non-thinking user.

All breeches interchange perfectly. A questionable plug can be instantly removed without stopping the engine, and a tested one put in its place.

The Breech Block Terminal Clip is now furnished with a patented handle. It can be detached from the plug in an instant while the engine is running without getting a shock, the kind of a spark that is reaching each plug may be noted and the trembler adjusted if needed. It's a heap of satisfaction to be able to locate your spark trouble instantly.

Every kind and shape of porcelain has been tried on the "Breech Block." We think those we are using are the best glazed and toughest made, but any kind or shape can be furnished in reasonable quantities.

The "Breech Block" is the plug of the future—"four can be removed, cleaned and replaced in less than a minute."

Write for booklet.

THE STANDARD COMPANY,

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owa, well known manufacturer of the awkeye refrigerator basket, has recent- brought out two new styles of auto bas- ets, known respectively as the "De Luxe" nd the "No. 2."

The "De Luxe" Hawkeye Refrigerator Basket.

For those desiring the highest produc- on of the basket makers' art, and the est that can be produced in a refrigera- or basket regardless of cost, the manu- acturers offer the De Luxe. This basket made out of specially selected imported eed. The bottom is of hardwood, cov- red with two coats of mineral paint. The overs are best quality basswood, finished right in imitation of dark cherry. The

he "Hawkeye" Auto Refrigerator Basket, No. 2.

ning is made of polished nickel plated nc with special insulator constructed of airfelt and asbestos. Straps are tanned eather with brass lock buckles; hinges nd all trimmings are polished brass. The e Luxe is made in two sizes, as follows: o. 1, 20 inches long, 12 inches wide, and

finished in imitation of dark cherry, a it can be finished in any desired colo match car at an extra cost of $2.00. style is 25 inches long, 14 inches wide inches deep, and lists at $10.00. concern also furnishes a neat dull fi rubber cover for these baskets for $

The "Stereo-Light" Gas Tank and "Universal" Tire Tank

To meet the demand for gas ta and tire inflating tanks of mode price, the New York Coach & Auto L Co., 794-798 Tenth avenue, New York Y., has recently placed on the market "Stereo-Light" gas tank and the "Uni sal" tire tank, here shown.

The "Stereo-Light" Gas Tank (on the left) the "Universal" Tire Tank (on the right).

The Stereo-Light tank is made of he prest seamless steel, and when f charged will last sixteen hours with one-half foot burners, in other words, burning capacity of two lamps. The t lists at $15.00. The cost of rechargin $1.00.

The Universal tire tank will fill f eight to ten tires. It is 3½x12-inch s and weighs about 15 pounds. It lists $10.50, and when empty can be exchan for a charged tank for $1.00. A lib discount is allowed the trade.

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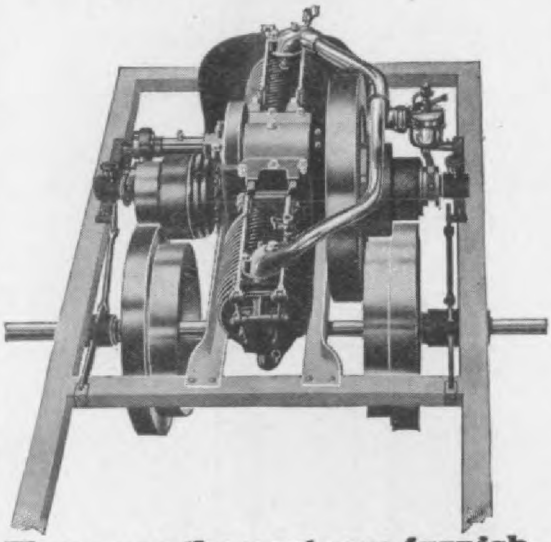
"The REEVES

Combined Engine and Transmission, designed for high wheel two pa
senger buggy-type cars.

Engine is 10 B. H. P. 4 x 4 double opposed air cooled.



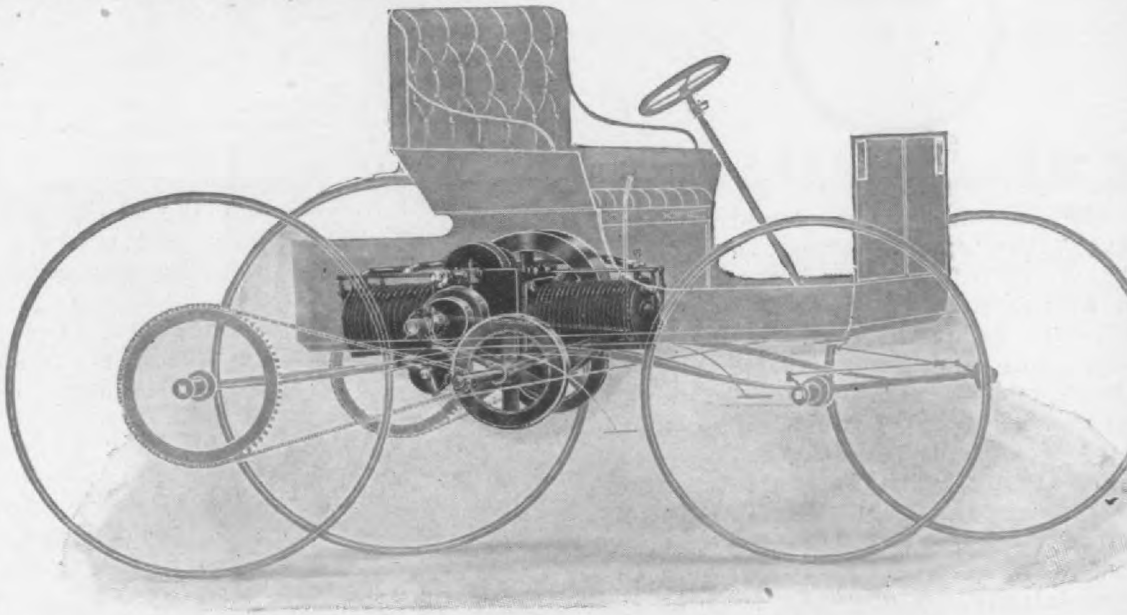
These are the parts we furnish.

Transmission is friction drive, noi
less, efficient and durable.

With these parts furnished the
may be assembled by carriage or bug
manufacturers.

There is no differential, no clut
no gears, no universal joint.

It's the car for the business ma
the doctor, the farmer, the contr
tor, in fact, any man who wants
"get there" without any "fuss
feathers."



With the engine and transmission we will, if requested, furnish a
of blue prints giving full particulars and details of mounting same in bug

We sell the engine separately.

We also build Models E. and L., 4 x 4, 4 cylinder, 20-22 H. P. air
water cooled motors.

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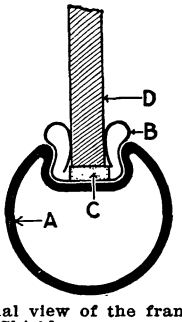
1908 Conover Wind Shield

The Conover Wind Shield Company, of Paterson, N. J., has made an important improvement in the Conover Wind Shield for 1908. This improvement consists of a new method of holding the glass in the frame in such a manner that rattling is entirely avoided. The inner side of the tubular frame is slotted to admit a grooved piece which by spring action holds the glass, the edge of which is backed up by a piece of felt packing. As the glass is continually gript by this grooved piece it cannot rattle, as there is no side play whatever. This method also has the advantage of flexibility, and the frame can be twisted considerably without cracking the glass.

Another important feature of the Conover Wind Shield is the adjustable side rod which is now used. This makes the shield applicable to any car without any cutting or soldering, which are necessary where non-adjustable side rods or braces are used.



End sectional view of the frame of the 1908 Conover Wind Shield.

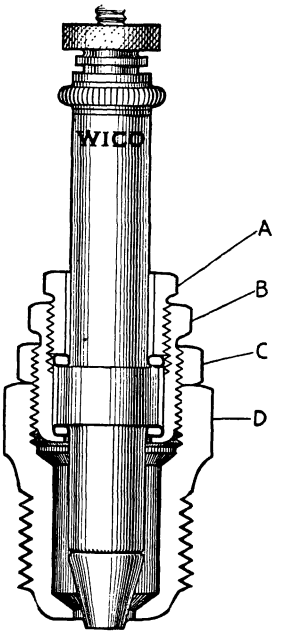
In the acompanying illustration A represents the special brass tubing used for the frame of the wind shield, B the spring anti-rattle device, C the felt strip which entirely surrounds the outside edges of both the upper and lower glass D. The spring B entirely surrounds and also presses gently on both sides of the glass, thus entirely eliminates all possibility of rattling. The spring being made of phosphor bronze will last indefinitely. By removing two small screws, either glass can be taken out or put in, in less than one minute, by any one without special skill.

The "Wico" Spark Plug

The Wico Spark Plug is the product of the Witherbee Igniter Co., 541 West Forty-third street, New York City, manufacturer of the well known Witherbee battery.

A feature of this plug is that it possesses a micrometer attachment which permits of quick adjustment to any required distance down to 1000th of an inch. By means of this feature accurate adjustment of the spark gap is permissible and all guess work obviated.

The porcelain is made to withstand the most intense heat without breaking or cracking, and the end of the electrodes are so formed that they act as a siphon cleaner, at the same time providing a large sparking surface. In case the plug



The "Wico" Spark Plug, Sectional View; A, the packing gland; B, main carrier for the porcelain; C, lock nut for porcelain carrier B; D, the main shell into which the porcelain carrier B screws.

fouls, all that is necessary to remedy the trouble is to take out the brass porcelain carrier and wipe off the end, screw it back to where it was, and the adjustment remains the same.

To adjust the plug the nut C is loosened and the porcelain carrier B raised or lowered. By observing its location and turning from a given point 1-6 turn either way, gives 1000th of an inch adjustment to the gap. When in proper position the nut C is locked.

To remove the plug for cleaning, the nut C is loosened and the porcelain carrier B is raised or lowered, the porcelain wiped off and replaced to its original position.

A complete directory of the entire manufacturing element of the cycle, automobile, motor boat and parts and accessory trade will, as usual, be included in our January number, and no extra charge will be made for this valuable feature, altho the directory once sold at $1.00, bound separately. Non-subscribers should subscribe for the Journal at once—yearly subscription, $2.00—to assure receipt of the January number. Single copies can be obtained at 20 cents, same as other numbers.

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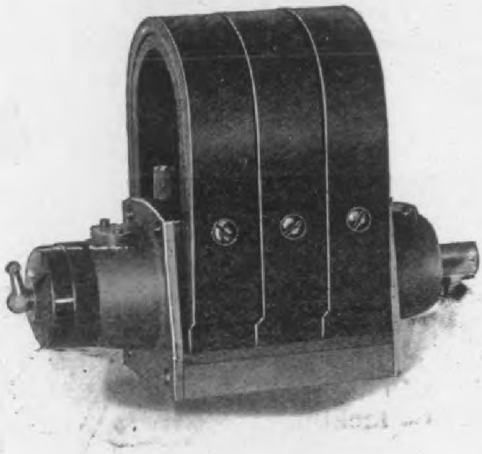
The "life" of an automobile is in the spark



If your automobile is equipped with the right magneto you can rely on the spark. *The General Electric Company's* low tension magnetos have bearings that do not require attention and they have permanent magnets that are genuinely permanent.

These magnetos give

An open circuit pressure of 100 volts.
A short circuit current of .4 amperes.

The discriminating buyer demands them.

Write for descriptive booklet No. 211-B.

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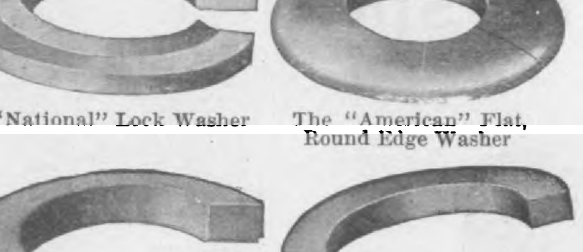
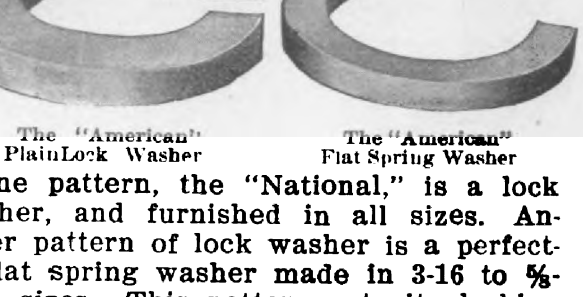
n wire by a special patented process marketed under the trade name, nerican." The Hobbs process pro- es washers of accurate form and finish, from burrs, smooth and uniform. A e variety of shapes and sizes are of rse included in the Hobbs line, and few shown herewith are merely sug- ive of the line.



"National" Lock Washer — The "American" Flat, Round Edge Washer



The "American" PlainLock Washer — The "American" Flat Spring Washer

ne pattern, the "National," is a lock her, and furnished in all sizes. An- r pattern of lock washer is a perfect- lat spring washer made in 3-16 to ⅝- sizes. This pattern gets its locking er entirely from the spring of the al. There is also a plain pattern made ectangular wire with the center slight- hicker than the rim. A flat, round d pattern is furnished in 3-16 to ⅝- sizes, and a plain ring type made round wire. In the flat patterns they ly copper and brass washers in sizes 3-16 to ⅝-inch; also a lap joint type a V-joint type.

New Hancock Specialties

e Hancock Manufacturing Co., of Char- , Mich., in addition to their extensive of valveless force feed lubricators for mobiles, are now manufacturing gaso- and water tanks, fenders, monograms, and foot rails and brass pipe fittings; the Hancock Tank Gage, which is rately described in this issue. The s and fenders are made to customers' ifications. Two styles of coat rails two of foot rails are included in their These rails are all first-class qual- highly polished and lacquered. Their of brass pipe fittings includes a ty of tees, cross elbows, return bends, lings, plugs, bushings, lock nuts, ns, etc., and is quite complete.

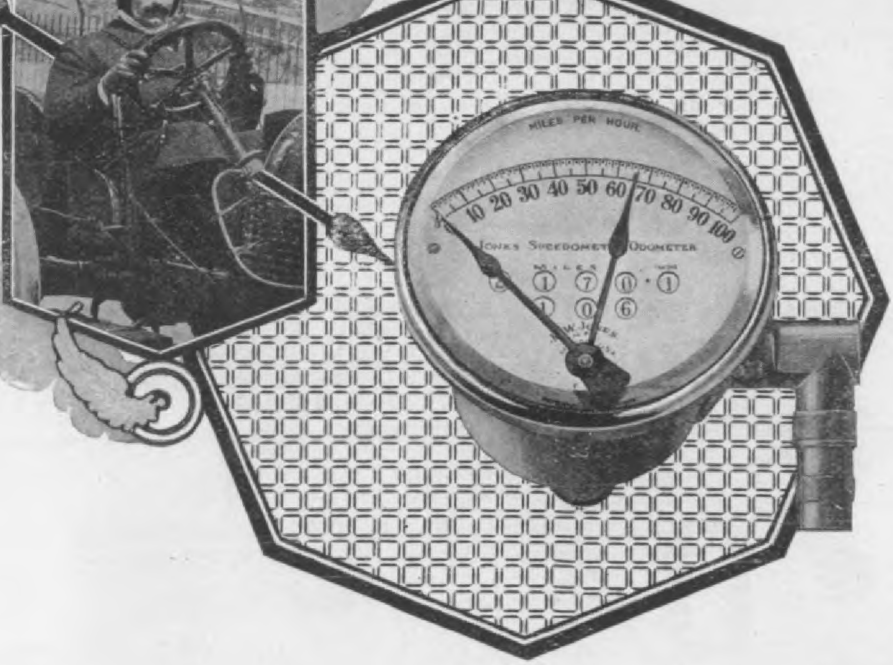
chanically operated by a pulley, which brought into contact with the engine wheel by means of a pedal and suitab shaft. The tone can be varied from a so hum to a very loud blast. The movin parts run on ball bearings, and the who

The National Siren.

thing is constructed for durability. Be sides it is ornamentally finished, and c course adds to the attractiveness of th car. All the openings are protected b screens of fine mesh gauze. The price i $25 complete ready for installation, inclu ing a steel wire flexible shaft of 5-16-inc diameter and 4 feet long, a polished bras pedal and all fittings needed.

Get in line for all the benefits of th early issues of the Journal for 1908. Th next number will be the Eighth Annua Buyers' Guide Special, the February num ber will be the Boston Show number, an the March number will contain the Eight Annual Complete Vehicle Review. Sub scribe at once to commence your subscrip tion with the January number.

The Ed. Verstraete Manufacturing Co 421 Clinton street, Milwaukee, Wis., i manufacurting auto and marine special ties, such as clutches, rollers, pumps



Sixty-Si Miles a Hour fo Twenty Four Hou

The most str uous test ever giv to a speed indi tor was on S. Edge's Napier Cars when he made the World's record for hours on the Brooklands Track, London, England. The

Jones Speedometer

shaft revolved 4,039,200 times in 24 hours and came throu the test perfectly.

The Jones is the pioneer speed indicator. It is the accep standard speed indicator. It is used in this country and abr by the police departments as a means for timing motor vehi for the reason of its **accuracy.** It won the Royal Automo Club's **Reliability** award, finishing the Contest without one m against its mechanical construction, receiving the Gold Me

The Jones guarantee for **Reliability** and **Accuracy** stronger than that of any other manufacturer. From ev point of view the Jones is the best in the World.

Exhibit at Chicago Show.

Write Dept. 12 for catalog.

JONES SPEEDOMETER

76th St. and Broadway,
NEW YORK

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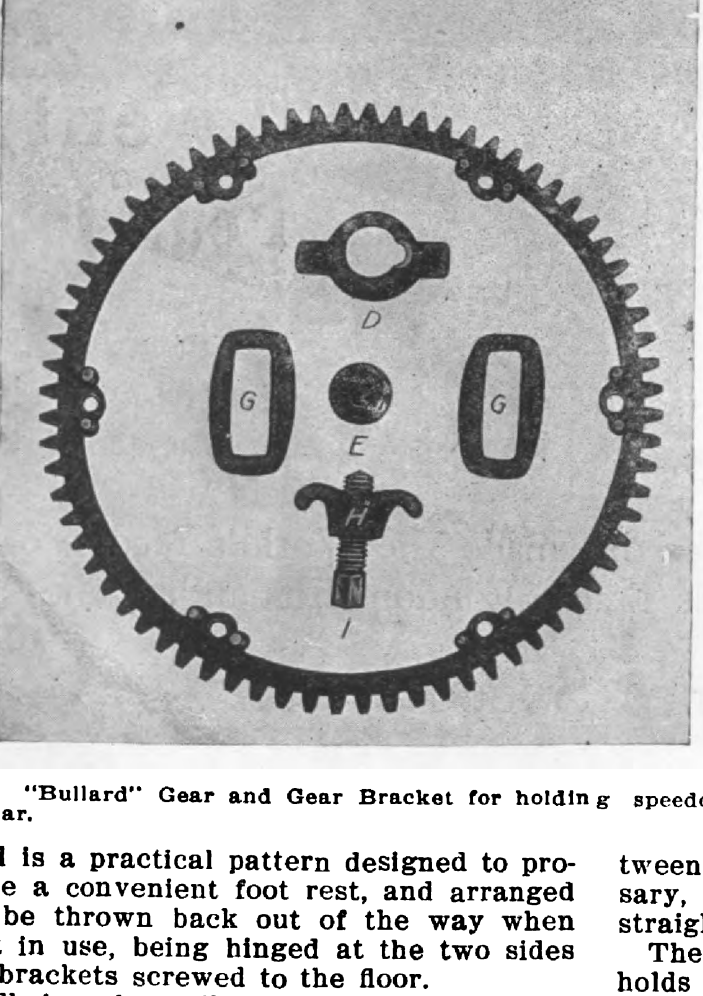
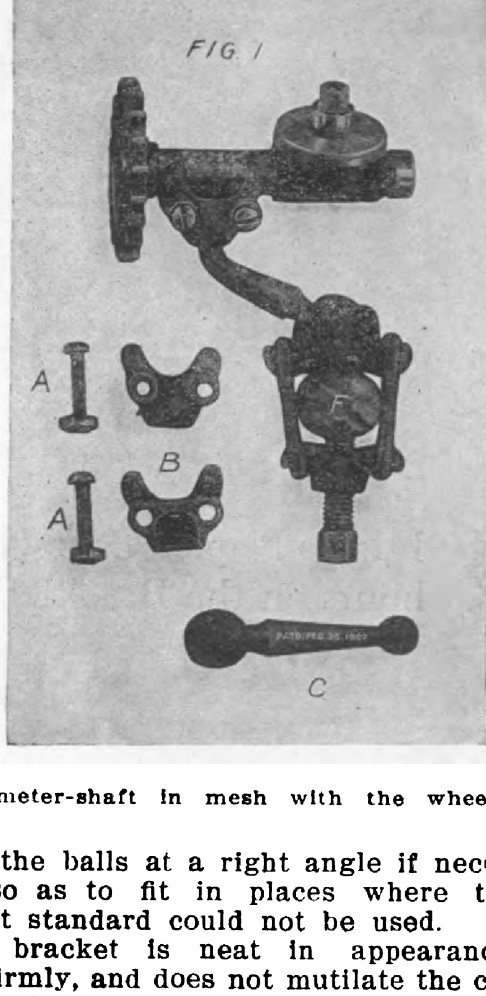
arket with a line of automobile robe d foot rails made of solid brass, and in rious designs and styles to suit all re- irements of the trade. Their No. 4 foot

socket and binder H is screwed in pl by the binder screw I.

The standard C is made of the b quality of soft steel, and can be bent





"Bullard" Gear and Gear Bracket for holdin g speedometer-shaft in mesh with the whee ar.

l is a practical pattern designed to pro- e a convenient foot rest, and arranged be thrown back out of the way when in use, being hinged at the two sides brackets screwed to the floor.

Their robe rails are made with large ckets, which give a good clearance be- een the rail and the back of the seat, owing ample room for large robes with- difficulty in placing them on the rail.

e "Bullard" Gear and Gear-Bracket

he accompanying illustrations show Bullard gear-bracket and connections connecting the speedometer-shaft to arm of the steering-knuckle. It is so de that it fits any car, and only three ews are necessary to attach it. This cket is a 1908 feature of the Bullard edometer made by J. H. Bullard, High- d Station, Springfield, Mass., and makes instrument applicable to practically all s on the market.

eferring to the cut, A-A are two bolts

tween the balls at a right angle if nec sary, so as to fit in places where t straight standard could not be used.

The bracket is neat in appearanc holds firmly, and does not mutilate the c in the slightest degree. It can be tached to any car whether the steeri arm is in front or in the rear of the axle

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Hopewell Brothers, Cambridge, Mas have discontinued all auxiliary lines, a for 1908 will carry nothing but fabr goods, including their well known ti cases, tube cases, sleeve protectors, to bags, wrench rolls, spark plug cases, lan covers, and a new line of robes and ves just brought out.

Our next issue will be the Great Buyer Guide Special, and will contain a co plete, classified directory of the industr It is one of the most important issues the year, especially from the tradesman point of view, and if you are not a su scriber to the Journal you should not d lay an instant in sending your subscri

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For a Long Time

We have been telling you about our

ALUMINUM CASTINGS

WE know they are the BEST that can be produced
We want YOU to know it too
The only way to find it out is to send us a sample order
Large or Small, it makes no difference to us

Greatest Strength and Resistance to Vibration, Lightest in Weight, Prompt Service, Right Prices—Surely a Winning Combination

SYRACUSE ALUMINUM & BRONZE COMPANY

530 Leavenworth Ave., SYRACUSE, NEW YORK

THOMAS J. WETZEL, 29 West 42nd St., NEW YORK CITY
EASTERN SALES AGENT

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ruction being such as to eliminate all cate mechanism, thereby reducing its ing parts to the least number of pieces ble.

is of the governor type constructed entirely different lines from any- yet attempted. The device is ated by a train of gearing from the

"Standard" Speedometer-Odometer, Model

rnor weights direct to the indicating . The governor weights are attached wo pivoted gears which revolve to- er with the main spindle and mesh a circular rack which is moved length- on a central spindle. This part com- s the entire revolving mechanism and ounted on a hardened steel ball bear- The rest of the mechanism is sta- ry with a gear always in mesh with revolving circular rack. These gears ll very accurately made and of hard- steel running into bronze. The er itself is attached to the top end spindle with a very long bearing, h is operated by this upper train of onary gears. The dial is evenly ed and the governor weights move tly in proportion to the hand at all ls. The only spring used in this in- nent are the two coil springs one on side of the governor. It can be at- ed to either the right or the left hand l and also will indicate the speed and the mileage that the car has been n backwards instead of subtracting it. e Standard speedometers are all fitted a special pivot drive. This elimin- the bend in the shaft at the wheel, enables the shaft to be carried straight to the dash. The well known Veeder meter is used. This gives the trip total mileage, the trip being set back

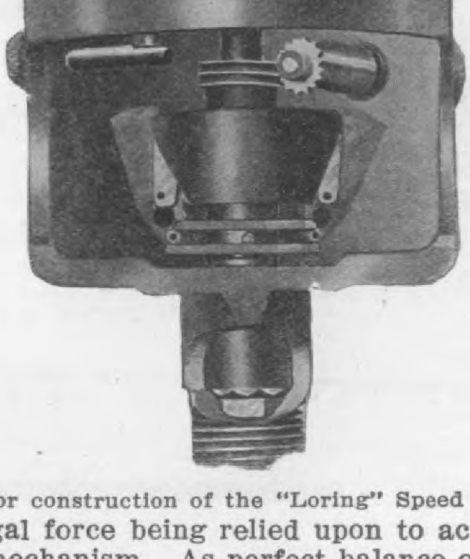
out the maximum hand $50.00. This typ is also made with an 80 mile dial and lists $65.00 with maximum hand, and $60.00 without.

The Standard steering knuckle clamp is as near universal as it is possible to make it, and will fit nearly, if not quite all of the different types of steering knuckles now in use on the various makes of cars. When once properly attached it will remain in place indefinitely.

Interior Construction of the "Loring" Speed Gage

As a supplement to the description of the 1908 "Loring" speed gage that appeared in the November Journal, page 205, we present herewith an illustration of the interior construction of this device, which is marketed by the Loring Auto Appliance Co., 49 West Sixty-third street, New York City, a cut of this view not having been available heretofore.

By reference to this illustration it will be seen that the Loring instrument operates on the flyball governor principle, cen



Interior construction of the "Loring" Speed Gage

trifugal force being relied upon to actuate the mechanism. As perfect balance of the rotating parts is necessary to obtain accuracy, the weighted arms are balanced against the effects of gravity or any influence except that of centrifugal force, and the makers of the instrument claim absolute steadiness for all positions of the indicator needles.

The "Pater-Noster" shock absorber which is marketed by Herz & Co., 203 Lafayette street, New York, has been im

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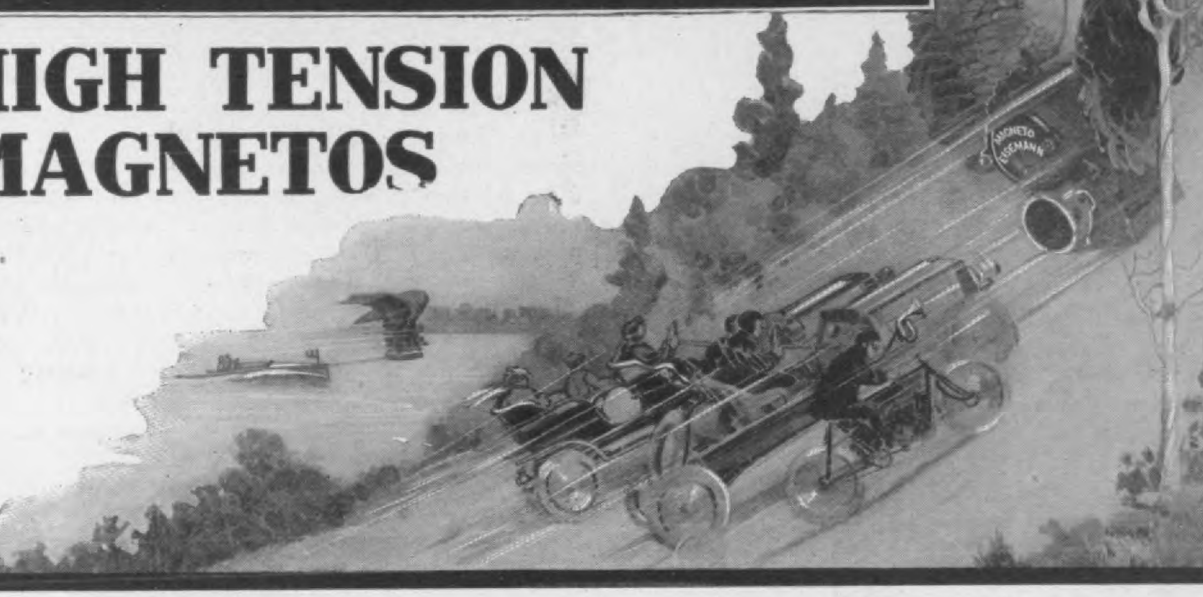
IGH TENSION
AGNETOS



When a manufacturer equips with Eisemann-Lavalette Magnetos it means that he considers his cars equal in class to the highest grade foreign cars, although there may be a wide difference in price.

The greatest cars of Europe use Eisemann-Lavalette Magnetos exclusively. The Peerless, Packard and other leading American cars equip their entire output with our magnetos and freely admit that it is in a great measure due to the perfection of our instrument that the running qualities of their cars have brought them to their present remarkable popularity.

Magnetos are as permanent an integral part of the motor car construction to-day as pneumatic tires.

The question then is—which magneto?

The answer is—the Eisemann-Lavalette.

The Eisemann-Lavalette, in spite of its admitted superiority, costs, with dual ignition, $50 less to install than any competing make, because of its mechanical points of extreme simplicity, which cannot be duplicated without infringing our patents.

It does away with the cumbersome necessity of placing a timer on the motor with all its attendant wiring complications and expenses. It gives a greater increase in efficiency than any other magneto on the market. It is the most durable instrument of this sort, and it will outwear any car on which it is installed. It is perfect in the matter of timing. This means that it lengthens the life of the motor to a remarkable degree, gives perfection of service under all conditions, which can be obtained in no other way, and is as much a factor in strengthening the performance, and, consequently the reputation of the car as any other one point in its construction.

If you make a moderate price car, say $2,000 or $2,500, the use of our magneto will at once class it as a leader at that price. It will enable your agents to give demonstrations fully equal to a $4,000 or $5,000 car, provided the difference in horse power is not too great. It will mean an enormously increased demand for your cars in 1909, with no effort to yourself, and it will also mean that the best automobile agents will be more apt to solicit making connections with you on your own terms. They know the value of any instrument and we are taking strong steps to see that they do not forget it.

The Eisemann-Lavalette Magneto carries its coil in a separate box, thus providing ample space for a heavy thickness of insulation. The space is so ample that we would increase this insulation provided there was any advantage to be gained by it. Barring accidents, it is impossible for short-circuiting to occur. In the very rare cases where short-circuiting has occurred it has been a matter of slight expense and a few minutes of time to install a new coil in this separate box, thus making the instrument absolutely as good as new. When short-circuiting occurs in this separate box, which is a safe distance from the armature, the magneto is entirely unaffected.

In competing makes, which claim to be as good as the Eisemann-Lavalette, the coil is carried in the space inside the armature. This space is so small that the insulation is, of necessity, very thin and inadequate. With inadequate insulation short-circuiting is bound to occur sooner or later, and when it does occur the entire magneto is out of commission and must be replaced by a new instrument or sent to the factory for repairs.

When you sell a man a car equipped with an Eisemann-Lavalette Magneto you can guarantee him freedom from Ignition troubles. Our guarantee to you stands behind yours. By using our instrument you greatly reduce his cost of upkeep.

Are you dissatisfied with your present ignition system? We have engineers, specialists in WHAT YOU WANT TO KNOW. We will gladly send one to you to work out your ignition problem for you. Better still, come and see us at the automobile shows. We are exhibiting at all of them.

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ıced on the market two new specialties interest to the automobile trade, one lled the "Timograph," a device for show- ; when a car is used, and for how long. is Timograph consists of a clock mech- ism operating an indicating needle, ich, when the car is in use traces on paper dial a curved line extending as

The Timograph.

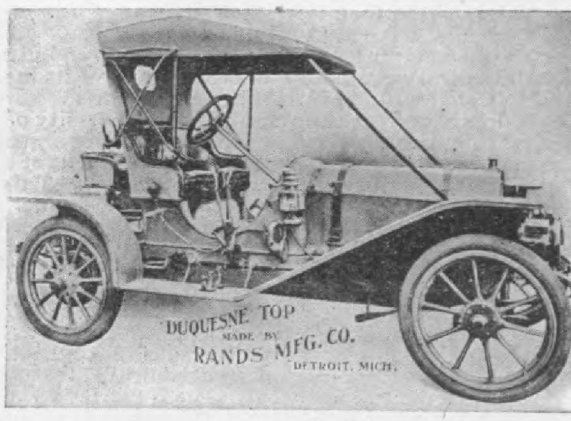
on the dial as will indicate the space represent the hours of the day, and se spaces being sub-divided to repre- t the fractions of hours. The indicator dle does not trace a line on the dial ept when the car is in use, the vibra- ı caused by traveling over the roadway ıging it into contact with the dial. The icator mechanism is so adjusted that vibration of the motor, when the car standing still, will not cause the indi-

$35.

This company is also manufacturing new tire chain or anti-skid, which is signed to be not only economical but e cient, and is said not to injure the t shoe, for the reason that the under s face of the cross links is flat and smoo while the outer side gives first-class gr ping effect on the roadway. Each li consists of a plain flat metal piece, flang up on two sides and provided with a ho at one end and a slot at the other e which admits the hook of the next joining link. These cross pieces can attached to any kind of side chain even to leather strips. Each cross cha can be bought separately, costing fro 12 cents to 20 cents each, according size, the individual links listing at 3 cen each.

Rands Rumble Seat Runabout Top

Rands Manufacturing Co., Macomb a Beaubien streets, Detroit, Mich., h added to its extensive line of automob tops a special style of the Duquesne ty for runabouts with rumble seat. This t has an extra horizontal front bow whi keeps the front of the top extended o



Rands Duquesne Top for Rumble Seat Ru abouts.

to the dash line without any slanting bo from the seat up. The horizontal bow of course, shorter than a slanting bo would be, and when it is desired to fo the bow the two ends of this horizont bow are lowered to the cluster at the se side, hooked there, and then when the t is folded back the shortness of this bo prevents the top from extending back the way of the rumble seat.

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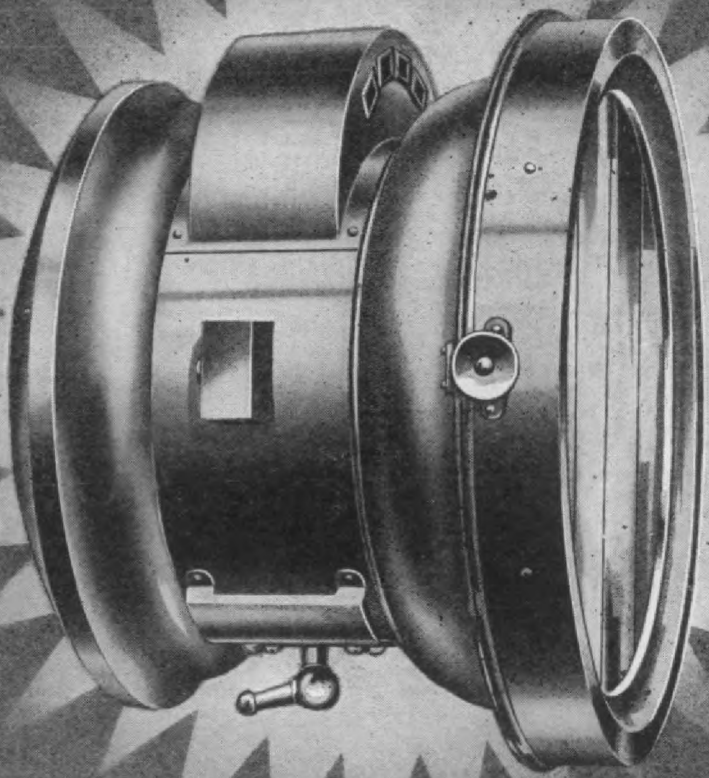
GRAY & DAVIS

1908

LENS MIRROR SEARCHLIGHT



SQUARE OR STRAIGHT LINE EFFECT TO MATCH OIL SIDE LAMPS

Ever since the coming vogue of the square oil side lamp, our designers have been trying to produce a headlight that would match the business-like and artistic lines of the square line oil lamp.

A square headlight was out of the question. We have therefore designed a square line headlight (as looked at from the side, the point from which a car is generally seen.)

Particular attention is called to the square corners made up from straight lines, the ventilating holes in the hood are square also; socket of lamp is square, in fact everything is in harmony, and if you have square side oil lamps, you should have our 1908 headlight and then your lamp equipment will be in perfect harmony and up to date in every particular.

GRAY & DAVIS AMESBURY, MASS

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Trade Printed Matter

The Goodyear Tire and Rubber Company, of Akron, O., lately issued a folder calling particular attention to the fact that only one spreader is needed on Goodyear Universal Rims. This folder is gotten up in an attractive form, and contains an illustration showing the one spreader that is needed, together with a strong paragraph of advertising matter.

The American Motor League have lately issued a map of the route between Philadelphia and Pittsburg, via Downingtown, Coatesville, Lancaster, York, Gettysburg, Chambersburg, McConnelsburg, Everett, Stoystown, Jennertown, Ligonier, Greensberg, Irwin, and intermediate points, and will give 5,000 copies to members of the League, the prices to outsiders being 50 cents each. The maps are drawn and arranged from actual surveys, and information supplied by members of the League who have covered the route.

The Vehicle Apron and Hood Company, 272 North Fourth street, Columbus, Ohio, have just issued their 1908 catalogue, containing 32 pages, which shows that they have greatly extended their line of products for the coming season, and now include in addition to their tops, storm aprons, top boots, etc., a line or weather proof clothing for automobilists, leggings, sleeve protectors and similar fabric specialties.

The Studebaker Automobile Company, of South Bend, Ind., have just published one of their route books containing data of the route from Chicago to South Bend and South Bend to Chicago, wisely giving the reverse of the route separately so that a tourist can easily follow the same without deep study and mental rearrangement of directions. There are several pages of map-diagrams for the guidance of the user in connection with the detailed information given on the other pages. The cover of the book is a durable cloth suitable for the purpose.

The 1908 Warner Auto-Meter, made by the Warner Instrument Company, of Beloit, Wis., is very cleverly described and attractively illustrated in the latest catalog of this concern. The catalog is gotten up in good style and consists of 32 magazine-size pages enclosed in an attractive embossed cover on which appears in gold an illustration of the "Auto-Meter" itself. The catalog not only describes the constructional features of the instrument, but tells about the methods of its manufacture, and goes into such detail that the reader cannot help but fully grasp the good features of this well known instrument. The last few pages of the book are devoted to a number of strong testimonials from users of the Auto-Meter.

The H. H. Franklin Mfg. Co., have been sending out pithy little booklets from time to time calling particular attention to special features of the Franklin air cooled cars and the latest in this line is a 14-page booklet in a buff cover containing the title "A Trifle Technical But—" This booklet contains very terse paragraphs describing the Franklin Auxiliary Exhaust, Concentric Valves and other important features of the 1908 Franklin cars.

A new catalog describing the 1908 Truffault-Hartford Shock Absorber has just been issued by the Hartford Suspension Co., 67 Vestry St., New York, and contains 24 pages enclosed in a very attractive cover showing a car equipt with a Truffault-Hartford Shock Absorber traveling over an extremely rocky road but carrying passengers who show by the pleased expressions on their faces that the jolts and shocks are all absorbed, making the ride very smooth. The illustrations of the device itself and of the road scenes which are spread thru its pages are all clear and leave a good impression on the readers' mind, while the reading matter is complete and well prepared.

An 18-page, well printed and well designed booklet has been issued by Kilgore Mfg. Co., Old Town, Maine, to advertise the latest model of the Kilgore shock eliminator. The cover illustration includes their advertising phrase "Ride On Air" and a very suitable illustration of the same. A number of half tones and diagrams are used to illustrate the text.

The good work of the "Reo" in the Glidden Tour is detailed in a booklet of 20 pages and cover carrying the title "The Giant of the Glidden Tour," which has recently been isued by the general sales agents of the car, R. W. Owen & Co., Lansing, Mich.

Williams & Robinson, Limited, Ferry Works, Queen's Ferry, S. O., Flintshire, England, makers of vanadium steel, have recently gotten out a very comprehensive and business like pamphlet which is being distributed by G. F. Ehrenzeller, Sole Agent for these steels in the United States, with offices in the Pennsylvania Building, Philadelphia.

In this pamphlet the qualities of vanadium steel are set forth in detail with the reasons for its fitness for use in the manufacture of automobile parts, as well as for tramway and railway work, illustrations of the micro-structure of some types of the steel are given, and motor car parts are shown in all stages from the billet to the finished article. The results of tests are also given and form interesting reading for the automobile manufacturer. The Company also manufactures carbon steels of high quality, including tube steel for the manufacture of high grade solid-drawn tubes, which it is claimed is in every respect fully equal to the best grade of Swedish Mild Steel. The Company will be glad to supply any further information concerning the steels manufactured beyond what is contained in this small but comprehensive pamphlet.

The Phoenix Auto Supply Co., St. Louis, Mo., of which A. L. Dyke is president and general manager, lately published their No. 3 catalogue illustrating a large line of 1908 automobile material. The book contains 80 pages and cover, and also a tipt-in order sheet for the convenience of customers. Besides illustrations of various makes of automobile parts and accessories, the book contains some characteristic Dyke illustrations of an amusing nature.

The Bethlehem Steel Co., South Bethlehem, Pa., have issued a special booklet, relative to their special steels, drop forgings, and frames for automobile manufacturers. The illustrations include a view of their plant, a picture of one of their very large drop hammers, and various pictures of twisted steel products showing the toughness of their steel. As a very fine grade of paper is used, the illustrations and text matter all show up very clearly, and the whole book is calculated to leave a very favorable impression upon the reader, regarding the high quality, durability, and general suitableness of Bethlehem Steel in automobile use.

The Maxwell-Briscoe Motor Co., Tarrytown, N. Y., have started the publication of a little house organ entitled, "The Co-Operator." The aim of this publication as outlined by Mr. Benjamin Briscoe in the first number is to "bring together into closer communion all those of the Maxwell faith to the end that they may understand each other better, that they work together with the utmost enthusiasm, and strive with greater energy toward the object of placing the Maxwell automobile on the very top round of the ladder of success." A careful perusal of the paper leads one to believe that it will be successful in obtaining this object.

The White Co., of Cleveland, O., distributed at Madison Square Garden Show copies of their latest White route book, the fifth in the series issued by this company. This book gives detailed route directions for over 1500 miles of the main highways suitable for tourists in New York State and in the Province of Quebec, including the routes in both directions between New York and Albany, and between Albany and Buffalo. Like the four others in the series, this White route book is profusely illustrated and contains a double page map of the section of the country covered, as well as descriptive matter relative to the routes.

One of the most elegant catalogs issued this season is that of the Baker Motor Vehicle Co., of Cleveland, Ohio, manufacturers of the well-known Baker Electrics. It is elegant because of its high character and simplicity. It is not what might be termed an elaborate catalog, because there is no ostentatious display of costliness. It is pocket size, being 7½ inches long and 4 inches wide, and the illustrations are clear and pleasing; the reading matter brief and convincing. The whole is in appearance attractive and effective. The Baker Motor Vehicle Co. are to be congratulated on having produced a commonsense kind of printed matter for illustrating and describing their goods. Anyone interested in electric vehicles should send for a copy of this catalog.

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The Silent Northern 24.2 H. P. (A. L. A. M. rating) $1600

f. o. b. factory—includes full gas and oil lamp equipment.

For 1908 the Silent Northern embodies the same strong, enduring construction that has given it supremacy for five successive years, plus *MORE POWER,* due to large cylinders, larger valves and other refinements. Five years experience manufacturing this one type insures perfection in every detail.

¶ Style, efficiency, reliability, quietness the conspicuous features. As you are in search of these qualities any comparison you may make ***must*** confirm the fact that this is the greatest value the automobile world affords.

¶ Perfectly balanced motor — *the quietest, smoothest-operating,* simplest automobile engine made—supported at three points—the "Northern way." The mechanism cannot get out of alignment no matter how difficult the roads.

¶ Every part accessible and every part protected. Full control on steering column.

¶ Each detail of construction thoroughly tested out and successful. No guess work—no experiments. This car will prove for ***you*** as it has for others—a genuine money-saver—and give you every comfort and pleasure possible to get from any machine regardless of price. Investigate. Find out for yourself. Send for the Catalogue.

NORTHERN

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The 1908 line of the Motorcar Company, troit, Michigan, manufacturer of the rtercars, consists of one chassis with ostantially the same friction driving echanism as for 1907. Upon this type chassis five models A, B, C, D and E e based. The Model C being a dery car of 1000 pounds paying load. odel A is a five-passenger touring car shown in Fig. 1. This car has a wheel se of 96 inches. The motor is of the posed type with two 5½x4½-inch cylinrs set crosswise under the hood. The H. P. is 24 at 1000 R. P. M. A single ain drives to the divided rear axle.

tion with the disk and traversing-wh drive. However there are also large fr tion losses where toothed gearing is us and no one, so far as the writer know has yet made public the difference any motor car between the motor pow as shown by indicator diagrams, and t "draw-bar pull."

Simply riding on cars of about the sa piston area and weight one using tooth gearing, and the other friction-disk a traversing wheel will prove to any f observer that the friction-drive can pu a car over the road with no more appare friction losses than a toothed change-ge

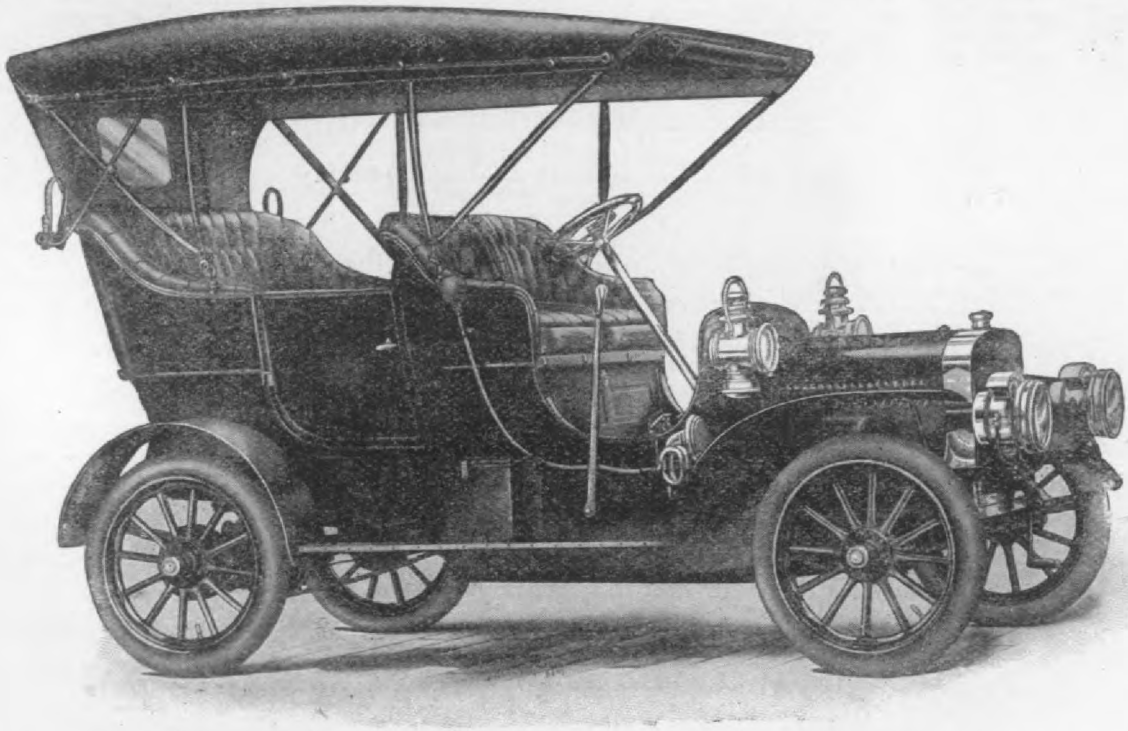

Fig. 1. 1908 5-passenger touring Cartercar, Model A; wheel base, 96 inches; gage 54 nches; tires, 30x3½ inches, motor, two opposed cylinders, 5½x4½ inches, 4-cycle, water-coole 1 B. H. P. at 1000 R. P. M. Friction disk and paper wheel speed change, with chain to divide ear axle. Weight, 1850 pounds, tanks empty. Price, $1350, including three oil lamps, mat horn and tools. Acetylene lamps and cape top, extra.

e car weighs 1850 pounds tanks empty, d sells for $1350, including three oil nps, mats, horn and tools. The acetye lamps and cape top are extra. Model s a four-passenger Artz folding tonneau, nvertible into a two-passenger car. The ce and equipment are the same as the ring car. Model D has a beetle-back ker, but is convertible by the use of detachable tonneau into a 5-passenger . The car weighs 1800 pounds and ls for $1250. The detachable tonneau $200 extra. The delivery car sells for 00.

The only well-founded objection to the

since one will go about as fast as t other, same motor and same weight.

The only carefully-observed competiti trial known to the writer between t geared and friction drives, was made Cleveland, September 10, 11 and 12, 19 and gave the Cartercar 2-cylinder a disk and traversing-wheel second place this ton-mile contest, first place going a car with a 4-cylinder motor and slidi gear; the Cartercar showed about per cent. better than its 2-cylinder, pla tary-gear competitor. This one test quite enough to convince the unprejudic observer that the friction-drive does n

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1908 REO

The Car that shows why

Every REO shows why from beginning to end.

The big, handsome, powerful touring car; the swift, sporty, gentleman's roadster; the natty little runabout—all are strong, simple, able and sensible; easy to manage; speedy; smooth-running, comfortable; free from complications; full of style; and doing the work of cars that cost twice the money to buy and to operate.

Their inmost mechanism, down to the smallest detail, shows why these qualities are there; and the incomparable REO performances, both public and private, show why every REO will make good every time.

REO 5-passenger Touring-car $1250; REO Gentleman's Roadster $1000
REO 4-passenger Runabout $650
Prices f. o. b. Lansing

Write for the REO "Show Why" catalogue.

R M Owen & Company, Lansing Mich.

General Sales Agents for the
REO Motor Car Co.

The New REO Roadster

Touring-car chassis. 32-inch wheels. 45 miles an

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en doubled in 1907. The management pects to produce about 600 Cartercars ring the season of 1908, all on one chas- with different bodies, passenger and ivery, to make five different models as lows: Model A, a 5-passenger touring , built-in tonneau; Model E, a 4-pas- ger folding tonneau, Artz patent; del D, a 2-passenger runabout with a etle-back" locker, convertible by the plication of a detachable tonneau into a assenger car, and Model C, a delivery , 1000 pounds paying load, five different dels of cars in all, with only one chassis.

shaft which engages a sector of bev gearing integral with the globe-end ste ing arm. The beveled steering gear not locked against the transfer of moti from the front wheels to the steeri hand-wheel. All lost motion can be tak out of the beveled-gear steering-action moving the pinion on the steering sh towards the beveled steering gear cent

AXLES, SPRINGS AND BRAKES.

The axles are by Weston & Mott a the Salisbury Wheel & Mfg. Compa with Brown & Lipe spur balance gea The front wheels are on two circles

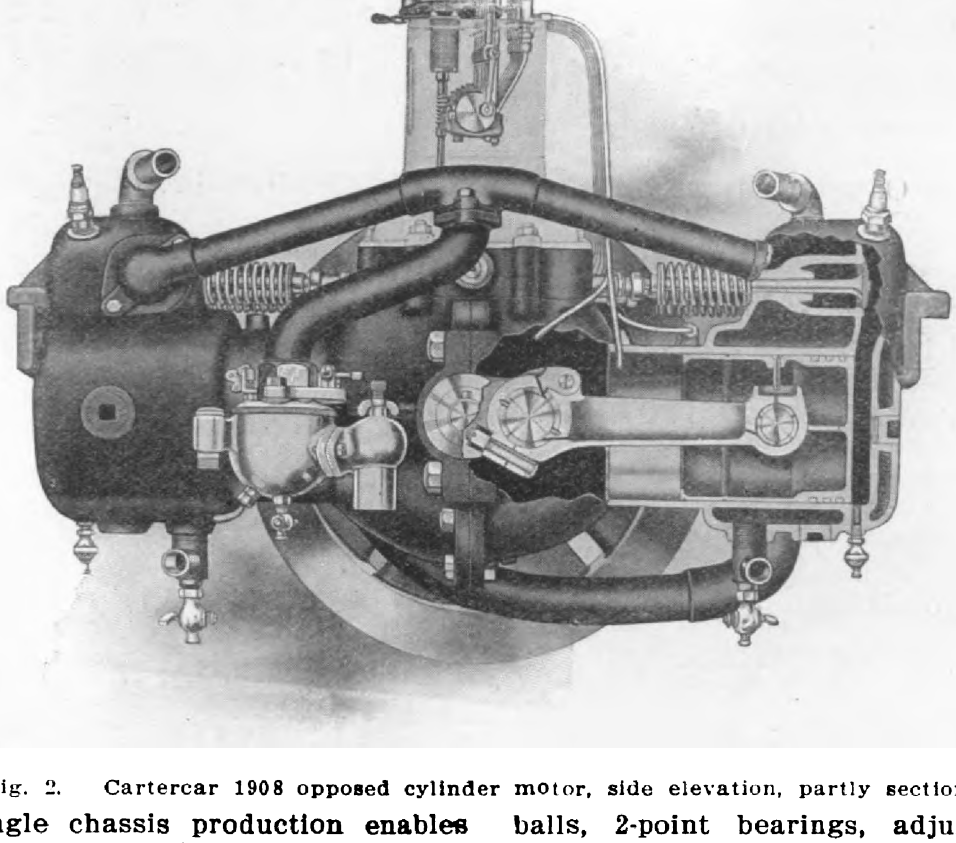

Fig. 2. Cartercar 1908 opposed cylinder motor, side elevation, partly sectional.

his single chassis production enables Cartercar to offer a considerable iety of low-cost cars, meeting the re- rements of middle class purchasers.

NOTABLE FEATURES.

he Cartercar chassis has a prest steel me, all 34 inches wide, greatest frame- e depth, 3½ inches, 1½ inches side me width, greatest side frame depth, inches, thickness of sheet steel stock inches. The chassis frame is carefully embled and hot riveted thruout. The tor is set crosswise in front, under the d, the drive is an aluminum disk 20 hes diameter, having a short sliding vement fore and aft to engage or dis- gage the paper-wheel, which is a straw- rd friction ring, 20 inches outside

balls, 2-point bearings, adjustable. T springs are half-elliptic, 40 inches by 6 leaves in front, joined in front a linked in the rear. The rear springs a 48 inches long, 2 inches wide, leave linked at both ends. All Cartercar sprin are tongued and grooved, and have tw bands on each spring. Screw-adjust struts are fitted, flat joints between lu in the rear, and forked flat joints in fro The brakes are internal, camel's-hair-be ing faced, in prest steel rear-hub drum 10 inches diameter. The friction rever furnishes a convenient and powerful brak

THE MOTOR.

The opposed cylinder motor drives t shaft thru less than one-half of each tu of the crank-shaft and hence demands

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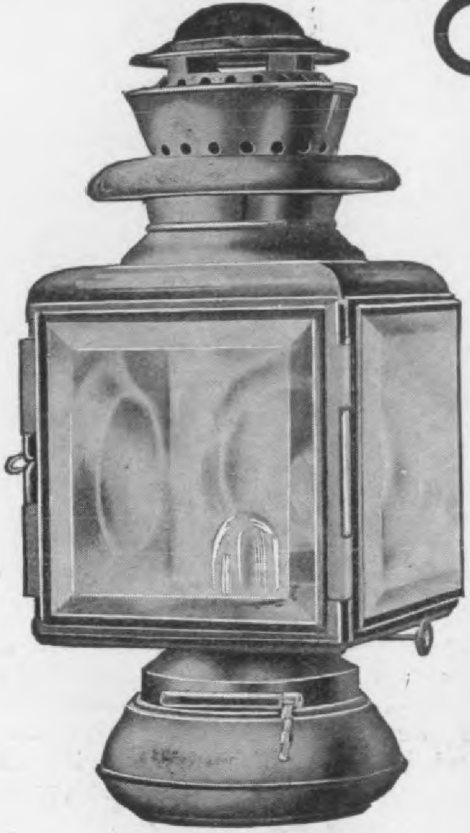
Ham's Famous "COLD BLAST" Auto Lamps

Represent all that can possibly be desired in Automobile Lamps, viz:—

Immense Light,
Excellent Burning Qualities,
Heavy Gauge Material,
Strength of Construction,
Style and Finish.

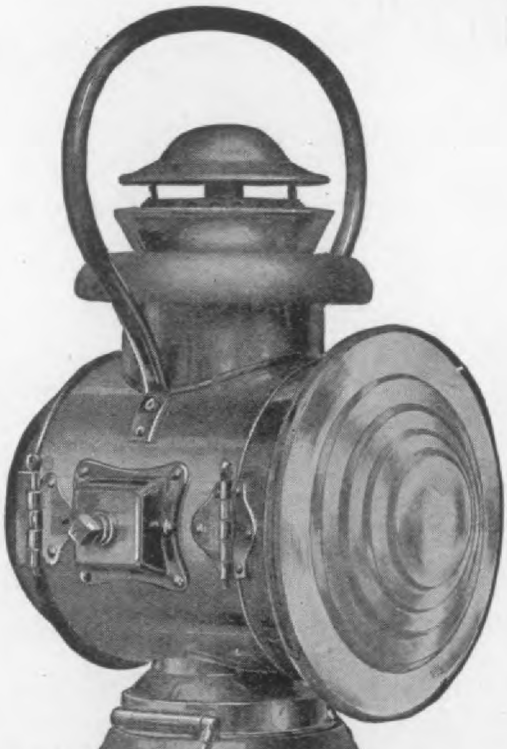
We are the Originators and Patentees of the Genuine "Cold Blast" principle, which is the only known method to obtain perfect combustion for outdoor lamps, that's why we can guarantee our lamps not to blow or jar out.



HAM'S ROCHESTER

We will exhibit at the Chicago Show "Space 143."

Don't place your orders until you have seen our 1908 line.



Manufacturers, Jobbers, Dealers, and Users.

If you are interested in the best Automobile Lamps on the market, lamps that are guaranteed to give satisfaction don't fail to call and let us demonstrate

Why Ham's "Cold Blast" Lamps are Superior to any other make of lamps on the market.

Also write for one of our 1908 catalogues. Address, "Dept. D."

C. T. Ham Mfg. Co.

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elevation in partial section is herewith shown. The cam-shaft is spur-gear driven from the crank-shaft, and the mechanical oiler, 6-leads, is driven by 45 degree angle gears from the cam-shaft, the oiler base serving as the crank-box cover. The

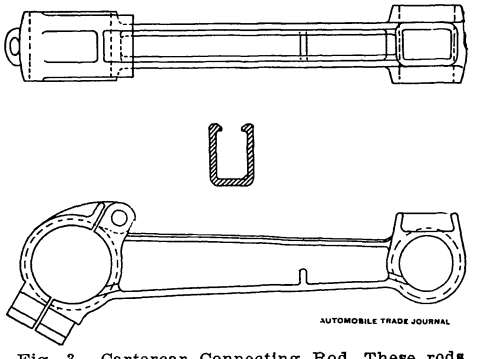

Fig. 3. Cartercar Connecting Rod. These rods are steel castings of V-section for the retention of oil and are 8 5-8 inches, center to center.

commutator is placed on the top end of the lubricator vertical driving-shaft. The connecting rod-bodies are V-section, to make them serve as oil-troughs to catch oil and lubricate the crank-wrist and the piston pin as shown in the accompanying drawing.

The valve action consists of rollers carried in pendulums. The roller-centers are placed above and below the cam axis with a view to quick opening and slow closing of the valves. The two roller pendulums are pulled towards each other by a single coiled spring, ends hooked in the pendulums, all as shown in Fig. 5. The valve pushers have fibre-filled cups, screw adjusted to make the contact silent. The cylinders are 5½x4½, and the crank-boxes and wrists are all 1⅞-inch diameter. The valves have chrome nickel steel heads with stems electrically welded to them. The ports are all 2⅛ inches diameter, valves 45 degrees angle. One of the arms of each crank is given a disk shape and this disk has an under-cut, annular groove formed in it to catch oil and transfer the oil to the crank-wrist oil-holes by centrifugal action.

CONTROL.

The spark and throttle control is had by ratchet-retained levers on top of the hand-wheel. The one outside hand-lever, not latched, traverses the paper wheel across the aluminum disk. There are two large pedals on the foot-board and a plunger pedal which opens the muffler. The left, large pedal pushes the disk to the rear and locks it to effect the disk and paper-wheel frictional engagement. The right, large pedal applies the rear-hub, internal, ordinary brakes only.

ON THE ROAD.

To show what the Cartercar fuel consumption is under ordinary conditions the following run was made, fuel measured.

October 17, 1907, a 1908, 5-passenger Model A Cartercar, carrying five passengers, total weight 3030 pounds, Mr. Snyder, driver, and Hugh Dolnar, observer, left Cadillac Square at 1.00 p. m., and was driven to Pontiac and return.

The day was delightfully warm, and the Pontiac road, gravel and clay, was good as it ever is, dry, not dusty and fairly smooth for much of the distance, with some rough spots and a detour at Birmingham, where the pike is closed for changes at the trolley power house. There was a fresh northwest wind, and it is a 450 feet climb to Pontiac, but as the course was doubled, wind and grade

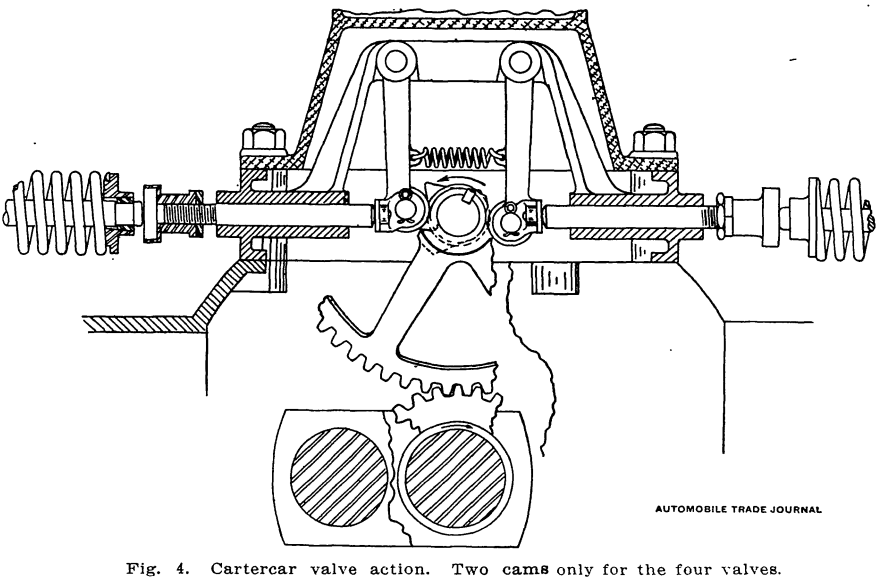

Fig. 4. Cartercar valve action. Two cams only for the four valves.

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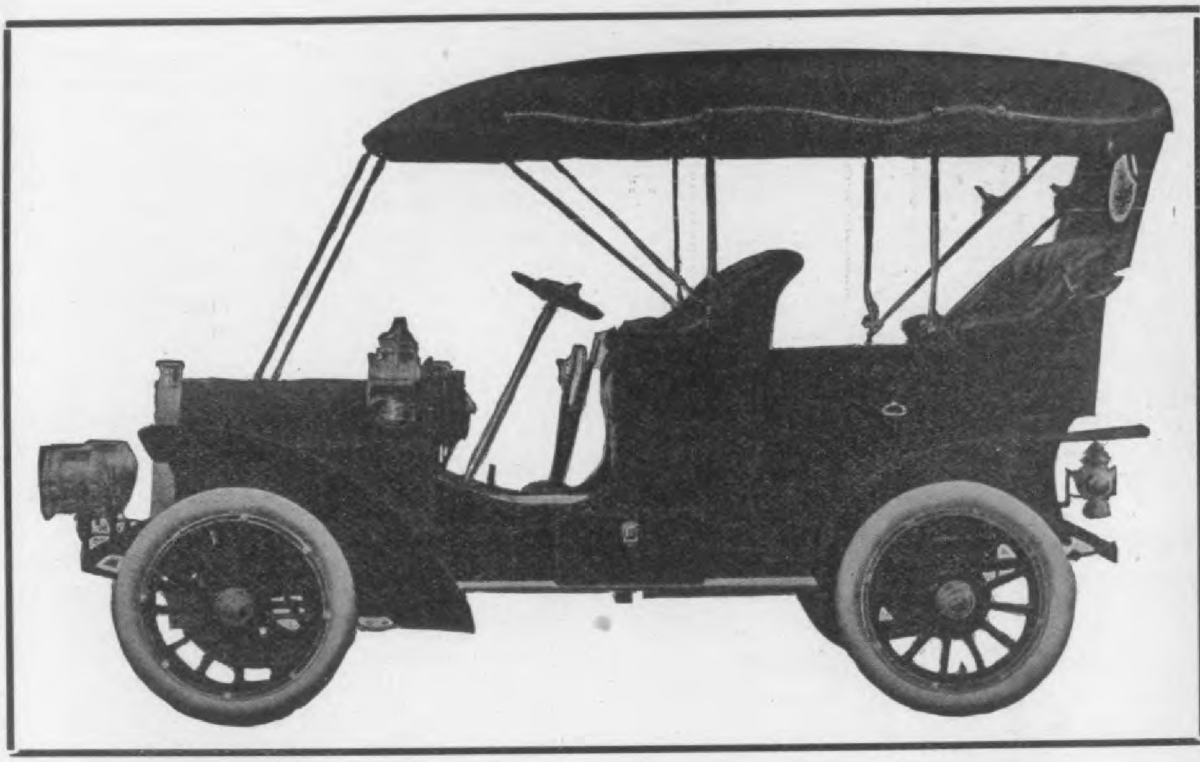
The Springfield Metal Body Co.



LARGEST MANUFACTURERS OF HIGH GRADE ALUMINUM TOURING, RUNABOUT, LIMOUSINE, AND LANDAULET BODIES IN THE WORLD.

We will be pleased to correspond with manufacturers as to their requirements.

We are now closing contracts for 1908 delivery.

Write for information and prices.

SPRINGFIELD METAL BODY COMPANY

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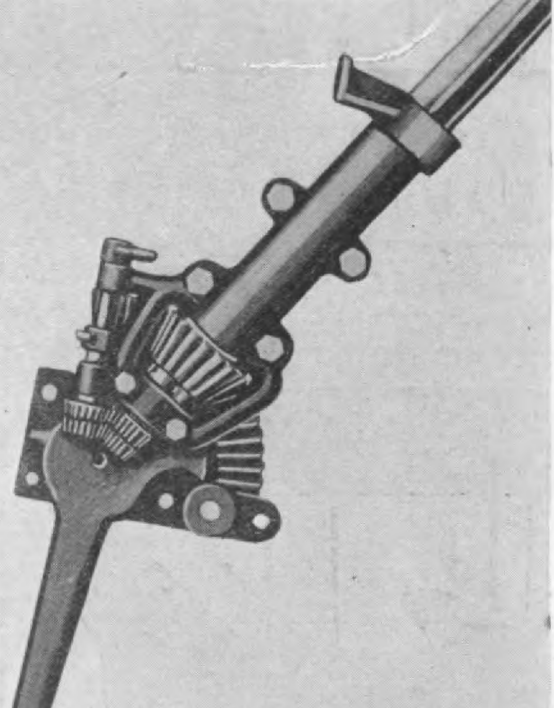

'ig. 5. 1908 Cartercar bevel gear steering ion.

eedometer and mile recorder and the ight was taken on scales, so the dis-

standing on a level floor. The highe speed noted was 37 miles per hour, a the distance, as shown by the record was 27.2 miles one way, 54.4 miles rou trip. The road surface altho rough spots, was hard, except over the deto in Birmingham. The speed limitations Birmingham and Detroit prevent fast ru ning, Detroit just now being severe fast driving.

Our running time, Hodges House to t Fountain, 27.2 miles, was 52 minutes. O weight was 3030 pounds, the distan covered was 54.4 miles; these figures giv 3030 multiplied by 54.4 and divided 6,000, 27.4 ton-miles to the gallon of gas line burned, a very much better resu than was had at the Cleveland trials ferred to, because the Cleveland runs we made on muddy roads, while the Ponti pike was clean and dry the day of our ru

There are not many cars made that c show as good as 27.44 ton-miles to the g lon of gasoline for this Detroit-Ponti round trip, and this run shows, conclusiv ly, that the Cartercar friction drive is n more wasteful of power than the ordina toothed-gear speed-change. This very joyable ride also showed the Cartercar be fast enough, and roomy enough to car five passengers with satisfaction to concerned.

Creditable Performances

Charles S. Henshaw, of Boston, Mass., October 17, made a noteworthy run of 1/8 miles with a Columbus Stanhope ctric, on only one charge of the bat- y. The run was over all kinds of high- ys from Boston to Gloucester and re- n. Mr. Henshaw started at 9.30 from State House, arriving in Gloucester ee hours later, a distance of 35 miles. the return trip the route was changed, l on reaching the garage the odometer istered 74.7 miles. Without five minutes t Mr. Henshaw continued over the city eets to roll up his mileage until the 1/8 miles mark was reached.

A Mitchell 20 H. P. motor truck loaded h one and a half tons of drugs, re- tly made a trip from Chicago to New rk City. The run was accomplished in hteen days. No attempt was made at king a time record. Six to eight hours lay were spent on the road and con- erable time was devoted to exhibiting truck in the various towns thru which past.

and violations of the automobile laws that state. It was organized in June, a recently rendered its first report, showi that it has been very active in the go work. More than 50 cases have been vestigated; five have been presented the criminal courts; four defendants we convicted, and one case was appeale Several other cases will soon be trie Eighteen complaints for reckless drivi have been made to the State Automob Commission, and about the same numb have been reported to the Commission, t evidence not being sufficient to warra a complaint and request for revocation licenses. The association has also pr pared cards for noting breaches of t law in the display of number plates, a issued these cards to the police of Bost and other cities and towns. Rewards ha in some instances been offered for t conviction of flagrant violators of the la The Secretary and Treasurer is Geor M. C. Sargent, 38 Equitable Trust Buildin Boston.

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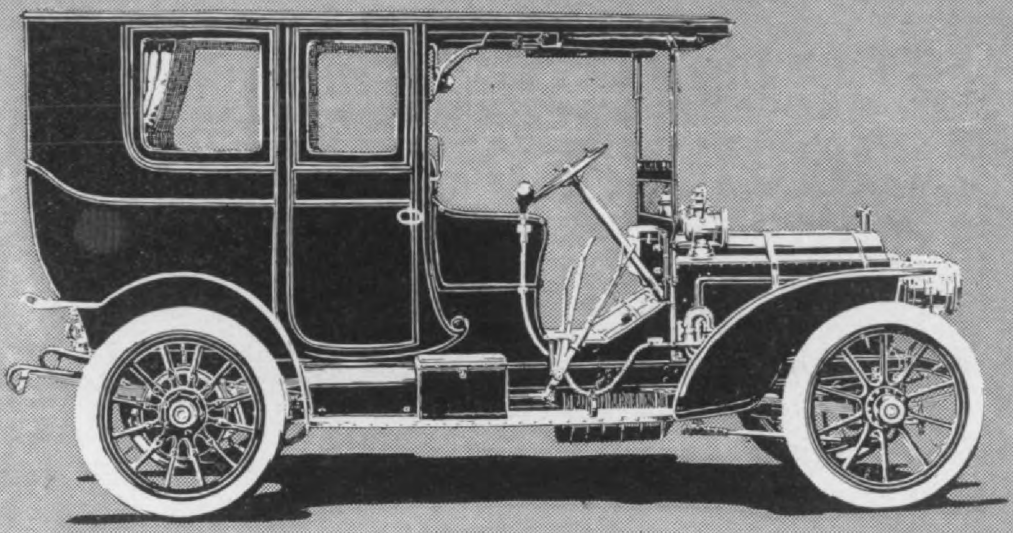
The Smith Motor Car Company, is t

Packard

"THIRTY"
1908



"Ask the man who owns one"

PACKARD MOTOR CAR COMPANY
DETROIT, MICHIGAN

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'he Northern Motor Car Company, fac-
ies at Detroit and at Port Huron,
chigan, will offer for the season of 1908
four-cylinder chassis with either a 7-
ssenger touring car body or a 3-pas-
ger runabout body, and a two-cylinder
ssis, which will take four styles of
lies, a 5-passenger tonneau body, a 3-
ssenger runabout, a limousine, and a
ivery wagon body.

all good in practice, were patented to t
Northern Company and are believed
this company to be of real value, but no
of these Northern 1907 characteristics w
appear in the 1908 cars, for the reas
that these same original features, high
meritorious as extended service show
them to be, made the cars hard to se
they were good and satisfied every pu
chaser who could be induced to buy, b

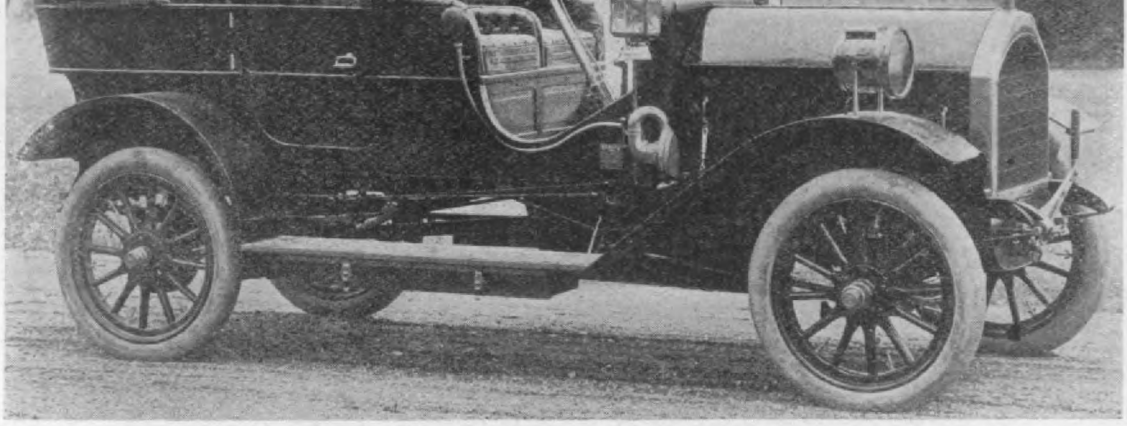

Fig. 1. Northern Model L, four-cylinder touring car, showing the new body lines, rounded
ge radiator, the carrying boxes under the running board, and the location of the lamps upo
e rigid guards. The elevation of the lamps alleviate the deceptive shading of road surfac
riations.

he Northern 1907 four-cylinder motor
s a quadruple-unit castings, the four
inders cast together in one-piece, and
Northern 1907 chassis had distinctive

every man's hand and voice was again
them, because if the air-control was rigl
it put all the others wrong, and the batt
was too strenuous for the Northern sal

Fig. 2. Northern Model L, four-cylinder runabout, same chassis as the large touring ca
Northern special starting lever and change gear lever under the steering wheel.

inal features in the way of an air-

agents. Hence, tho having every evidenc

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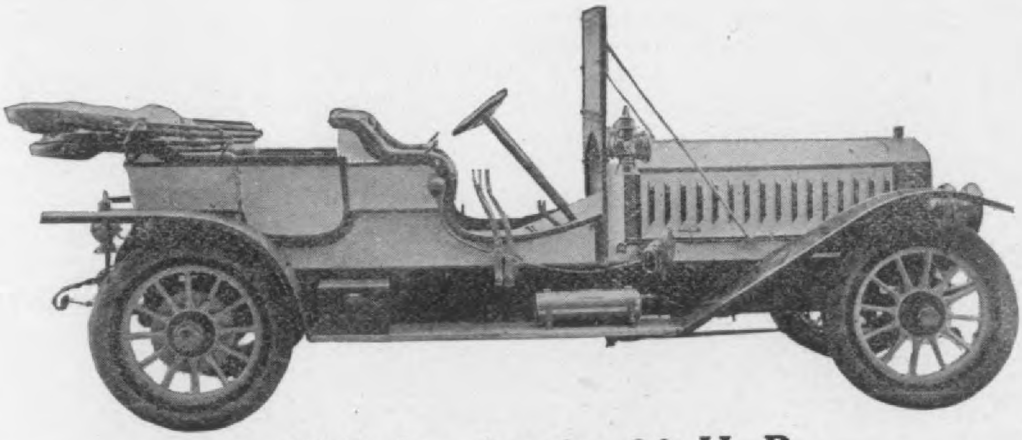
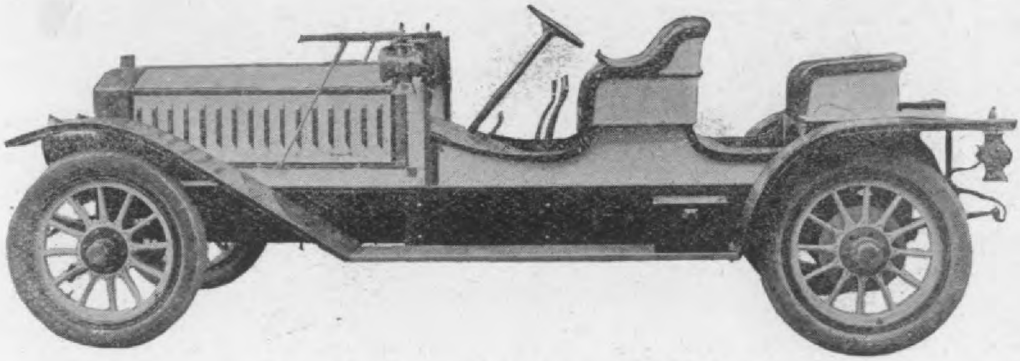
1908 Austin Model



6 Cylinder Austin, 90 H. P.



6 Cylinder Austin, 90 H. P.

The 1908 Austin Models are designed to exactly meet my own personal req ments after 6 years of building high grade cars, and to fulfill the ideas of that clas owners who want the "sportiest" kind of a car it is possible to get with *all* the po and speed they can possibly use—a car that is either a touring car or a runabout c ble of making a 1000 mile trip any time, and will beat anything on the road.

Our 6 cylinder 90 h. p. model is my idea of such a car—and I believe it st today without an equal in the Automobile world at any price.

Our new combination body as a touring car has an extra folding footb chauffeur's seat. The tonneau seat can be replaced in 3 minutes by a rumble thus converting the car into a runabout of the very latest design.

The equipment is complete in every respect, and includes both seats, and exte surrey top for the touring car, and single top for the runabout. We also furnish new combination body on our regular 60 h. p. model in place of 7 passenger to body. This regular standard body, either with or without detachable limousine will be furnished on both 60 and 90 h. p. models.

All Austin cars have the celebrated Austin Motor and are built in our own under my personal supervision.

Send for Catalogue and detailed information about our new models.

Hosted by Google

WALTER S. AUSTIN Austin Automobile Co

small forgings generally will be pro-
ed at Detroit, while the front and rear
es and steering gear will be made at
Port Huron shops; the assembling
be done at both places. The expecta-
is to turn out 50 Northern 4-cylinder
and 500 of the 2-cylinder chasses.
he single cylinder which was the first
turned out by the Northern Company,
which has been built ever since the
t, will be discontinued in 1908, as this
pany believes the opposed cylinder
h better than the single cylinder for
driving.

as the touring car. It has a 3-passeng
runabout body, 40 H. P. motor, A. L. A. M
rating, and weighs 2800 pounds. The pric
is $3500, including 5 lamps, mats, hor
and tools, all ready for the road. The to
is extra.

The 1908 Model C, two-cylinder 5-pa
senger touring car, has a wheel base o
106 inches, gage 56 or 60 inches at th
purchasers option. The tires are a
32x3½ inches. The motor is a pair of op
posed cylinders, 5½x5¼ inches, 4-cycl
water-cooled, 24 H. P., A. L. A. M. ratin
The cylinders are cross-wise of the ca

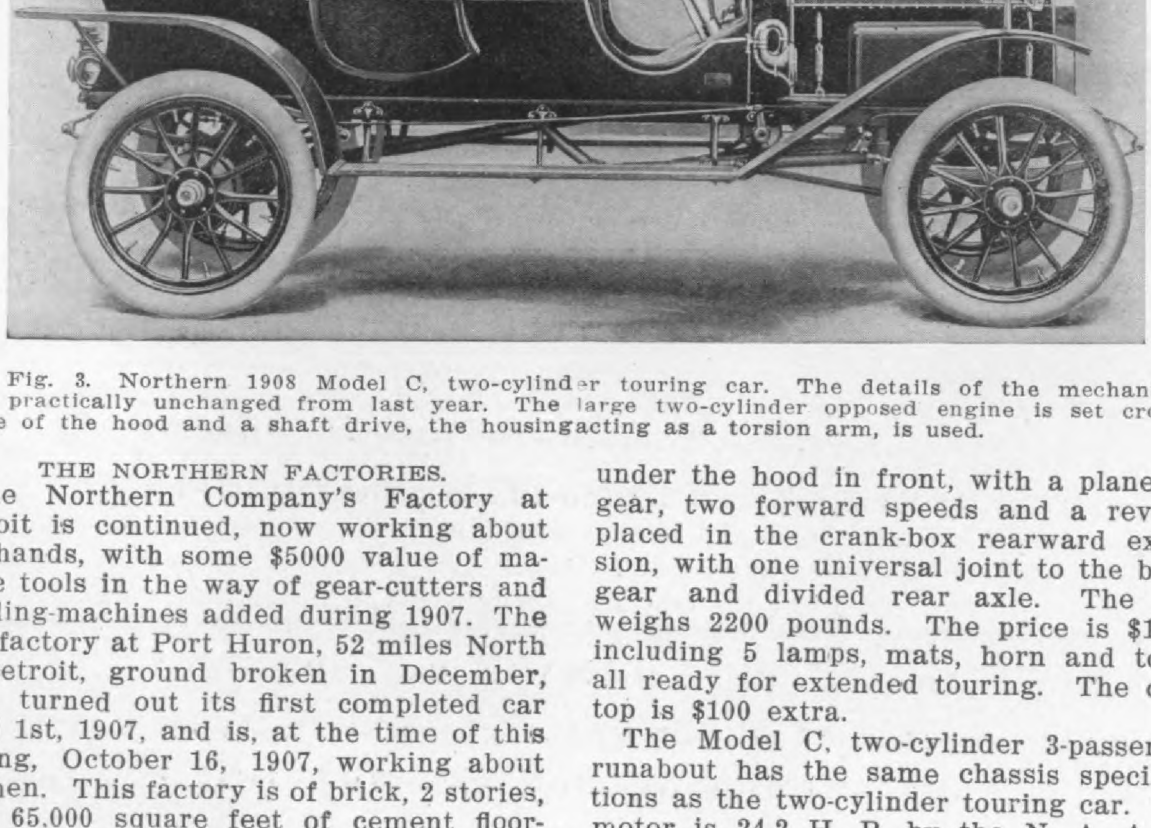


Fig. 3. Northern 1908 Model C, two-cylinder touring car. The details of the mechanism practically unchanged from last year. The large two-cylinder opposed engine is set cross- e of the hood and a shaft drive, the housing acting as a torsion arm, is used.

THE NORTHERN FACTORIES.

e Northern Company's Factory at oit is continued, now working about hands, with some $5000 value of ma- e tools in the way of gear-cutters and ling-machines added during 1907. The factory at Port Huron, 52 miles North etroit, ground broken in December, turned out its first completed car 1st, 1907, and is, at the time of this ng, October 16, 1907, working about hen. This factory is of brick, 2 stories, 65,000 square feet of cement floor- ce and $60,000 value of machine tool ment. It is the policy of the company ake all of the components of the cars own factories, axles included.

THE 1908 LINE.

e Northern 1908 7-passenger touring Model L has wheel-base of 119 inches, 56 inches. The tires are all 34x4½ s. The motor is 4-cylinder, 5x5 s, water-cooled, 4-cycle, dual-units, 40 A. L. A. M. rating. The change

under the hood in front, with a planetar gear, two forward speeds and a reverse placed in the crank-box rearward exten sion, with one universal joint to the beve gear and divided rear axle. The car weighs 2200 pounds. The price is $1600 including 5 lamps, mats, horn and tools all ready for extended touring. The cape top is $100 extra.

The Model C, two-cylinder 3-passenger runabout has the same chassis specifica- tions as the two-cylinder touring car. The motor is 24.2 H. P. by the N. A. A. M. formula. The weight is 1900 pounds, and the price $1600, including 5 lamps, mats, horn and tools, ready for the road. Upon this same chassis a limousine body is also fitted. This limousine body is of elegant design, finest upholstering and finish, beveled plate glass windows which will open, speaking tube, toilet and valuable cases and electric lighting from storage battery. This limousine body has ample

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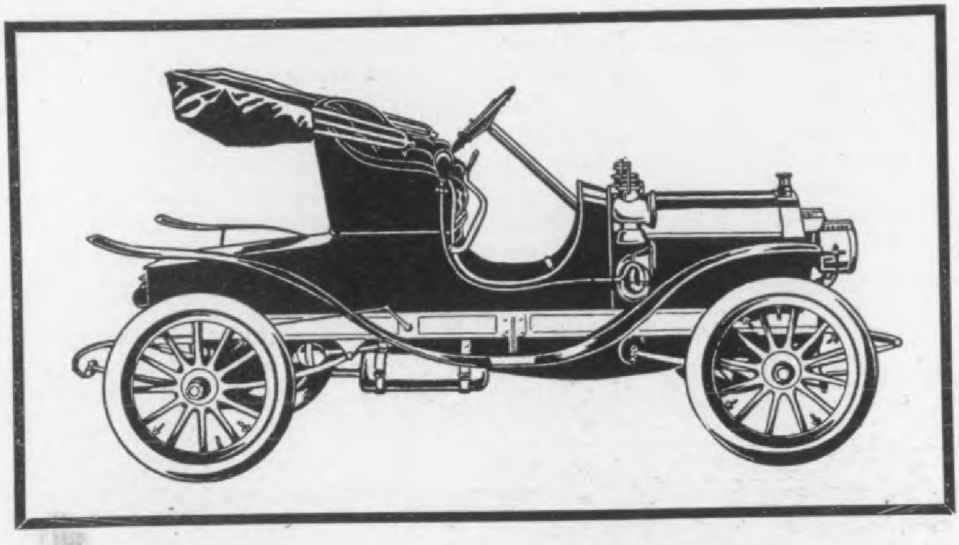
Agents .. Speak Quick!



The Atlas

Famous 20hp. Runabout.
Rumble-Seat 30hp. Runabout
Luxurious 40hp. Touring Car.

Equipped with the motor-marvel of the age, in units of 2, 3 and 4 cylinders.

These motors embody *absolutely all* the successful and desirable features of the best 4, 6, and 8 cylinder automobile engines, with ONLY ONE-TENTH as many moving parts.

All cars equipped with finest aluminum bodies.

Hosted by Google

Atlas Motor Car Co.

The Model C Delivery Car, 1200 pounds ying load capacity has the same chassis ecifications as the two cylinders, 24.2 P., 5-passenger touring car. The car ighs 2200 pounds and sells for $1500, cluding 3 oil lamps, mats, horn and tools, th a large tool-box on the foot-board.

NOTABLE FEATURES.

The notable features of these Northern rs on the road are silence and the strong nning of the motors at low speed, due good balancing and low compression. e notable manufacturing feature is the nstruction of all principal components, the Northern Company's own factories. e silent action of the motor is obtained the placing of two large and long ffler-shells, having no internal obstruc-

of angle steel 2x3x¼ inches, wide me ber vertical inside, and narrow meml horizontal on top. The weight is greater than that of a prest steel fra which makers will guarantee to carry required weight, and the cost of the ang steel frame is only about one-half that the prest steel equivalent. The angle-st frame is much less damaged by accide than the U-section prest-steel frame, whi buckles under impact, while the ang steel frame merely bends under extre pressure and can nearly always straightened without replacement of frame sides.

The company claims never to have h a broken chassis frame, and offers to gi any man who can show a Northern chass

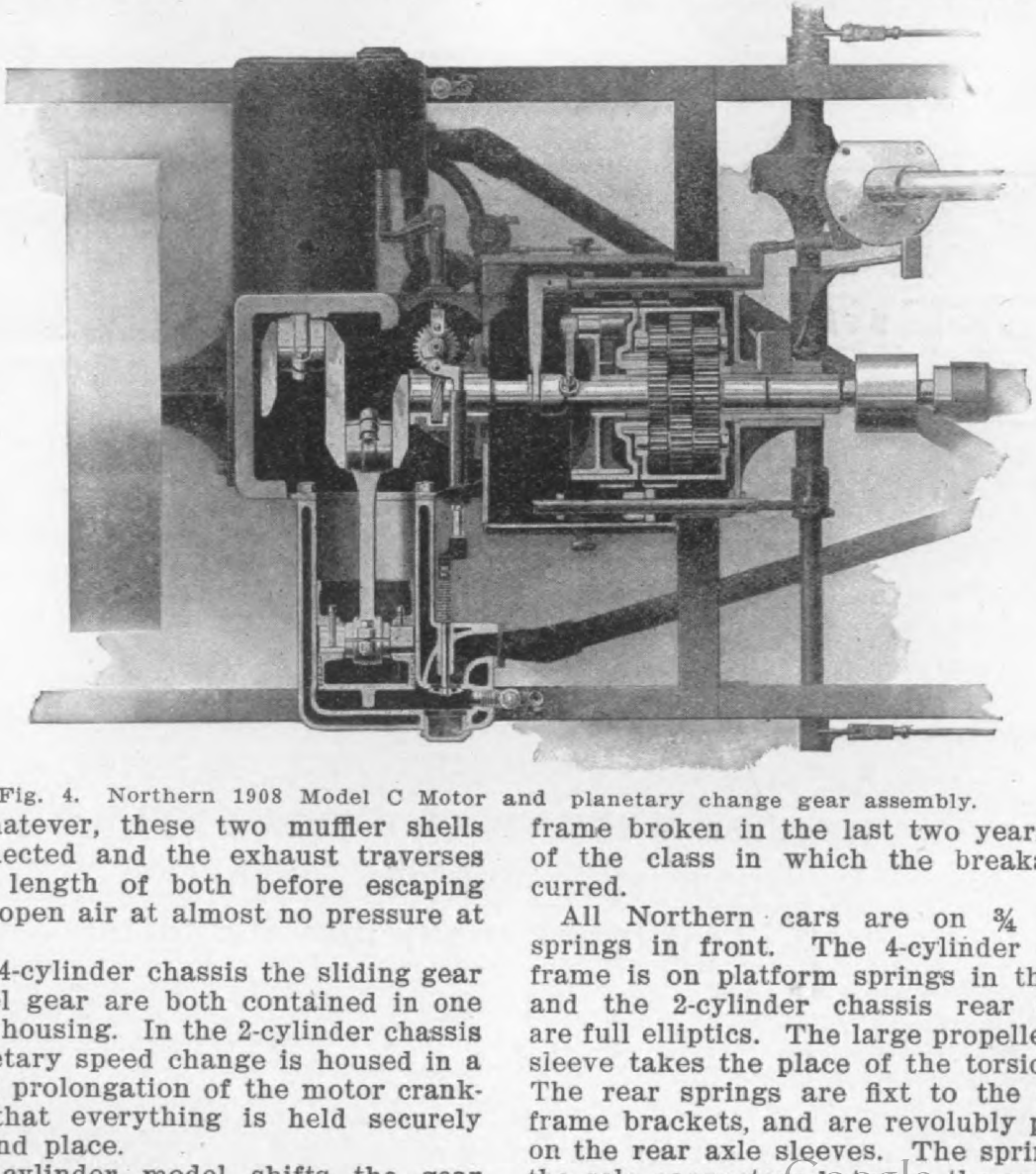


Fig. 4. Northern 1908 Model C Motor and planetary change gear assembly.

s whatever, these two muffler shells connected and the exhaust traverses full length of both before escaping the open air at almost no pressure at

the 4-cylinder chassis the sliding gear bevel gear are both contained in one -axle housing. In the 2-cylinder chassis planetary speed change is housed in a rward prolongation of the motor crank- so that everything is held securely ine and place.

he 2-cylinder model shifts the gear a short horizontal lever under the ring wheel.

frame broken in the last two years a c of the class in which the breakage o curred.

All Northern cars are on ¾ ellipt springs in front. The 4-cylinder chass frame is on platform springs in the rea and the 2-cylinder chassis rear sprin are full elliptics. The large propeller sha sleeve takes the place of the torsion ar The rear springs are fixt to the chass frame brackets, and are revolubly perche on the rear axle sleeves. The springs a the sole connectors between the axles a the chassis frame. The steering gear

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The Wonder *of the* Palace Show

One of the Notable Surprises of the Automobile Year has been

The SEXTET

"JUSTIFIES ITS NAME"

This car has a Conservative Rating of forty-five horse-power.

Seats Seven Passengers.

Double Ignition.

36″ Wheels—126″ Wheel-base.

Chrome-nickel Gears, Hess-Bright Bearings.

Irreversible Steering Gear, Acme Special Carburetor.

Full Equipment—Including Acetylene Generator.

And Sells for Forty-Five Hundred Dollars
The Best of the Sixes

The Acme Motor Car Company

A few agencies are still open

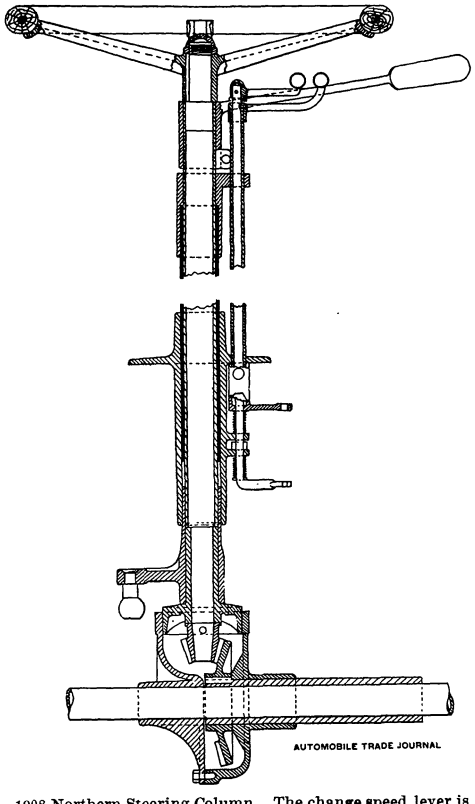
READING, PA.

Hosted by Google

lowing the wheels to yield to obstacles. A single tubular rock-shaft journaled crosswise of the chassis frame, is made to support the rear end of the motor and gear box assembly the pedals and the steering gear, while this tubular shaft also serves as the brake-rocker.

BRAKES.

The brakes for both forms of chassis are on and in the same brake-drum, prest steel, 11 inches diameter by 4 inches face, instead of the much narrower faces commonly placed. This great brake-drum and shoe-width ensures durability, and enables the camel's hair brake facings to stand



1908 Northern Steering Column. The change speed lever is still under the hand wheel. The spark and throttle control are by concentric rocker and rocking sleeve with small knobbed levers under the wheel.

hard work without deterioration. It is stated by the company that it has never yet been necessary to replace the camel's hair facing of any brake-band or shoe on a Northern car, and some of these brakes have been in use for four years.

The 4-cylinder chassis uses exterior brake-bands and internal shoes; the 2-cylinder chassis fits exterior brake-bands only, the planetary reverse serving as an emergency brake. The rear hub brakes can slide the wheels.

Two-cylinder cars with tonneau and runabout bodies to carry 5 or 3 passengers respectively, are offered at lower prices than are asked for the Northern cars of the same seating capacity, and about the same power, while the appearance, when new, and the equipment list, on paper, are about alike for cars of the same class. The Northern prices are higher simply because it is claimed the cars cost more in the factory. In painting, which determines the appearance of the car, no less than eighteen finishing coats are given, while eight is the number of finishing coats actually applied to many low-priced automobile bodies. Instead of the usual low lamp placing on a fork just above the chassis frame sides, large brackets are used, which elevate the lamp above the tops of the front-fenders, and light the road in a much better manner than is possible with low-placed lamps. This same careful consideration of best results is carried thru the entire construction. There is considerable difference in cost between the 2-cylinder chassis having the motor set lengthwise under the body with chain drive to the rear axles, and one with the motor set crosswise in front under the hood, with the propeller shaft and bevel gear drive to the rear axles. This construction alone it is claimed makes the chassis cost about $200 more.

THE AXLES AND SPRINGS.

The Model C front axle is a steel-tube 2 inches diameter, 5-16 walls, with spring perches and Lemoine type of stub-axle support applied by pinning and brazing. The front wheels are on Timken rollers. The rear axle sectional assembly carries everything on Timken rollers and uses a bevel balance gear. The wheels are held up to a shoulder on the cylindrical outer ends of the axles with hex. nuts, and are keyed to prevent turning.

The top ¼ member of the front spring is one heavy leaf. The lower front spring member is half-elliptic, 36 inches long by 2 inches wide, has 6 leaves and is tongued, grooved and banded. The rear full-elliptics are 36 inches long by 2 inches wide, 6 leaves, banded, tongued and grooved, revolubly supported on the axle sleeves and fixt on top to the chassis frame under side. Neither struts nor torsion arm are fitted as the cardan-shaft housing acts as an effective torsion rod.

The float feed carburetor is a special Northern design, first introduced in 1904, and has been so satisfactory as to have had only slight changes since.

MODEL C STEERING AND CONTROL.

The steering is by bevel pinion and bevel gear sector as shown in the accompanying drawing. The spark and throttle control are by concentric rocker and rocking sleeve, with small handles on top,

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Announcement

For 1908 We Shall Have Four Distinctly GOOD Automobiles

1. The Model C Jackson, listing at $1250, a chain drive, two-cylinder touring car, 20-24 H. P.
2. The Model D Jackson, listing at $1500; a bevel-gear drive, two-cylinder touring car, 20-24 H. P.
3. The model E Jackson, listing at $2000; a bevel-gear drive, four-cylinder touring car, 35-40 H. P.
4. The Model E Jackson Runabout, listing at $2000; a bevel-gear drive, four-cylinder runabout, with rumble seat, 35-40 H. P.

The Model C has a planetary transmission, the others have sliding gears, selective type; all have full elliptic springs, rear; every one of them is distinctively a leader in its class; all of them will certainly sustain the well-known reputation of Jackson cars for style, speed, power, and endurance.

"No sand too deep"
"No hill too steep"

Jackson Automobile Company
JACKSON, MICH.

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ing on the steering shaft to the
e-end steering wrist fixt in the short
ring arm at the left of the bevel gear
ng.

here are two pedals on the foot-board.
left pedal, free, when pushed forward
cts the reverse. The right pedal,
hed, when pushed forward applies the
rnal, rear-hub brake bands.

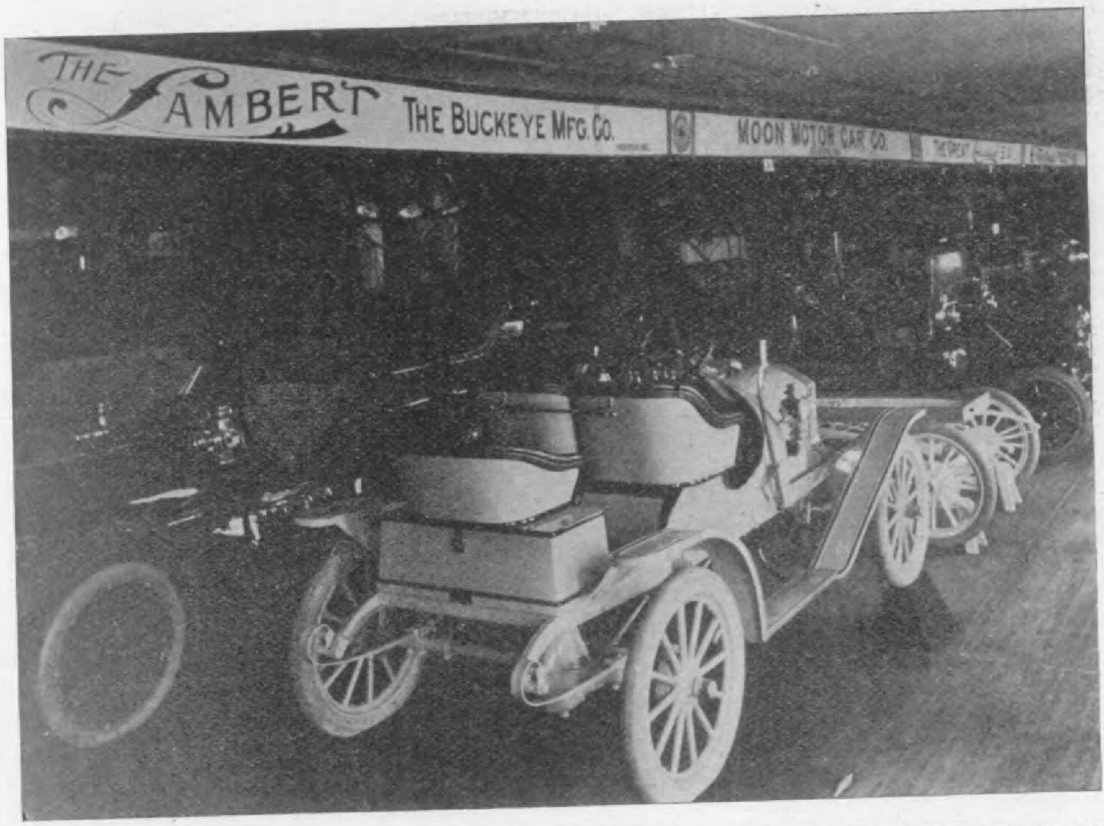
ON THE ROAD.

aturday, October 19, a Northern Model
ouring car, tank full, driven by a pair
opposed cylinders, and with the
ter as observer headed for Pontiac,
sing the Fountain, Cadillac Square, at
p. m. The day was cloudy and raw,
Pontiac Pike was very dusty and full
farmer's teams and motor cars, as it
ays is on a Saturday afternoon, and
first 14 miles was made behind a
rless with a full load, which we could
pass without consent, the thick dust
ids and raw wind making these miles
thing but delightful. Finally the Peer-
s let us go by and we reached the

Returning to Detroit the Fountain wa
reached at 4.45 p. m., 65 minutes for th
27.2 miles. The car was then driven
miles, to the Northern Shops where it too
7 gallons of gasoline to fill the tank. Th
total distance covered was 65.4 mile
weight 2,860 pounds, fuel 7 gallons, givin
about 13.4 ton-miles as the performanc

The Northern Model E is almost entirel
silent, and is one of the easiest riding ca
in which the writer has ridden. Th
run was not made in very fast time, an
as it was a round trip, wind and grad
did not affect the result. As usual, th
return run seemed much the quickest, b
the watch showed only 3 minutes diffe
ence.

The performance of the Northern as
touring car to carry its passengers wi
comfort and certainty, was perfect. Th
springs are very easy indeed and nothi
whatever was touched by the driver sa
the starting crank, the steering post co
trol and the pedals.



Grand Central Palace Show—Buckeye Mfg. Co., Anderson, Ind. Lambert Friction Drive Cars

A. M. C. M. A. Show Luncheon

The American Motor Car Manufacturers'
ssociation held its annual show luncheon
Monday, October 28, in the Hotel Man-

speakers were Winthrop E. Scarritt, B
jamin Briscoe, A. O. Smith and Thor
F. Moore.

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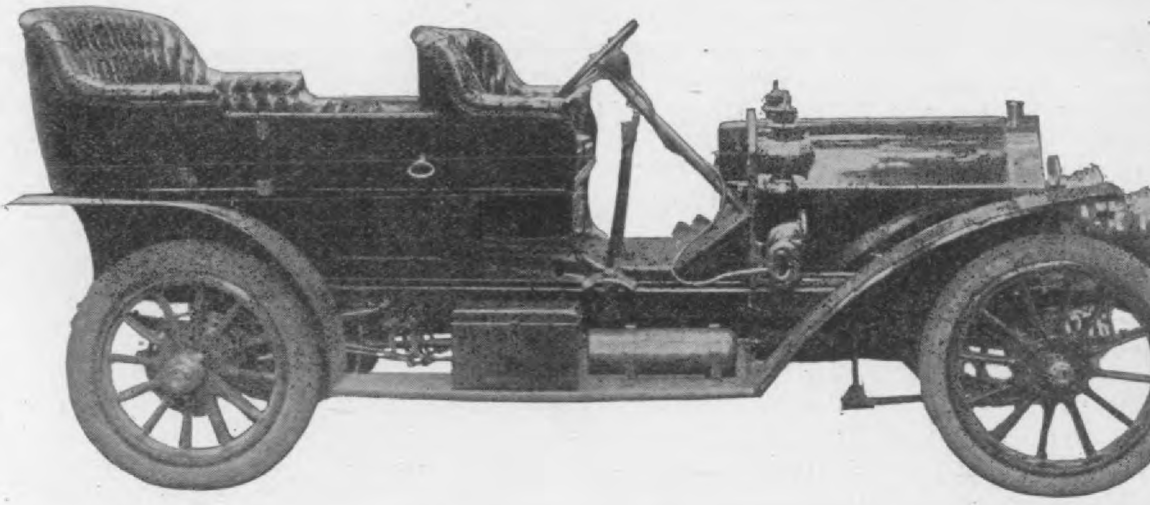
Because adequate space could not

TYPE C

PENNSYLVANIA

50



¶ Embodying Chrome Nickel Steel, Annular Bearings, Aluminum Body. *Equal to the Best. Impossible to get better.*

$2800.00

FIFTY H. P.

¶ 4¾ x 5¼ valve in head. Hollow Crank, Eccentric Ring Oiling, Large Bearings, Perfectly Balanced.

Pennsylvania Auto Motor Co.

Hosted by Google

he Maxwell-Briscoe Motor Co., was
l to be inadequate, and in 1906 and
two additional plants, one in Paw-
et, R. I., and the other at Chicago
acquired, the combined output of
e being 4,000 cars in 1907. The fourth
ry at Newcastle is now nearing com-
on and all parts of the Maxwell cars
be manufactured at this plant.

e fundamental prinicple of two cylin-
opposed motors for all small cars
g at 20 H. P. or under, and four-
der engines of the vertical type for
igher powered cars will be adhered to.
e season of 1908 will see no radical
ges. The Maxwell two-cylinder con-
ction has reached a high degree of
ection, and the few changes that will
ar in the 1908 product are minor ones,
isting in refinement of less important
ils rather than in departures from the
gn of former models.

e most noteworthy addition to the
well line is the 24-26 horse-power
-cylinder car, which is furnished
either runabout or touring body, and
at $1,750.

oil lights, horn, complete set of tools an
tire repair kit. Despite the additiona
equipment, the price $1450 has not bee
increased.

No change has been made in the doubl
opposed motor of 5-inch bore and 5-inc
stroke. A special feature is the metho
provided for quickly adjusting the mai
bearings. These bearings consist of tw
babbit-lined bronze boxes, behind each o
which is a wedge-shaped piece of stee
controlled by a set-screw. After loosenin
a jam nut the wedges may be forced u
ward, bringing the bearing together an
taking up wear. It is claimed the entir
operation of adjustment requires but te
minutes, and obviates the necessity fo
dismantling the engine.

The unit construction of the moto
clutch and change speed gear, the whol
being mounted in a three point suspe
sion is continued as in previous models.

The largest of the cars Model M, wit
its four cylinders 5x5 inches, rated at 4
H. P., is also continued without an
material change, the price being $3000.

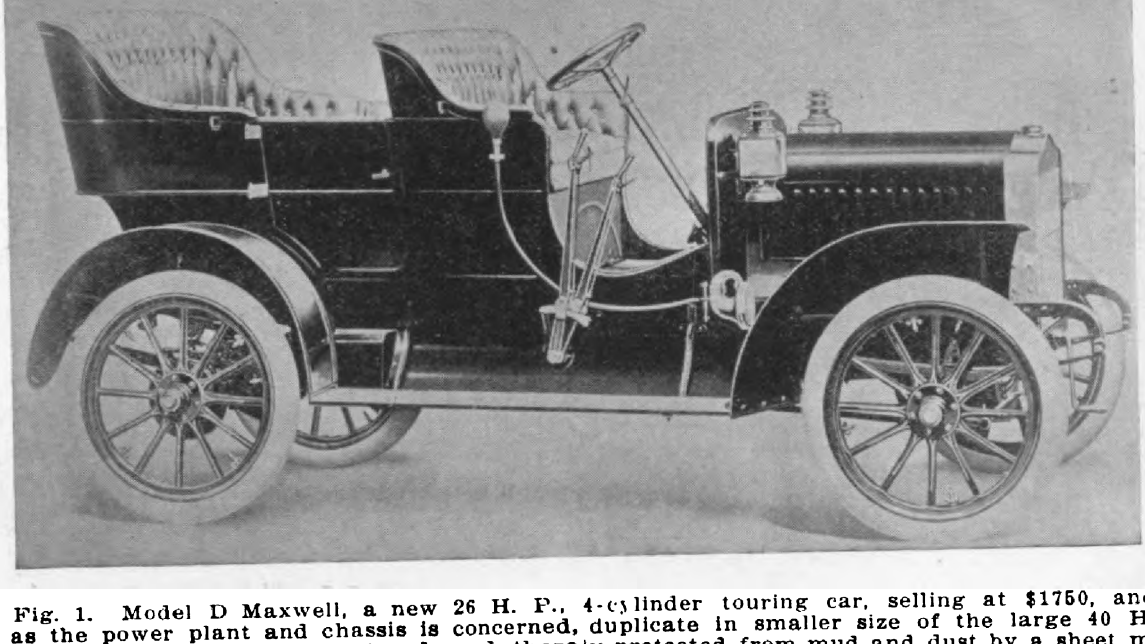


Fig. 1. Model D Maxwell, a new 26 H. P., 4-cylinder touring car, selling at $1750, and a
r as the power plant and chassis is concerned, duplicate in smaller size of the large 40 H. P
uring car. It is well proportioned, and thoroly protected from mud and dust by a sheet meta
n extending from the frame to the running board. This car will also be furnished with
ecial runabout body, built on the lines of the Hammond roadsters, and provided with the usua
auffeur seat, the wheel being tilted proportionately.

he runabout of 12-14 H. P. is carried
r practically as marketed last year,
n the price of $825 is the same.

he 16-20 H. P. two-cylinder opposed
ring car remains practically the same
last year. An increase of four inches

THE NEW 26 H. P. MAXWELL.

This year the company has added a ne
four-cylinder car, known as Model
selling at $1750.

The motor is of the four-cylinder, v
tical, four-cycle type 4¼x4½ inches, rat

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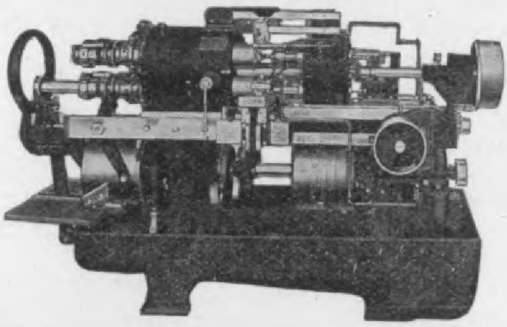
THE
Most Economical Method of Screw Making
and the manufacture of
Duplicate Parts
from the bar is the use of



The Acme Automatic
MULTIPLE SPINDLE
Screw Machine

IN DULL TIMES it arms you to meet competition.
IN BOOMING TIMES it equips you to handle a larger volume of orders.
AT ALL TIMES it increases the efficiency of your plant and saves you money.

MILLED GOODS

of all classes made from iron, brass and steel to your specifications.

Attractive Prices
and
Prompt Service
GUARANTEED

Send us your samples and specifications. We will quote you prices without delay.

Screw Machine Product

BRANCH OFFICES
New York

THE
National Acme Mfg. Co.

General Foreign Representatives

Hosted by Google

ration, and its operation is noiseless. lve chambers and water-jackets are in-gral with the cylinders, the chambers ing located on opposite sides, with lves mechanically actuated.

The Maxwell thermo-siphon system of ater-cooling which has proved so effec-ve, is also employed in the Model D

directly under the steering wheel, on steering column.

THE CHANGE SPEED GEAR.

The transmission is sliding-gear—p gressive type giving three speeds f ward, and reverse. The transmissi housing is absolutely dust and oil-proof

Motor and transmission are connec

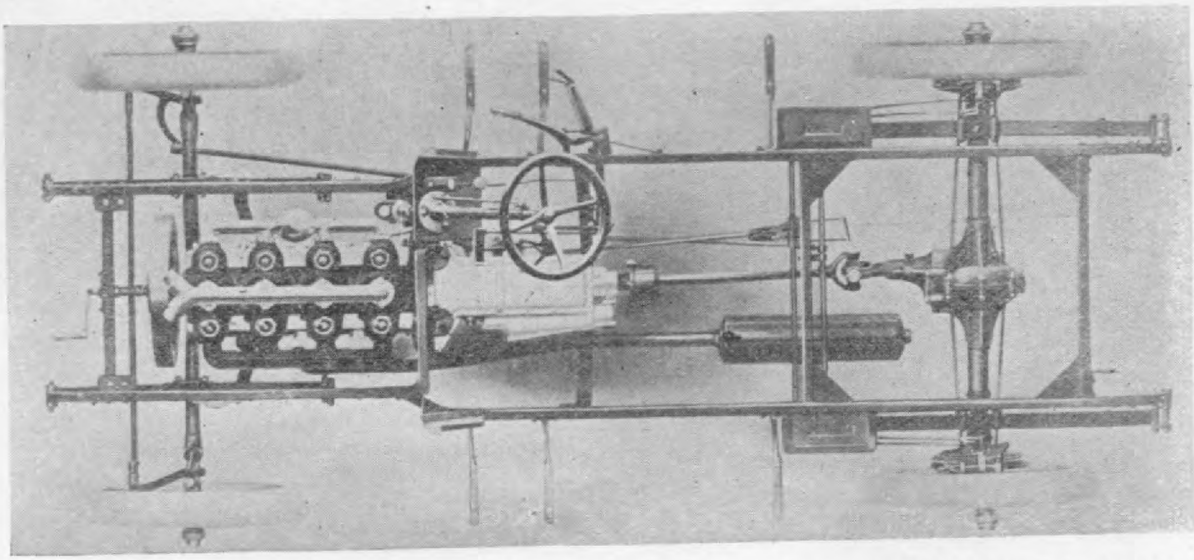
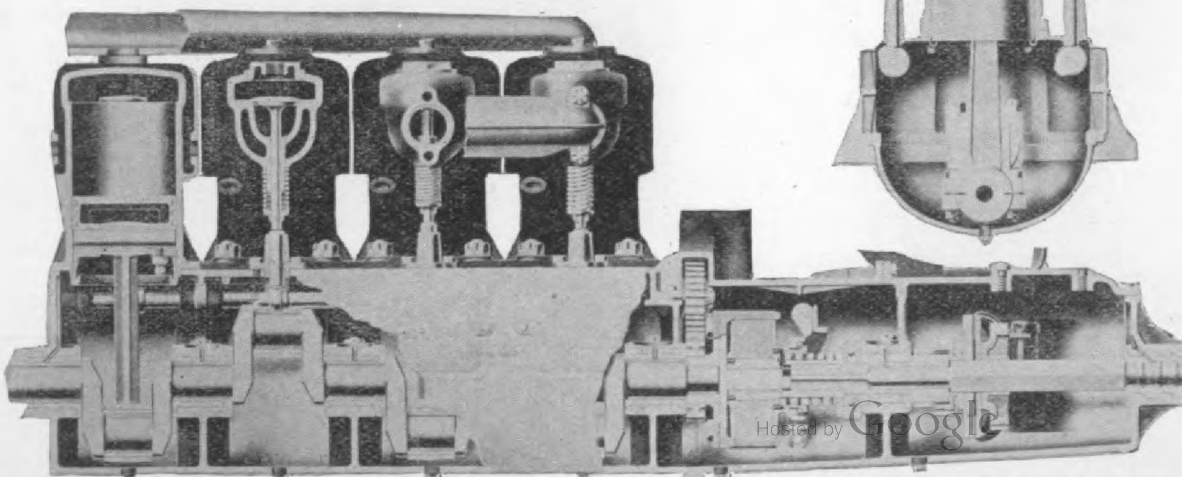


Fig. 2. Chassis of the new 26 H. P. Maxwell. This chassis is modeled after that of the H. P. touring car. The engine is slightly tilted so that the universal joints are not called up to do excessive work.

our-cylinder car. In this system, no ump is required, the natural circulation f the water being depended upon to cool e engine. Since the rapidity of the ermo-siphon water circulation depends irectly upon the heat developed in the ngine, cooling is automatic, slow enough o give full thermal efficiency, and rapid nough to prevent overheating even under onditions of severe service. A fan, ounted on a ball-bearing shaft assists n cooling.

The carburetor is of special design

by an all-steel multiple-disc clutch of n teen plates of a size that affords a tion surface much in excess of all rea able demands. The clutch is fully enca and runs in a bath of oil, limiting t minimum the liability to wear and



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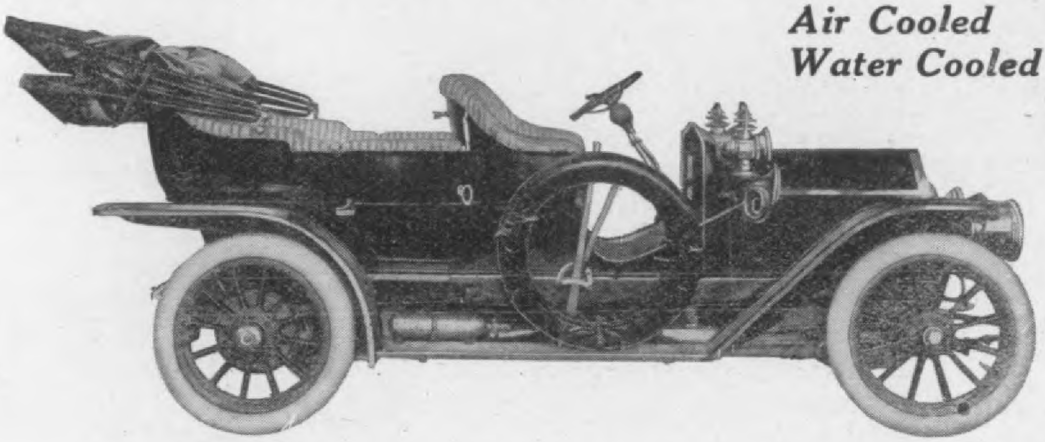
THE MARMON

"A Mechanical Masterpiece"

The Easiest Riding Car in the Worl

Air Cooled
Water Cooled



YOU may think you know what it is to ride comfortably in a motor car.

But until you experience the easy, gentle motion of a Marmon over rough roads, you simply do not know what automobile comfort is.

This is just one feature of the exclusive mechanical excellence of the Marmon Car. It offers all that any other high-grade car offers, plus a number of distinct advantages.

The Marmon account for 1908 offers a very attractive proposition. We have some open territory for first-class agents.

Model H. Touring Car, 40-45 H. P., $3500; Model H. Roadster, 40-45 H. P., $3500; Model G. Touring Car, 35-40 H. P. $3000.

For complete description of all models, address Department 15.

Nordyke & Marmon Co.

(Established 1851) INDIANAPOLIS, IND.

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y, that starting and stopping is e-
d without jolting. Another valuable
re of the clutch consists in an inter-
ng device, which makes it impossible
he operator to shift gears while the
h is engaged. Gear-stripping is in
manner made impossible, and even
reless or inexperienced operator can-
njure the gears.

e drive is by shaft, and two cardan
s are interposed, an interesting fea-
of which is a self-oiling device, which
s the universal "crosses" well lubri-
l at all times. These "crosses" are
tructed so as to hold a quantity of oil,
g automatic lubrication requiring no
nishment for a considerable time.
final drive is by bevel gear to a
ed tubular rear axle. The differential
ing is light, but amply webbed for
mum strength with minimum weight.
live rear axle revolves in a tubing of
n steel and perfect alignment is in-
l by a special thrust bearing.

LUBRICATOR.

brication is effected by means of a
tive force feed oiler, in connection
which there is automatic lubrication
he engine case and to the transmis-
A novelty is the unique way in
h the piston is kept lubricated. A
ved brass ring extends around the
r end of the vertical piston chamber;
ring is kept filled with oil by a sepa-
lead and the piston dips into the oil
he end of its downward travel. This
em insures perfect lubrication, at the
e time solving one of the most trouble-
e problems of piston lubrication, be-
e it is often found in ordinary vertical
line motors that the side opposite the
ead is dry on account of the oil being
umed by the heat of combustion be-
it has had time to work around the
e circumference. The superfluous oil
the grooved brass ring drops into the
k case, augmenting splash lubrication.
lubricator is positively operated by
motor and the oiling is absolutely auto-
ic, increasing or decreasing with every
ation in the speed of the motor. A
t feed on the dash gives the operator
ortunity to see that the lubricating sys-
works properly.

IGNITION.

nition is by jump spark, and the cur-
supplied by a set of dry cells and a
age battery, either of which may be
ght into operation by a two-way
ch on the box of a four-trembler coil.

FRAME, SPRINGS, BRAKES.

The rear springs are set out well towa
the hubs, in order to place the load of the
vehicle as near as possible to the point
where the axle enters the hub. Two sets
of brakes are provided, acting on the rear
drums, one set, operated by foot pedal,
being internal expanding; the other
actuated by a hand lever at the right-hand
side of the vehicle, being external con-
stricting.

Fig. 4. Rear of the dash Model D Maxwe
showing the control levers. The throttle is con
trolled by the small foot pedal, while the spar
is regulated by a lever on the steering post. Th
inside lever controls the gear shifts.

BODIES.

All Maxwell bodies are made of shee
metal, with stamped mouldings, a con
struction as light as wood and stronge
than aluminum, but not liable to breakag
since dents may be hammered out, whil
in the case of a panelled wooden body th
substitution of an entire new panel i
necessary to repair damage. The upho
stery is of the fine quality leather an
hair, and the equipment includes lamp
horn, tools, dry cells, storage battery et
The weight of the car, with full equipmen
2100 pounds. The price is $1750. F. O
B. Factory.

The same chassis is also fitted with
body of the semi-racing type, the divide
front seats being well back on the fram
and the steering post, tilted to correspon

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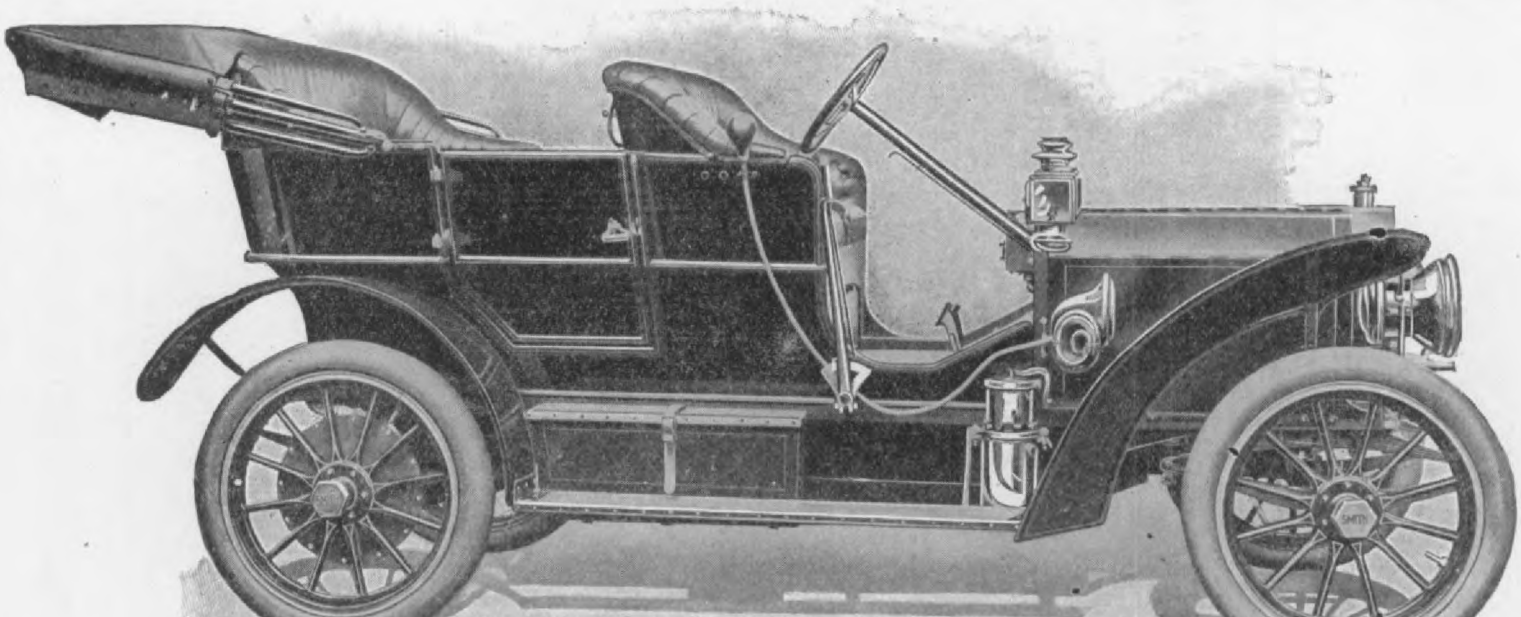

"Isn't it Great?"

he Great Smith four-cylinder touring car for 1908 is just as dependable as ever, it looks just as good, and it behaves just as well. hese are the big things that count. Then come the little things, and this is where we have made improvements that have materi d the general efficiency of our 1908 model.

he addition of roller bearings on the auxiliary shaft makes far less noise and more power. The tonneau door has been made two inc nd a quadrant has been placed over the steering wheel giving better control of the throttle and spark levers.

Including Lamp Equipment - $2,650.00 Price, Including Lamp Equipment and Pantasote Top : $2,775

OUR 1908 LITERATURE IS NOW READY

SMITH AUTO COMPANY, *Manufacturers.* **Topeka, Kansas, U. S. A.**

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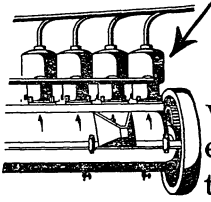
The Right Place and the Wrong



for Gasolene Explosions

It is a function of gasolene vapor to explode. It is explosions in the cylinders that drive your car along; but gasolene vapor is too apt to form and explode in places other than the cylinders and cause destruction of property and loss of life.

The Bowser Gasolene Storage Outfit

will prevent gasolene vapor from forming and exploding in the wrong place. The **Bowser Outfit** will preserve the life, the explosive quality of the gasolene until it reaches the right place.

For this reason: the **Bowser Outfit** is absolutely air tight; it transfers the gasolene from the underground tank direct to the reservoir of the car without exposing it to the air. And since the gasolene is never exposed to the air, it has no chance to form explosive vapors in the wrong place or become weakened and contaminated before it reaches the right place.

That is one reason why the **Bowser** is recognized throughout the entire country as

The Standard Garage Equipment For Gasolene Storage

There are **Bowser Outfits** for Public Garages and Private Garages, outfits of all capacities and all prices. There are **Bowser Outfits** which **exactly** meet your requirements. They are all illustrated and described in Catalog T. Ask for it and we will send it with complete information and prices. Write today —**NOW**—or better still, call at **Space 72-73 at the Chicago Show.**

S. F. BOWSER & CO., Inc.,

FORT WAYNE, - - - INDIANA.

255 Atlantic Ave., Boston, Mass. | 299 Broadway, New York City. | 209-210 Fisher Bldg., Chicago, Ill. | 66-68 Frazer Ave., Toronto, Ontario.

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etroit, Mich., for the season of 1908 will fer four models, a limousine, a landau-t, a touring car, and a runabout, the asis of all of which is a chassis with several improvements and changes in etail from last year's. This chassis was ery completely described in our April, 907, issue, page 120. The wheel base is

backs and are very comfortably up stered. Many small luxuries in way of robe rails, foot rests, pockets, e are supplied in these cars. All the br handles and rails are covered in bl leather, making the handling of them cold weather much less disagreeable, also makes the car much less difficult

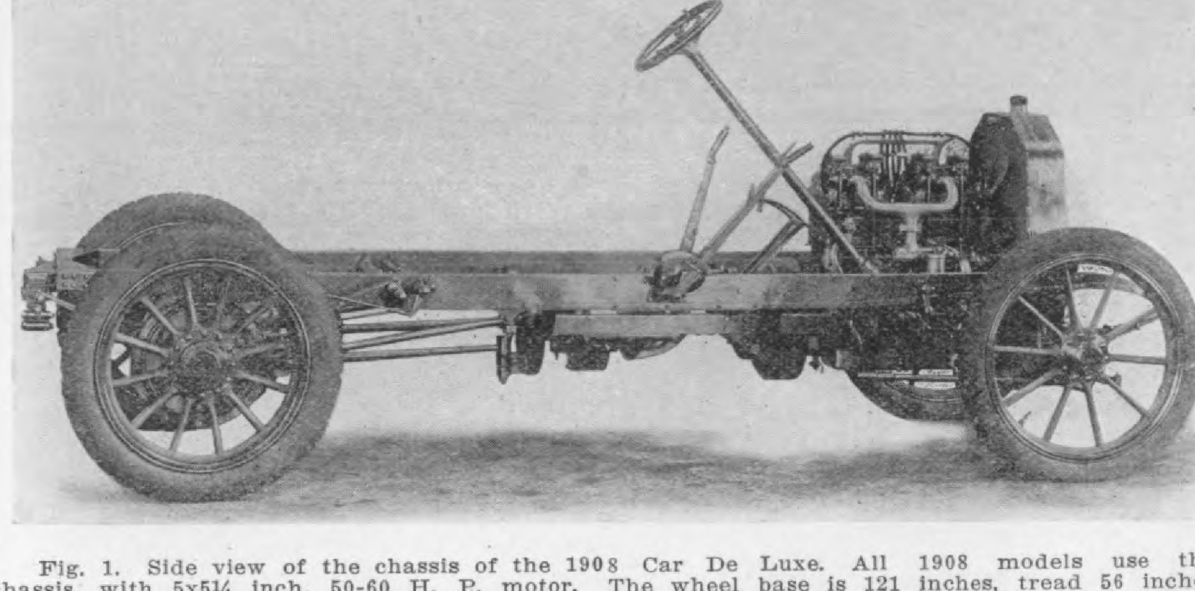
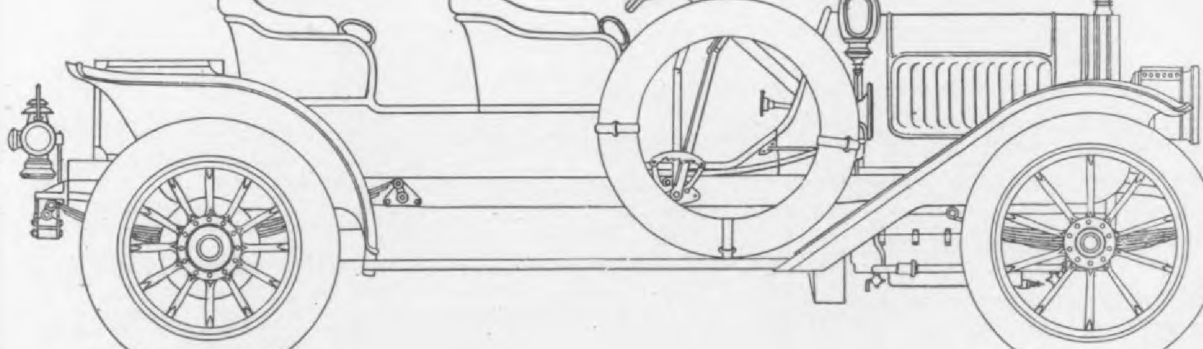


Fig. 1. Side view of the chassis of the 1908 Car De Luxe. All 1908 models use th chassis, with 5x5¼ inch, 50-60 H. P. motor. The wheel base is 121 inches, tread 56 inche A few minor changes have been made in the motor as mentioned in the text; however, t characteristic single rocker for two valves has not been altered, and the corrugated copp jackets are also retained. Le Moine platform springs are now used at the rear instead of sem elliptic, and the size and weight of the change speed gears have been reduced. With f equipment the limousine and landaulet sell for $6250, and the touring car and new runabout $5000 each.

ne same for all models, 121 inches; tread standard, 56 inches. The limousine and ndaulet are the same price, $6250, and ne touring car and runabout are the ame, $5,000. The equipment includes ve lamps, generator, full set of tools,

keep clean. For $100 additional an en outfit of khaki covers for the upholster furnished, this material being of suc nature that it will wash the same a piece of linen, and is very useful on l dusty tours in protecting the upholster



AUTOMOBILE TRADE JOURNAL

Fig. 2. The 1908 De Luxe Runabout. This new runabout has the same chassis as the ot models. Motor, 4 cylinders, water-cooled, 5x5¼ inches, rated as 50-60 H. P. Chrome nick

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ble. The inlet valves are in ground
s with lock nuts on top instead of
g held by the inlet domes. This ar-
ement takes all of the injurious hold-
strain from the domes, leaving them
ly to carry the gas. A double igni-
system is employed, but one set of
s is used for 1908, yet these systems
independent, thus doing away with a
er part of the complicated wiring,

g. 3. The De Luxe front axle end and
ing pivot. This axle is a one-piece drop
ng. The steering pivot is mounted on two
of annular D. W. F. ball bearings at the
nd one at the bottom. The upper set carry
weight and the others take the side and
rd and backward thrust.

icularly the large number of second-
wires required when two sets of
s are used. The current is supplied
ither Simms-Bosch or Eisemann mag-
, the other system of ignition being
orage battery using a single vibrating
on the dash and a timer, the dis-
itor of the magneto being used for
secondary current to the plugs.

LUBRICATION.

e oiling system has been modified so
not only is a forced feed oiler used
ubricate the cylinders, clutch, change
d gears and the water pump, but in
tion a reserve tank is placed as an
gral part of the lower portion of the
k case with overflow pipes from the
k case, so that the level in the case
onstantly maintained at the proper
ht, the overflow passing into a re-
e tank below, from which it is again
ped upward into the crank case by a
pump. This small pump is at the
r end of the vertical shaft driven by
iral gear from the middle of the cam
t. The 2 to 1 gears at the forward
of the engine are supported from the
crank case by an oil tight parti-
and the gear case is filled with

springs inserted for gradual engagemen
a special bronze casting is used with cor
inserts. This clutch instead of being en
gaged with one central helical spring i
operated by four springs. The clutch i
provided with an automatic brake whic
prevents it from rotating the gears afte
its disengagement; this brake consists o
a small fibre tipt piston working in
short cylinder, fixt to the central cros
member of the sub-frame. The left peda
operates the clutch alone, while the righ
pedal controls the internal expandin
brakes on the rear wheel drums and als
disengages the clutch. All the brakes fo
1908 are on the rear wheel drums, bein
of the internal expanding and externa
contracting type, metal to metal, the ma
terials being a combination of copper an
bronze in the shoe acting against a stee
drum. These brakes are hinged at th
bottom and opened at the top, and ar
therefore as effective in backing as i
going forward. The third pedal as use
in previous models and the brake, fo
ward of the transmission and on the ca
dan shaft at the rear, have been dis
carded. The brake rod pull is trans
mitted to the brakes thru a system o
ball ended equalizers of the single-tre
type. The steering pivots are mounte
on a double set of balls at the upper en
and a single set of balls at the lower en
the upper set of balls carrying the weigh
and taking the thrust in the direction o
the steering pivot axis, while the othe
set of balls takes the side play, but d
not carry the weight.

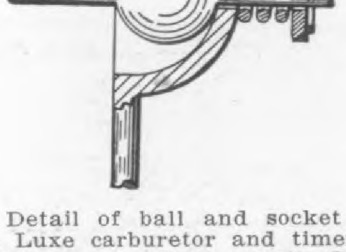

Fig. 4. Detail of ball and socket ends use
on the De Luxe carburetor and timer adjustin
linkage. These ends form small flexible con
nections, and are without backlash on accoun
of the spring. They may also be readily take
apart and show refinement of detail which ha
been noticeably lacking on many of the Ameri
can cars.

THE CHANGE SPEED GEAR.

The change speed gear is four speed
ahead and is operated on the selectiv
system, using an H-slot, but the direc
drive is on the third speed instead of th

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National

Prophecy Fulfilled.

In the fall of 1905, when we brought out the

First Stock Six Cylinder Car

made in America

We stated in our advertising

THAT IT WAS "An Innovation in Touring Cars."

THAT IT WAS "A car very much ahead of the times."

THAT IT WAS "A car which would be extensivel copied in the near future."

Note the number of manufacturers who are NOW building six cylinder car

THE 1908 NATIONAL LINE

Model T.	Model R.	Model N.
6 Cyl. 75 H. P.	6 Cyl. 50 H. P.	4 Cyl. 50 H. P.
TOURING CAR,	TOURING CAR,	TOURING CAR,
LIMOUSINE.	LIMOUSINE,	LIMOUSINE,
	ROADSTER.	ROADSTER.

Write for Catalogue and Booklet
"What Owners Say About Their Nationals"

Limousine bodies for National Models E, H and L ready for Immediate Delivery.

WATCH FOR THE ROUND RADIATOR

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tire rear axle construction, all the
and the steering pivots and fan are
ounted on the same type of bear-
The ends of the gear shifting levers
formerly protruded from the case
is year entirely encased.

FLEXIBLE CONNECTIONS.

veen the clutch and change speed
s placed a flexible connection of the
type, which relieves the drive shaft
y strain due to traversing uneven

the rear of the change speed gear
a large universal joint with four
the ends of which are bushed and
e in a chrome nickel steel drop
ring, is used. As the cardan shaft
ctically in alignment with the bevel
shaft, and is held by a heavy tor-

mentioned, is used.

Two strut rods, adjustable in length with ball and socket forward ends are used as well as the torsion rod, which is also provided with a ball and socket retention. The strut rods are held by fixtures fastened to the under side of the side frame member. The patented De Luxe rear axle construction remains unchanged. This rear axle is of the floating type, but the axle housing does not carry the weight of the car, nor does the rotating shaft, but an "I" beam axle which is placed beneath the housing carries all the weight. In place of the rear semi-eliptic springs used in 1907 Le Moine springs of the platform type are used.

rand Central Palace Show—Exhibit of Lane Motor Vehicle Co., Poughkeepsie, N. Y., and
l Motor Car Co.

The January Journal

e next issue of the Journal—the Jan-
1908, Journal—will contain a com-
, classified directory of all concerns
ely engaged in the manufacture of
r cars, motor boats, motorcycles, and
accessories, parts, etc., pertaining
to. This directory of the industry
been the chief feature of the January
s of the Journal for seven consecu-
years, and previously was sold sepa-
y at $1.00, but we now include it in
January Journal without extra charge

January. The yearly subscription is $2.00, and remittances should be made promptly to the Cycle & Automobile Trade Journal, Forty-ninth and Market streets, Philadelphia, in order to insure receipt of this special January number.

Oscar Lear Automobile Co., Springfield O., after thoroly testing the Atwater Kent Spark Generator ignition system, has adopted the same for the 1908 output of Frayer-Miller cars. This ignition apparatus is the product of the Atwater Kent

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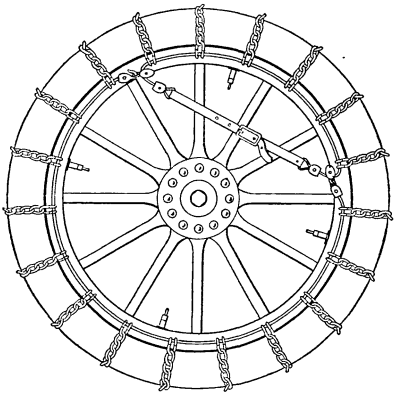
AT LAST! The Perfect Non-Skid

THE NOISELESS S. & W.



INSIDE VIEW OF WHEEL

No More Clashing Chains

No More Broken Fenders or Fender Irons

No More Worry

THE S. & W. NON-SKIDS may be applied and removed without tools and without deflating tires. They are instantly adjusted and stay so until you take them off. The cross chains are attached to flexible steel cables which encircle the wheels at the right points. Tension on chains is regulated by an adjusting strap which secures an even adjustment all around the wheel without binding or chafing the tire. S. & W. Non-Skids will not creep. It is not necessary to have the chains tight to produce the proper result, but it is absolutely necessary not to have them too loose. Our adjustment gives the happy medium and prevents noise and extra wear on cross chains.

PRICES PER PAIR

American Sizes	Metric Sizes	
28 x 3	700 x 85	$10.00
28 x 3½	710 x 90	
30 x 3	750 x 85	$11.00
30 x 3½	760 x 90	
30 x 4	760 x 105	$11.50
30 x 4½	760 x 120	
32 x 3	800 x 85	$12.00
32 x 3½	810 x 90	
32 x 4	815 x 105	$12.50
32 x 4½	820 x 120	

American Sizes	Metric Sizes	
34 x 3	860 x 85	$13.00
34 x 3½	870 x 90	
34 x 4	875 x 105	$14.00
34 x 4½	880 x 120	$15.00
34 x 5	880 x 125	
36 x 4	915 x 105	$16.00
36 x 4½	920 x 120	
36 x 5	920 x 125	

Fisk sizes, 50 cents extra

Remember, this device will positively not injure your tires. Order a pair now —don't wait until after the accident. SAFE, SURE, SILENT.

STORY & WINKEL CO., Woodbury, N. J.

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Cork Inserts

A great amount of space in the automobile journals has been devoted to the question of friction as applied to bearings and their lubrication, and very little difficulty is to-day experienced by engineers in obtaining satisfactory results in the designing and manufacturing of these parts.

The converse of this proposition arises in the question of brake and clutch construction, where it is desired to absorb power with the least wear, and yet allow the necessary amount of flexibility.

In endeavoring to find a suitable medium having a high co-efficient of friction and the necessary durability, various substances and combinations have been tried, but none have been found to fulfill the requirements as well as cork under the proper mechanical application. The coefficient of friction of cork being .36 is much higher than any other material which possesses the combined qualities of durability, resiliency, non-absorption and its indifference to excessive heat. Exhaustive tests to bear out these assertions have been made in the laboratory of Harvard University, under the supervision of Prof. Ira N. Hollis, and also at the Worcester Polytechnic Institute.

More practical, and perhaps more interesting demonstrations of efficiency have been derived from investigations made by automobile companies themselves, where cork inserts have been put to extensive tests, purposely, intended either to develop any inherent defects or destroy them.

The principal clutch troubles of the present day automobile are excessive slipping with the consequent loss of power; and burning or abrasion of the frictional surfaces, and on the other hand, a fierce seizing when engaging and resulting strains on the car's entire mechanism.

It has been found that by using a certain proportion of cork inserted in sockets in a clutch member, an accellerating engagement is obtained with a greatly increased ultimate holding power, and one that is in no wise affected by the application of oil in any quantity. The percentage of cork to obtain the desired results, i.e., an ideal clutch action, varies in each instance, according to the individual construction and type of clutch.

Other factors to be considered in relation to cone clutches are the mediums used in the frictional face of the clutch, the width and angle of same, the diameter, and the pressure applied. General practice is to construct the cone of aluminum with a view of reducing its centrifugal velocity, and thereby allow an easy and noiseless shifting of gears. This cone is almost universally faced with leather, not that this material is the best obtainable for this work, but that it was adopted by common practice prior to the advent of cork inserts. These have been found to be a superior frictional agent, and when used with a leather facing entirely obviate the great difficulty hitherto experienced by clutch leathers burning out or slipping excessively as a result of an undue amount of oil.

In machining sockets for these inserts, the standard practice is to stagger them across the cone so that the wiping and frictional effect of the cork may be distributed upon its full width. The diameter and depth are matters of calculation depending on the thickness of the rim and the tortional strain. Bosses to receive these corks are frequently an adjunct to this construction, and are cast integral with the cone. These bosses do not add appreciably to the weight of the rim or increase the centrifugal velocity, as there is considerable metal machined out to form the sockets. By the adoption of cork inserts superseding the plain leather-faced clutch, it has been found that a reduction of spring pressure of from 25 per cent. to 50 per cent. can be obtained.

Probably the most original innovation of clutch cone construction is to face the aluminum cone with phosphor-bronze. This facing is merely to protect the aluminum from wear in case of a metal to metal contact; the intention being to allow a sufficient percentage of cork in the driven member to drive entirely on the corks themselves. This makes a practically indestructible clutch, and one that can be depended upon for long life and severe usage. This type of cone clutch is fast gaining favor on account of these remarkable qualities, and deserves careful consideration by the discriminating engineer.

In the plate and disc type of clutch, we are confronted with the metallic area and its proper percentage of cork area and the pressure to be applied, with due consideration to certain minor details requisite to the proper application of these cork inserts.

First. The plate or disc must have sufficient thickness to give the corks a depth proportionate with the frictional work demanded of them, with all due margin of safety allowed to present the possibility of their becoming distorted or torn out.

Second. As a matter of design and bearing in mind that cork inserts protrude slightly above the metal plate or discs, sufficient clearance should be allowed in the release to avoid any drag occasioned by the contact of these parts.

The difficulty caused by the vacuum arising from the oil having been expelled from between the plates is the most serious drawback to the multiple-disc type of clutch. This drag, it has been demon-

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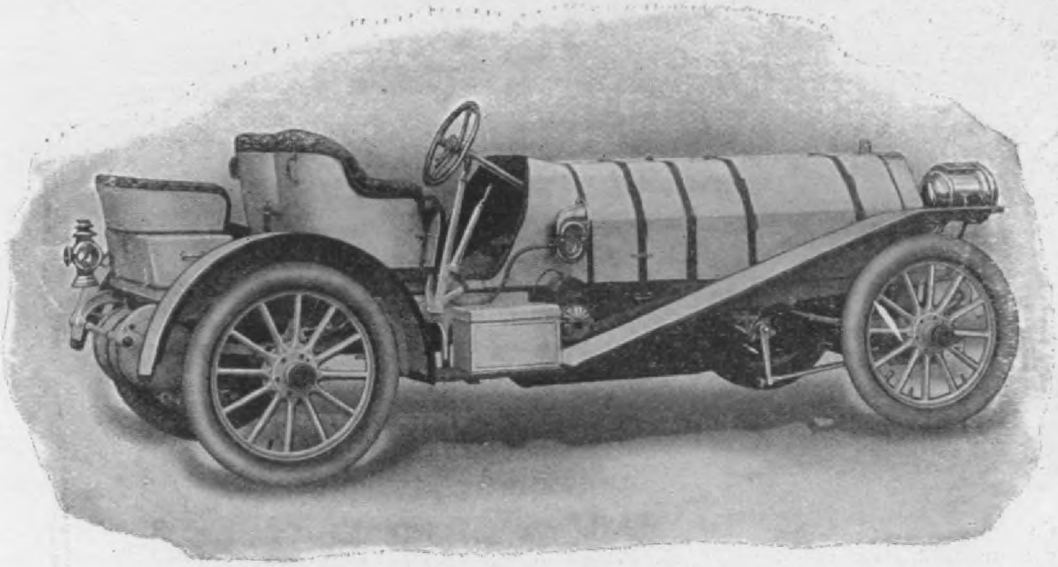
Gearless Greyhound

The Thoroughbred Roadster

A car that creates a genuine sensation wherever shown. It fairly bristles with original features and possesses the most distinctive lines, combining speed, power and style to the last degree.



1908 MODEL

Speed, 75 Miles *Price, $4000*

SPECIFICATIONS:

SEATS—Three.
WHEEL BASE—126 in. **GAUGE**—56 in.
TIRES—Front 36 in. x 4 in.
TIRES—Rear 36 in. x 4 in.
BRAKES—4 on rear wheels. 2 internal expanding. 2 external contracting. 2 band brakes on transmission operated by foot pedals.
SPRINGS—39 in. front, 50 in. rear. Semi-elliptical.
HORSE-POWER—75 at 1350 R. P. M.
BORE—$4\frac{13}{16}$ in. **STROKE**—5½ in.
CYLINDERS—6-4 cycle.
VALVE ARRANGEMENT—Opposite in ports.
COOLING—Water cooled. Honeycomb radiator.
IGNITION—Jump Spark. Two sets of plugs.
CURRENT SUPPLY—Bosch high tension magneto. Storage Battery reserve.
LUBRICATION—Delauney-Belleville System. Absolutely positive at all times.
CLUTCH—Internal expanding ring.
CHANGE GEAR—Gearless Transmission.
SPEEDS—2 forward and reverse.
DRIVE—Direct on high speeds. Frictional on low and reverse.
BEARINGS USED—Crankshaft, Parson's white brass. Wheels Front, Balls Wheels Rear, Hyatt Rollers. Transmission, Balls.
SPECIAL STEELS USED—Nickel steel in rear axles and propeller shaft.

WE MAKE OTHERS, TOO.

WRITE FOR CATALOG, IT TELLS MORE

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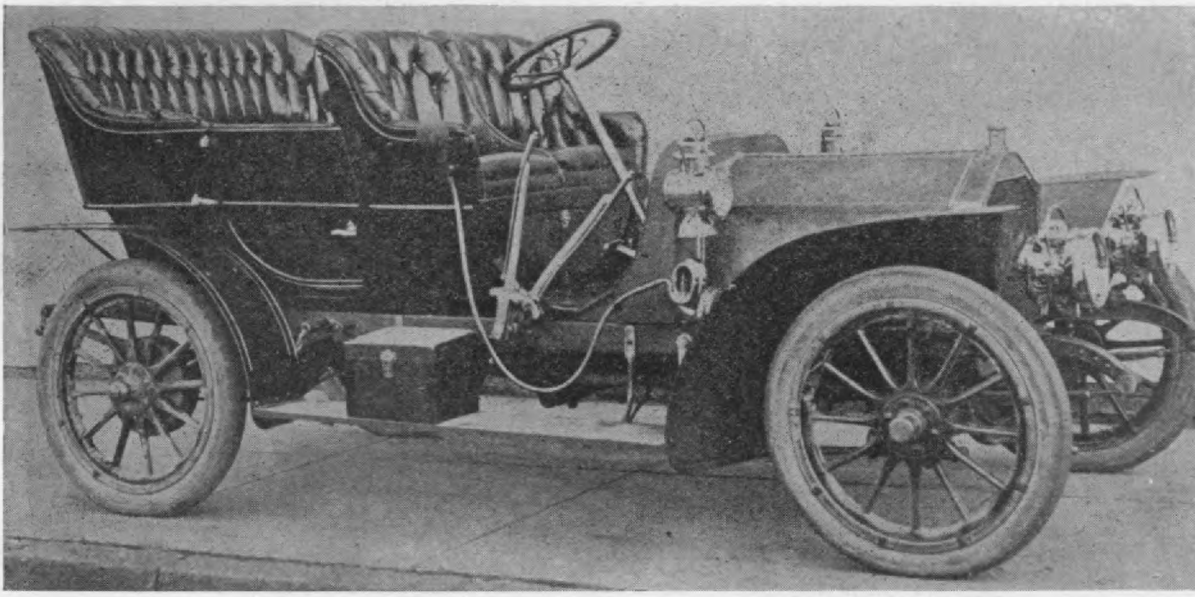
Gearless Transmission Co. (Motor Car Dept.)

ace due to the protrusion of these corks nake the vacuum practically impossible. he three plate clutch being a simplifica-on of this type has been extensively dopted and a number of manufacturers epend entirely on the cork inserts to ransmit the load and to prevent any scor-ng of the metal surfaces even when run ithout lubrication.

posite. Therefore, the action in bra is identical with that attained in a clu The principal advantages are gre holding power, reduction of wear, and elimination of burning or scoring of frictional surfaces. They are also affected by oil or water, and conseque increase the reliability—a matter of importance in itself.



Model H "Yorke Pullman," the latest production of the York Motor Car Co., of York, Pa. motor is four cylinders, rated at 20 H. P.; cylinders cast separately, mechanically opera valves. The ignition is by jump spark, with distributor and single coil on dash, with the opt of magneto at extra cost. Control is by friction retained throttle and spark levers on top of hand wheel. A selective, sliding three speed and one reverse change gear is used. The clu is an inverted cone with cork inserts, and the drive is bevel gear; 32-inch wheels with 3½-in tires are used. The wheel base is 100 inches, tread standard and weight about 1875 poun The price complete is $1875, without top, tops being $100 and $150 according to quality. N types of hood, radiator and dash are used. The tonneau is detachable. The equipment consi of two side oil lamps, one tail lamp, two front gas lamps, generator, horn, full set of tools a storage battery. The other Yorke Pullman cars were described in our issue of October, 19 page 126.

Anderson Vanadium Steel Forged Parts

In the latest catalog issued by Anderson orge & Machine Co., of Detroit, Mich., pecial attention is called to their facili-es for producing forged parts of Van-dium steel. The automobile trade is nowing great interest in Vanadium steel, nd the Anderson Company has not been ow to thoroly fit itself for handling busi-ess in Vanadium steel forgings. It is repared to meet all requirements of the ade in this line, and is ready at any time give advice in regard to the best grades f this steel to meet particular require-ents.

various grades for different purposes. is claimed that this steel possesses qu ties of toughness, strength, hardness, ability and uniformity. "Poldi Extra' a grade adapted for all general purp where uniform and reliable steel is quired at a moderate price, such as forged or welded tools, milling cutt reamers, taps, broaches, chisels, etc., is carried in stock by the Frasse Comp in four tempers to meet all requirem from the hardest tools to the mildest.

Everybody interested in the motor motor boat and motorcycle trade will the January number of the Journal great value, as it will contain a comp directory of the trade—classified acor

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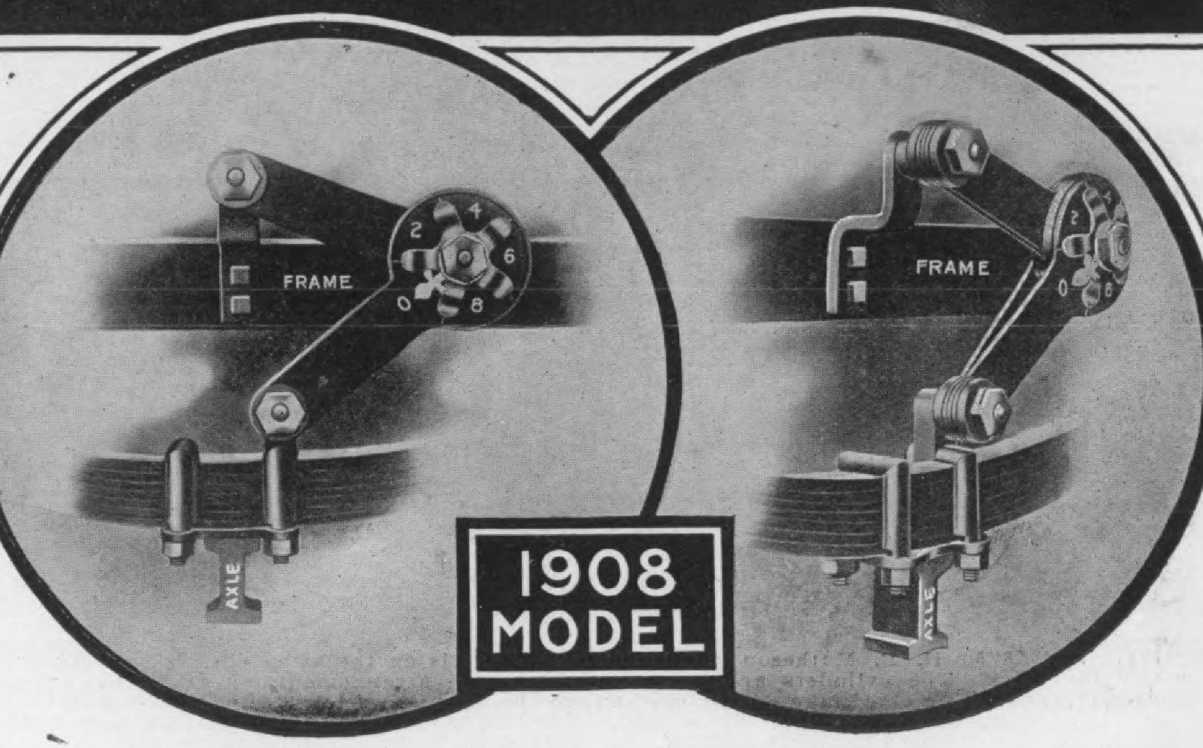
TRUFFAULT HARTFORD SHOCK ABSORBER



THE DEVICE THAT MADE

Safe, Speedy and Comfortable Automobiling Possible

The spring action of a car affects its smooth running qualities. Proper control of the springs prevents excessive oscillation, which insures LESS WEAR and TEAR, LONGER LIFE OF TIRES, GREATER SPEED and GENUINE COMFORT.

This control of the springs can be secured only by the use of TRUFFAULT-HARTFORD Shock Absorber—the device that has made SAFE, ECONOMICAL AND COMFORTABLE automobiling possible.

In the 1908 model we believe that we have practically obtained perfection.

A distinctly new feature has been added, consisting of a regulating dial with indicator, making it possible for even a novice to obtain a perfect and uniform adjustment to suit the exact requirements of the car as measured in terms of its gross weight, and easily secure the maximum benefit.

The Truffault-Hartford is the only spring retarding device manufactured with a regulating dial. It is automatically lubricated, absolutely dust and water proof, interchangeable, practically indestructible and fully guaranteed.

The superiority and individual qualities of the Truffault-Hartford Shock Absorber are best demonstrated by the fact that it has been adopted exclusively as equipment by such prominent cars as the:

PIERCE GREAT ARROW, STUDEBAKER, STEVENS-DURYEA BIG SIX, STODDARD-DAYTON SIX CYLINDER, MARMON, CONTINENTAL, LANE, CONOVER, SULTAN, FRONTENAC AND ACME SIX CYLINDER.

Write Today for Our "Ruff Roads" Booklet. ADDRESS DEPARTMENT B.

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ne Matheson Motor Car Co., of Wilkes-arre, Pa., and represented by the Palmer Singer Manufacturing Co., of 1619 roadway, New York City, as sole selling gents, show a few changes in detail, altho ne strictly Matheson features have prac-cally all been retained. Three models n the same 50 H. P. chassis are offered. he first is a touring car seling for $5500; ne second is a limousine, $6500, and the hird is a landaulet at $6500.

is held in a spherically ground fixture lowing some chance for self-adjustm so that the chain will not bind over sprocket teeth. A special arrangen has also been provided for taking up wear in the connecting rod lower end crank pin bearings. This consists o wedge located behind one of the halve the connecting rod bearing box, whic very similar in design to the connec rod ends of steam engines. These wed

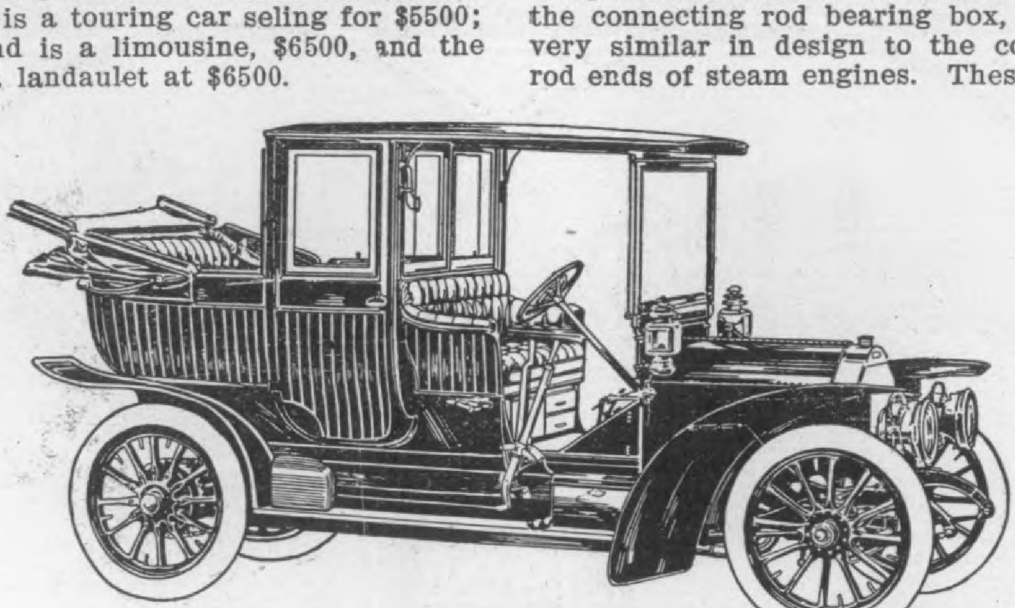


Fig. 1. 1908 50 H. P. Matheson Landaulet. This car is on the same chassis as the touri car and limousine. The cylinders are 5x6, with the same arrangement operated by extern roller end levers, as in 1907, the entire mechanism being accessible without getting into t crank case. Make and break ignition is used. The Matheson chassis has simply been refin n detail, while the main features remain the same as in 1907. This landaulet sells for $65 fully equipt.

MOTOR.

The general features of the motor are he same as in previous models, the bore eing 5 inches and the stroke 6 inches. he outside valve operating mechanism as been retained owing to its great ac-essibility. Among the changes which ave been made in the motor, probably he most important has been the change f the cam shaft driving gears from the evel to the spiral type, giving very uni-orm and silent driving. These gears are f special hardened steel, completely in-losed in an aluminum casing and packed vith semi-solid lubricant. In case of any vear on these gears a simple device for lightly changing the position of the gear nakes easy a readjustment. Ease of ad-ustment and accessibility have been argely considered in the refinements in he 1908 cars. The centrifugal pump pre-iously used has been replaced by a pump f the gear type. The reason stated for his change is that a centrifugal pump of ny size, and particularly in the small izes is very inefficient at low speeds,

can be advanced in a lateral directio means of two screws, one on either of the head of the rod. This prov

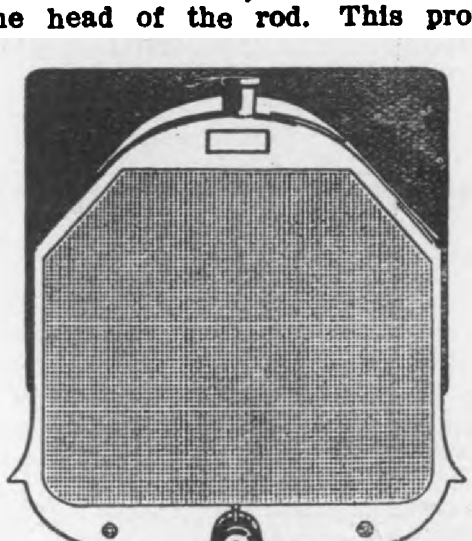


Fig. 2. The new radiator contour of the Matheson cars, which outline will be a dis ive Matheson feature for the coming seas

7 TO 1

is the preference in solid tire equipment at the two New York Shows voluntarily expressed in favor of

"Firestone"

Side-Wire Motor Tires
The World's Standard

37 cars equipped with Firestone Solid Motor Tires
5 equipped with nearest competing type and make

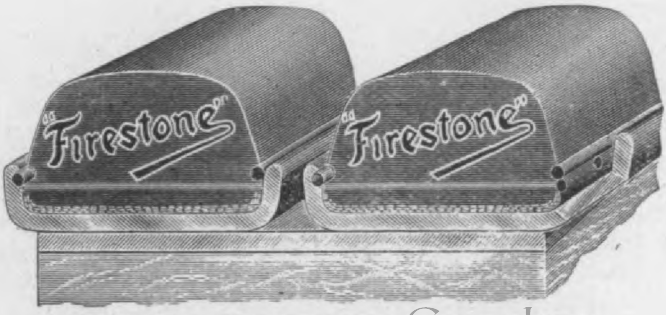
Seven other competitors divided the remaining twelve sets. Every Firestone Tire was bought and paid for at regular prices.

Firestone Tire & Rubber Co.

AKRON, OHIO

BRANCHES AND AGENCIES EVERYWHERE

SINGLE MOTOR TIRE



DUAL TIRE FOR HEAVY CARS

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ing makers of light cars. A new divided gasoline tank is provided on the 1908 cars, the smaler compartment containing but five gallons. This is separated from the other compartment by means of a by pass connection, which is normally kept closed to be used, in case of necessity, as a reserve. This small compartment is automatically filled when the main tank is filled.

The change speed mechanism, with the exception of the gear shifting details, remains the same as in 1907. A double bevel drive on the counter-shaft is used and shorter driving shafts are thus at-

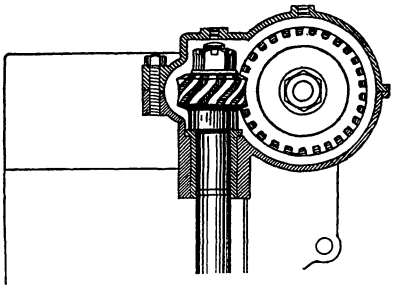

Fig. 3. The arrangement of the spiral gears and casing on the 1908 Matheson, showing the two-to-one gears and the details of the housing. These gears were of the usual spur type in 1907, but all the 1908 models will be fitted with spiral gears, which insure quiet running. A device is also provided by means of which wear in these gears can be compensated for. These gears are of specially hardened steel, completely enclosed in an aluminum housing, and run in semi-solid lubricant.

tained. The change speed gears provide four speeds ahead and one reverse. The change levers are operated by the usual gate system, but all the levers and connecting links and the cross slide tube have been completely covered and protected from road dirt and the weather. The frame is of nickel steel of the usual channel section, but is well trust to counteract any sagging, as it is well known that all frames, no matter of what material, sag after continued use. The multiple jet carburetor, as used in 1907, which is a distinctive type, as it does not employ the ordinary float feed system, is retained. A positively operated pump is used to suck the gasoline from the tank at the rear of the car, force it into the sight feed chamber beside the carburetor body, in which chamber a correct level with relation to the jets in the carburetor body is maintained by an overflow which carries the surplus back to the main tank. It is claimed that this system is not affected by grades, and is free from the disadvantages connected with the pressure feed system. The ignition is still of the make and break type. The Matheson ignition plugs can be reset without necessitating retiming of the motor, and the insulated portion or electrode can be readily removed without disturbing the hammer mechanism. This feature is pointed out as a distinct advance, as in nearly all the high grade make and break ignited foreign cars, the complete igniter has to be taken out when only a slight cleaning of the electrode is necessary. Double counter-shaft brakes controlled by a foot pedal are used, and 14-inch bronze, shoe-expanding brakes are used on the rear wheels. The steering gear is still of the worm and sector type, but the steering gear connections have been somewhat strengthened. A safety locking device has been arranged for the attachment of the steering arm to the link connecting with the steering knuckle. This device consists of a right and left hand plug and cap, which so enclose the ball end of the arm that it cannot pull out. The multiple disc clutch incased in the fly wheel hub is identical with that of 1907, and the lubrication system, consisting of force feed to the bearings, and also splash, has not been altered. The contour of the radiator has been changed to a neat, graceful and distinct outline.

It wil be seen that the 1908 changes consist simply of minor refinements of detail, as the general constructive features of the 1907 Matheson have proven satisfactory.

Pierce Again Wins Chicago Economy

Paul Hoffman, driving Harry Paulman's Pierce Arrow on October 18, won the 200 mile economy contest of the Chicago Motor Club for the Knight trophy, thus winning the Chicago economy test for the third consecutive time.

The meeting of October 31st of the Technical Publicity Association was devoted to the discussion of "The Mailing List in Securing Foreign Business." It was announced at this meeting that organizations modeled on the Technical Publicity Association were being started in Chicago and London, England.

The directory of the trade which is included in the January Journal is revised daily and kept strictly up-to-date. It is therefore the only really accurate and complete directory of this industry. All inactive and "dead" concerns are eliminated, a feature peculiar to our directory, and those who use it therefore waste no time or postage in useless correspondence, as is the case when unreliable directories are used. The January number of the Journal sells at the same price as other numbers, 20 cents per copy, but the best way to assure receipt of a copy is to remit at once $2.00 for a year's subscription, having the subscription start with the January number.

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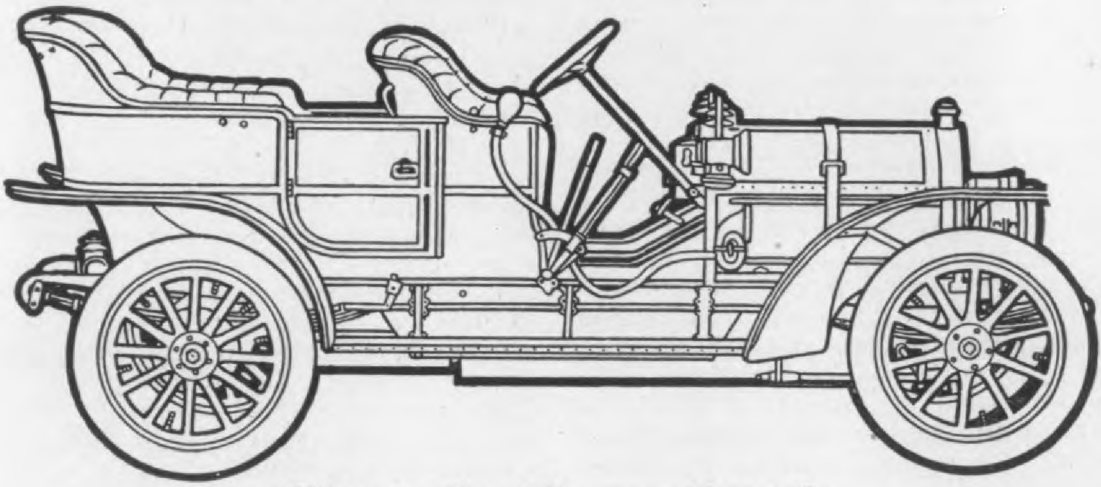
Thomas

1908

4 Types of Chassis, 19 Types of Bodies

Absolutely the most complete line of ***reliable*** cars with reserve power and the prestige of the Thomas name.



This is the Thomas Detroit
4 Cylinder, 40 H. P.

A marvel of lightness and smoothness. It has dash and style in appearance and action that fascinates the expert. With good, wide, roomy seats for five—plenty of room—plenty of reserve power—finely, luxuriously finished—it is absolutely the most for the money in automobiles to-day.

Because of our great increase in facilities, we propose to extend our trade to territories hitherto neglected, and cordially invite all automobile dealers and users to visit our factories for demonstrations and inspection. Pamphlets and photographs will be sent on request.

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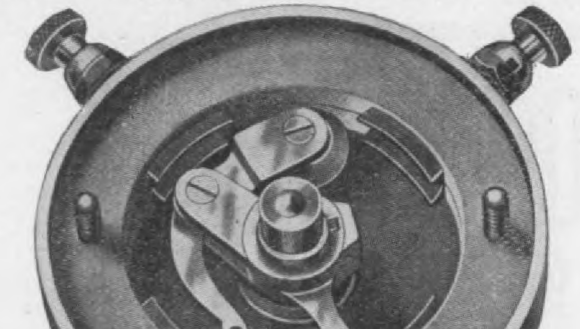
ere shown.

The case is a strong casting, dust proof nd highly polished. The shaft carrying the ontact wheel holder is supported on two all bearings, adjustable from the outside



The "Connecticut" Timer.

ithout tools and while in operation. Wire onnections are held in cupt washers preenting the breaking of wires. All binding uts have slotted shanks, cone shaped, ting in cone shaped holes, thereby forcing e threads of the binding nuts to the reads of the studs and preventing loosen-g of same. Absolute ground contact on aft is obtained by ball and spring. Con-ct blocks are made of tool steel hardened nd ground to polish and accurately spaced y micrometer index. Contact wheel and vots are tool steel, hardened and ground ue. The contact wheel holder hub, fitted shaft is slidable on Woodruff key and eld in electrical contact by a phosphor ronze spring in key seat, bearing against ey. The insulating ring is of special rocess hard fiber, non-absorbing. The ontact blocks are projected from the in-ulating ring and have V-shaped grooves their inner peripheries, the point of V nd the V groove in insulating ring form-g a continuous and true circular path or rack for the contact wheel which is round to exactly fit the V-shaped groove, aking a perfect electrical connection hen passing the contact blocks. The ob-ct of the V-shaped groove and wheel is ree-fold. First. To form a track for e wheel to travel in without resorting fastenings other than the sliding key. econd: To retain the smooth rolling otion of the flat wheel timer, without its ndesirable features of the wheel picking small particles of dirt, which, lodging the roller and contacts, cause pitting, c., which is prevented in this timer by

contact blocks. The circles being of di ent diameter, the circumferences of same also differ, the outer circle being more than ¾-inch the larger. This is the case in the contact wheel, the o edge of which being also by more than inch larger. Now as the outer edge wheel travels in the outer circle it w revolve 3.16 times around its own during one revolution, and as the in edge of wheel travels on the inner ci it would revolve 4.25 times around its axis during one revolution. The differe between 4.25 and 3.16 being 1.09, it is dent then that as the roller cannot tr in true contact with the outer and the ner edge at the same time, the true tact must be about half way between outer and the inner edge, and a slippin dragging motion is taking place betw the roller and contact to the extent of the difference of 1.09 or .54 of one rev tion of wheel forward on its outer e and backward on its inner edge. slight friction keeps the contacts cl without producing undue wear.

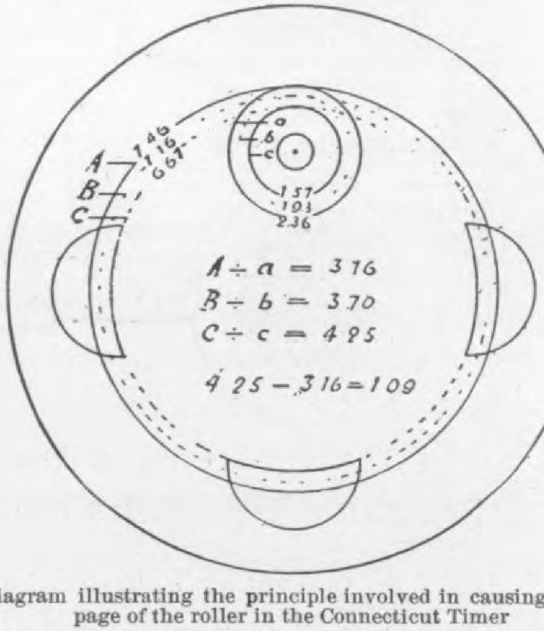


Diagram illustrating the principle involved in causing page of the roller in the Connecticut Timer

The timer is made in all standard si and is carried in stock for ½-inch and inch shaft. It is furnished in bottom side posts, side posts being supplied less otherwise specified. The prices fo 2, 3, 4 and 6-cylinder timers are $1 $12.00, $13.00, $14.00 and $16.00.

To-morrow never comes. To be sur the January number of the Journal, wl will contain the Eighth Annual Buy Guide, send your subscription to- This important number is always in g

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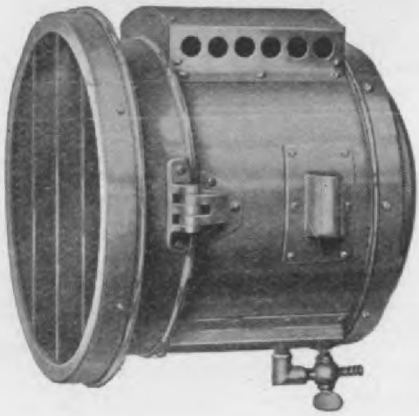
Rushmore Searchlight



is not its size (light for light, no other lamp is so small). Nor is it price (size for size, the Rushmore is the highest priced American lamp). Nor is it dressy appearance (the Rushmore looks its part, but it certainly does not look like a brass sunflower).

What sells the Rushmore is just one thing: —the simple, unshakable, foundation fact that it is optically more efficient, and mechanically better built, than any other automobile lamp the world over. The Rushmore Lens Mirror has a shorter focal distance than any other made, and is the biggest the lamp body will contain. It must project the most light. And Rushmore construction is so substantial that the owner will always be proud of his lamps.

Rushmores are everywhere today; ask any Rushmore owner what he thinks of them!

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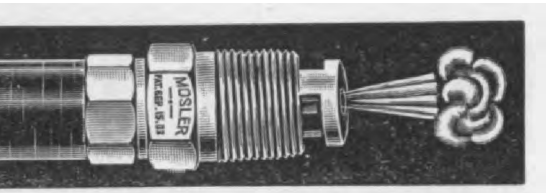
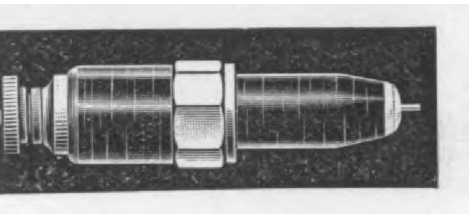
r line of Spit-Fire spark plugs a
ica plug, and are also furnishing
cores separately, which are inter-
able with the porcelains or glazed
insulators of other Spit-Fire and
h spark plugs. These mica cores
$1 each.



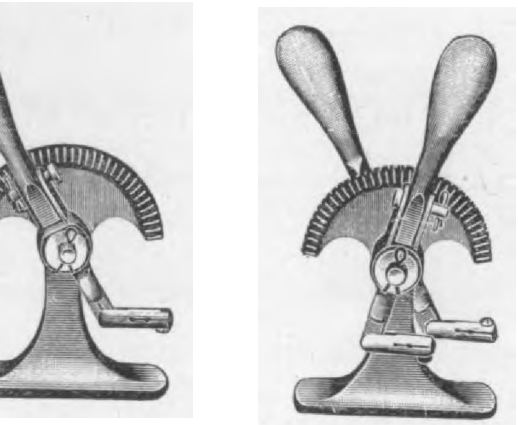
Mosler's "Spit-Fire" Mica Plug.

ne "Spit-Fire" mica plug no pack-
washers are used, but the makers
us that the plug is entirely leak
and that no adjustments are neces-
The mica core is machine made,



Mosler's "Spit-Fire" Mica Core.

therefore mechanically accurate.
bit of mica used is subjected to
examination and testing, and the
are also thoroly tested after assem-
Price is $2.50.



r's latest "Self-Snap" cut-out levers, sin-
double types.

er & Company have also brought
w types of their "Self-Snap" levers,
hat similar to their "Self-Snap"
levers, which were described in
columns some time ago.
single type, or cut-out lever, lists
and the double type for spark and
ntrol lists at $6.
e new "Self-Snap" levers are for
ng to the dash same as French con-
g levers, and are connected by flexi-

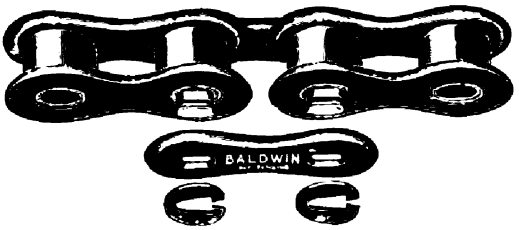
Action Spring, described in our September. 1907 issue, page 160, fitted to a platform spring.

The "Triple-Action" Platform Cross Spring.

The manufacturers, the Triple Action Spring Co., 1254 Michigan avenue, Chicago, claim that with this spring applied to a car it will make the car ride as easy with one person as under a full load, and that no side motion whatever is noticeable.

New Baldwin Detachable Roller Chain

Baldwin Chain and Manufacturing Co., Worcester, Mass., has brought out for 1908 a new form of the Baldwin roller chain, in which the pins or rivets are headed on one end, and are slotted on the



New Baldwin Detachable Roller Chain.

opposite end to take flat link discs which can be opened at one side with a screw driver, and pinched into the slots after the connecting side link has been placed over the rivet ends.

Nathan Strap Tool Rolls

Nathan Novelty Manufacturing Co., 84-90 Reade street, New York City, are now making strap tool rolls capable of accommodating about 30 tools, and adjustable to any size of tool, the straps being laced thru slits and having free play, so that as much or little slack as desired may be allowed for each tool. Two flaps are provided, one on each edge of the main portion of the roll, which fold over the tools, and a strap and buckle is attached on the outside of the roll for strapping up the roll after it is rolled up.

The entire automobile and motor boat trade use the January Journal as a reference book thruout the year on account of its important feature, the complete, accurate, classified directory of the trade which it contains. If you are not a sub-

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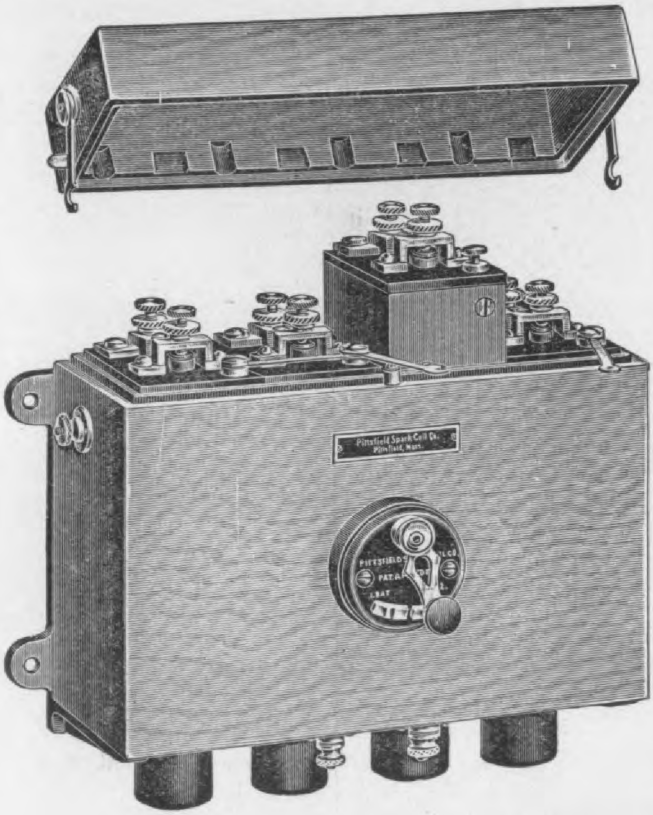
Food for Thought

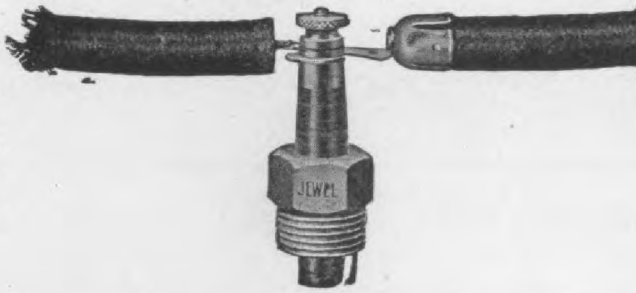
Think of the different makes of ignition tha have had a certain amount of prestige during th past few years.

Think of the number that are seeking popula ity today.

Then think of PITTSFIELD which has bee standard since the early days of the automobil and has won and re tained a premier po sition solely throug merit. Do you thin you will make a mi take by specifyin PITTSFIELD IGNITIO on your car?



Pittsfield Magnetos, Pittsfield Spark Coil Pittsfield Timers an Jewel Mica Spar Plugs



will never fail you in any emergency. Do you want full particulars?

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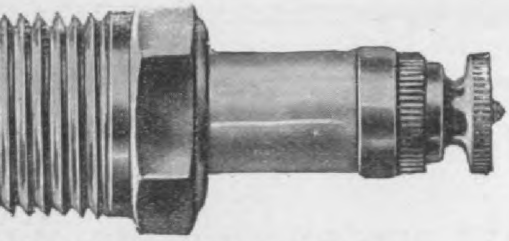
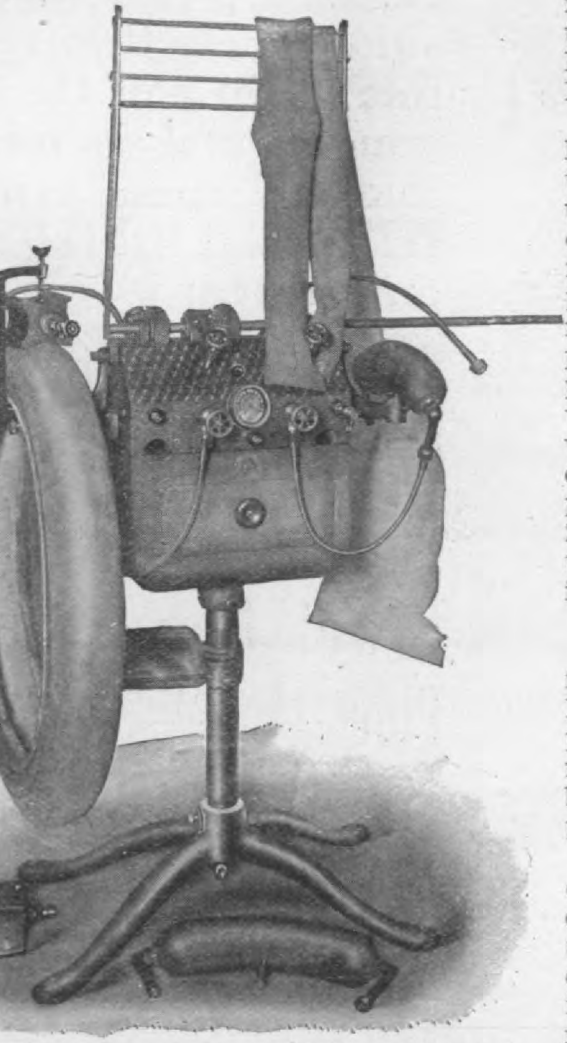
Pittsfield Spark Coil Co. Dalton Ma

reet, New York City, are the Ever- Spark Plug and the Ever-Ready izer for garage and repair shop use. spark plug has a removable soot



The "Ever-Ready" Spark Plug.

baffle shield, which can be instantly ed, to facilitate the free and easy g of the porcelain from any de- that may have accumulated thru ong usage. The spark points are roding. The list price of the plug ents.



'Ever-Ready" Vulcanizer for garage and shop use.

vulcanizer is made especially for and repair shop use, being so con-

tube, it being necessary to keep the parts not being vulcanized away from the hot surface.

The "Ever-Ready" Runabout speed indicator was placed on the market to meet the demand for an instrument at a price in proportion to the cheaper automobiles. The speed index is calibrated up to 50 miles per hour. The odometer registers up to 9,999 miles. The instrument lists at $20.00.

This concern has also improved its well known Ever-Ready Tourometer for the 1908 season by the addition of a maximum hand, which registers the highest mileage made thruout the trip.

"Elastic" Tire Filling

Elastic tire filling is a product closely resembling, in its characteristics, pure gum rubber, and having nearly the same elasticity. It is the product of the Elastic Tire Filling Co., 43 Columbus avenue, Boston, Mass.

This substance is put in the tire in a liquid state under pressure, it then hardens to the right consistency. The manufacturers state that all danger of break downs of the car due to punctured tires is eliminated with the use of this filling compound, as a cut of an inch or more will not allow the escape of the filling, thereby preventing rim cutting. The pressure placed in the tire varies according to the weight of the vehicle, the rear wheels always receive a greater pressure on account of the greater weight to be sustained. The price for filling a tire is from $2.10 for a 26, 28 or 30 by 1¼ to 1⅝-inch single tube tire, up to $19.95 for a 32, 34 or 36 by 5-inch tire.

The Graygood Shock Absorber, manufactured by the Graygood Co., 51-55 West Ninety-third street, New York, has been placed on the market for 1908 with no material change in its construction, but has been reduced in price from $75 to $60 per set of four.

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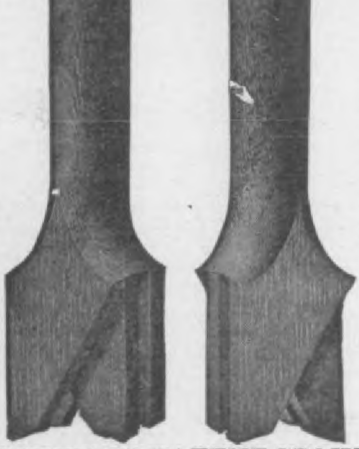

SCHWARZ PATENT SPOKE

The SCHWARZ WHEEL

FINISHED WOOD WHE

The tenons of the spoke are grooved and mortised for interlocking.

They are put together at one time, under pressure.

WHEEL COMPLETE

The whe can be ma complete a n shipped witho the hub.

For Automobiles and Heav Vehicles. The best and strong est artillery wheel made. Spoke can never loosen. Wheel wi stand where every other fails.

APPROVED AND ADOPTED BY LEADING AUTOMOBILE MANUFACTURERS

Send for illustrated booklet.

THE SCHWARZ WHEEL COMPANY

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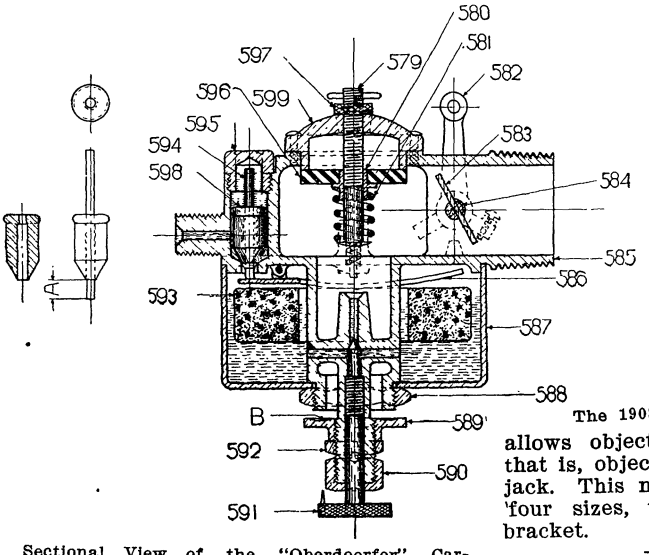
The "Oberdorfer" Carburetor

A new carburetor has recently been placed on the market by the M. L. Oberdoerfer Brass Company, Syracuse, N. Y., the main claims for it being simplicity, ease of adjustment and lightness.

The accompanying cut shows a sectional view of this carburetor. The adjustment and operation of the carburetor is as follows:

In starting, the carburetor is adjusted for slow speed by first raising or lowering the air adjusting nut (589), and when proper mixture is obtained tightening the lock nut (592), which will maintain the position of the adjusting nut (589). The throttle is then opened and the auxiliary air valve (596) for high speed. By turning the adjusting screw (579) to the left it tightens the spring (581), and allows less air in the mixture and vice versa.



Sectional View of the "Oberdoerfer" Carburetor. 579, Auxiliary Air Valve Adjusting Screw; 580, Auxiliary Air Valve Sleeve; 581, Auxiliary Air Valve Spring; 582, Throttle Lever; 583, Throttle Valve; 584, Throttle Valve Shaft; 585, Carburetor Body; 586, Float Valve Lever; 587, Float Chamber Cup; 588, Cup Retaining Nut; 589, Air Adjusting Nut; 590, Needle Valve Stuffing Nut; 591, Needle Valve; 592, Air Adjusting Lock Nut; 593, Cork Float; 594, Float Valve Pin; 595, Float Valve Cap; 596, Auxiliary Air Valve Washer; 597, Lock Nut for Auxiliary Valve Screw; 598, Float Valve; 599, Auxiliary Air Valve Cap.

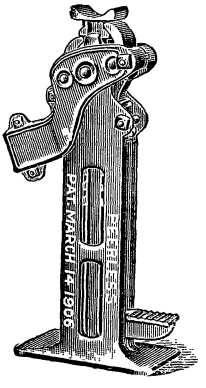
When the proper mixture is secured the screw (579) is locked in position by tightening the lock nut (597).

The level of the gasoline in the float chamber can be altered by removing the cap (595) and lifting out the float valve and stem (594 and 598). The float valve pin is made to driving fit at the top of the float valve (598), as shown in separate sketch. By increasing the distance (A) the level of the gasoline is raised, and by decreasing the distance the level is lowered. A change of 1-32 inch in the distance (A) changes the level of the gasoline 1-16 of an inch. The lowest speed at which the engine is to be run can be maintained by adjustment of the screw throttle arm (582). When the carburetor is primed (primer at back and not shown in cut) a small quantity of gasoline is caught in the cup of the adjusting screw (589) at the point (B). This insures gas being taken up at the first turn of the engine.

The 1908 "Peerless" Jack, No. 52

In addition to the Peerless jack described in our October, 1907, issue, page 158, the Oliver Manufacturing Co., 203 South Desplaines street, Chicago, has just placed on the market a new model No. 52, illustrated herewith.

All the features of the model previously described are retained in the new model with the addition of a low bracket which



The 1908 "Peerless" Jack, No. 52.

allows objects low down to be raised; that is, objects lower than the top of the jack. This new model is being made in four sizes, two of which have a low bracket.

"Ever-Ready" Asbestos Brake

The Auto Improvement Co., 316 Hudson street, New York City, are on the market with a new brake materially known as "Ever-Ready" Asbestos Brake, which they claim will not burn out nor slip, and is both durable and elastic. This material is fastened to the brake with numerous copper rivets placed 1 to 1½ inches apart and countersunk. Four standard sizes are furnished, the prices ranging from $1.00 to $2.10 per foot.

Everybody interested in the motor car, motor boat and motorcycle trade will find the January number of the Journal of great value, as it will contain a complete directory of the trade—classified according to products—and is therefore called the "Buyers' Guide Special." Price is 20 cents per copy, same as other numbers, or will be included in yearly subscriptions at $2.00.

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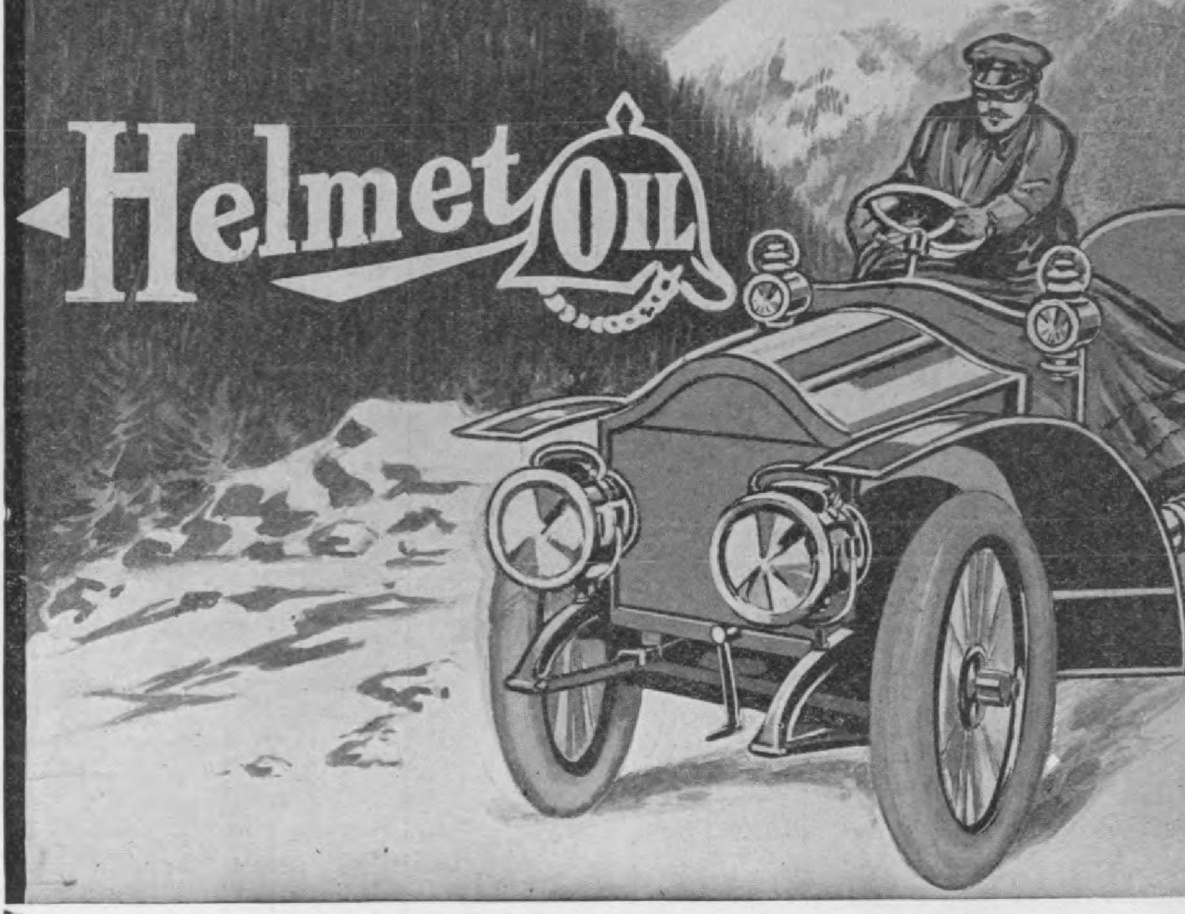


Helmet Oil Ends Your Oil Worri

Helmet Oil gives the same amount of lubrication on a cold day as hot day. Temperature does not affect it. You do not have to watch lubrication of your car when the days change in temperature.

If you use common liquid oil, the bearings require constant watching. the day is hot, liquid oil becomes thin, flows too readily, the bearings are flo and the supply is exhausted. On the other hand, i day is cold, the liquid oil congeals, flows slowly a very slow acting. Helmet Oil is not affected by or cold. It is not a liquid oil. On account o "body" or density, the temperature of any day not affect it. Helmet Oil does not contain an a of pitch, gum or acid. It will give you perfect s faction on every bearing in your automobile.

The merits of Helmet Oil can be thoroughly de strated on *your* car *free* of expense to you.

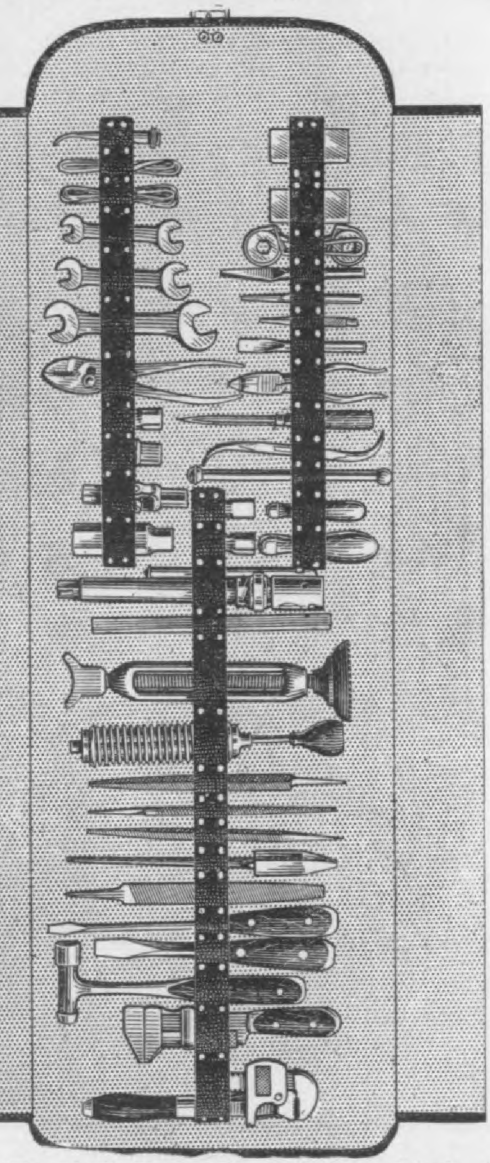
Try It Free—Write for Booklet

Send us the name of your dealer and we will have him give you a sample to try. Put it on the bearing that is giving you the most trouble you will find that it will give perfect satisfaction.

Digitized by Google

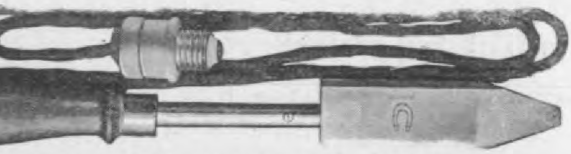
"Auto Lubrication" is a booklet that we send *free*. It contains facts a

e line of Patterson, Gottfried & r, of 144-148 Center street, New City, for 1908, the additions includ- e oil squirt gun, pump, jack and oupling, here illustrated.



"Empire" Tool Kit, including "Auto Cle" es, squirt gun and jack, an exceptionally te tool equipment.

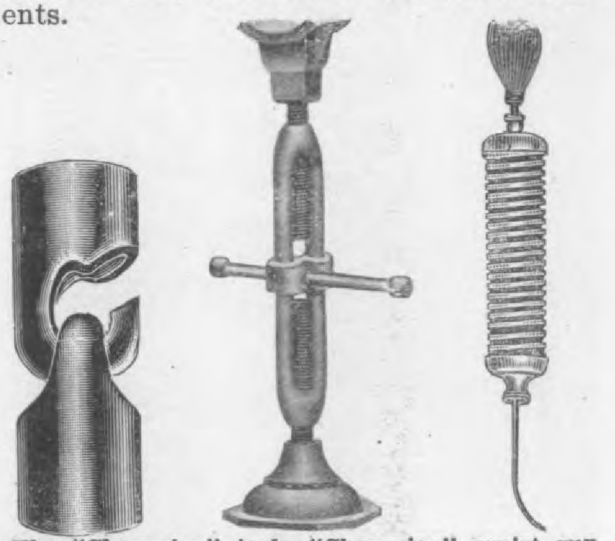
y also offer an exceptionally com- automobile tool kit, including the gun and jack, as well as the "Auto wrench handle, and several sockets me. This tool kit is called the "Em- and lists at $25.00. It includes such



e "Economy" electric soldering iron.

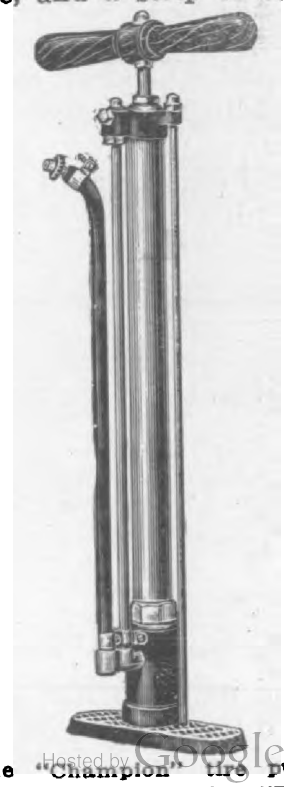
Cle" sockets as are usually needed

pion oil gun lists separately at $1.50. It is made of seamless brass tubing, and the barrel is wire armored to protect it from dents.



The "Champion" jack, "Champion" squirt gun, and the "Victor" belt coupling.

Besides the Auto Cle, the jack and squirt oil pump referred to above, the Empire kit includes 3 machinist's wrenches, 3 punches, 4 files, 2 Walden wrenches, 2 file handles, ⅜-inch cold chisel, Stilson wrench, 1 monkey wrench, 2 Perfect handle screw-drivers, 1 Perfect handle hammer, 2 sizes of pliers, scraper, copper extractor, soldering copper, box of cotter pins, box of soldering paste, bundle copper wire, and a strip of solder.



The "Champion" tire pump.

A smaller kit called the "Elite" is fur-

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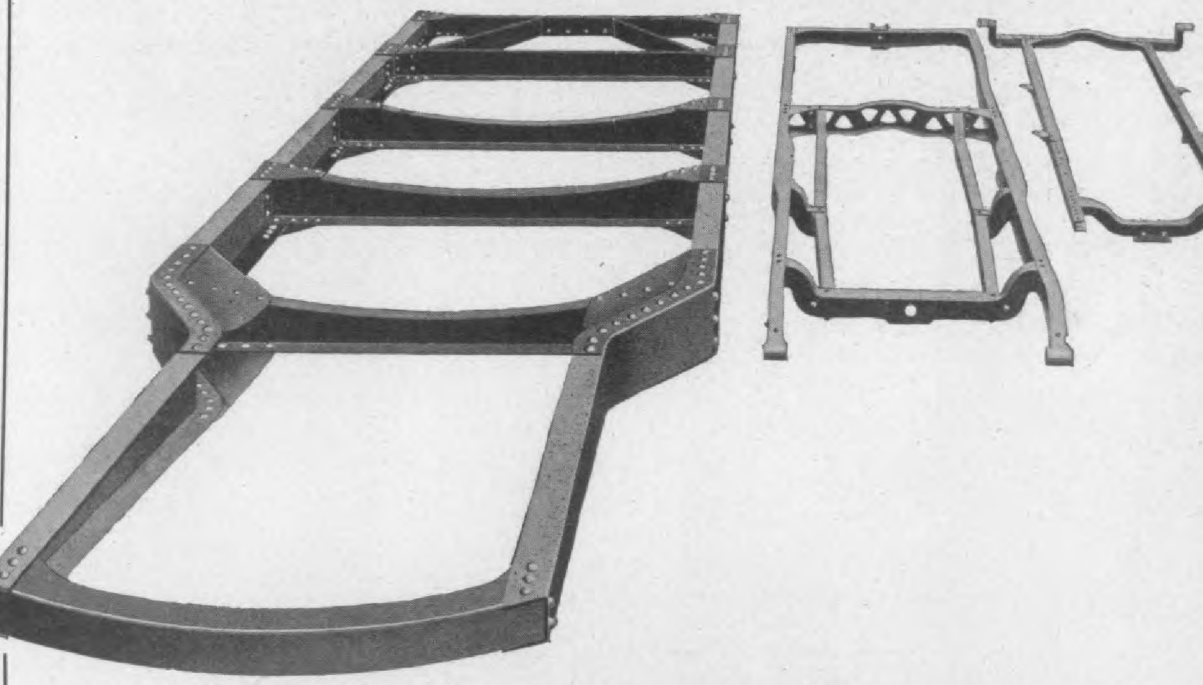
SMITH FRAMES

From Smallest to Largest Pressed Steel Automobile Frames

High Carbon, Nickel or Chrome Nickel Steel



A. O. SMITH CO.

257 Clinton St., Milwaukee, Wis.

Largest Producers of Pressed Steel Automobile

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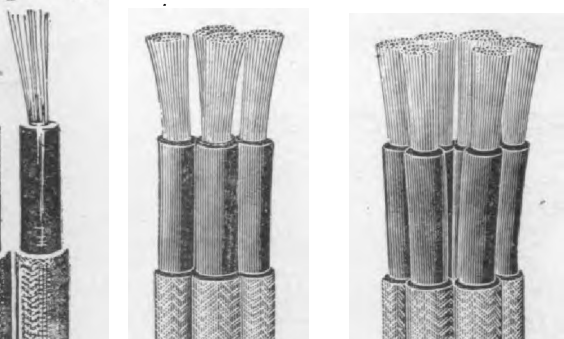
ne "Economy" electric soldering iron
constructed as to concentrate all the
in the copper, and they claim that
heir new method the heat is evenly
ributed and a uniform temperature
ntained, allowing continuous use of
iron while in circuit. Six types of
e irons are furnished for different
ages, and prices range from $6.00 to
00.

ne "Victor" belt coupling is made of
t steel in a large number of sizes,
es ranging from $4.00 to $26.00 per
n, list. This form of construction
uces a very smooth, strong coupling.

New "Packard" Ignition Cables

ome of the latest additions to the
kard line of ignition cables, manufac-
d by the Packard Electric Co., War-
Ohio, are 2, 3, 4, 5 and 6 strand low
ion cables this company's attention
ng heretofore been given to the man-
ture of high tension cables exclusive-

he 2 strand size is composed of 2
nds of regular low tension cable,
ept that the rubber has a single



Packard 2, 3, and 6-Strand Low Tension Cable

id saturated with flexible enamel. The
vidual strands are red and black in
or, making them easily distinguishable.
ese two strands are enclosed in a com-

tween the strands, which completely fi
the interstices, making it solid and com
pact. The twine and strands are en
closed in a common brown double cover
ing treated with enamel in the usual man
ner. The finished cable is round in form
and about 25-64 inch in diameter.

Improvements in the 1908 Splitdorf Coil

In the 1908 Splitdorf spark coil, manu
factured by C. F. Splitdorf, 138th stree
The Bronx, New York, the same unit typ
of construction is followed, using th
Bogert hammer, the Bogert contact sprin
and the ratchet adjustment screw.

The 1908 Splitdorf Spark Coil, fitted with silent stop for the Bogert hammer.

One improvement in the working par
of the coil is a silent stop for the Boge
hammer, making it practically noiseles
The general battery wire connecting th
battery binding posts on the units an
leading to the switch, has been remove
from the top and put inside of the cas
the idea being to overcome any possibili
of short circuiting on the outside. The v
brator is also made more sensitive, pe
mitting of a lighter adjustment which
course means a saving of current. E
cept that the material is thicker an
heavier, the top of the box is practical
the same as in 1907.

The 1908 Splitdorf timers are bein
made up in three different styles for th
various number of cylinder engines; th
regular timer with the plain bearing, th
snap point type with ball bearings, an
the roller contact type, also with ba
bearings.

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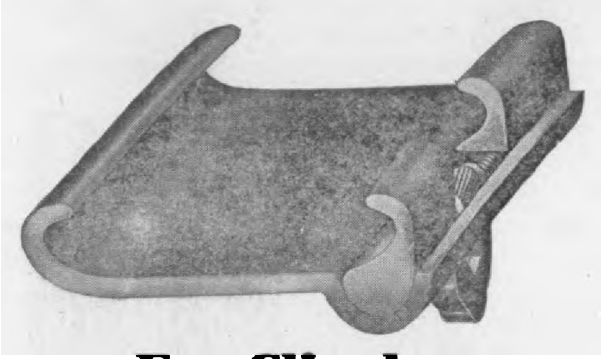
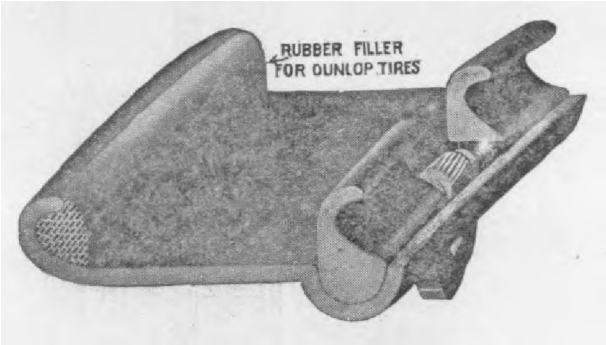
The Philadelphia branch of the Firestor

For Morgan & Wright

and all other tires.



For Clincher



For Dunlop

This unique rim is easily the most important rim achieve
since the advent of the automobile. It simplifies the use of va
types of tires as no other rim pretends to do. It is as valuable a
tribution to the industry as are tires of the quality of Morg
Wright's.

Bear in mind that this rim will accomodate every make of Clincher or Dunlop tires, as well as every type of mechanically fastened tires but one. Standard measurements thruout, including inside diameter. Solid bead.

MORGAN & WRIGHT, Detro

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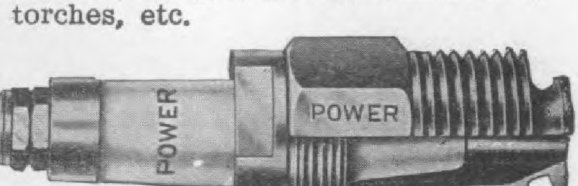
t, New York City, which controls a ber of motor car accessories marketed r the trade name "Continental," has l a new gasoline filter to its line for The "Continental" filter is extreme- mpact, light and easily installed. It be threaded or soldered into the main y line leading from tank to car-

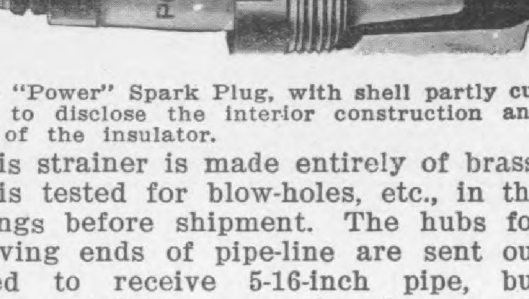
The "Continental" Gasoline Filter.

tor, and a lug is provided for anchor- the strainer to the frame or other The upper cap extends into the body, and has the filter gauze at- ed to it; this is readily disassembled, ed and reassembled without disturb- he main housing installation. A pin- ed drip with lock nut is provided for sional cleaning, washing hands, filling torches, etc.



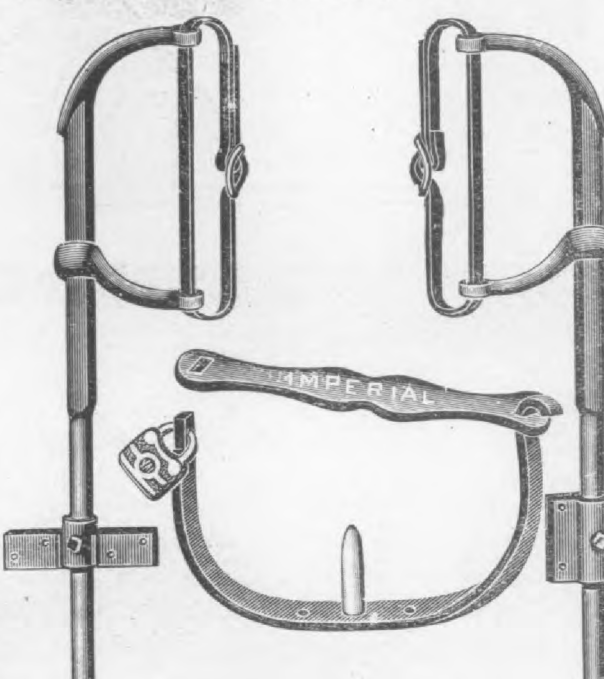
"Power" Spark Plug, with shell partly cut to disclose the interior construction and of the insulator.

is strainer is made entirely of brass, is tested for blow-holes, etc., in the ngs before shipment. The hubs for ving ends of pipe-line are sent out d to receive 5-16-inch pipe, but gh metal has been allowed to permit eir being bored out to fit pipe, up to including half-inch in diameter. Price .50.



Sectional View "Power" Spark Plug.

screws into it, forming a gas tight joint. A very heavy central electrode (E) is used, which is claimed to be non-corrosive. The insulation is double, an extra heavy mica tube (F) immediately surrounding the central electrode (E), and being surrounded itself at the outer end and also at a point near its sparking end by comprest mica washers (G G), the surface of which is highly polished and easily cleaned. Between these two portions of the outer insulation is the metal, threaded collar (D), which screws into the shell and forms the gas tight joint. The price of this plug is $1.50.



The "Imperial" Tire Brackets.

The "Imperial" tire holder, another 1908 addition to this line, is intended as a precaution against theft of spare tires as well as a mere holder, being fitted with a padlock. The entire set includes two side pieces and one base piece on which the lock is provided. The side pieces have straps to encircle the tires, and the bottom piece has a hinged metal cross bar which can be locked down with the padlock. This bracket set will accommodate two tires of any size, and is easily attached to any make of car. The metal parts are of bronze, highly polished.

To-morrow never comes. To be sure of the January number of the Journal, which will contain the Eighth Annual Buyers Guide, send your subscription to-day

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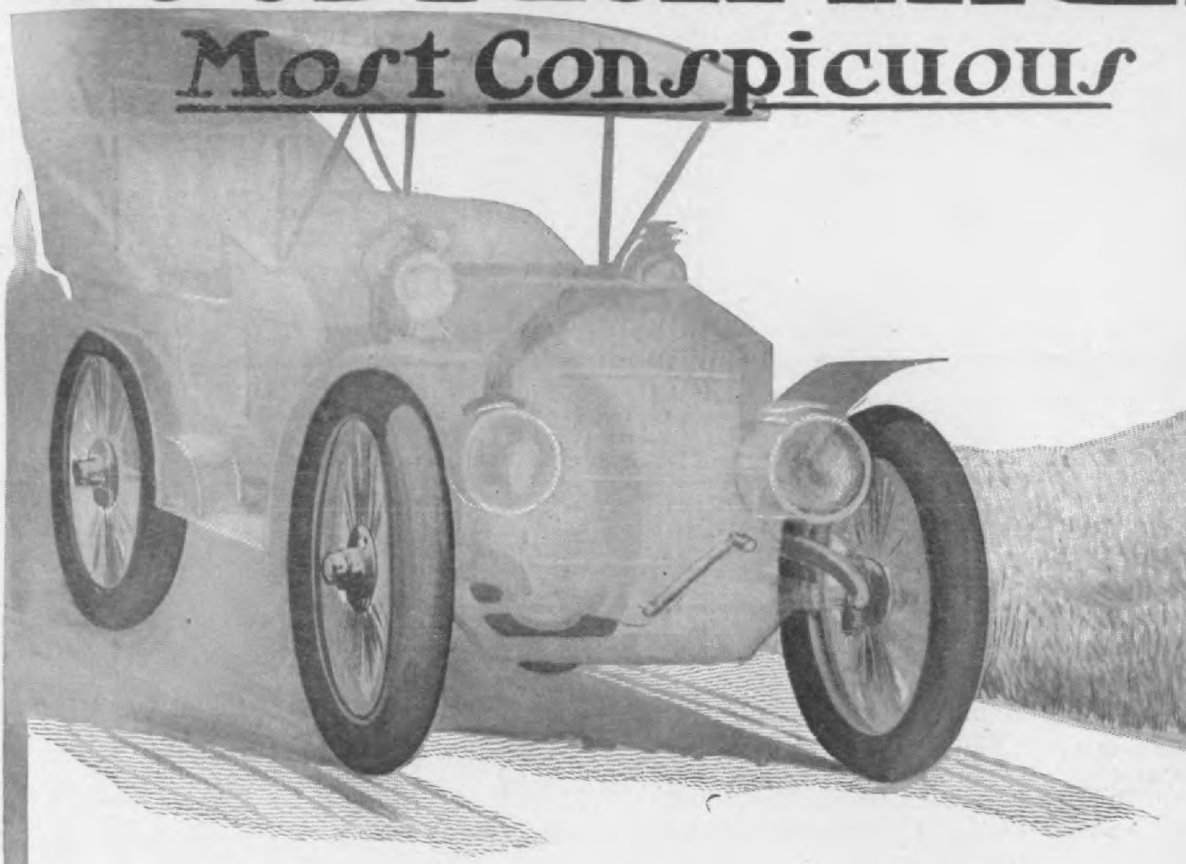
GOODRICH TIRES

Most Conspicuous



ACTUAL count in many localities will sho Goodrich tire preference—and numbers a a pretty good argument too; but, better argume and bigger evidence is found in the fact that all the Goodrich tire users have a prime good reason f their choice—they have been attracted to Goodric Tires by

GOODRICH TIRE DOINGS

It is popularity derived from everyday occurrenc of notable good work, as well as from the servi given in such long distance endurance events as t Glidden Tour where *Goodrich Tires were conspic ously ahead in both numbers and final honors.*

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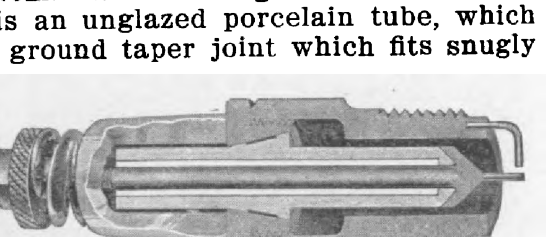
plug has recently placed on the mar-
new spark plug known as the "K-W."
plug is built upon similar lines
Vim plug, but is adapted more par-
rly for 2-cycle engines. The central
ted stem is surrounded by a wrapt
tube extending the whole length of
tem. Surrounding this wrapt mica
is an unglazed porcelain tube, which
ground taper joint which fits snugly

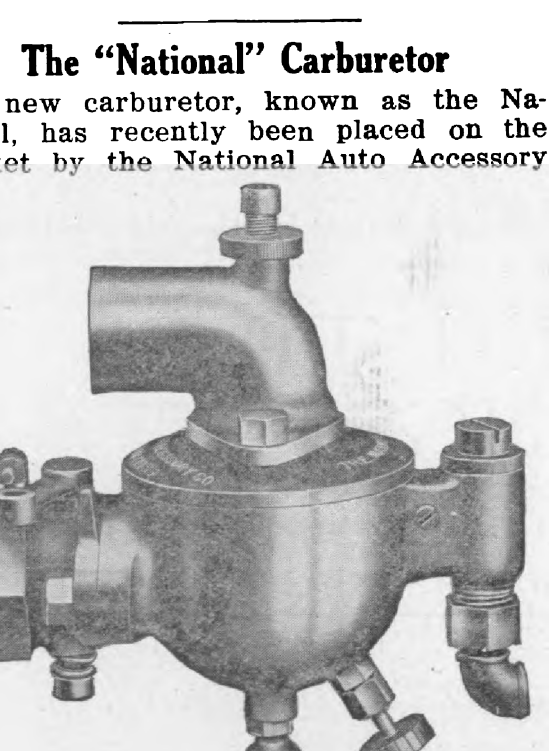


The "K-W" Spark Plug.

the taper joint at the head of the
near the spark gap. About centrally
ed is a larger taper joint on the out-
of the porcelain core, which fits snugly
a corresponding taper joint in the
hexagon nut. On the top of this
gon nut is a porcelain cap which sup-
a steel coil spring which keeps both
joints tight and in place, also taking
ne difference in expansion and con-
on between the metal central stem
the porcelain core, thus effectually
enting cracked porcelains.
e spark gap points are made of non-
zable high fusing point metal. The
is made in all sizes and threads and
at $1.50.

The "National" Carburetor

new carburetor, known as the Na-
l, has recently been placed on the
et by the National Auto Accessory



and is adjustable so that when "closed" it stands at any desired distance from the seat, say from 1-64 inch to ½ inch, which can be regulated by the screw on the top of the air valve, and after once adjusted requires no more attention.

It can be readily understood how this would allow quick action when the throttle is quickly opened, after the motor has been running on low throtle. When the valve is said to be opened 1-64 inch when in its "closed" position, the air which comes in is sprayed by the valve, and as the spray is increased the regular action of the valve is not interfered with, as no adjustment of the spring against which the valve opens is ever made, so that the valve opens just the same to accommodate the suction, whether under heavy duty or low duty. It being a non-seating air valve not only makes it distribute the air properly, but it also prevents the constant clatter of the valve. However quickly it is shut down after high duty, it can be adjusted so that it will not smother itself, thereby preventing back fire. This carburetor is especially adapted to motors of the 2-cycle, 3-port type. It is made entirely of brass (except the float), and is furnished in 1, 1¼, 1½ and 2-inch pipe sizes, listing at $16.00, $18.00, $21.00 and $25.00.

Priestley's Auto "Cravenetted" Roseberry and Mohair Cloths

These cloths are of English manufacture, being woven especially for automobiling and outing wear by the Priestley Mills, at Bradford, England, and made into auto garments by the Leon Mann Co., 699 Broadway, New York City.

The Roseberry auto cloth is cravenetted, making it spot-proof and rain proof. It is porous to air, and will not cause perspiration. The cloth has a lustrous finish, and comes in plain and fancy designs and in a wide range of khaki and other colorings.

The English mohairs are made specially for automobile dusters and entire suits for men's and women's wear. They are claimed to shed dust and not to rain-spot or wrinkle. They come in all the new and fashionable designs.

The address of the Lane Motor Vehicle Company is Passaic, N. J., not Poughkeepsie, N. Y., as was given in the summary of exhibits of the Grand Central Palace Show in the November, 1907, issue.

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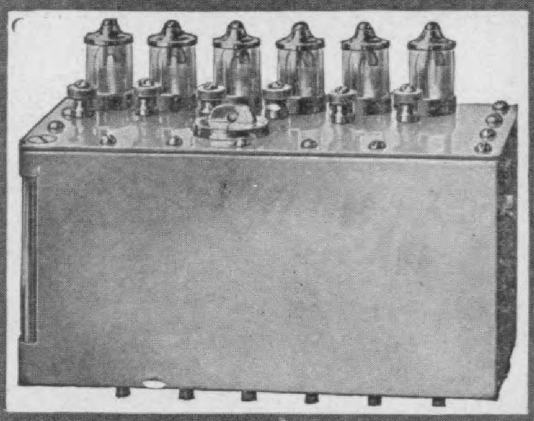
McCORD & COMPANY

1412 OLD COLONY BLDG.,

CHICAGO, U.S.A.

NEW YORK OFFICE, 24 BROAD ST.



McCORD

FORCE FEED LUBRICATORS

RADIATORS

CARBURETORS

WIRE BELTING

SPARK PLUGS

CIRCULATING PUMPS

McKIM COPPER

ASBESTOS GASKETS

motor boats, known as the SirenO.
this instrument the sound is pro-
l by drawing air thru the front open-
f the casing, and forcing it out at the
openings. This current of air is gen-
d by a rapidly revolving turbine,
n by an electric motor. To operate
SirenO it is only necessary to press
sh button conveniently located. The
whether high or low, can be regu-
by the length of time the button is
in contact.

The "SirenO."

is device can be installed in ten min-
It is connected up with the wires
ng to the ignition battery already
lled in the car. If the auto or boat
uipt with a magneto it is connected
the same manner as to a storage
y cell battery. It will operate on 6
cells, the current consumed being
3 amperes. Its weight is about 4
ds. The price of the SirenO in pol-
brass, complete with push button
ll directions for installation, is $35.00.
standard SirenO is wound for 6 volts
special voltages to order.

"Reliable" Compound Tire Pump

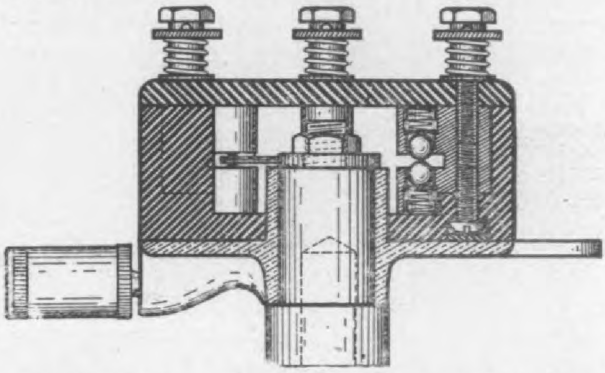
e Elite Mfg. Co., Ashland, Ohio, has
tly brought out a new tire pump
n herewith.

e "Reliable" Compound Tire Pump

swiveled handle which prevents binding and cutting the piston rods. Each pump is tested to 200 pounds pressure before leaving the factory. The list price of the pump is $5.00.

Improvement in the Crouse-Hinds Commutator

The Crouse-Hinds commutator, made by the Crouse-Hinds Co., 341 Walton street, Syracuse, N. Y., has been placed on the market for the 1908 season with an improvement in the shape of the knife blade contact or cam which is now made to cause a quick break of the circuit, with the consequent effect of prolonging the life of the contact.



Sectional view of the Crouse-Hinds 1908 Commutator.

The principle of this commutator is the making of the contact by a hardened steel cam passing between two steel balls held against each other by coiled springs. The price has also been reduced, which the concern states is due to the recent installation of a considerable amount of special machinery, together with the purchase of material in very large quantities.

The "Pagel" tank gage, described in our November number, page 196, is now made by Edmund E. Haus Co., 424 South Fourth street, Minneapolis, Minn., all patents, etc., having been purchased by this company from the former manufacturers, Wm. F. Pagel Co.

Our next issue will be the Great Buyers' Guide Special, and will contain a complete, classified directory of the industry. It is one of the most important issues of the year, especially from the tradesman's point of view, and if you are not a regular subscriber to the Journal you should not delay an instant in sending your subscription so as to begin with the January

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EVER READY SPEEDOMETERS

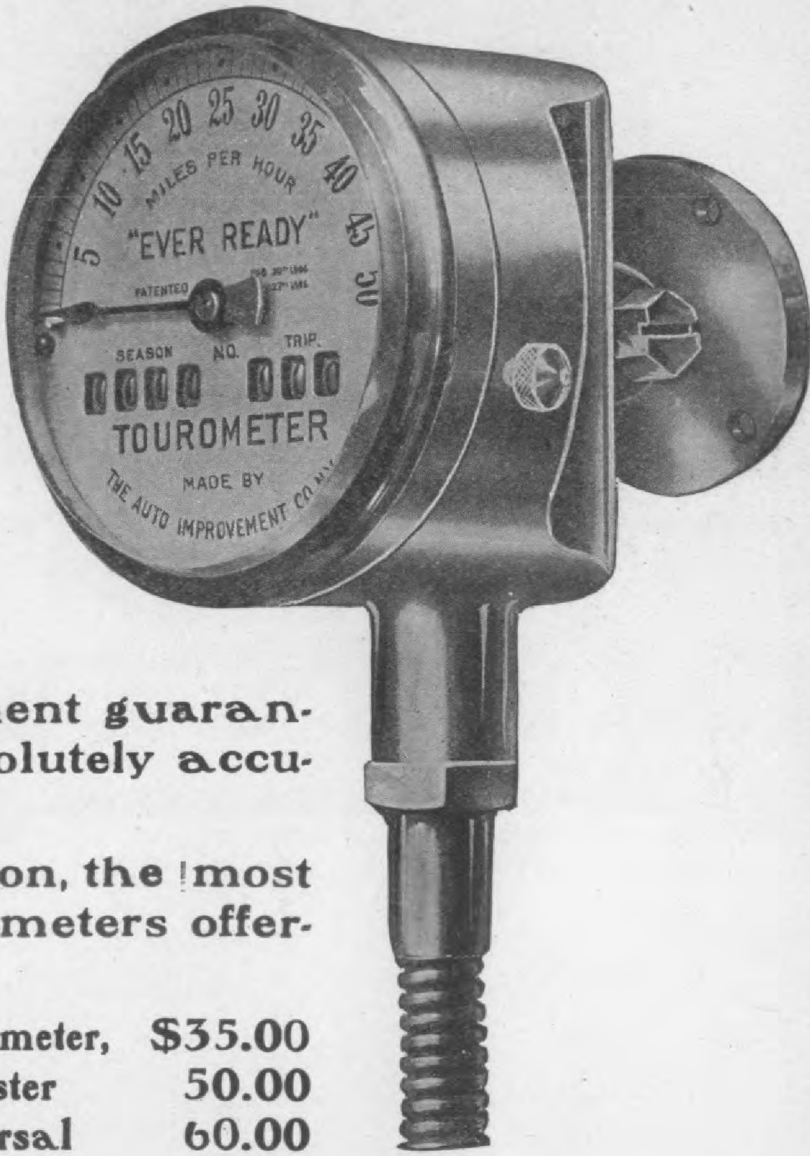
1908 MODELS NOW READY

We are now closing contracts for next season and suggest that you investigate our liberal proposition.

They can also be had for immediate delivery.

Every instrument guaranteed to be absolutely accurate.

Without exception, the most reliable speedometers offered the public.



"Ever Ready" Tourometer,	$35.00
"Ever Ready" Roadster	50.00
"Ever Ready" Universal	60.00

DEPARTMENT 5

AUTO IMPROVEMENT CO.

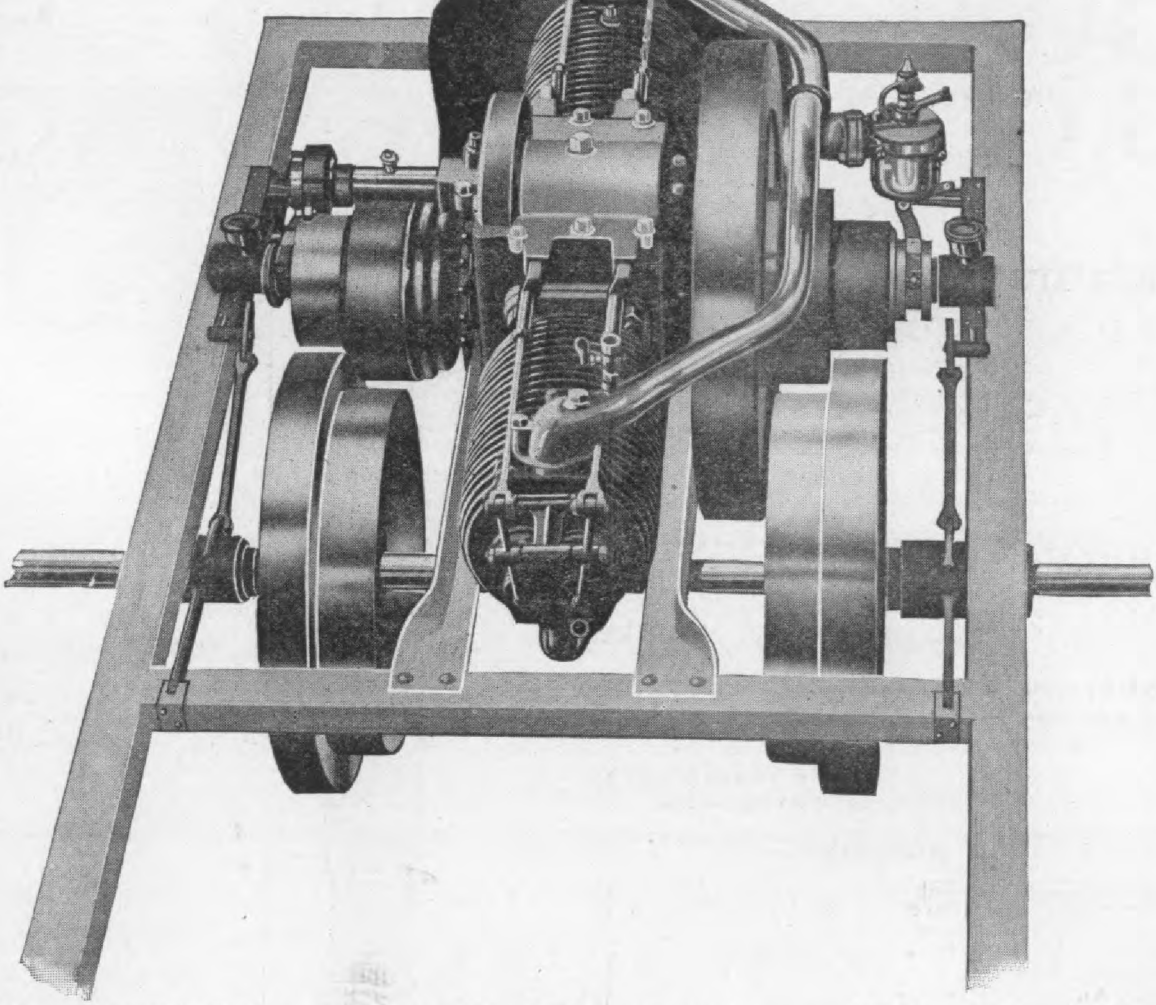
Sales and Show Rooms, 2128 Broadway
Factory, 316 Hudson Street

Digitized by Google

Co., of Columbus, Indiana, have just ed upon the market a combination er plant and drive which should prove nterest to manufacturers.

ne engine employed is 10 H. P. double osed 4x4 air-cooled with valves in the l mechanically operated, with straight cylinders and abundant radiating and .it is claimed is built thruout of t A-1 material and of the highest grade orkmanship.

the friction pulleys may be swung to o away from the engagement with those o the motor by movement of the hand leve located at the seat. When the small fric tions on the engine shaft are out and th auxiliary shaft is rocked forward the large steps are engaged, thus securing the slo or hill climbing speed. When the smal frictions are slipt to their position i side the large pulleys then the engagemen comes on the smaller aluminum step an



The "Reeves" Engine and Change Speed Mechanism. Two paper friction pulleys are mount- on each end of the engine shaft. The smaller pulley sliding on a spline telescopes the larger, movement being controlled by a foot pedal. To the rear and below is a divided ball bearing- unted shaft, the two parts of which are independent, each carrying a set of friction pulleys a driving sprocket. These shafts can be swung so their pulleys engage the paper pulleys the engine; thus two speeds are furnished and no differential is required. The device gives e rolling contact between the friction surfaces. The drive is by side chains to the wheels.

eferring to the accompanying illustra- of the transmission it will be noted on the ends of the engine crank-shaft ounted two sets of paper friction pul- The smaller of these is spline nted and by a simple movement of a

the result is the fast speed forward.

The reverse is effected by interposing small aluminum idler between the frictio wheels on the engine and the countershaf which reverses the travel of the counte shaft. The ends of the engine shaft ar

AJAX

WRAPPED TREAD

TIRES

GUARANTEED FOR 5,000 MILES RIDING

And we MEAN IT

Making the best tire, backing it by the most liberal guarantee, and standing squarely b hind every word of that guarantee has placed us in thirteen months among the leade of the tire industry.

Write for copy of guarantee stating what size tire you are using.

DEPT. G

AJAX-GRIEB RUBBER CO.

GENERAL OFFICE, N. E. Cor. 57th St. and Broadway, New York.
FACTORIES: Trenton, N. J.

BRANCHES:

DETROIT, 743 Woodward Ave.
CHICAGO, 1418 Michigan Ave.
SAN FRANCISCO, 438 Market St.
LOS ANGELES, 1046 South Main St.
SEATTLE, 1102 Broadway.

AGENCIES:

Baltimore, 20 St. Paul St.
Philadelphia, 1413 Race St.
Boston. 819A Boylston St.
Washington, D. C. 602-604 E. St., N. W.
Pittsburg, 201 Wood St.
Fisher Automobile Co,, Indianapolis.
St. Louis, 3948 Olive St.
Seattle, 1419 Broadway.
Minneapolis, Nicolet St.
Jacksonville, Fla., 317 W. Forsythe St.
Cincinnati, O., 331 East 5th St.
Joseph Straus & Sons Co., Buffalo, N. Y.
Kansas City, Mo., Maxwell-Briscoe Auto Co.
Dayton, Ohio, Borderwisch & Glancy Automobile Co.
Des Moines, Ia., Automobile & Supply Co.
Sioux City, Iowa, Wm. Warwick.
Porto Rico, 32 Marina San

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cooled may be safely run in the coldest ather. When the pneumatic tires were elved" that was a step in the right ction. Here is another which is claimed be a "longer stride."

he demonstrating buggy used by the pany to show this transmission has n run, it is stated, between 1800 2000 miles. It has been driven over kinds of roads under all conditions. On des, in sand or mud the buggy moves n the greatest possible ease, and the air expense is confined to one broken e-up spring and the replacement of one .

is the intention to sell simply the ine and transmission as illustrated, to and carriage manufacturers who can nt the same, with the assurance when pleted of having something which will satisfactory results.

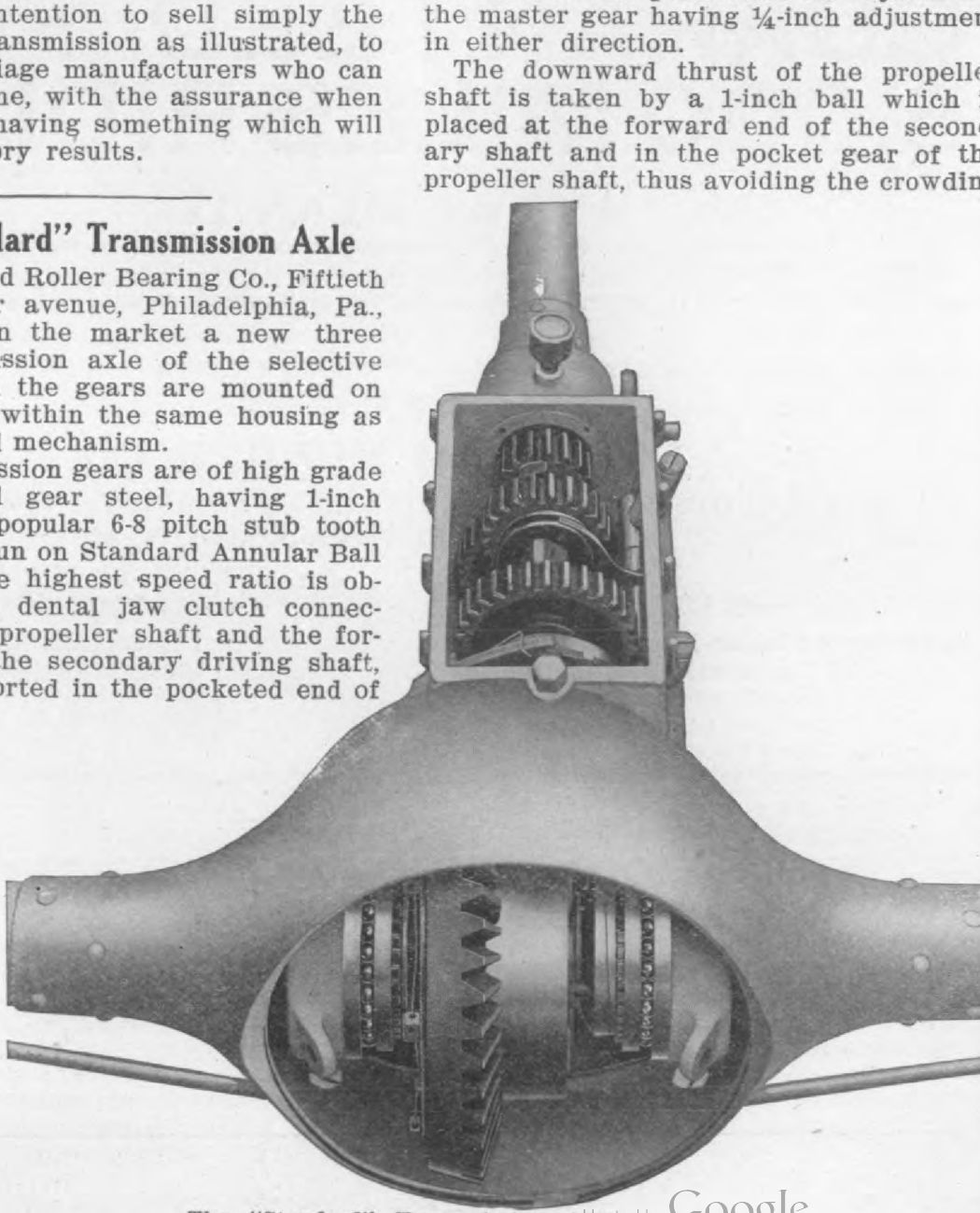
he "Standard" Transmission Axle

he Standard Roller Bearing Co., Fiftieth Lancaster avenue, Philadelphia, Pa., placed on the market a new three ed transmission axle of the selective in which the gears are mounted on rear axle within the same housing as differential mechanism.

he transmission gears are of high grade me nickel gear steel, having 1-inch and the popular 6-8 pitch stub tooth our, and run on Standard Annular Ball rings. The highest speed ratio is obed by the dental jaw clutch connec- thru the propeller shaft and the ford end of the secondary driving shaft, ch is supported in the pocketed end of propeller shaft on a roller shaft bear-

driving thrust of the master gear is take by ball thrust bearings on either side the differential, and the driving thrust the pinion and secondary shaft is take by a special ball bearing which is inserte immediately back of the pinion. Th thrust bearing and two annular bearing which support the secondary shaft imm diately back of the pinion, are held in self-contained cup, which makes the pinio adjustable from one point, in or out of th master gear. The master gear is adjus able longitudinally by means of a speci adjusting cam, which is absolutely wit out threads and positive in its adjustmen the master gear having ¼-inch adjustmen in either direction.

The downward thrust of the propelle shaft is taken by a 1-inch ball which placed at the forward end of the secon ary shaft and in the pocket gear of th propeller shaft, thus avoiding the crowdin of the propeller shaft against the second



The "Standard" Transmission Axle.

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Mr. Dealer:

Are you "IN RIGHT" for

1908?

Are you handling the right line of cars?

Are you handling a line that worries you half to death to keep the cars going and to keep the owner satisfied?

Do you feel like you wanted to find a hiding place every time you see a user of one of your cars coming?

Are you handling a line that makes every buyer a "booster" for you, or are you handling a line that makes every buyer a "knocker"?

Does every car you sell help sell another, or does every car you sell prove a boomerang?

Do you have to cut prices because your cars wont sell at list?

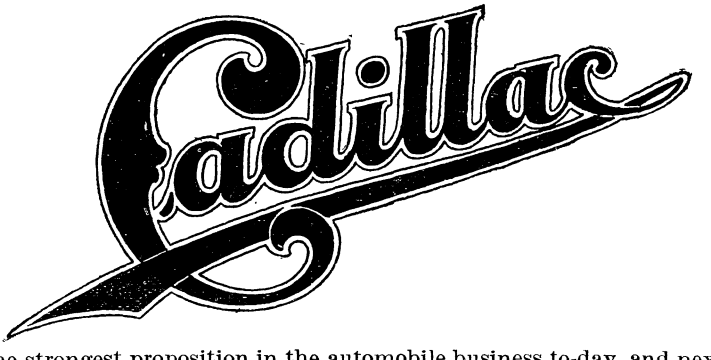
Are you handling a line that people want, or do you have to work to sell them something they don't want?

Does the manufacturer properly protect you in your territory?

In other words, are you entirely satisfied?

If you're not, now is the time to commence figuring on what you are going to do for 1908.

The



line is the strongest proposition in the automobile business to-day, and next year it will be stronger than ever.

We are stocking up on material and preparing for 1908 now, so that deliveries will be made promptly throughout the season. That's an important item.

We will be prepared to handle some new territory that we haven't been able to touch before because of lack of cars.

A few "dead ones" among our dealers may be weeded out, because our output next year will be greater than ever, and we want only "live ones."

If you are open to consider the line that almost sells itself write us. Tell us who you are, what you are now handling, how much business you have done, and what you think you can do with the Cadillac.

CADILLAC MOTOR CAR COMPANY

DETROIT, MICH.

Members of Ass'n Licensed Auto. Mfrs.

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on each end. The entire weight of the vehicle is carried on the axle tube construction, thus removing all strain from the driving members.

The housing is made of a single crucible steel casting, and all the bearings supporting the transmission and differential systems are cast solid in this housing, in this way avoiding the possibility of disalignment to any of the gears or ball bearings.

The differential, secondary shaft and main propeller shaft are removable thru the opening in rear of the axle; the sliding transmission gears, also the lay shaft and other bearings comprising the transmission system are removable thru the cover over the transmission, thus avoiding the necessity of taking the axle from under the car for any necessary adjustments or changing of parts.

The rear axle, propeller shaft and tortion tubes are of chrome nickel steel. The tortion tube is securely fastened in the forward end of the main housing, and is provided on the forward end of the tube with a steel casting, which is provided with a ball thrust bearing, and an annular ball bearing which supports the forward end of the propeller shaft. The end of the propeller shaft is of 1¼-inch square section. The tortion strains due to stopping and starting the car, also the driving torque is transferred thru the tortion tube directly thru a cross member to the frame in a simple and effective manner. The maximum amount of flexibility that is required by the axle is obtainable thru a spherical member which is clamped to the forward end of the tortion tube, and is provided with a spherical connection to the cross member, the centre line of which should be on the same centre with its universal joints and radius rods, if same are used.

The brake system is provided with an internal and external brake, which are applied on a brake drum which has 1-inch air space between the internal and external drum. This air space contains a number of thin veins, which are cast between the two drums at an angle of 20 degrees, and which acts as a fan for the purpose of circulating the air thru the brake system.

The internal and external brakes are lined with camel's hair. The front axle is of I-beam section and is made of a solid drop forging.

The mounting of the steering knuckle is of a very novel construction, as the entire weight applied at this point is taken on a 1-inch ball which is placed at the top of the vertical column of the steering knuckle. The manner in which this is adjusted and accomplished is shown in the accompanying photographs.

The Value of a Trade Directory

The value of a trade directory is gaged not by its enormity, but by its accuracy and the activity of the concerns listed in it, as well as by its arrangement to permit easy reference. Judged by this standard the directory of the automobile and motor boat trade which is included in the January number of the Cycle & Automobile Trade Journal is pre-eminently the best directory of its kind. As it is revised daily, and as its publishers are constantly corresponding with every concern listed in it, the chance of retaining names of inactive concerns is practically eliminated, and the directory is therefore absolutely accurate up to the minute of going to press.

We originally published an annual directory of the trade in book form, and sold same for $1.00 per copy, but in late years, for the convenience of the trade, we have included this directory in the January number, so that at the beginning of each calendar year every subscriber is "automatically" supplied with the most complete and accurate trade directory extant without effort on his part excepting his annual remittance of the subscription price of the Journal. For several years we charged extra for the January number on account of this valuable directory, but last year we sold this valuable number at the same price as other numbers, and will follow the same practice in regard to the next "Buyers' Guide Special," as the January number is called, the price of which will be 20 cents.

All our subscribers will, of course, receive the January number—the "Great Buyers' Guide Special"—just as other numbers, and we therefore urge all non-subscribers to remit $2.00 at once so as to have their subscriptions start with the January, 1908, number. Send remittances to the Cycle & Automobile Trade Journal, Forty-ninth and Market streets, Philadelphia.

Besides its completeness, and its entire lack of "dead wood," the Journal's trade directory is arranged in practical form and fully indexed for easy and quick reference. All active makers in each particular line are grouped under a suitable heading, such as "Gasoline Automobiles," "Motorcycles," "Motor Boats," "Gasoline Automobile Motors," "Carburetors," etc., etc., and a complete index of all headings is also given, while the various groups are placed alphabetically according to their headings.

C. B. Warren, for several years manager of the New York branch of the Haynes Company, has succeeded Frank J. Fanning as sales manager of the Haynes Automobile Company, of Kokomo, Ind.

The Warner Gear Co., of Muncie, Ind., informs us that it is about to move into its new steel and concrete factory, which will more than triple its capacity. This concern manufactures transmission gears, **both sliding and planetary types, selective side control levers, steering gears, and both spur and bevel gear differentials.**

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Reliance

SPARK PLUGS

Patented in France and Belgium. U. S. and other Foreign Patents Pending

CONCLUSIVELY PROVING

INFALLIBILITY

If Water Won't Short-Circuit A Plug nothing else will, for water is conceded to be unparalleled as fouling matter.

Construction.—The insulated sparking point is a hair-like platinum wire entirely protected from corrosive action in the cylinder by being baked in and brought flush with the surface of the porcelain. The spark in leaving this minute point is concentrated and intensified to such a degree as to instantly destroy any deposit on or near the point by its intense heat and scouring action produced by striking the surface of the insulator.

NO QUESTION AS TO RESULTS.

LOOK FOR US AT THE CHICAGO SHOW.

Price, $2.50 Each, Postpaid.

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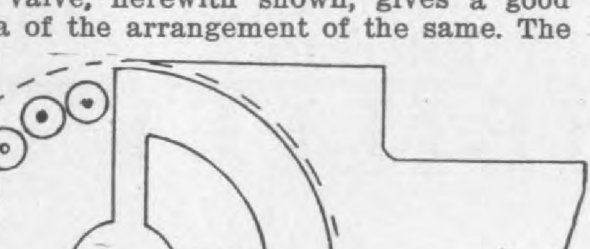
rk avenue, Cleveland, O., and has been igned with the usual idea of obtaining fect mixtures regardless of the speed the engine. Instead of having one

he Krause Carburetor, exterior view with en pocket removed.

ge opening for the admission of air and ingle jet for the admission of gasoline the mixing chamber, this carburetor a number of small openings each of same size. These openings are in a f circle, and the diagram of the throt- valve, herewith shown, gives a good a of the arrangement of the same. The



ir passage and throttle valve in the Krause uretor.

air, as well as the velocity of the air, remain in the same relation.

Another feature of the Krause c buretor is the fact that a large screen used at the gasoline entrance, which not easily clogged, and can be very qui ly removed for cleaning, if necessary. band of gauze surrounds the entire c buretor, forming a screen jacket whi prevents dust and foreign particles bei sucked in. The accompanying exterior lustration shows the carburetor with t gauze jacket removed.

The "B B" Turner Safety Alarm Pu

This pump is constructed upon the co pound principle, and is the product of t Turner Brass Works, Sycamore, Ill.

A feature of this pump is that it fitted with a safety pop or alarm, whi can be adjusted to pop at any pressu from 50 to 100 pounds instantly, there preventing one tire getting more pressu

The "B B" Turner Safety Alarm Pump.

than another, in turn distributing t weight of the car equally.

The length of the pump over all is inches. The handle is 8 inches wid The tubing is 1⅛ and ⅞ inch diamet No. 18 gage. An extra heavy 4-ply re forced hose, 30 inches long, is furnishe fitted with either Keno or Michelin co nection. The price of the pump in di brass is $5.00, and in polished brass $5.5

Our next number, the January Journ will contain as its most important featu a directory of all active manufacturers this industry, with all manufacture names and addresses classified accordi to their products. A glance shows all t

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Won in the Glidden Tour

Won in 1906 Won in 1907 in the Glidden Tour

Last year 38 out of 62 Cars entered in the Glidden Tour were equipped with Warner Auto-Meters, as compared with 55 out of 74 this year. At the finish last year 10 Cars out of 13 with perfect scores had Auto-Meters, and this year 36 out of 48 Cars that finished had Auto-Meters.

Won in the Sealed Bonnet Contest

Out of 68 Cars in the Chicago Sealed Bonnet Contest, 26 had Auto-Meters—the nearest competitor of the Auto-Meter had only 16 and the next 14, the next 7 and the rest—"nowhere" with 2 and 1 each.

Practically all Route Books Are Compiled by Auto-Meter

including *Motor Guide, The White Route Book,* Sidney J. King's Book, and the Routes issued by the *Automobile Club of America.*

From start to finish in the far-famed Glidden Tour this year the **Warner Auto-Meter** helped to win most of the perfect scores for the contesting cars. The **Auto-Meter** was installed

On 55 Out of 74 Cars AT THE START

in Cleveland. In this awful endurance test of keeping absolutely accurate figures on "How Fast" and "How Far" to Chicago, and then on to New York under some of the fiercest road conditions, there were **36 Auto-Meters on the 48 Cars that finished** at New York—**75 per cent** of the **Winners.**

Victory for The Warner Auto-Meter

On 36 Out of 48 Cars AT THE FINISH

That's going some. It's a victory for the **Auto-Meter** which might have been anticipated, because—

The magnetic principle which makes the **Auto-Meter** as reliable as a mariner's compass makes it unnecessary for the shaft to run at such a *wearing* high rate of speed, as on other speed instruments.

Consequently, experienced Motorists, like the Glidden Tourists, know that the **Auto-Meter** is the instrument that can be *depended* upon to stand hard endurance runs and *accurately tell* the *speed* and distance made by a car *from* start *to* finish without wearing out or being put out of commission like others.

That is also the practical reason why you'll see the **Auto-Meter** on the *Cream of all Cars* on any road.

Watch any line of Motor Cars anywhere—you'll see the handsome little **Auto-Meter** on the dashboard of the best of them and the most of them—then you'll decide that

You ought to have an Auto-Meter on Your Car.

Agencies in All the Principal Cities

New York

Won in Almost Every Contest

The Auto-Meter is so immensely popular with motorists everywhere and it is so universally used and depended upon to tell speed and distance figures, that it is only natural that it should be used by experts in all great contests and win the most victories

Won the Chicago Reliability Run and Boston Endurance Race

In both of these hard tests the **Auto-Meter** was used by the majority of the entrants, and proved absolutely dependable under all trying conditions.

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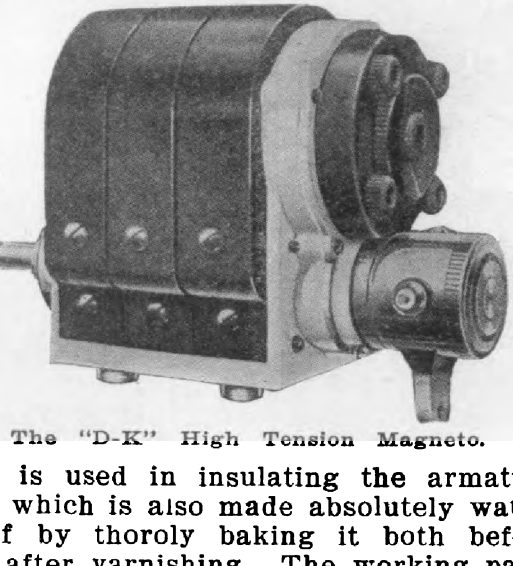
impulses for every revolution. This neto is manufactured by the D. K. etric Co., 106-110 Locust street, St. is, Mo., for 2, 3, 4 and 6-cylinder nes, known as types C-2, C-3, C-4 and for jump spark ignition only. For e and break ignition this concern ds a low tension type D-2 for 4 cylin- or less.

ne timer and distributer are mounted the gear case and form a part of the hine. One non-vibrating, non-adjust- coil completes the system for six nders or less. Either plain bronze or bearings are used for the armature t, and plain bearings for the distri- r shaft. The timer is made of alumi- with a bronze bushing threaded on hub of the main bearing, which forms gid mounting, yet allows the same to urned easily.

ne contact points are made of extra y platinum wire and with means of sting and locking the same. Great



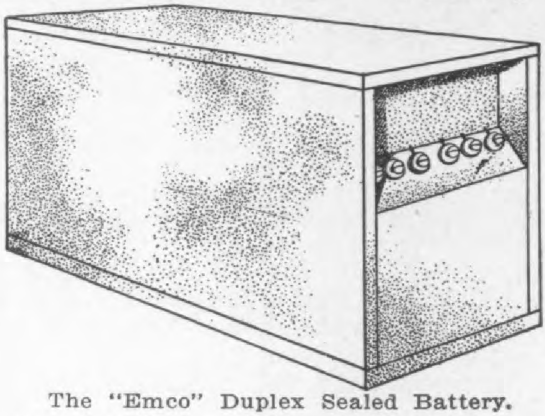
The "D-K" High Tension Magneto.

is used in insulating the armature which is also made absolutely water- f by thoroly baking it both before after varnishing. The working parts e timer are made of tool steel, thoroly ened and ground to a proper bearing. gears are of black fibre and mesh an aluminum pinion fastened on the ature head; the combination needs no ication.

e magnets are made of high grade net steel treated in a careful and skill- manner to obtain premanence. No are required for starting the engine, a set can be connected with the sys- for use in emergency cases.

e magneto is geared directly to the t of the engine. For a three-cylinder ne the magneto must be geared to ¾ the speed of the engine; for four nders same speed as engine, and for

Recognizing the deteriorating effects o moisture, heat and cold on dry cells, Elec tric Battery & Mfg. Co., 319-321 Jackso street, St. Paul, Minn., designed th "Emco" sealed batteries consisting o

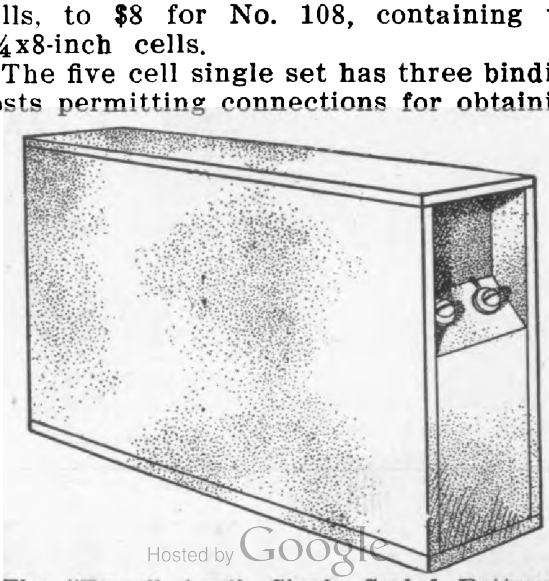


The "Emco" Duplex Sealed Battery.

various numbers of dry cells put up i sealed boxes with all connections insid to prevent their jarring loose. The con nections are all securely soldered. Th whole outfit is surrounded by a compos tion which when hardened excludes al moisture and prevents jarring of the cells

Several different sized batteries ar furnished in "single" and "duplex" form The single sets contain four or five cell each, and the duplex sets either eight o ten cells each different sized cells bein furnished as desired. On the duplex set there are six binding posts on the fron of the box by means of which eleven di ferent connections can be made, producin a voltage of from 1½ to 15, as desired When each set has been individuall weakened the two sets can be connected Prices on "Duplex" sets range from $3.0 for No. 86, containing eight 2½x6-inc cells, to $8 for No. 108, containing te 3¾x8-inch cells.

The five cell single set has three bindin posts permitting connections for obtainin



The "Emco" 4-cell, Single Sealed Battery.

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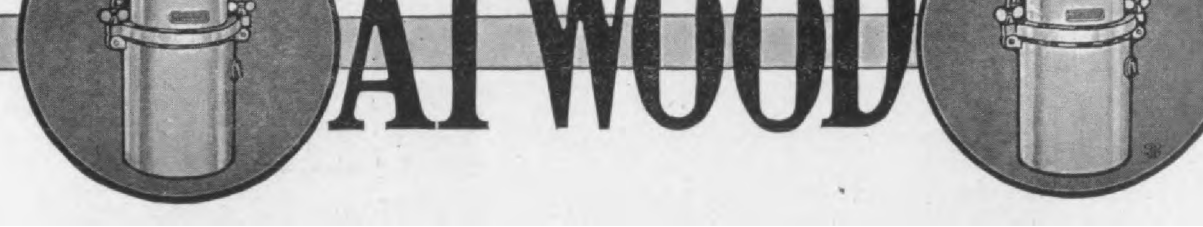

QUALITY **LAMPS**

Skill in the building, care in selection of material, and practicability as well as beauty in designs have made the Atwood Lamps and Generators the foremost product of their kind in the world. Constant improvements, the most severe tests upon completion, and careful and minute inspection through every process of construction have conserved the reputation for quality so consistently earned during 35 years in the building of lamps.

Write for Catalogue

ATWOOD MANUFACTURING CO.
Amesbury, Mass.

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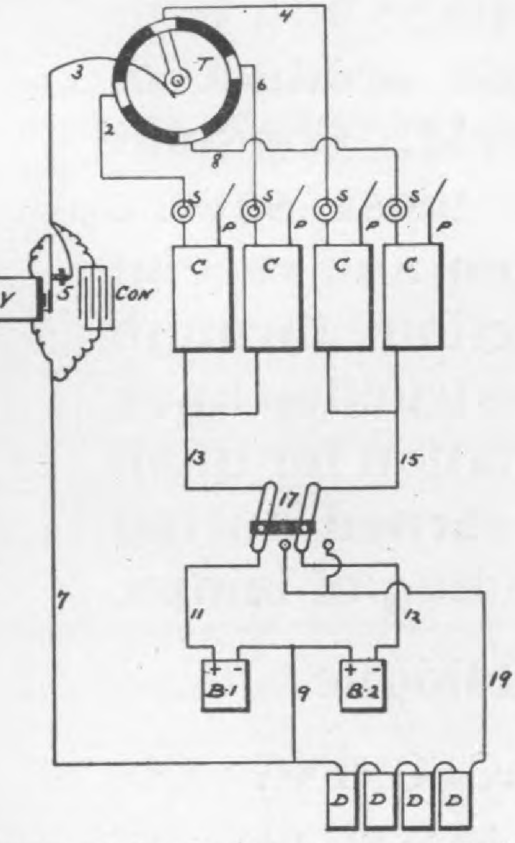
ust placed on the market a new de-
for use in the ignition systems of
r cars and designed to do away with
isual distributor, as well as to save
ry current and obtain perfect syn-
ization.

efly, the system consists of a 2-way
h and a device for alternating the
ent causing it to pass first thru
et of batteries and then thru another.
" is an ordinary timer with its four
onary contacts, connected to four
le coils C C C C having no vibrators
ndensers. Included in these connec-
are four normally closed switches
S S. Continuing thru the coils
four circuits are connected in two
os 13 and 15 carried thru the switch
the positive and negative poles re-
tively of two storage batteries B1
B2, whose opposite poles are connect-



gram of the Sterling Alternating Ignition
m.

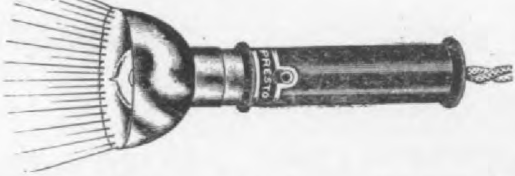
ogether also to the circuit 9. From 9
current is carried by circuit 7 to the
e vibrator V, around which is shunt-
he condenser. From the vibrator the
it terminates thru 3 and the moving
of the timer T. As this last part is
rally a part of the motor, it is only
ssary to connect 3 to the motor frame

Exterior View of the "Sterling" Alternating Device fo
obtaining perfect synchronization.

to positive; it continues thru circuits 9
and 7 thru the vibrator V back to the
moving timer arm, the latter continuing its
motion makes contact with 6, whereupon
the circuit passes thru the appropriate coil
but when followed out it will be seen that
this time the current is passing in the
opposite direction thru the vibrator points
which reverses the polarity. The circuit in
this case is from battery B 1 thru 11
switch 17, 13 to the proper coil, thru the
timer and ground wire, to the vibrator
and by 7 and 9 back to the battery. It
will thus be seen that every timer contact
carries the circuit alternately thru bat-
teries B1 and B2 there by alternating the
direction of the battery current.

"Presto" Cigar Lighter, Lamp Lighter and Inspection Lamp

The Metal Specialties Mfg. Co., 18-24
West Randolph street, Chicago, successor
to the Abet Mfg. Co., are marketing the
Presto Combination Electric Cigar Lighter



"Presto" Lighter, with lamp attached for in
spection purposes.

**Acetylene Lamp Lighter and Incandescen
Repair Lamp.** The device is operated
from the spark battery of the automobil

THE STEWART

Has no maximum hand or other useless contraption.

¶ The great success and popularity of the Stewart Speedometer has been achieved, because of its indisputable accuracy, dependability and mechanical perfection. It is built to indicate the speed and distance traveled and nothing else and keep on doing it.

¶ We don't cumber our speedometers with a lot of valueless contrivances that can add nothing to their usefulness or reliable operation. Does the maximum hand serve the purpose for which it was made? Surely no court is expected to accept as evidence something that can be manipulated at the will of the defendant.

¶ Such contraptions are not improvements, but are a source of confusion and disappointment to many that have tried them—Stewart Speedometers have always given excellent service and entire satisfaction to car owners that want a real speed indicator and mileage recorder.

$40

We exhibit at all the shows

FULL SIZED 4-inch dial, 60-mile, enclosed Odometer, equipped with the wonderful Stewart Flexible Shaft and Stewart Patented Swivel Joint, that mean such a great saving in shaft annoyances and expense.

Backed by Our Famous Ironclad Guarantee

Our new model is a world beater—The American, Price $25.00

Send for catalog

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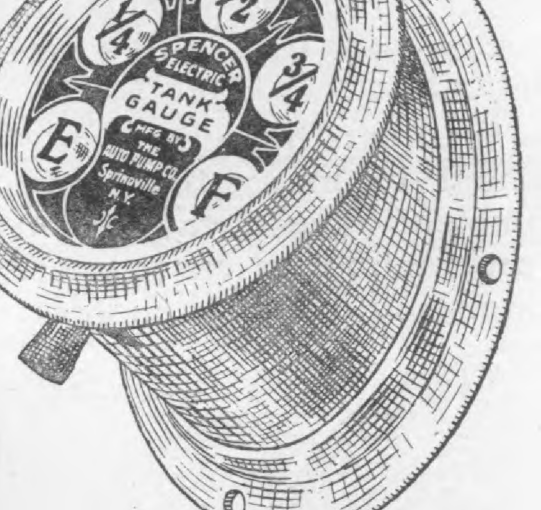
pencer power tire pumps have made improvements on the pump for 1908, also brought out a new tank gage, ically operated, which consists of a sliding up and down a vertical n, which extends down into the ne, this float being connected with arranged so that it can be brought connection with a dial indicator, d on the dash in front of the driver. olumn which extends down into the ine is of hard rubber and carries its sides brass strips, each strip insulated from the strip above, the



cator of the Spencer Electric Tank Gage.

e forming two tracks for small rollers, n are on the float and are kept in ct with the brass strips by means of itable spring. As the float rises or with the rise or fall of the gasoline rollers on the float are brought into act with the successive sections of strips and by pushing a button on dash indicator, the electrical circuit een the battery and the float is com- d and a small electric globe throws ght beneath the proper numeral or r on the indicator, showing whether tank is full, three-quarters, one-half, quarter full, or empty, as the case be. Each pair of sections of the s strips one in each side of the mn is connected to the lamp under numerals corresponding to the posi- of the float at that time, so that when button is pushed, the light will be wn on the proper number.

but is soldered to the tank separately, and can therefore, be used on either pressure or gravity feed tanks. The current is taken from the ignition battery.

The improvements on the Spencer tire air pump consist of making it more compact and of changing the method of connection with the crank-shaft, so that it can be used on any make of car.

The Auto Pump Co. furnish a complete starting handle for any make of car, if necessary, so that this pump can be used, the pump being operated from the crank-shaft.

Archer Gasoline Storage System

The Archer Tank Company, 76 West street, Rutland, Vt., is putting out a new gasoline storage system after a long series of tests which, they claim, have shown conclusively that its use prevents all loss from evaporation and eliminates water and dirt from the gasoline. The apparatus is of the simplest form, and consists only of common valves and piping fully understood by every plumber. Pumps and their complications are avoided, and all that is necessary to deliver gasoline is to open the valve and to close it when thru. This system uses the well-known principle of water displacement, and the gasoline is drawn from the top of the tank, while all water and sediment remain at the bottom and cannot possibly be drawn out at the gasoline valve. The tank is carefully made of heavy boiler steel riveted and caulked, is buried in the ground for safety and convenience, and is guaranteed against explosion or danger in case of fire. The apparatus is equally well adapted for use with kerosene or any oil, but is of especial value in handling gasoline.

Automobile Wiping Towels

Mr. George S. Browne, 303 Canal street Providence, R. I., has devised a strong porous and very absorbent wiping towel to be used for cleaning automobiles, cycles and other vehicles, as well as machinery in general. It is of handy size, double hemmed. The price is $4.00 per gross and a discount is given to the trade when great gross lots are purchased.

Planet Motor Co., 280 St. Nicholas avenue New York City, is about to place on the market a new 6-cylinder, 2-cycle motor with revolving air-cooled cylinders. In this motor, called the "Planet," a pump is used to deliver the fuel to the cylinders

Goodyear Leads

¶ A count of the Automobiles equipped with Quick Detachable Rims at the Grand Central Palace Show just held at New York City, shows the following result:

GOODYEAR UNIVERSAL RIMS ON			**27**	**Cars**
Marsh	"	"	**19**	"
Goodrich	"	"	**17**	"
Midgley	"	"	**8**	"
Fisk	"	"	**1**	"

¶ The Goodyear Universal Rim has been adopted exclusively for 1908 by the following manufacturers, representing an output approximating 64,000 Rims, viz.:

The Bartholomew Co. (Glide)
Buick Motor Co.
Chalfonte Motor Car Co.
Crawford Auto Co.
De Luxe Motor Car Co.
Dolson Auto Co.
Jackson Auto Co.
Motorcar Co. (Cartercar)
Pierce Engine Co. (Pierce-Racine)
Reo Motor Car Co.
The Smith Auto Co.
Waltham Mfg. Co.
York Motor Car Co.

¶ **See it and the Goodyear Tire demonstrated at any branch. Tire off or on in less than a minute.**

Goodyear Red Seal 1908 Tubes Guaranteed For One Year

The Goodyear Tire & Rubber Co.

AKRON, OHIO

BRANCHES

New York, 64th St. and Broadway
Chicago, 80-82 Michigan Ave.
Baltimore, 400 S. Fremont Ave.
Detroit, 251 Jefferson Ave.
Buffalo, 719 Main St.
Philadelphia, 1404 Ridge Ave.
Boston, Cor. Dartmouth and Boylston Sts.
St. Louis, 712-714 Morgan St.
Cincinnati, 317 East 5th St.
Los Angeles, 932 S. Main
San Francisco, 506 Golden Gate Ave.
Pittsburg, 5988 Centre Ave.
DENVER

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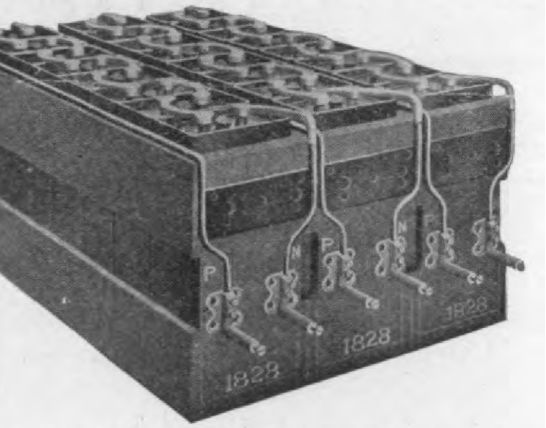
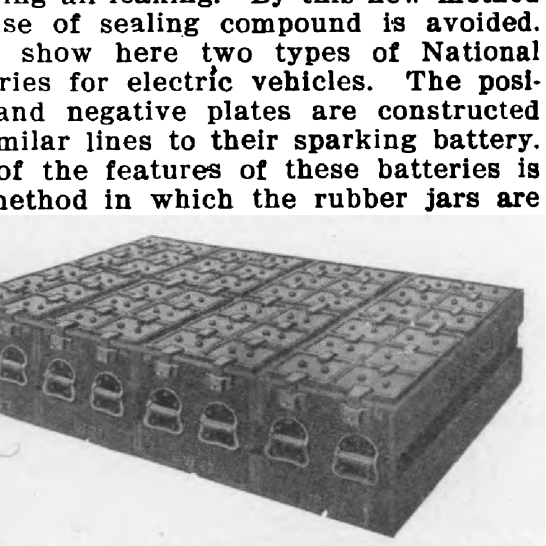
factured by the National Battery Co., lo, N. Y., is being offered for 1908 no changes in its construction other a new process of assembling and g the battery for the purpose of eli-



ional" 1908 Type 9—C. B., 24-cell, 3-tray battery, assembled side.

ing all leaking. By this new method se of sealing compound is avoided. show here two types of National ries for electric vehicles. The posi- and negative plates are constructed milar lines to their sparking battery. of the features of these batteries is nethod in which the rubber jars are



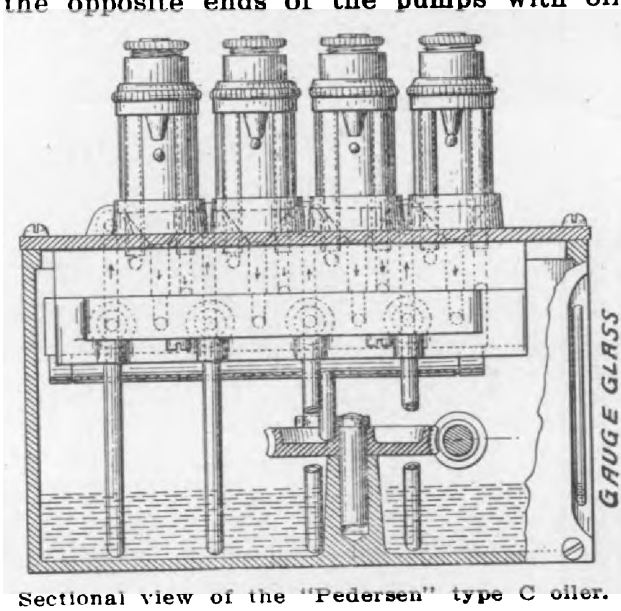
"National" 44-cell Type 17—W. B. Vehicle y; assembled end, 4 trays.

ructed. The bottom of the jar is shed with a patented soft rubber top hich the plates rest, thus reducing ibration to which vehicle plates are cted to, and decreasing the neces- of frequent washing.

1908 "Pedersen" Type C Oiler

e Pedersen Mfg. Co., 636-644 First ue, New York City, has just added w oiler to its line, specified as Type The chief claim made for this oiler mplicity of construction, this model ; even more simple than its predeces- of which it is a refinement.

e operation of the oiler is as follows: leading to the bearings to be lubricated on the other, it will be noted that in the first quarter of the motion, the rocker shaft is rotated, thus filling the pumps from the receiving ports, and at the same time discharges the oil from the opposite ends of the pumps to the bearings. In the second quarter, the slide is moved lengthwise, till it registers on one side with the delivery ports, communicating to the Sight Feed and Regulators, the other side with the ports leading from the same. In the third quarter, the rocker shaft is rotated back and forces the oil to the Sight Feeds, at the same time filling the opposite ends of the pumps with oil



Sectional view of the "Pedersen" type C oiler.

from the Regulators. During the last quarter, the pin moves the frame back to the first position. The overflow from the Sight Feeds passes back into the tank. These operations are repeated as the wheel is revolved.

The Sight Feed used in connection with this oiler is the same in construction as the one described in our September 1906 issue, page 144 with the addition of a few improved details.

The "Door Knob" Dome Lamps

In addition to the new dome lamps de- scribed in our October number The Storage Battery Supply Co., 237 E. Twen- ty-seventh street, New York City, has another new dome lamp called the "Door Knob," as the bulb is about the shape and size of an ordinary door knob.

The new lamps for both exposed and recess work, are made with a bulb screw- ing directly into the center of the reflector

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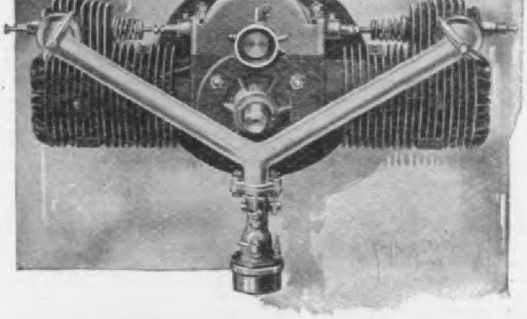


DeTamble

Buggy-Type

ENGINE

The one best engine for buggy-type automobiles; also suitable for any light runabout or light delivery wagon.

Two cylinders, 4x4, double opposed. Air-cooled, 10-12 H. P. (conservative rating.) Weight including flywheel, 180 lbs. Over-all dimensions, including spark plugs: length, 30 in.; width, 16¾ in.; depth, 17 in.; depth without flywheel, 11½ in.

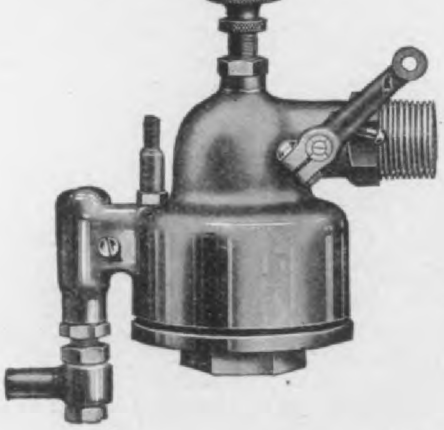
This is a high grade, carefully constructed engine, perfectly balanced and free from vibration. Every engine fully warranted to deliver the rated power and keep cool. Has been run at full speed for six hours without a sign of distress.

Prompt Deliveries
Attractive Prices in Quantities

We Also Build The Famous

CARRICO
Air Cooled ENGINE

4-Cyl. 4 x 4. 20-24 H. P.



The SPEED
Carburetor

Guaranteed to give greater mileage per gallon of gasoline than any other carburetor.

Guaranteed to increase the power and the flexibility of any good motor, make it respond instantly to the slightest movement of the throttle, and to eliminate all jerky motion.

Guaranteed to give an absolutely constant and perfect mixture in any climate, any temperature, on any grade or around curves, with unequaled economy.

Purchase Price Refunded to any manufacturer or private owner who tries a Speed and is not convinced that we have precisely what we claim.

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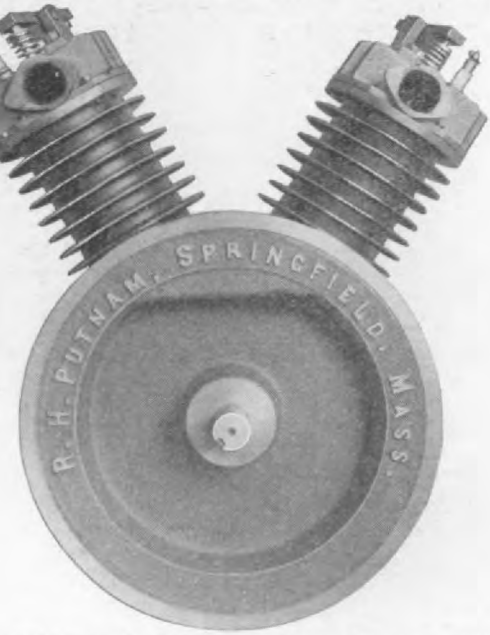
g for 1908 a new V-type runabout , shown herewith, especially suitable uggy type motor vehicles.

s motor is of the 4-cycle air-cooled and is fitted with automatic intakes with push rod and rocker arm to te the exhaust valves. The pistons

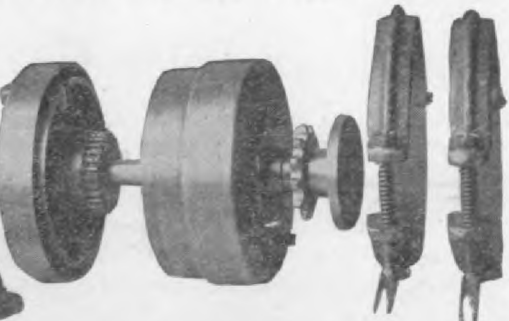


"Putnam" 7 H. P. two-cylinder V-type, ycle, air-cooled runabout motor.

f the trunk pattern and are fitted three rings each at the top ends. The pins are positively held in place at scoring of the cylinder walls is nated. The cylinders are finished by ng. The connecting rods are of e with large bearings at each end. cranks are made from special crank steel and made heavy enough to a full load without danger of spring- The list price of the motor is $100.00.

urray" Planetary Transmission vith Internal Expansion Clutch

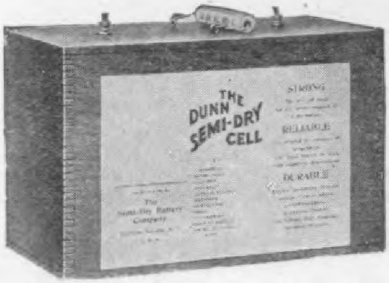
e accompanying cut shows the Mur- Planetary Transmission gear fitted an internal expansion clutch an im- d feature in the 1908 model. This



diameter by 10½ inches wide over coupling and cone. The gear case is cast of gray iron. In this transmission there is nothing to work loose and all adjustments are made from the outside of the gear. The transmission is made for chain and bevel gear drive. One size of this transmission is made for touring cars and a larger type for commercial work.

The "Dunn" Emergency Battery

The Semi-Dry Battery Co., Fifth and Essex streets, Harrison, (Newark) N. J., have recently placed on the market an emergency battery for automobiles in which the magneto is the regular ignition equipment.

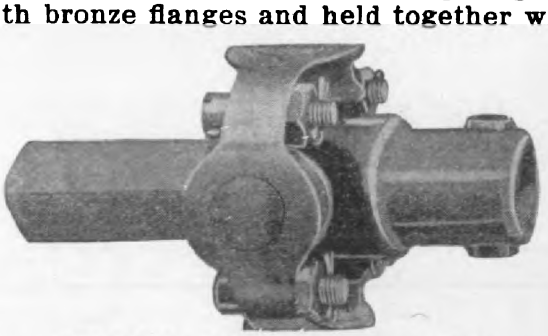


The "Dunn" Emergency Battery.

This emergency battery consists of a number of Dunn Semi-Dry Cells placed very compactly in a locked-corner box, nicely finished and fitted with handles for the convenience of the user. The box is water-proofed and has just the two terminals exposed. It is finished in carmine color.

Hussey No. 2 Universal Joint

Cambria Forge Co., Johnstown, Pa., which succeeded the Hussey Drop Forge & Mfg. Co., of Cleveland, Ohio, some time ago, has made some slight changes in the "Hussey" universal joint, the latest model of which is here illustrated. The new model is made up from steel drop forgings with bronze flanges and held together with



The Hussey No. 2 Universal Joint.

four screws and nuts secured by cotter pins, the square end being 1-inch and the

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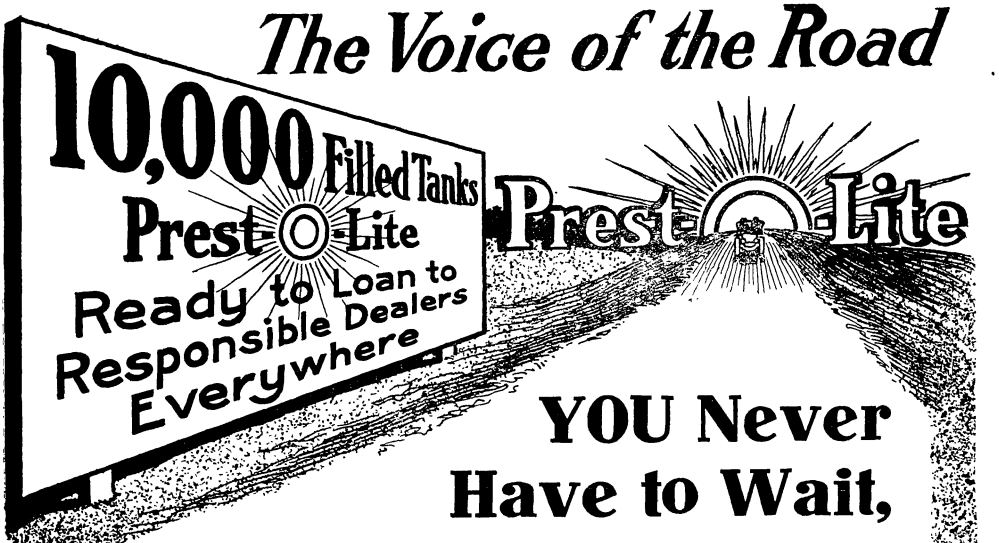
The Voice of the Road



YOU Never Have to Wait,

Prest-O-Lite

IS EVERYWHERE

Over 1600 replacing stations where Prest-O-Lite users can have their Prest-O-Lite tanks exchanged without a moment's delay.

Our Five Main Stations

have 10,000 filled tanks of Prest-O-Lite ready to loan to responsible dealers everywhere—a filled tank of Prest-O-Lite is ready for you at nearly every garage, from the Atlantic to the Pacific.

CAUTION - Prest-O-Lite Gas Tanks are being imitated by concerns who are putting out tanks like Prest O-Lite Gas Tanks of three years ago. Your Prest-O-Lite Tank has all the new improvements shown most practical by three years' more experience. Prest-O-Lite Tanks are thus much more valuable than imitations which cannot be supplied promptly.

In exchanging yours see that irresponsible dealers don't keep your Prest-O-Lite Tank and give you a cheap imitation. Be sure to see the name Prest-O-Lite on the tank you get back to protect yourself.

The Prest-O-Lite Company

MAIN STATIONS:

NEW YORK, 1904 Broadway.
SAN FRANCISCO, Point Richmond,
BOSTON, 607 Boylston St.,
INDIANAPOLIS, 22-24 S. East St.
TORONTO, 6 King St., W.

OR AT ANY RESPONSIBLE DEALERS OR GARAGE.

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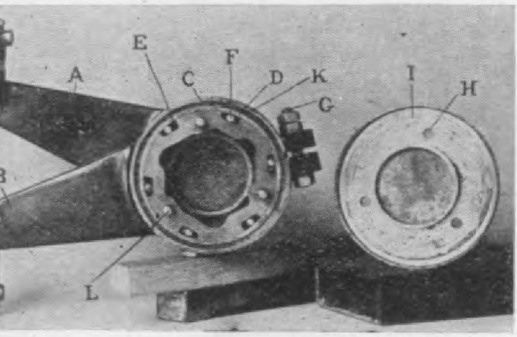
and Broadway, New York, called Shocsorber."

main feature of the device con- of a very simple little arrangement llers set in tapering openings which d around the edge of a drum. A is attached to the drum and this s in a perfectly free manner when ame is closing down on the axle and s, and the springs are being deprest. the springs begin to throw the car rd, the rollers slip into narrow por- of the tapering openings and exert on on an expanding ring which sur- s the drum. This tends to make it for the springs to act and checks rebound.

construction of the device is very e as shown by the sectional view ith. (A) is a lever which ends in a



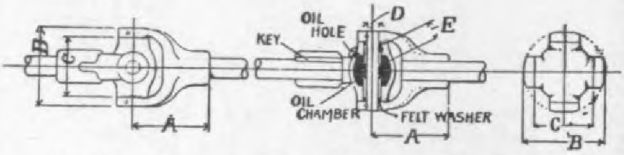
The "Shocsorber."

The end of the lever is attached frame. (B) a lever with an outer the end of which is affixt to the and axle. (C) a sectional friction of second growth hickory, which een found to be the best material his purpose. (D) another friction which works against the filling of y. (E) are six tapering openings drum (K) in which run six steel designated as (F). (G) is a bolt a spring and a thumb-nut for ad- g the extent of the friction. (H) ree holes thru which pass the bolts hold in place the protection plate nd (J) three nuts which bind the tion plate to the bolts.

The Michigan Universal Joint

Michigan Wheel Company, of Grand , Mich., who are widely known as acturers of high grade propellors for boats, have lately brought out a sal joint for use on shaft driven obiles and in similar constructions. xterior view herewith gives a good

B 4 inches, C 3 inches, D ¾ inch, E 1 inch, and in this size the wearing surface or frictional area of the journal is 9⅜ inches. In the other two sizes the dimensions and areas are proportionately larger.



Construction Details of the New Michigan Universal Joint.

This universal joint can be disjointed and put together again, we are informed, in one-half minute without special tools, this being accomplished by removing a cotter pin from the journal and a pin from the center block, thus unlocking or separating the two halves of the joint. The joints are bored and key-seated to fit any size propellor or engine shaft.

Besides the regular pattern this company is prepared to make special universal joints for any purpose and to meet any particular requirements. The large bearing surface makes this Michigan universal joint durable and strong and specially suitable for the constant work it is called upon to do in automobile and motor boat use. The center block is hollow and contains enough oil to last a season. Provision is made to prevent the oil from being thrown out by centrifugal force and to keep out dirt and grit from the bearing. Felt washers are used in the recess at the end of the bushing at the center block pressing against the face of the fork at the only place

The Michigan Universal Joint, Exterior View.

where the lubricant can possibly come out, thus making the joint absolutely dust and oil tight. This feature makes it unnecessary to use leather or metal covers on these joints. The journal pins are of hardened steel, ground, and are interchangeable. All bushings are of hardened steel and are prest into the center block under a pressure of ten tons, after which they are upset and ground to fit the journal pins.

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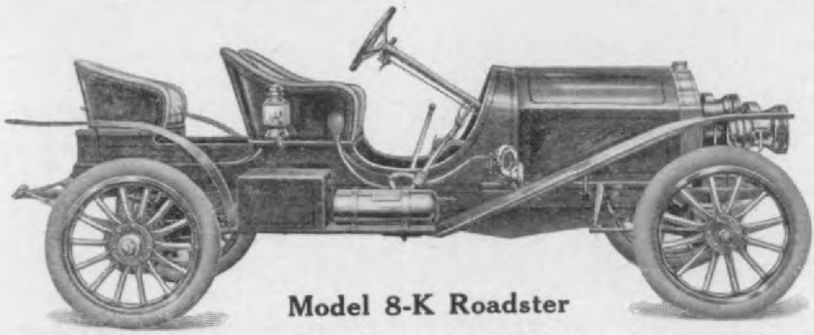
American Cars of Note

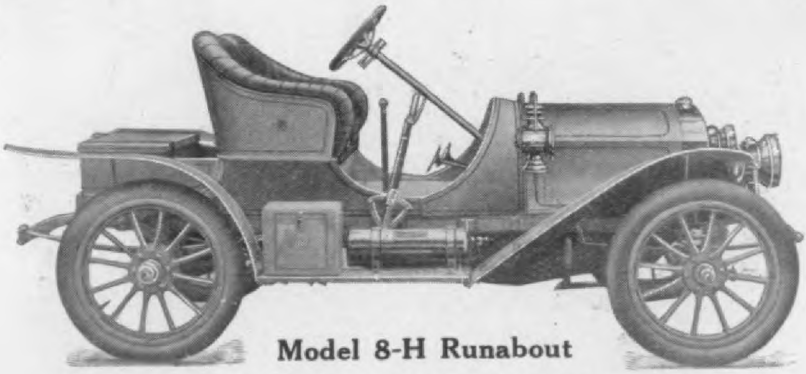


Model 8-K Roadster

ALL Stoddard-Dayton Models have gained distinction for *dependable* service. In competiton with cars *higher* in price, but of *less* practical motoring value, honors have been won and held.

Stoddard-Dayton

Model 8-K Roadster	Model 8-H Runabout
40-45 H. P. Motor, valve-in-head type. Four vertical cylinders, cast in pairs, $4\frac{3}{4}$ x 5 inches. Transmission, selective sliding gear type, three speeds forward and reverse. *Price, $2,500 F. O. B. Dayton.* Extras: Magneto $200; Top $75.	18 H. P. Motor, four cylinders, cast in pairs, $3\frac{7}{8}$ x $3\frac{3}{4}$ inches. Transmission, selective sliding gear type, three speeds forward and reverse. Wheel base, 92 inches. *Price, completely equipped with lamps, $1,700; with top, $1,750 F. O. B. Dayton.*



Model 8-H Runabout

SEND FOR 1908 CATALOG

THE DAYTON MOTOR CAR CO

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York, manufacturer of Shofo hand er, etc., has recently added to his metal polish and a varnish renewer n as Varnish-Lusta.

nley's metal polish is claimed to be ıtely free from benzine, thus elimi- evaporation. It works quickly, a clear, even polish, and will not h the most highly polished surface. nish-Lusta is especially adapted for obile bodies. Containing an abund- of linseed oil, is preserves the var- ınd aids in preventing cracking and g.

1908 "Dietz" Lamps

1908 the R. E. Dietz Co., 60 Laight New York City, is presenting an ive line of lamps, and we illustrate ith two of the latest models, viz: Empire, Jr." side light, and the nph" flare front headlight. This ny also has a new marine search- which is described in the motor-boat ment of this issue of the Journal.

Empire Side Light can be fitted for r electric light, and is especially le for cars of the closed body type a smart effect is desired. It is in two sizes, the Empire and the e, Jr.

"Triumph" Flare-front Headlight.

Triumph Headlight is made in two

The "Alco" Type 12 Acetylene Burner

The feature of this new burner is in the fact that the side air ports are drilled at such an angle as to increase the efficiency of the injector action on which principle this burner operates. This burner is manufactured by the American Lava

The "Alco" Type 12 Acetylene Burner.

Co., Chattanooga, Tenn., and has been selected by five of the largest automobile lamp makers for their 1908 lamps.

The burner is milled, drilled, etc., out of one piece of imported high grade lava,

The "Empire, Jr.," Side Light.

and is mounted in a heavy brass pillar

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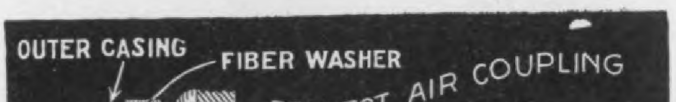
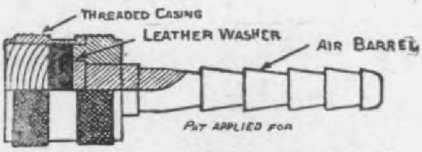
Your Money Back if you find it Leaks, Regardless of the Pressure.

This is the broad guarantee back of

THE PERFECT AIR COUPLING



It is the favorite connecti for coupling air pumps valves on automobile and cycle tires, especially whe high pressure is required, it makes an absolutely tig joint which will not lea It is of a convenient size, and retails for 25 cents. Write trade prices.



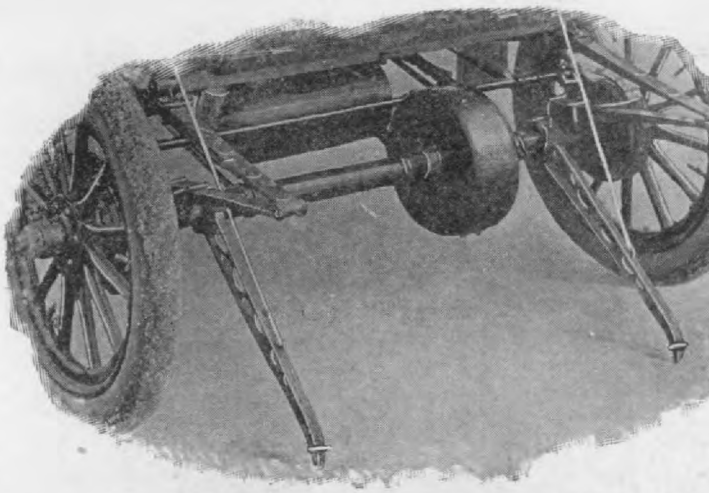
Perfect Jr. Air Coupling, Youse, Reading, Pa.

PERFECT JUNIOR AIR COUPLING

Has fewer parts, is less expensively constructed and sells for a lower price than the

PERFECT AIR COUPLING

Guaranteed to give satisfaction.



THE PERFECT DROP BRAK

is the best safeguard against accide which might be caused by the backing down an incline, if the ch should break, or machinery go wro Every jobber should catalog it, a every dealer carry it in stock.

F. S. YOUSE

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feature of the model is an improved rsing lever working at the front of ack and displacing the less convenient b screw at the side, formerly the only as of changing the direction of the s movement. The new lever makes jack available in any position under body of the car.

The 1908 "Barrett" Automobile Jack.

other notable feature of the 1908 Bar- s the new handle, which is hollow and of fine tube steel, amply capable of ing the weight of the heaviest car. erous other uses can be found for it an automobile. The new Barrett only on the downward stroke of the e.

"Stratton" Convertible Top and Body

A. Stratton Carriage Mfg, Co., Mun- nd., has brought out a new conver- body and top combination, which en- one to have a single seated, coupe

baggage receptacle in the rear. When the body and top are up the car has the appearance of a regulation two seater, the convertibility feature not being noticeable

"Stratton" New Body, with Rear Portion Closed.

The top is detachable, giving an open runabout or touring car as desired. The making of these various changes is said to be a simple operation, and the body is claimed to be as strong as regulation, unconvertible bodies.

"Hagerstown" Wheels, Hubs, Spokes and Rims

Hagerstown Spoke & Wheel Co., Hagerstown, Md., which has had 25 years' experience in the manufacture of wooden spokes, rims and hubs, has for some time past been catering to the automobile wheel trade. This company recently built an addition to its factory and installed a large amount of new machinery for the manufacture of wheels, and is prepared to meet any requirements in the wooden wheel line. The location of this factory in the heart of the hickory and oak region of the Cumberland valley and Valley of Virginia, places the company in a position to obtain any quantity of the best materials quickly and at a minimum cost. The Hollingsworths, who have been connected with the wheel business for a quarter of a century, are in charge of the automobile wheel department.

The Duquesne Plant of the Carnegie Steel Company has recently completed a large addition to its machine shop. The

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A Plug that will "STAY RIGHT"

WE'VE been making Spark Plugs so long it's second nature to make the best Plu possible.

We've just placed on the market what we reall think the best Plug it is possible to make!

It's the result of all our experience, and the satis factory service given the user by thousands o STA-RITE Plugs, from Coast to Coast.

The "GOTHAM" Spark Plug

is just a little better, for all-'round service than any other STA-RITE Plug.

End is partly closed to protect the Porcelain tube—

Bigger Air Chamber in the Shell,—more air space and less chanc of fouling—

Bronze Bushing,—that prevents binding or sticking when takin the plug apart for cleaning or inspecting,—

Steel Shell and Bolt, carefully milled,—

Packings of Copper asbestos filled gaskets, preventing all leakage and giving greater durability.

Let us send you a set of GOTHAM STA-RITE Plugs, $1.00 each,—with the STA-RITE Guarantee! Half Inch size only.

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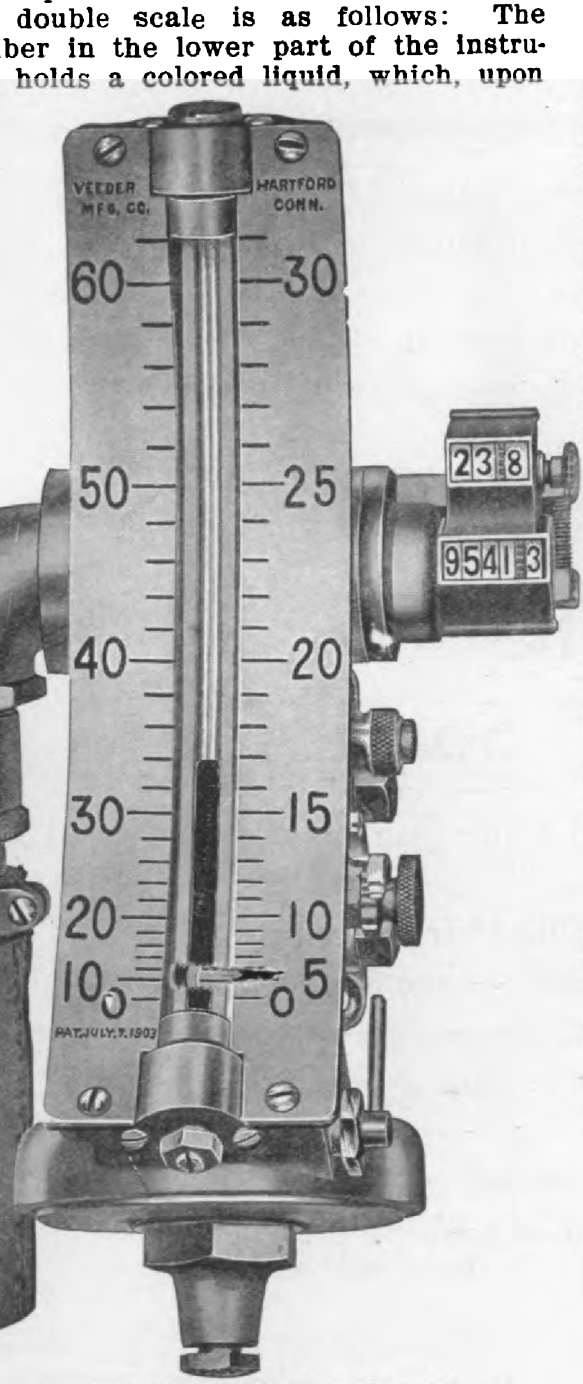
THE R. E. HARDY COMPANY

ruction, chief of which is a double . This instrument is manufactured he Veeder Manufacturing Co., Hart- Conn., and is fitted with a universal ket which makes it possible to at- the instrument on nine-tenths of cars now on the market.

e operation of the new tachodometer, double scale is as follows: The ber in the lower part of the instru- holds a colored liquid, which, upon



The "Veeder" 1908 Tachodometer.

volution of the paddle is thrown out- l by centrifugal force and rises in the , the height to which it is raised in tube depending upon the speed at h the paddle wheel is revolved. When liquid in the tube to the zero mark in case of any evaporation of the liquid.

The paddle is divided into two diameters which practically makes it two paddles. The object of this is in order to avoid having an extremely long scale to get high readings. By means of the two-way valves the liquid is made to pass from the smaller diameter of the paddle to the tube or from the larger diameter of the paddle to the tube, as desired. The small diameter of the paddle is of course used for the high speed readings, and the large diameter of the paddle for the low speed readings. When the two-way valve lever is parallel to the tube, it is adjusted for the low speed reading and is read on the scale on the right hand side of the instrument, and when the two-way valve is pulled forward it is then adjusted for the high speed paddle and is read on the scale on the left hand side of the instrument.

If when the car is running at a given speed and the valve moved from the position for the large diameter of the paddle to the position for the small diameter of the paddle, the column of the liquid would drop down to half the reading which it had before on the low scale, which of course allows the liquid to mount higher in the same tube when reading on the high speed scale. The instrument as usually made is furnished with 30 and 60 mile scales, but can be furnished with other scales if so desired.

Winship Tonneau Pocket

W. W. Winship, of 71 Summer street Boston, Mass., has added to his line for 1908 a very handy accessory, the Winship Tonneau Pocket, which we here illustrate These pockets are furnished in material to match the upholstering of the car, and are very useful receptacles for gloves

Winship Tonneau Pocket.

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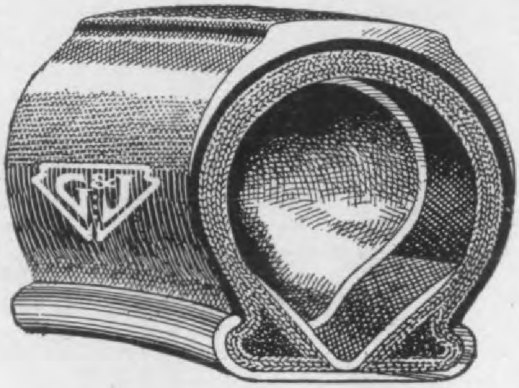
TIRE LOGIC



MEN who are careful in their selection of tires usually choose a tire that is carefully made by experienced conscientious makers. We believe that this Oval Raised Tread is the best automobile tire made. Many men call it "The Tire of the Day." We know that if you'll give one G & J tire a fair, square trial on your automobile, you'll soon equip it with a whole set. ¶ Are you willing to trust us? Will you make the trial? Will you write for prices? ¶ We build our Oval Raised Tread Tire with the famous Non-skid, non-side-slip Midgley Tread if desired. We can also supply you with the new 1908 Universal Midgley Rim.

G & J TIRE CO.

INDIANAPOLIS, IND.

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Boston—243 Columbus Ave.
Cleveland—New No. 1837 Euclid Ave.
Detroit—247 Jefferson Ave.
Chicago—1434 Mich Ave.
New York—10 W. Sixtieth St.
San Francisco—423-433 Golden Gate Ave.

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G & J Tire Agency, Denver, Colo., 1528 Court place.
G & J Tire Agency, Buffalo, N. Y., 912 Main St.
Enterprise Rubber Co., Boston, Mass., 110 Federal St.
Alexander-Elyea Co., Atlanta, Ga., 35 N. Pryor St.

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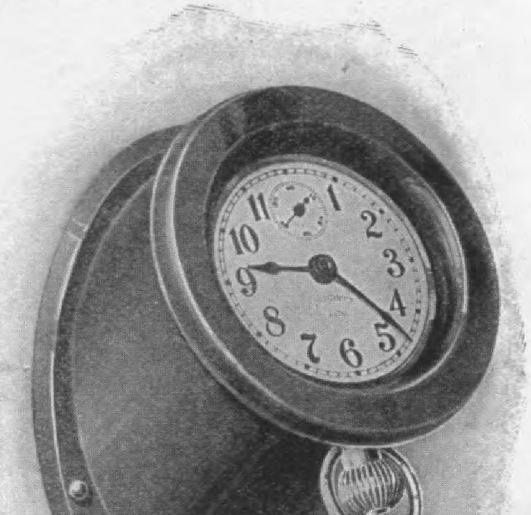
lers' Court, New York City, gotten especially for the automobile trade. watch is the regular Ingersoll in a plate finish case with a dial especially gned with heavy numerals for quick ing and provided with a second hand.



The "Ingersoll" Motor Watch.

he holder which is fastened to the n is made with a rich black finish of a composition to imitate hard rubber. s holder is close fitting, impervious to er and dust, and can be washed with- being damaged. The watch can be oved and carried in the pocket if de- d. The list price of the device com- e is $4.00.

ew Automobile Clothing Novelties

wo new automobile clothing novelties e recently been brought out by the cago Auto Robe Supply Co., 159 Market eet, Chicago, Ill., a fur-lined foot muff a fur auto driving glove.

or Sheep, fur-lined with plush cover, an lists at $3.75; the other of black dog fu and covered with genuine leather, listing at $5.50.

The "Chicago" Fur-lined Foot Muff.

This concern has also made some in provements in its Spring Belt Robes, d scribed in our February, 1906 issue, pag 350. The main improvement in the 190 style lies in the shape of foot pocket which are made to conform more to th lines of the foot. A new style of th robe is being offered, known as style N 10, made of double plush, rubber inte lined and listing at $5.00 .

The "A-J" 1908 Wrapt Tread Tire

The Ajax-Grieb 1908 wrapt tread ti manufactured by the Ajax-Grieb Rubb Co., Fifty-seventh and Broadway, Ne York City, differs materially in constru tion from the previously made mould tires inasmuch as it bears a cushion pure Para rubber between the carcass a the tread varying in thickness from ⅛ 3-16 of an inch, according to the size the tire. It also has two breaker stri between the cushion and the tread whi absolutely prevent the separation of t tread from the carcass.

In curing the tire the carcass is fi semi-vulcanized and the tread, which al varies in thickness according to the si of the tire is then put on raw and ha wrapt, after which the whole tire is cur by the open steam process which toughe the facing and adds miles of wear to t tire. Every tire is guaranteed for 50 miles.

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To DEALERS

The Index Speed Indicator

REPRESENTS

GOOD GOODS and a GOOD SELLER

If you want to furnish your patron with something that is genuine, equip his car with an INDEX—Where you sell one, the merits of this instrument will sell a dozen.

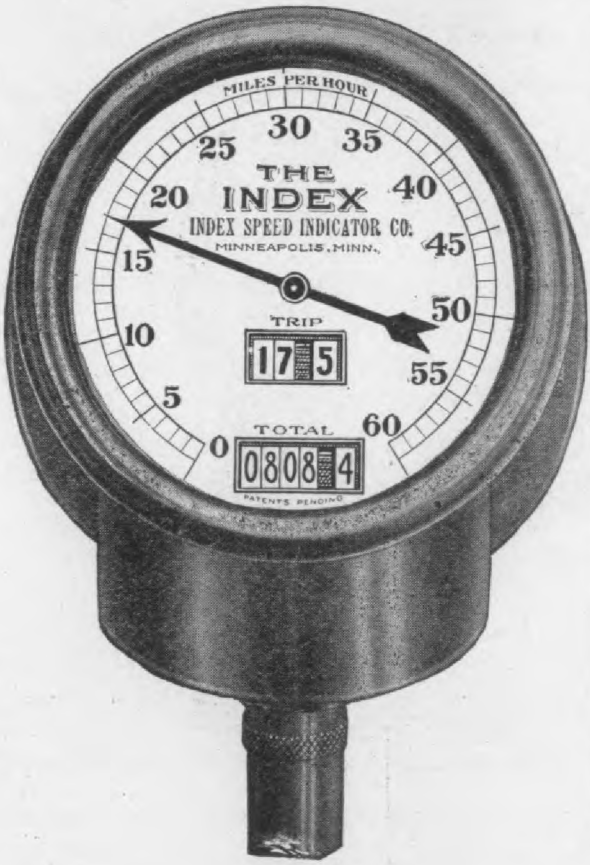
It is to your interest to order an INDEX, NOW—if it does not prove a good seller, send it back and we will return your money and give you full credit.

Flexible Shaft

That will not break. The Index Shaft is made from ¼-inch steel rod into small links mitred and connected so as to make a strong yet flexible shaft which runs in a steel housing.

Action

The INDEX Pointer is quiet and accurate at all speeds.



WRITE FOR QUOTATIONS

Index Speed Indicator Co.

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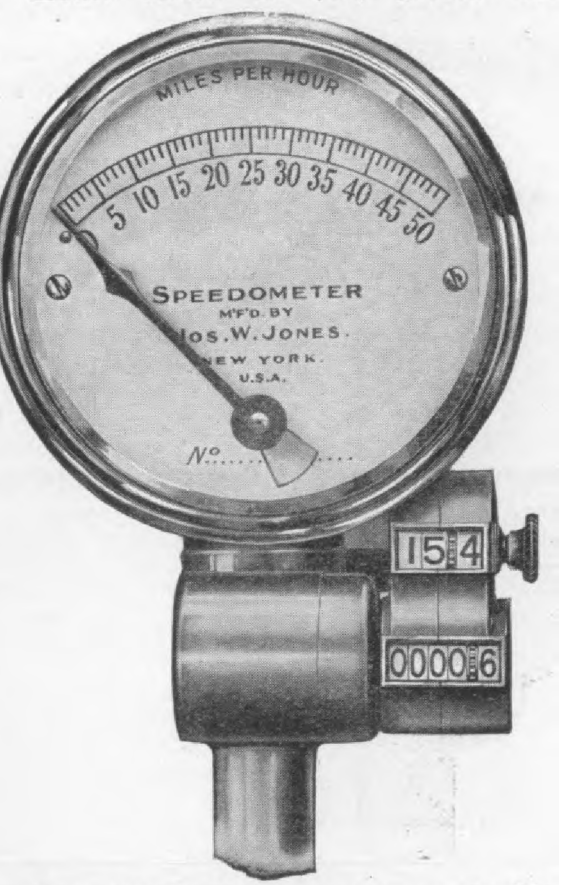
g their standard Jones combined dometer-odometer with practically no ge over last year's model, but are this fitting all their high priced instru-

e 1908 Jones Speedometer with maximum hand.

ts with the maximum hand as regular pment, while last year an extra charge made for fitting the maximum hand. his company also offers for 1908 a model listed at $25, gotten out



e Jones $25 Speedometer, shown with Odo-r attached, in which form it lists at $40.

ecially to meet the demand for a lerate priced instrument. The $25 same as in the higher priced models, an a lowering of the price has not been don by a sacrifice of efficiency.

The 1908 Jones line also includes a $4 instrument registering up to 50 miles an showing both trip and season mileage This is known as Model 20. Model 21 i a 60 mile instrument of the same con struction and lists at $45. The $25 mode is listed as No. 22. None of these in struments have maximum hands. Th price of the maximum hand Jones speedo meter—odometer range from $75 fo Model 14 with 50 mile scale, up to $200 for Model 16 with 100 mile scale.

The G. & P. Soda Kettle

The Gray & Prior Machine Company, o 90 Suffield St., Hartford, Conn., hav placed on the market a very convenien form of soda kettle for use in automobil garages where a supply of live stea cannot be obtained for heating a stea jacketed kettle. The feature which make it suitable under such conditions is th fact that it is heated by a Bunsen ga burner or blue flame kerosene burner, in

The G. & P. Soda Kettle.

stead of being provided with a stea jacket. This feature makes it muc more economical to install than the stean heated kettle and also makes it portabl

The G. & P. Company originally mad these kettles for their own use in the factory, and they have proved so satisfa tory and convenient that the company d cided to place them on the market.

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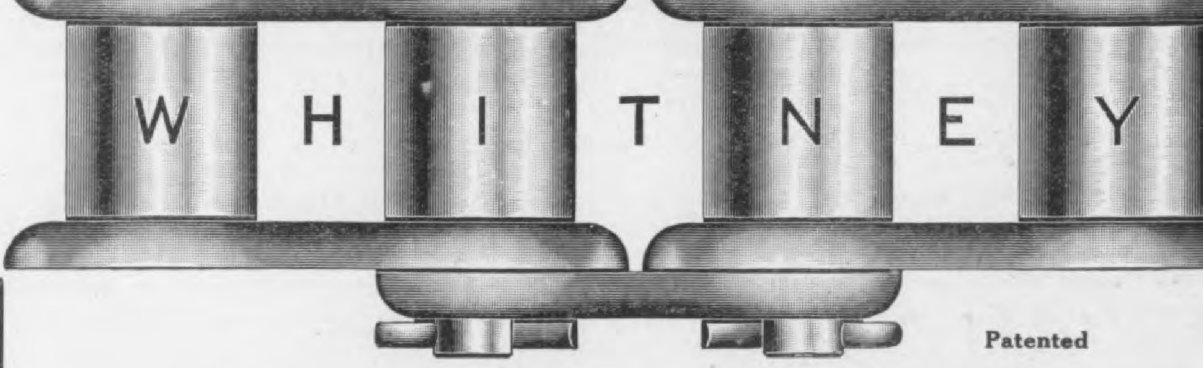
R. E. Bloomer, of Keithsburg, Ill., no



Patented

"WHITNEY" CHAINS

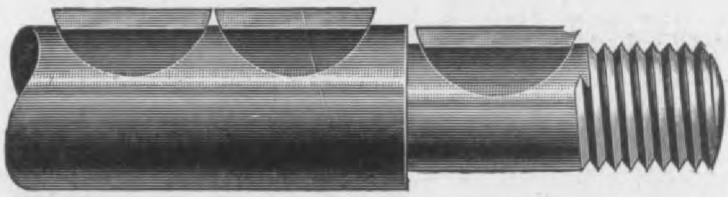
January 1, 1907 to November 1, 1907, conditions as follow

On January 1, 1907 we were renting about 38,000 sq. ft. of floor space in a buil ing not adapted for our growing business. At the same time we were giving muc attention to our new buildings which were under construction and not complete until July 1907. During this period we moved our entire equipment to our ne factory and for a number of weeks were obliged to operate machinery in both plant We also carried on important experiments and constructed much special apparat for our new factory. While thus handicapped we could not fully meet the increa ing demand for "Whitney" Chains. Nevertheless, we succeeded in shipping greater number than ever before for an equal period of time.

"WHITNEY" CHAINS

November 1, 1907, to December 31, 1908, conditions as follow

New fire-proof factory, one of the best, strongest and safest in the countr Floor space over 70,000 sq. ft. Best of light and excellent condition for employe Location one of the best in Hartford. Private side-track connecting with ma line between New York and Boston. Land area over ten acres. Large i crease in new machinery and tools. Improved methods. Inspection syste more rigid than ever. Greater accuracy. Increased strength by the use of ne materials and improved treatment. Greater durability. Better finish.



"WHITNEY" MACHINE KEYS AND KEY-SEAT CUTTERS
(For The Woodruff Patent System of Keying)

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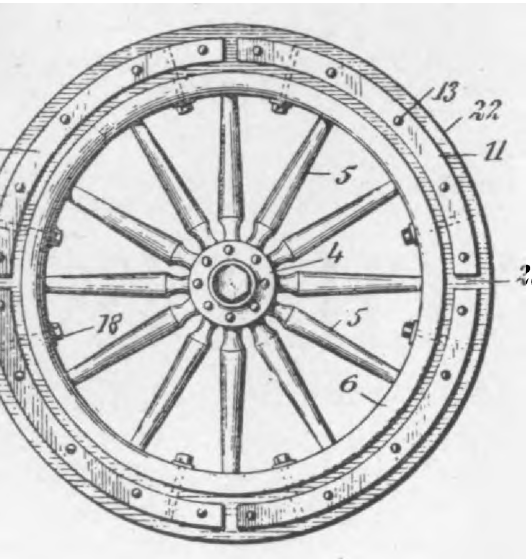
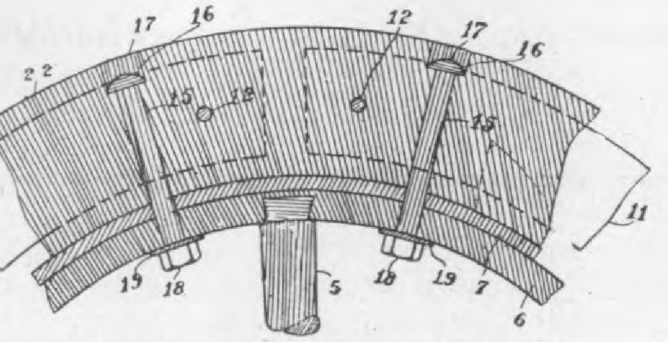
722 Congress avenue, Austin, Texas, marks a new departure in tire con-ction in that it is made in the form a combination, airless cushion tire, tructed of rubber and fibre paper.



e "Carhart" Laminated Tire; 11, metallic rs at sides of paper tire; 13, lateral bolt s; 20, space between ends of metallic side rs; 22, face of paper tread.

he paper filler is made of complete s, or of sections, of the toughest fiber er known. This fibre paper is made mported flax with a layer of special ent being used between each two ers, or rings. After the completion of rings they are subjected to enormous raulic pressure. The paper ring is



e "Carhart" Laminated Tire; 6, rim of wheel, er concave or plain; 7, strip of specially de-ed rubber belting, forming foundation of tire; metallic strip; 12, transverse bolts; 15, radial s fastening tire to wheel rim; 16, radial bolt ls; 17, plugs filling countersunk holes; 18, on radial bolts; 19, washer; 22, tread of r tire.

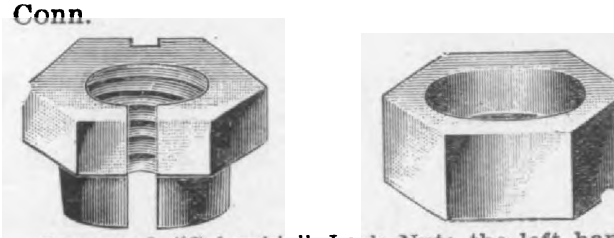
n turned and finished, after which it is nrated with oil, by a peculiar process, ch gives the filler additional tough-s and renders it water-proof.

his tire can be applied to any standard el rim of any size. A heavy rubber

with bolts of suitable size, and as closel as the load to be carried may require The tires when run awhile on the ground will thus soon fill with grit, thus preven ing rapid wear, slipping and skidding.

Improved "Columbia" Lock Nut

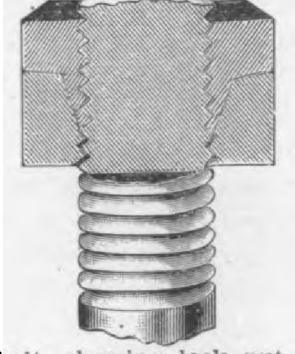
We show herewith the improved forn of the Columbia Lock Nut, manufacture by the Columbia Nut & Bolt Co., Railroa avenue, near Bostwick avenue, Bridgepor Conn.



Improved "Columbia" Lock Nut; the left han cut is the top part, and the right hand cut th bottom part.

This lock nut consists of a bottom an a top part, both of which are threaded t receive the bolt. The top part is slotte its entire length, and is finished with taper collar to fit the corresponding tape recess in the bottom part. In applyin this nut to a bolt each part is put on i dependently, and screwed separately unt the part bears firmly against the wor and the slotted part against the solid, a seen in the cut showing the lock nut a sembled.

By applying the wrench to both par at once, every advantage of the ordinar



End of bolt, showing lock nut in place.

hot or cold prest nut indraw bolt strai etc., can be had with the additional a vantage of being able to lock the n firmly by slipping the wrench to the t part and screwing this home alone. Th buries the conical collar of the top pa into the recess of the bottom part, forcin the threads to mesh with the bolt thre and gripping it. The nuts are furnish plain, semi-finished and finished.

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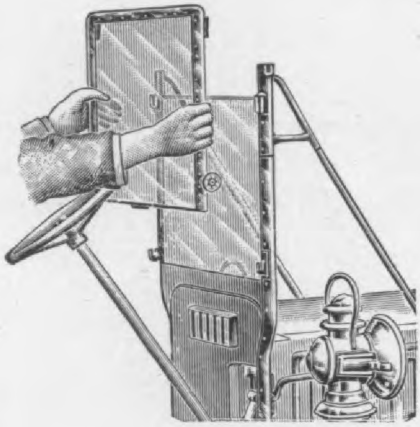
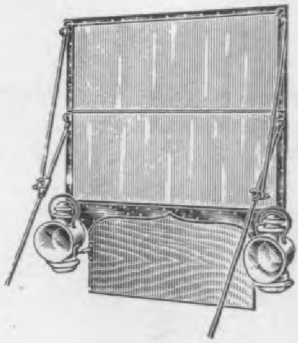
The 3 Best Divided Wind Shields



The Voltz

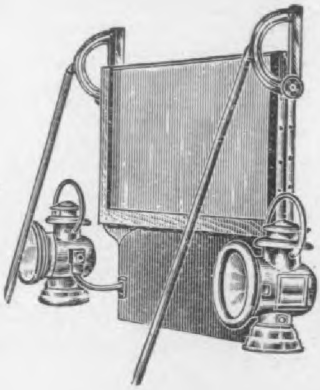
Its simplicity causes its popularity. No explanation of this clever shield is necessary as the cut is self explanatory. It is the lightest, strongest and simplest shield made. All brass—no top rods or hinges—quickly operated. Furnished to fit any car.

The Schildback



This Wind Shield is not new—over 1000 are now in use. Its construction is such as to entirely do away with hinges. One advantage of which is the top appearance of the Shield, being the same when up or down.

Furnished in full brass or solid mahogany, with brass trimmings, to fit any car.



The Beecher

The most practical and easily worked low priced Shield made.

The small wheel on either side holds the Shield at any angle firmly and securely. Mahogany finish standard—natural ash or painted frames to order, to fit any car.

Send for catalogue.

The Limousine Carriage Mfg. Co.

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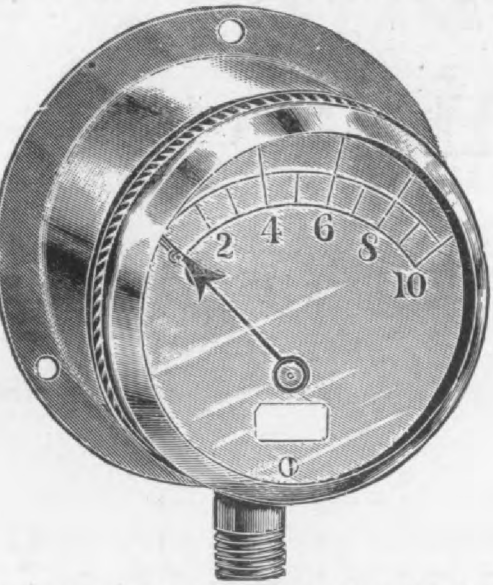
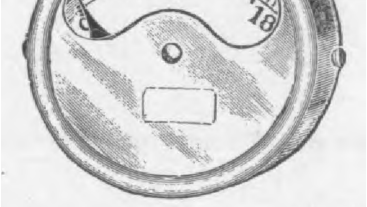
ng the exact pressure of the water
ne water jackets of gasoline engines,



"Brown" No. 500, Water Circulation Gage, nowing the pressure of water circulation in ylinder water jackets.

the Brown No. 527 Automobile Tire sure Gage for obtaining uniform pres- on tires.

ese gages are being manufactured Henry W. Brown, Syracuse, N. Y., and made with an improved independent ement which allows the cases to ex- and contract without affecting the ement of the instruments, thereby in- g accuracy and durability. The

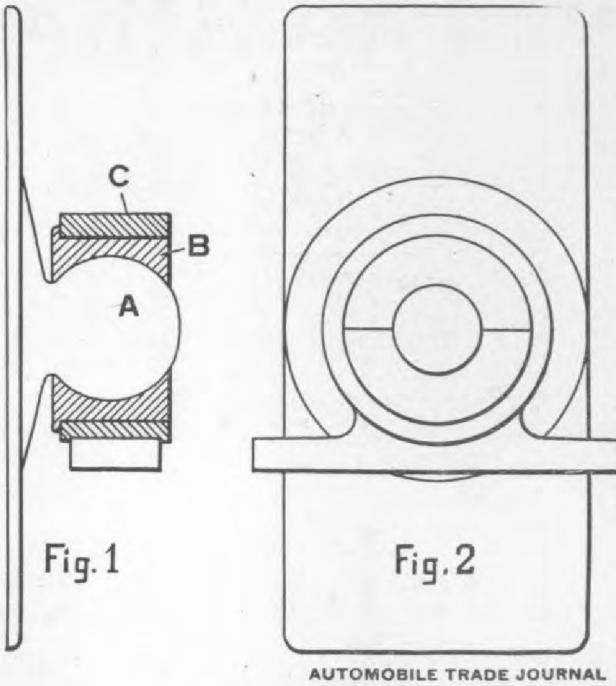


"Brown" No. 527 Automobile Tire Pressure

ufacturer is in a position to furnish e gages promptly, and gives a guaran- with each gage.

Ball Trunion Radiator Suspension

e cuts herewith illustrate a new od of suspending radiators. This ball on radiator suspension is one of the products of the A-Z Company, of 527-9 6th St., New York City, and by ref- ce to the cut it will be noticed that a tor held on the frame of automobile s by this suspension is entirely re-



A-Z Ball Trunion Suspension for Radiators.

so that at no time can any strain be thrown on the radiator. Fig. 2 is the front view of the device above described

Cramp's One Piece Axle Casing

The Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa., are fur nishing the Corbin Motor Vehicle Cor poration with one piece rear axle casings

Cramp's One Piece Rear Axle Casing, made o Parsons' Manganese Bronze.

made of Parsons' Manganese Bronze.

The cases are furnished complete from the gear case to the wheel hub, the spring seats and brake operating gear supports being cast in one piece. This construction they believe will materially reduce the expense of machining and assembling, and also prove of great value in reducing the cost of rear axles as well as in afford ing automobile manufacturers an oppor tunity to avail themselves of a more en during construction.

The Warner Instrument Company, o Beloit, Wis., have instituted a depart

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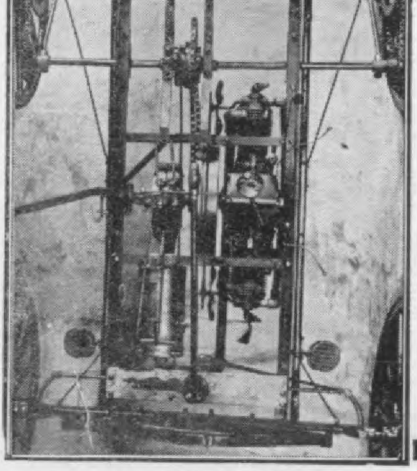

CHASSIS

THE WINTER KIN

365-DAY KIND

The Kiblinger Motor Buggy

is air cooled and consequently no pipes to freeze and burst. It has solid rubber tires, therefore no punctures. The machine will run through mud and snow where a touring car with pneumatic tires and low clearance would not attempt to venture.

This car appeals to everybody who has use for a runabout. It is the car for service—yet it affords all the pleasure there is in automobiling at a price that all can afford. It is simple in construction—durable and reliable under all road conditions.

You should send at once for complete catalogue, prices and terms to Dealers. There will be thousands of these wonderful little machines sold next year and you ought to get the agency at once in your locality. Our facilities for turning out these machines in large quantities are excellent, and we can make prompt shipments.

See our mammoth exhibit of our full line of motor buggies, auto delivery wagons and chassis at 383 Wabash Avenue, Chicago, Nov. 30th to Dec. 7th. We will have two demonstrating cars.

Write us today. We have a proposition that will appeal to you.

Price $250—$500

W. H. KIBLINGER COMPANY

460-468 W. 7th Street :: AUBURN, INDIANA

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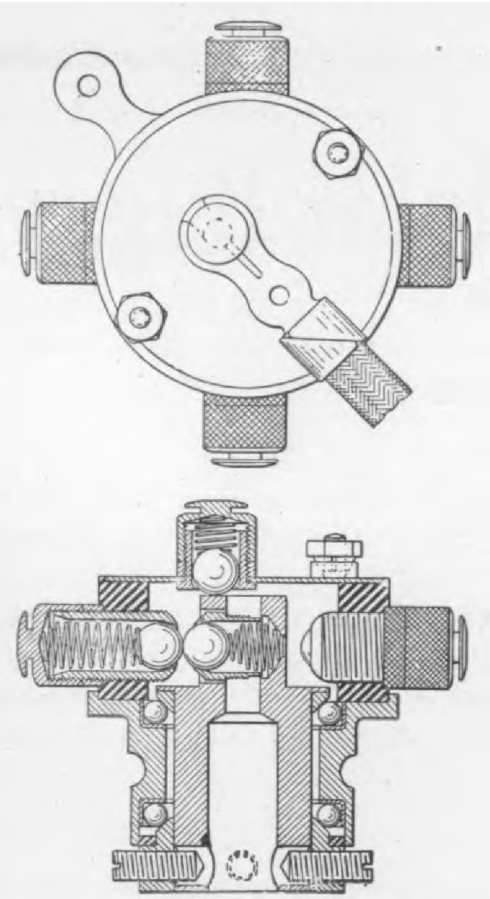
c avenue, Boston, Mass., has recently ght out a new ball bearing timer, h they guarantee to run for 60,000 s provided it is kept thoroly lubri- d and points of contact (which are dard ⅜-inch steel balls) are renewed ften as every 5,000 miles.

e ball bearing is simple in construc- and is adjustable. The ball races are rge size, each containing twenty-one nch balls, thereby insuring long life rigid bearing and by this arrangement possible to guarantee absolutely ac-



tional and top views of the "Bemus" Dou- all Contact Timer.

te timing for an immense amount of age. By the use of felt and fibre ers the timer is rendered practically roof; what little oil does escape has dency to take the dust and dirt away the bearing and makes the timer ly dust or dirt proof.

e construction of the sockets carrying centre and outside contacts has been ged, the centre contact being brought the axis and the outside contacts ex- ed in thru the insulation farther, so any specified number of degrees of act may be obtained with very slight ssion of the balls in passing each

cated with any lubricant of a non-fluid con sistency. The timer has a ground contac connection for a wire to conduct the cur rent back to the battery, and on accoun of the construction of this contact it is a positive and especially direct connection The timers are made for 1, 2, 3, 4, 6 and 8 cylinder motors, and list at $11.50, $12.00 $12.50, $13.00, $15.00 and $19.00.

New Pedal and Muffler Cut-Out

The Garage Equipment Co., Milwaukee Wis., has recently placed on the marke two new automobile devices, viz: a new muffler cut-out and a new foot pedal.

The G. E. Co.'s Muffler Cut-out; Style C.

The feature of the new muffler cut-ou is the fact that it does not necessitate the removal of the exhaust pipe to apply it All that is necessary is to cut a hole in the pipe and clamp the cut-out on and connect to the foot-board. This cut-ou lists at $3.00 with spring, and $3.25 ma chined.

The G. E. Co.'s Pedal, Style F.

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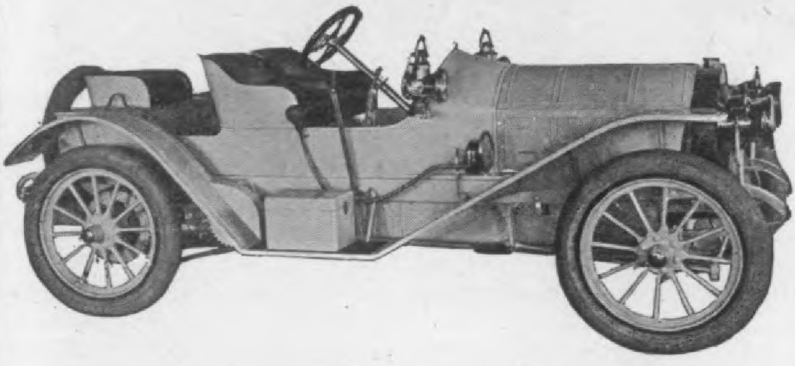
Crawford.

Model E., 35 H. P., $2500.
Model F., 50 H. P., $3500.



Model D., Gentleman's Roadster, $2500.

Don't judge th **CRAWFORD** automo biles by their cost, be cause they far outran other makes listed at corresponding price They represent excep tional value and ar high-grade in ever detail.

MODEL E is thoroughly reliable fam ily car that can be de pended upon for satis factory service 365 day in the year.

MODEL F is powerful (50 H. P.) larg touring car built on th same lines as the Model E and is a $5000 value for $3500.

MODEL D:—GENTLEMAN'S ROADSTER is a very pleasin model, built for rough use.

MODEL G is our shaft driven touring car. While we advocate th chain we nevertheless recognize that there is a certain demand for the shaf drive type of construction and have therefore perfected this feature in th Crawford Model G. In other details this car is like the well-known an popular Crawford models. Motor, 4 cylinder 4 cycle, 5" bore and 5" stroke 4 speeds forward and reverse; approximate speed 45 miles per hour o direct; geared up 27 per cent. on fourth speed. Price $3000.

If you want to handle "winners" for next year get the **Crawfor** agency.

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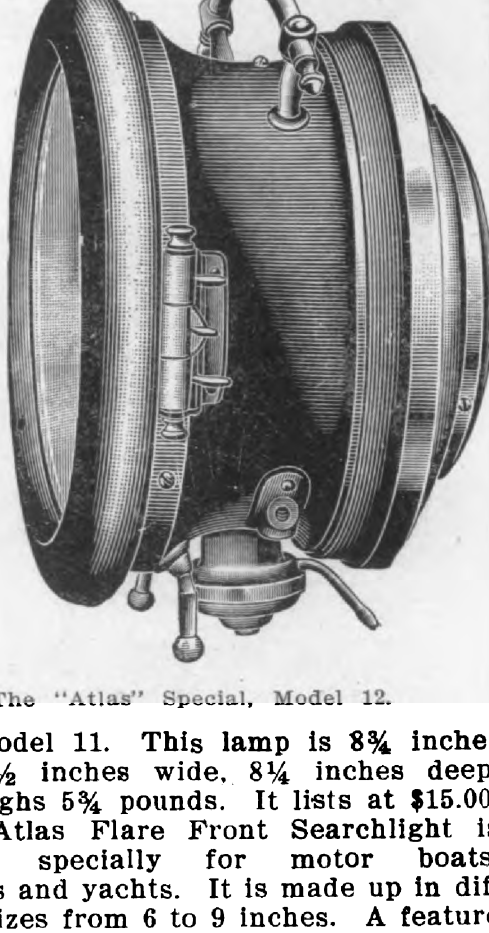
le lamps suitable for large touring motor cars, runabouts, motor boats aunches. The lamps are marketed by Vooster Auto Co., 88 Chambers street, York City.

mobiles. The lamp is 13 inches high, 11¾ wide, 8½ deep and weighs 10½ pounds. It lists at $28.00.

For runabouts and small cars this concern offers the Atlas Improved Bullet

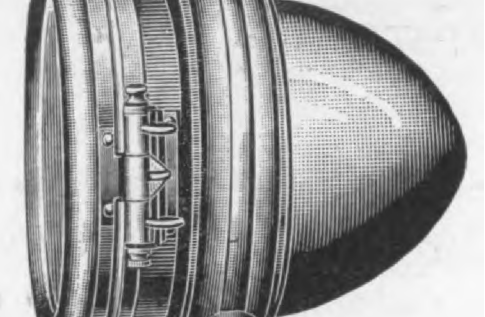
The "Atlas" Headlight, Model 14.



The "Atlas" Special, Model 12.

e lamps are made of 18 and 20 gage s, best mirror and lenses. A feature hese lamps is a patent spring door ning which obviates much trouble in ing and shutting the front door.

odel 14, here shown, is for large touring and motor boats. This lamp contains nerator. The height of the lamp is



he "Atlas" Improved Bullet, Model 11.

inch. It is fitted with a 2¼-inch lens. price is $70.00; with bracket $80.00. style is also made in a larger size

lamp Model 11. This lamp is 8¾ inche high, 7½ inches wide, 8¼ inches deep and weighs 5¾ pounds. It lists at $15.00

The Atlas Flare Front Searchlight i adapted specially for motor boats launches and yachts. It is made up in dif ferent sizes from 6 to 9 inches. A featur of this lamp is a new method of ventilat ing, which makes it an impossiblity to be come overheated, thereby causing the glas or lens to break. This type is made wit 6, 7, 8 and 9-inch body, listing at $15.50 $17.00, $18.50 and $22.00 .

The "Saxon" Annunciator

The Saxon Lamp Co., 530 West Twenty eighth street, New York City, has recent ly placed on the market the Saxon annun ciator, to enable passengers of a close car to communicate with the chauffeur.

The device is constructed of highl polished cast bronze, with inclined rub glass on top, on which signals appea simultaneously with the ringing of an elec tric bell. The box in which the push but tons are set is covered with morocc leather. Ten buttons or signals are pro vided. The device is fitted with a specia

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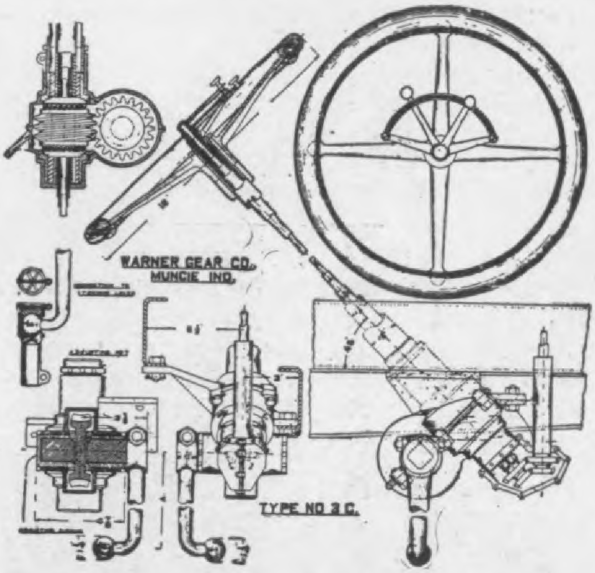
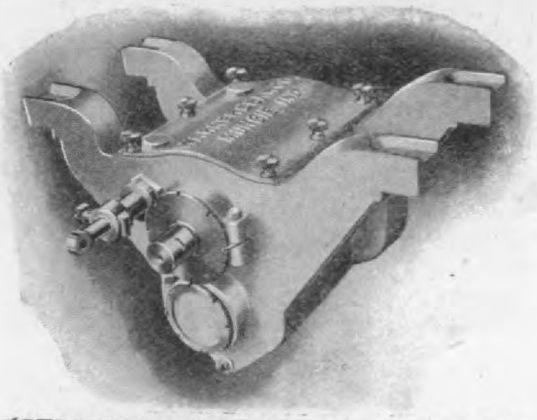
-1908 GEARS-



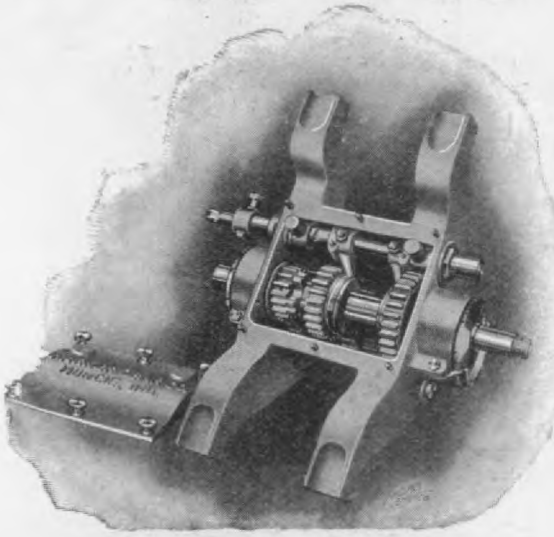
STEERING GEARS

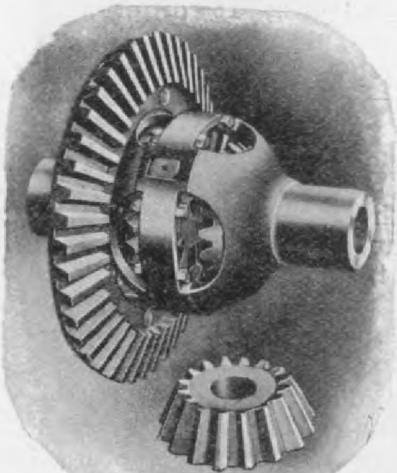
that are built to **"Stan Up."** Worm and sector adju table, hardened and groun to size. Control levers moun ed on top of 16 inch whee ribbed aluminum spider. Ba Bearings.

TRANSMISSIONS



"SELECTIVE" SLIDING—35 and 50 H. P.





For Timken Roller Bearing and Annular Ball Bearings

GEARS are made from **SPECIA GEAR** forgings, hardened, ground an "treated." We also furnish **"SELEC TIVE"** control levers. We build bot spur and bevel types of Differentials.

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ttest styles in electric lamps manu-
ed by the Standard Lamp and Mfg.
3 and 45 S. Canal street, Chicago, Ill.

e "Standard" Large Electric Headlight.

e Standard Semaphore Electric Head-
is designed for commercial purposes,
s capable of filling other requirements.
oduces an elegant, far-reaching white

"Standard" Semaphore Electric Headlight.

, and is furnished with Edison sockets
ss otherwise ordered. Three sizes are
shed, having 5½, 6, and 7-inch open-
and listing at $5.70, $6.75 and $9.00

The "Standard" Electric Dome Light.

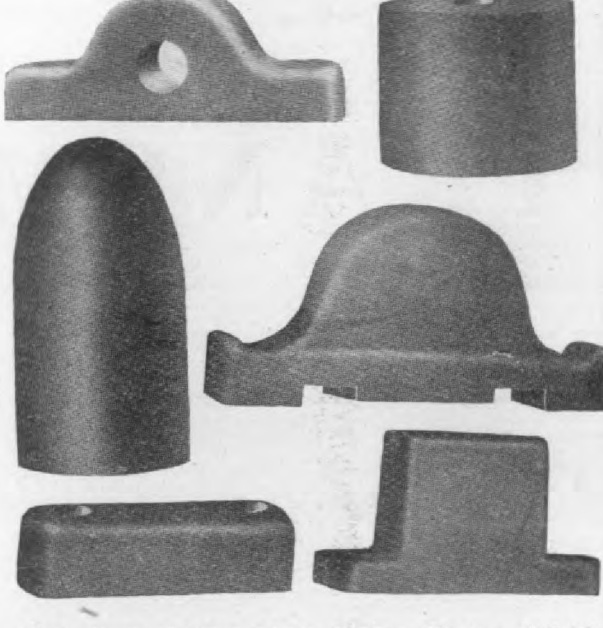
ull brass finish, and $6.75, $7.80 and

are finished in brass or plated and list at $3.75 and $4.50 respectively.

This concern is also manufacturing a brazing compound known by its trade name as "Superior." It is claimed that this product is over 98 per cent. pure boron, and its use is not attended by the deposit of scale or enamel. It is sold in one pound cans at 29 cents; five and ten pounds cands at 28 cents, and in barrel lots at 27 cents per pound.

M. & W. Bumpers

Morgan & Wright, of Detroit, Mich., are furnishing the automobile trade with rubber bumpers for use between the frame and axles to relieve the chassis of damaging shocks when the car goes over



Illustrations of Some of the Various Shapes of Rubbe Bumpers made by Morgan & Wright.

an extremely large bump and causes the springs to compress to their fullest extent They are furnishing 16 different stock sizes and can furnish special sizes and shapes to meet any requirements.

Announcement has been made by the E. R. Thomas Detroit Company of the appointment of Mr. John G. Utz as chief engineer, with G. G. Behn as his assistant On the return of Mr. H. E. Coffin from abroad he will resume his work as vice president of the E. R. Thomas Detroit Company, and as consulting engineer of both the Detroit and Buffalo plants.

The Automobile Supply Mfg. Co., 13 to 147 Emerson Place, Brooklyn, N. Y have recently added a new floor at 118 t

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Dealers' Department

The Mutual Electric Company

RAMBLER AGENCY OF DULUTH, MINN.

The Mutual Electric Co., 112 West First street, Duluth, Minn., agents for the Rambler, Reo and National cars, attribute building up of a successful automobile agency to conservative business methods, systematic advertising and careful attention to the needs of their users. The method of advertising employed has been through the local papers principally, altho a few billboards containing cloth posters have brought results. The local papers in Duluth are distributed thruout the entire State, and as far West as Montana, giving a good field for advertising. Several stunts in the way of using cars for hunting expeditions have been pictured on postal cards and widely distributed. The company states that some of these exploits were taken up by the daily papers, and gave them considerable publicity. But in the long run it has been found that the best results were obtained by personal calls on prospective purchasers. As far as possible these calls are made by one man who has shown himself to be able to bring results. The company do very little trading in second-hand cars, altho machines are sometimes taken when it would mean the placing of one of their own line in a particularly good field, where it is believed results might follow.

A model garage fully equipt with the necessary machinery and hand and bench tools is run in connection with the agency. This garage is in a steam-heated, fireproof building. The statement is made that no trouble whatever has been experienced with chauffeurs inclined to graft, as no dealings are made when such tendencies are shown, the management stating that they would rather go out of business than cater to this class of trade. Prices are fully maintained on the sale of cars, and at no time have prices been cut.

In approaching a customer who is about to complete a sale it has been found best not to require him to sign a long contract covering the type, description and details which he is about to purchase, but simply to require of him a deposit as first payment, the receipt for which is an acknowledgment from the office of the amount. This does away with a voluminous document which it has been found in many cases somewhat frightens a purchaser due to its very legal look, and many customers hesitate somewhat in signing a long contract, as there seems to be too much legal matter to the transaction. Better results have been obained by simply taking a small payment and acknowledging a receipt of the deposit, after which there is plenty of time to obtain signatures to the final contract.

The company states that they have placed a large number of cars in their city this past season, and feel well satisfied with the results. The company would like to hear thru the columns of the Journal expressions and views from other agents relative to business and business methods.

A Carthage, Missouri, Agency

The Carthage automobile garage, in charge of Mr. H. C. Griep, are agents for the Maxwell line. One of the reasons that this company assigns for the sale of a large number of their cars is the fact that they get after the customers and stay with them until a result is obtained one way or the other. In regard to trading in second-hand cars the statement is made that none whatever are taken. A garage fitted with some repair tools, air pump for tire inflation, etc., is run in connection.

FOR BETTERING THE AGENT'S CONDITION.

When questioned as to methods which result in the betterment of conditions for the agent it was said that the suggestion that the agents thruout the country insist upon some other method, and taking up forfeits to obtain an agency be used. The present method is for the manufacturer to insist upon a deposit for about ten or more cars to the extent of ten per cent. of their value, or some set amount on each car, as fifty or one hundred dollars. This ties up for practically the entire season a large amount of capital. The Carthage Automobile Garage Co. believed that if the manufacturer must insist upon having a forfeit, a more equitable method would be as follows: Suppose the manufacturer insists on an agent taking ten cars and making a $100 deposit on each, in place of asking the agent to deposit $1000 have him deposit instead $200, but apply this $200 on the last two cars of the ten. This would give the manufacturer an assurance that the agent would make a special effort to sell the number of cars contracted for, and would not tie up a large amount of capital. The company would like to hear this matter discussed by other agents, and if possible have it taken up with the manufacturers.

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A Live Bridgeport Agency

The Lyford Brothers, 625 East Washington avenue, Bridgeport, Conn., agents for the Oldsmobile, state that one of the features which has probably more than any other one cause built up their business is the earnest personal work of the members of the firm. Nothing of extreme importance is entrusted to uninterested employees, a large part even of the demonstrations being personally attended to. The company feel that at the present time there are so many inexperienced, and to a certain extent irresponsible and careless young men connected with the automobile business that the safest plan is to attend as far as practicable to all prospective purchasers personally. Every effort is made after a sale to see that the customer is well satisfied, and the statement is made that nine-tenths of the sales are directly due to satisfied users.

Careful attention is personally given to the repairing of customers' cars, a completely equipt machine shop being a most important department, but as far as possible a large stock of duplicate parts is carried, replacements with which cause less delay, and are more satisfactory than making up parts, as is often done when no stock is carried, and it would otherwise be necessary to send to the factory. In other words, every effort is made to keep the cars which have been sold always in working order and on the road. By carrying as complete a stock of parts as possible, even including duplicate complete springs, etc., these unnecessary delays to customers have been avoided, and in proportion the users have been pleased.

The Schaffer Manufacturing Co., of Baltimore, Md.

The Schaffer Manufacturing Co., of 406 North Talbert street, Baltimore, Md., has recently entered the field of automobile agents and handles the Pullman and Jackson cars. Altho this company has been but a comparatively short time in operation as automobile dealers, altho well established as machinists, the number of cars sold is reported as being very gratifying. In practically every instance the sales were traced to individual efforts, keeping continually after prospective customers. After sales are made the cars are occasionally looked over and given proper attention and adjustment. The machine shop in connection is said to be one of the best in the city, every facility for properly repairing automobiles being included in the equipment; in fact, much of the work of the shop is for garages in and around Baltimore. The statement is made by the sales manager, Mr. I. M. Schaffer, that grafting chauffeurs are doing more to harm the automobile business in his opinion than almost anything else could, and that the company has lost considerable trade by not complying with their requests.

Pittsburg Dealers Organize

An organization known as the Automobile Dealers' Association of Pittsburg was incorporated on August the 20th, comprising about seventeen of the largest dealers in that city. The association has secured offices at 5919 Baum street; has established there a Notary Public in order to accommodate the automobile trade in so far as automobile licenses are concerned, having arranged to obtain the licenses quickly to accommodate their patrons. Also to keep a list of chauffeurs in the office. Mr. W. N. Murray was appointed president; A. H. La Fountain, vice-president; A. T. Banker, secretary, and G. P. Moore, treasurer. The association will hold an automobile show next April 4-11, 1908, at Duquesne Garden.

Scientific Salesmanship

An interesting departure from the ordinary school of instruction is a course of the Science of Successful Salesmanship, from the Sheldon School of Correspondence in Chicago, in which the school endeavors not so much to appear as a tutor, but more as a helper in bringing out the undeveloped natural qualities in its students and making them successful salesmen. Not merely salesmen of an over supply of merchandise, but salesmen of goods sold at a profit. This science is not built upon a theory, but upon the actual methods used by every successful salesman, whether he sells the necessary commodities of life, is a specialty salesman or a promoter. This science is an earnest attempt to formulate a wealth producing system of special education, which not only appeals to the seller or distributing class, but also is of great importance to the manufacturers or producers.

The St. Louis Automobile Manufacturers' and Dealers' Association will hold an eight-day exhibition in the Jai Alai Building, beginning December 14, and closing December 21.

Cleveland's automobile show will be held the week of February 17, under the management of the Cleveland Automobile Dealers' Association.

The New York Automobile Trade Association was recently advised by the General Freight Agent of the Hudson Steamship Line that they are now in a position to allow gasoline motor trucks on their piers.

About two hundred agents from all parts of the country attended the fourth annual convention of Maxwell dealers, which was held in the lodge room of the Grand Central Palace on October 28, and followed by a banquet at Hotel Manhattan.

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For Cleaning Auto Bodies

It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO

Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

Put up in 8 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

CASSIDY, DAVY & CO.
20 St. Paul St.
BALTIMORE, MD.

and at all good automobile supply stores in all leading cities.

Send for our Mobo booklet —"*How to Clean Well Varnish and Paint on an Automobile*"

Wico

You don't have to gue with the Wico Spa Plugs with Micromet Adjustment.

The gap can be set to a KNOW DISTANCE—1/1000 of inch, and all plugs can be alike, to suit your compressi ensuring rhythmic running.

The electrode and chamber so constructed that WIC PLUGS are practically self-cle ing. Can also be taken ap without disturbing the packi or altering the adjustment.

Wico Spark Plugs

are made in all standard siz Price $1.00. A sample sent up receipt of price.

Write Dept. 23 for catalog.

For Sale by Agents and De ers Everywhere.

WITHERBEE IGNITER COMPAN
541 West 43rd Street, New Yo

CHICAGO 1429 Michigan Ave. | DETROIT 220 Jefferson Ave. | BALTIMORE 510 Continental Trust

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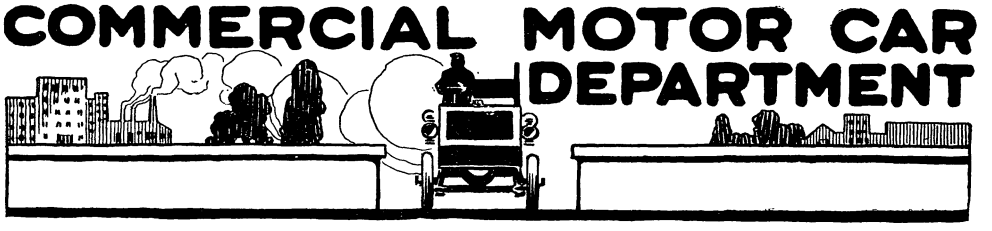

Experiences of Commercial Motor Car Users

"Rapid" Truck Replaces Four Horse Wagons at Much Less Expense

Barcalo Manufacturing Co., Buffalo, N. Y., maker of metal beds, bed springs and bedding, uses a Rapid motor truck in its delivery department, the truck having replaced four horse drawn wagons. The daily expense of maintaining the motor truck has averaged $5.54 3-5, including $4,069 driver's and helper's wages, .339 barn rent, .789 for gasoline, .127 for oil, .222 for repairs and sundries. These figures and those to follow are all based on the actual experience of the owners of from March 19 to October 10.

This truck has been used on an average of 9.1 hours per day, covering 28.3 miles daily, and 23 stops per day were averaged. The daiy consumption of gasoline was 4.7 gallons, and of oil 2.11 pints.

The average expense per mile is apportioned as follows: driver and helper, .1438; barn rent, .012; gasoline, .0279; oil, .0045; repairs and sundreis, .0078; total per mile .1960. The gasoline consumption per mile was .17 gallon and of oil .07 pint.

Successful Delivery With Motor Cars in a Large Grocery Business

The Delmonico Company, Savannah, Ga., Leigh M. White, president and manager, are large wholesale and retail dealers in fancy groceries, teas and coffees, and showed their progressiveness over two years ago by purchasing a Cadillac car for the purpose of testing the fitness of the motor car for delivery service. This car was second-hand when they bought it, having been in use something like two years. and it had an open body, but the company had a cover made for it, converting it into a closed vehicle. This addition made the body rather heavy, and the machine was therefore carrying more than it was intended to, but in spite of this fact it gave very satisfactory service. The expense of repairs, storage and gasoline approximated $75 a month, but this is good in view of the fact that the car carried from 700 to 1200 pounds loads when it was only intended to carry from 500 to 600 pounds. Besides delivering as much goods in the city as two of their horse teams. it made three trips to the country (about eight miles and back) each week, carrying a load of about 1000 pounds each trip. in addition to the driver.

They were so well pleased with the results obtained that in August of this year they purchased another car, a 22 H. P. Buick chassis, and had fitted to it a body built after their own plans. This machine is now in use and doing the work of two to three teams satisfactorily and at small cost, and Mr. White is having the machine kept at his private garage. and cared for under his personal supervision. The first car is being overhauled, and will again be put in use with several improved features.

In addition to the value of these cars as deliverers of goods, Mr. White states they are excellent advertisements, especially in view of the fact that this company is the only concern using gasoline machines for delivery purposes in their city, and he feels the advertisement should be credited against the expense of running the machine. These machines make three or four calls per day, averaging 30 to 100 calls per trip, and the territory covered is about two square miles, excluding the long distance trips. The operator is paid $40 a month and no helper is provided. Only the Buick is now in use, but of course another driver will be added to operate the Cadillac when it is overhauled. The present driver was formerly a team driver. The Cadillac car cost them $600 and the Buick $1200.

Salesman Covers Territory in Less Time with Motor Car than by Rail

A Worcester Massachusetts salesman has found that while a motor car incurs greater expense in covering a certain territory than railway car fare, it enables him to cover it in much less time, and therefore cuts down hotel expenses and increases his annual earnings by enabling him to cover more territory. and thus sell more goods in any specified time.

His motor car cost, with lamps $812. In covering a certain territory he used 316

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gallons of gasoline, costing $69.45, and 16 gallons of cylinder oil costing $12.50. Replacing three tires shoes cost, including expressage $64.50; repairs to engine $33.80; grease and minor supplies, $2.75; repairs to springs and axle, $6.45; spark plugs, $2; 21 sets of dry cells, $52.30, and storage, during the time consumed in this trip, 6 months, $91. Interest on his original investment of $812 for 6 months at 6 per cent., $24.36, should be added to these expenses, bringing the total expense to $359.11.

To have covered the same territory by rail would have required 7000 miles on the railroad, which at 2c per mile would bring the railway expenses up to $140, not counting any extras for parlor car seats, etc. The saving in time with the motor car was 9 weeks, in which time $180 more would have been spent in hotel bills had the trip been made by rail. This makes the expense saved by the motor car total up to $320. The apparent difference of $39.11 in favor of the railroad is more than offset by the increased earnings of the salesman.

In addition to keeping correct cost of running, he also kept tract of the time he spent in cleaning and adjusting the machine, for he considers it necessary to keep a machine in proper trim. Oiling, adjusting and cleaning on the average took 1½ hours per 100 miles, or 97 hours for the distance traveled. Delays on account of punctures and other repairs totaled 17½ hours.

Adams Express Company Installing Electric Trucks

The Adams Express Company, in Indianapolis, Ind., has entirely discarded horses and wagons in that city, having replaced them by electric vehicles. The company has been gradually installing similar vehicles in all the larger cities in the East. At Indianapolis sixteen one-ton delivery and three two-ton trucks were put into operation about two months ago, and have been giving thoro satisfaction. The horse equipment abandoned included 32 horses and 22 wagons. These were maintained at a monthly cost of $600 exclusive of drivers' wages. The men who formerly drove the wagons have all been retained and trained to handle the new vehicles, receiving as pay for their work sums varying from $50 to $55 per month. The light machines travel at a rate of 10 miles per hour, and the heavier cars at 9 miles per hour. One battery charge is sufficient for 35 miles of travel for each class of vehicles.

Fifty thousand dollars, it is stated, was expended by the company for the installation of the motor wagon service. Forty thousand was expended for the vehicles and the rest went for the erection and equipment of a garage. The building is one story high 50 feet wide and 117 feet long, and has a capacity for 21 one-ton trucks and 18 two-ton machines. The garage is divided into three parts, the main wagon room, a storage room, and a repair shop.

Taximeter Cabs in New York

Two companies are at present operating taximeter cabs in New York City, the New York Transportation Company and the New York Taxicab Co. The former company has been operating its cars since the middle of July, and the latter company only started its service the first of October, and will increase the service as fast as deliveries of the motor cabs can be secured from Europe. Up to October 1, thirty of the Delahaye landaulets were received from the manufacturers, the Societe des Automobiles Delahaye, of Paris. The cabs have a very striking appearance, having deep yellow running gears, olive green bodies and black leather top and upholstering. The cabs are delivered without tires and are fitted in America with Goodrich tires. The cabs are all fitted with taximeters. For the first half mile or fraction thereof 30 cents is charged, each quarter of a mile thereafter 10 cents, and ten cents for every six minutes of waiting.

Ringling Bros., the circus proprietors, are using "Indestructible" steel wheels, made by Indestructible Steel Wheel Co., 1301 Michigan avenue, Chicago, Ill., on an automobile that is used in a somersault act in their show. In this performance the car attains a speed of 42 miles per hour, turns a somersault in mid air, drops 30 feet and lands with an impact equal to the pressure of 9000 pounds dead weight. This has been done twice daily thruout the season without damage to the wheels.

The Chase Motor Truck Company has recently acquired the plant formerly owned by the Sweet Steel Company, located at 310-334 S. West street, Syracuse, N. Y. This property covers a ground area of 50,000 square feet, or nearly an entire city block. Beside the office building on West street, there is a Machine Shop Building four stories, 17,280 square feet floor space; an erecting shop one story, 15,750 square feet, and the pleasure car department, one story, 21,600 square feet.

Thru a misunderstanding of the circumstances we stated in the November Journal, page 286, in referring to the Hewitt 5-ton truck that it had recently made a run from New York to Philadelphia at a rate of 14 miles per hour. As a matter of fact the speed was just about half this rate, as the trip, which is approximately 100 miles, was made in 14 hours. The manufacturer of the truck, Hewitt Motor Co., 6-10 E. Thirty-first street, New York City, makes a point of the fact that the truck is geared low, and high speeds are not possible.

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The Sampson Gas-Electric Road Train

HUGH DOLNAR.

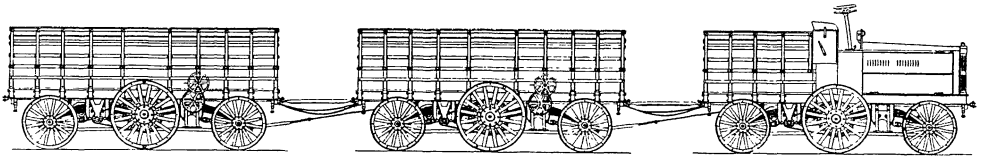
The Alden-Sampson Manufacturing Co., Pittsfield, Mass., U. S. A., showed at Madison Square Garden, November, 1907, a "Gas-Electric Road Train," consisting of a Tractor and two trailers. Each trailer has two electric motors, 20 amperes each, so that each trailer, weight 7,000 pounds, paying load, maximum, 14,000 pounds, 21,000 pounds total, can drive itself when its motors are supplied with electric current, at 5 miles an hour on a fair road. The Trailers are not equipt with an independent steering device, but when coupled into a train behind the Tractor they follow the course pursued by it perfectly. The Tractor and each trailer are mounted at each end and on two carrying and two steering wheels, not driven, and each is provided with two driving wheels, placed half-way between the carrying and steering wheels of each vehicle. The wheel base is the same thruout, 144 inches, the steering wheels are 42 inches diameter, with special wrought iron tires 3½ inches wide. The driving wheels are all 54 inches diameter with wrought iron tires, 7 inches wide. The gage is 72 inches.

The Tractor and Trailer wheels, springs and chassis frames are all alike, save that the Tractor is fitted with a spring-suspended, motive-assembly frame, and a steering gear, but save for the motive plant and steering mechanism the tractor chassis frame is the same as that of the trailers.

There are four equalizing springs under each car; these springs are 72 inches long, 3½ inches wide, 11 leaves, ½ inch thick, tongued and grooved. These springs are pivoted in the middle, are placed parallel to each other in front and near pairs, and each have one end resting in a cage on one of the end axles and the other end resting on one driving wheel axle. The middle of each spring is jointed to a chassis frame bracket, and each spring end is retained sidewise in a cage fixt to an axle, but is free to move endwise. Six struts under each chassis frame keep the three axles in about the same horizontal positions with respect to each other while permitting each wheel to lift or drop independently 15 inches, while each of the six wheels of any car in the train will always support the load upon the car, no matter how much any one wheel drops or rises.

The steering is thru bell-cranks pivoted to the middle of each front and rear axle and linked diagonally to each other; the short arms of these bell-cranks are 14 inches long, disposed cross-wise of the car, and the long arms are about 84 inches long, with slotted ends to take studs under the rear end of the next car forward. The cars are coupled together by tubular draw-bars, 54 inches pin hole to pin hole, with ends welded in and fitted to 1⅛ inch coupling pins. The effect of this draw-bar coupling and the steering bell-cranks is to make all the wheels of a train of any number of cars follow the tractor wheel tracks exactly.

Each driver has a sprocket 28 inches pitch diameter to take a 1¾ inch. pitch chain, and the sprocket is bolted to a malleable iron brake-drum, 22 inches inside diameter by 3½ inches face. The brake shoes are steel castings, jointed, and toggle expanded, and each shoe carries a segment of oakwood forced against the inside of the brake-drum when applied by a hand-wheel thru an equalizing bar. The electric motors serve as brakes by control from a tractor.



The Sampson Gasoline Electric Road Train: The tractor has a generating plant consisting of a 4-cylinder motor with a silent chain drive to a 35 K. W. dynamo. The motor cylinders are 6½x7 inches, 4-cycle, water-cooled, jump spark ignition, and show 50 B. H. P. at 650 R. P. M. All power is transformed to electric current, which is wired to two independent motors on the tractor axle on each trailer of the train, avoiding the use of balance gears. The steering is by a worm and worm gear sector, with an 18-inch hand-wheel. Weights, dimensions, power and price will vary to suit conditions of service.

The tractor has a generating plant consisting of a 4-cylinder motor with a silent chain drive to a 35 K. W. dynamo. The motor cylinders are 6½x7 inches, 4-cycle, water cooled, jump spark ignition, and show 50 B. H. P. at 650 R. P. M.

All power is transformed to electric current which is wired to two independent motors on the tractor and on each trailer of the train, avoiding the use of balance gears. The steering is by a worm and worm gear sector, with an 18 inch hand-wheel. The axles are I-section steel forgings. All wheels are on steel axles with bronze hub bushes.

This road train can be made to carry any load desired, as the trains can be of any length, and the motor can be given any power needful. Weights, dimensions, power and price will vary to suit conditions of service. The train described is designed to meet general requirements.

An automobile bus service is to be organized between Aiken and Wagener, S. C. Cars capable of carrying twenty-five passengers and freight will be used.

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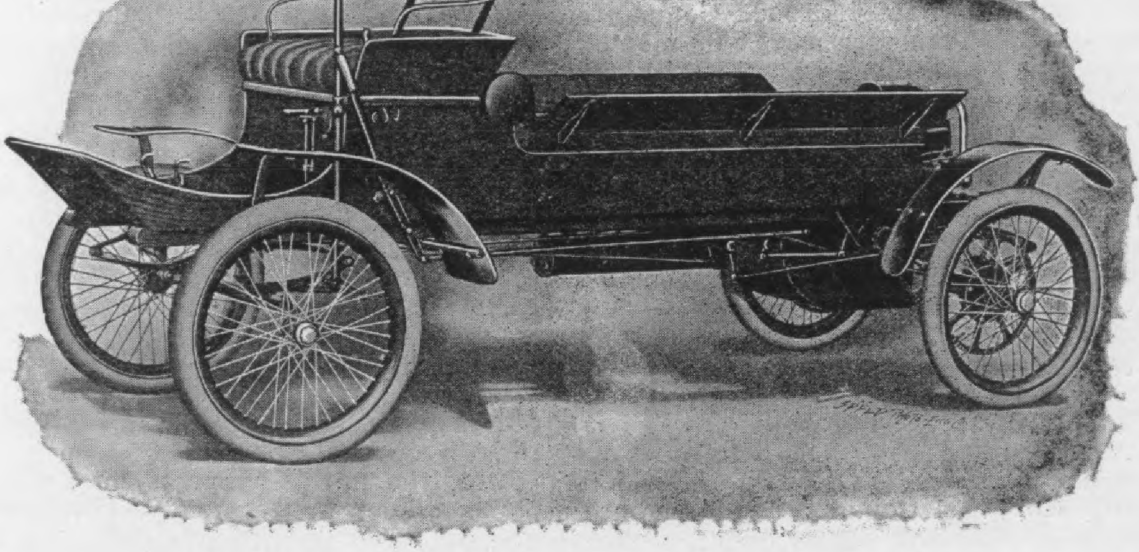

1908 DELIVERY CAR

MODEL D. C., 4 H. P., $550; 8 H. P. $650

Fitchburg, Mass., Sept. 25, 1907.

WALTHAM MANUFACTURING CO.,
Waltham, Mass.

Gentlemen:

Perhaps you may care to hear of a trip that I made July 4th to demonstrate the good qu ities of my Delivery Car—Model DC 4-HP.

There is a young man here who has been talking of buying one to use on a poultry far He had called upon me twice and I had called on him some six or eight times, and I felt ve sure that if I could make a good demonstration, I could make a sale, so I agreed to meet him ten o'clock, July 4th, and we would go up to his farm which is about eight miles out from t city. I met him as agreed, and as he had a friend with him I had nearly 200 pounds extra los The combined weight of us three was 545 pounds. For the first five miles I was well acquaint with the road; then we turned on to a road that I had never been over and for three miles I dro my car over the roughest and worst road that I ever want to see. There were places where gra had covered the entire width of the road and other places where one side was washed out; the were deep gullies across the road; there were places where the brush was so close that the fen ers on each side of car would hit. It was a steady ascent with no very steep grades but one th called for very careful driving.

At last I caught a glimpse of a house through the trees and began to feel better, but ju before we reached the house there was a sharp turn in the road and all that we had passed w but play to what was before us.

We were at the foot of a hill some five rods long, covered with small pebbles and it was t steepest grade that I ever remember riding over, either with team or auto. But my faith in t little motor was strong and I started; about one-third of the way up I thought what if somethi should break—I would be in a fix—so I stopped and asked one man to get off and walk behind wh a big rail to block the wheels in case of an accident to brake or power. But nothing happen and we reached the top in safety, and I want to say right here that I made a standing start on t steep hill and reached the top as quick—if not a good deal quicker—than a horse could, and t friction transmission did not slip.

That was the worst hill on the trip for the rest was easy. I stopped and waited for the m to come up, looked the machine all over; oiled up; and soon reached our destination.

When we were ready to return I asked if there was another road home. He said "Oh, ye go about half a mile and we would have State Road all the way home.

I have run my car over 3000 miles and the friction is in fine condition yet. All the troubl have had has been in the tires. Nails and glass bottles are bad for rubber.

Yours very truly,
W. A. YALE.

Write for information and illustrations of all 1908 Models
Discounts quoted dealers in unassigned territory

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Waltham Manufacturing Company

ne Commercial Motor Truck Company, ter of the Plymouth cars, Plymouth, o, U. S. A., will offer a single model hassis, fitted with either a truck plat- n or a "sight-seeing" body, for the sea- of 1908. The paying load capacity is pounds, and the distinctive feature ne Plymouth car is the double variable- d friction drive.

ne Commercial Motor Truck Company organized in 1906, and its factory was ted in Toledo, Ohio. Plymouth capi- became interested, with the result that ew brick factory building was erected Plymouth, and occupied in November, . At the time of the removal from do to Plymouth, there was but one erimental friction-driven Plymouth k in existence. Experiments with first chassis were pursued to March,

The Plymouth car's friction-drive new in form. The aluminum disks an paper wheels, as first used about 190 being arranged in this instance so as t balance the thrusts of two paper wheel on either one of two aluminum disks, on disk or the other being prest against th two paper wheels according to the dire tion of the truck-travel desired, so tha the paper wheel pressure is the same o each side of the working aluminum dri ing-disk.

This arrangement of two paper wheel which may be equally moved towards th disk center or away from it, balances th thrusts on the disk and also doubles th power transmitting capacity of a disk an paper wheel drive of given dimension The balanced thrust avoids the heavy sid friction inseparable from the single tra

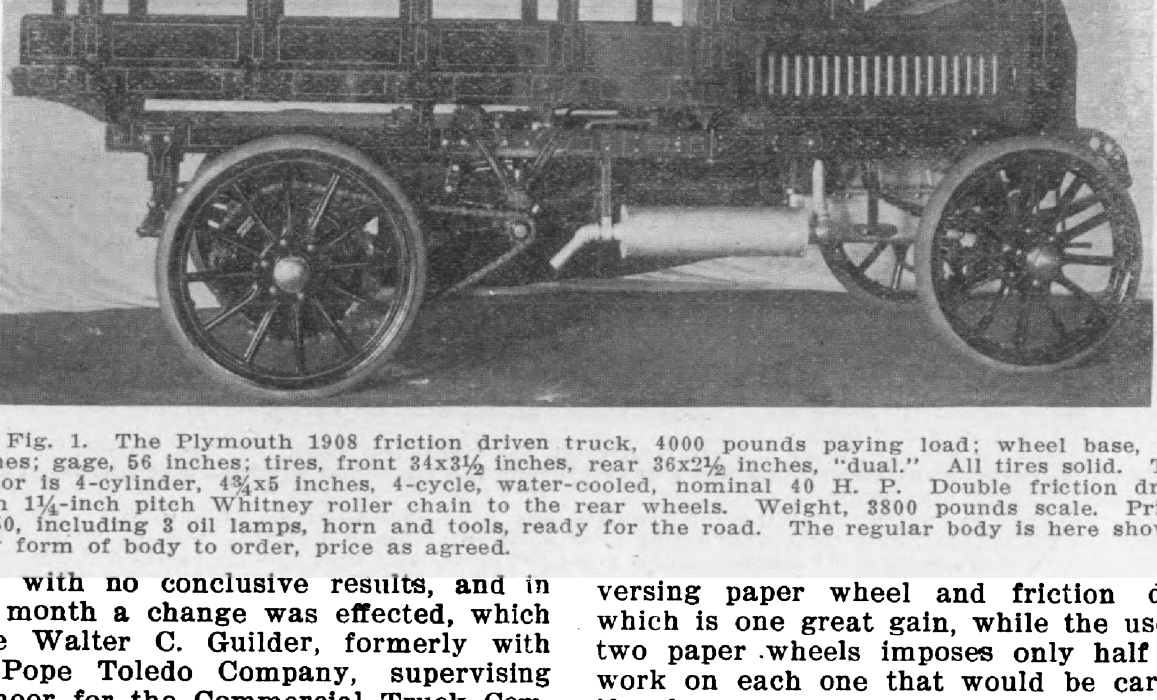

Fig. 1. The Plymouth 1908 friction driven truck, 4000 pounds paying load; wheel base, 103 nes; gage, 56 inches; tires, front 34x3½ inches, rear 36x2½ inches, "dual." All tires solid. The or is 4-cylinder, 4¾x5 inches, 4-cycle, water-cooled, nominal 40 H. P. Double friction drive n 1¼-inch pitch Whitney roller chain to the rear wheels. Weight, 3800 pounds scale. Price, 0, including 3 oil lamps, horn and tools, ready for the road. The regular body is here shown. form of body to order, price as agreed.

with no conclusive results, and in month a change was effected, which e Walter C. Guilder, formerly with Pope Toledo Company, supervising neer for the Commercial Truck Com- . The 2-ton, friction-drive truck, here described and illustrated, has been uced under the direction of Mr. Guild- who has been actively connected with r car design and construction for the four years.

FRICTION DRIVING FOR TRUCKS.

e friction-drive, which was a failure ne most discouraging description in

versing paper wheel and friction disk which is one great gain, while the use o two paper wheels imposes only half th work on each one that would be carrie if only one paper wheel was required t transmit the same power, which is a sec ond great advantage.

Since the paper wheels are moved equal ly and simultaneously to or from the disk center, the pressure on the two sides o the disks is the same, and as two disk are used, one for the forward drive and on for reversing, the work is perfectl balanced, and is also divided so that eac

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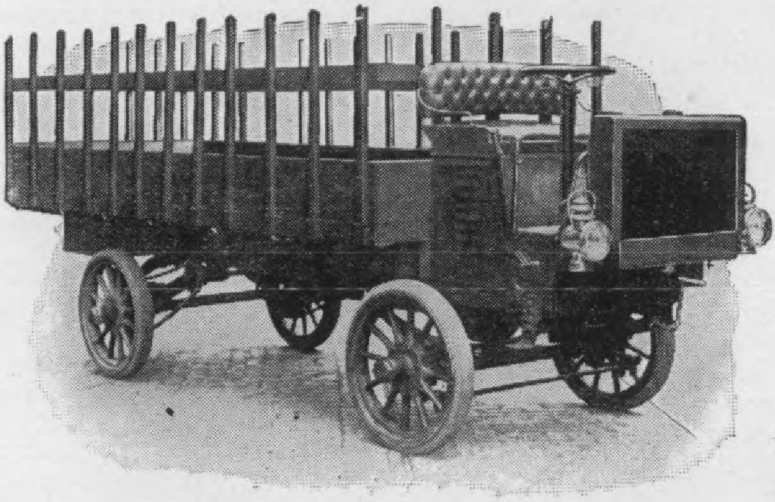
RELIANCE 1908 DETROIT



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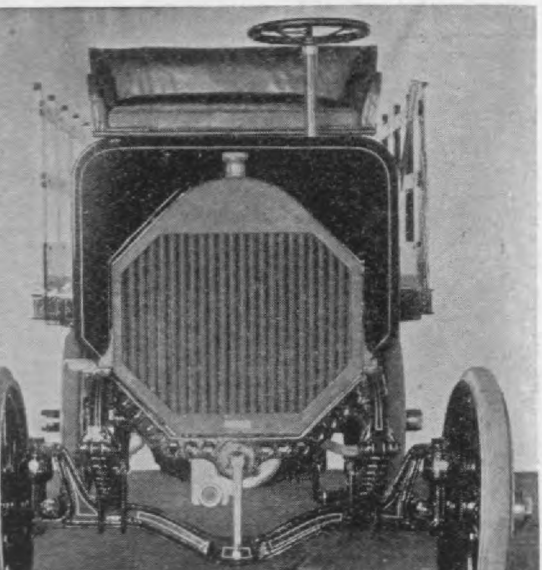
g friction surfaces. This does not ar to be a self-evident proposition,



2. Front view of the Plymouth Truck, ng the front axle construction and the large ng pivots; also the method of mounting the s by long encircling clips, and the mount- the radiator on the front cross member of ame.

n the opinion of the writer it has rtheless been fully proved to be true emonstrations made with over-loaded s rounding short radius curves on roads, with no perceptible waste of r, and with no call for added motive .

e Plymouth balanced friction disc does all that can be done in truck ng by any sliding gear arrangement, does it with a degree of silence and inty which no arrangement of ed gearing has ever yet shown, thus

backward drive. This was changed by Mr. Guilder to a fixt position counter-shaft carrying the traversing paper wheels and two driving disks fixt to a shaft, which has a short movement fore and aft by a linkage of plain levers and latched pedals, one pedal for the forward movement and one for the reverse. The pedal ratchet teeth are closely spaced, and the pedal is simply pushed forward until the friction drives the car. The speed change is by a vertical outside latched lever at the driver's left hand, which traverses the paper wheels equally thru a two-armed rocker and two bell-cranks.

The whole control is most simple, plain levers, locked by lever and pedal latches. The construction is so plainly shown by Figs. 6 and 7 as to need no detailed description.

In Fig. 1 is shown the 1908 friction-driven truck, 4000 pounds, paying load. The wheel base is 103 inches; gage, 56 inches; tires, front 34x3½ inches, rear 36x 2½ inches, "dual." All the tires are solid, the dual 2½-inch tire being two 2½-inch face convex treads integral with a single base, this integral base being 5 inches wide. This Firestone solid "dual" 2½-inch tire carries 900 pounds more than a 4-inch single Firestone tire. The front tires cost $84.00 per pair. The rear tires cost $124.00 per pair. The motor is four-cylin-

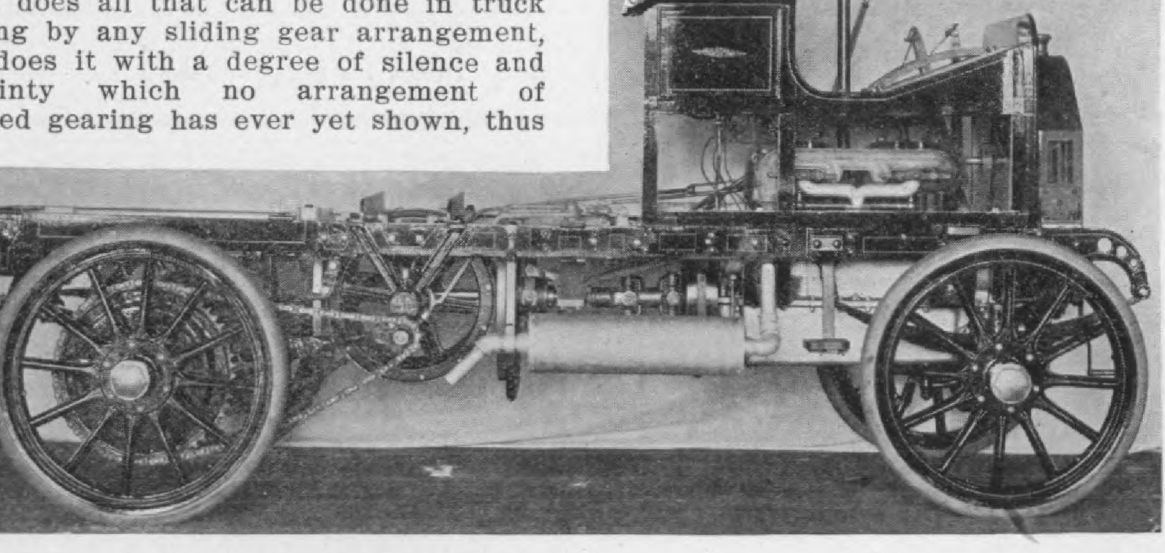


Fig. 3. Side view of the 1908 Plymouth Truck Chassis. This view shows the location of the inder motor and the friction change speed gear. Two friction wheels are used at once ist the forward or backing disc, as the case may be, each wheel driving one of the rear s thru a chain. The motion of one of the friction wheels is reversed by gears before it

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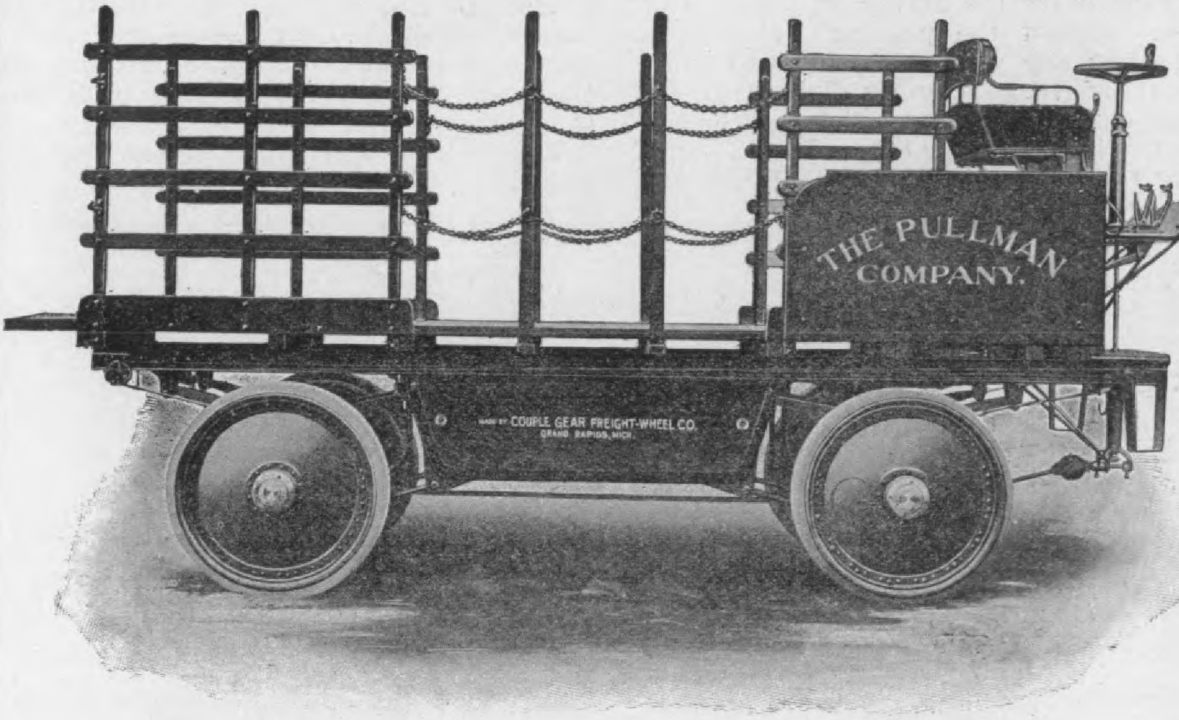

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The Entire energy of the Motor is converted into useful propelling force, giving the **Couple-Gear Truck Ample Mileage** for every condition of service. (The mechanical transmission efficiency exceeds 97% at normal load for the motors.)

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NOTABLE FEATURES.

side of the double friction drive, the iar features of the Plymouth truck placing of the driver and the control e left side, as is correct with our ican "turn to the right" rule of the as it seats the driver on the side of ar nearest the passing vehicle, so he can see what is in his way best. car is very strongly built thruout, he control is simple, strong and con- nt, with no delicate parts and noth- nywhere that is liable to disarrange-

BRAKES.

These are internal only, in rear hub drums, which are steel castings integral with the 54-tooth sprockets. The brake drum inside diameter is 16 inches by 2½ inches face. The jointed steel casting shoes are Gandy belting faced, cam-rocker expanded, and are applied thru a long evener, all the way across the chassis frame, and a brake pedal, which is latched.

The friction drive furnishes a powerful reserve or emergency brake, which can be applied without detrimental wear. The rear hub brake is 16 inches in diameter, and will hold the car anywhere.

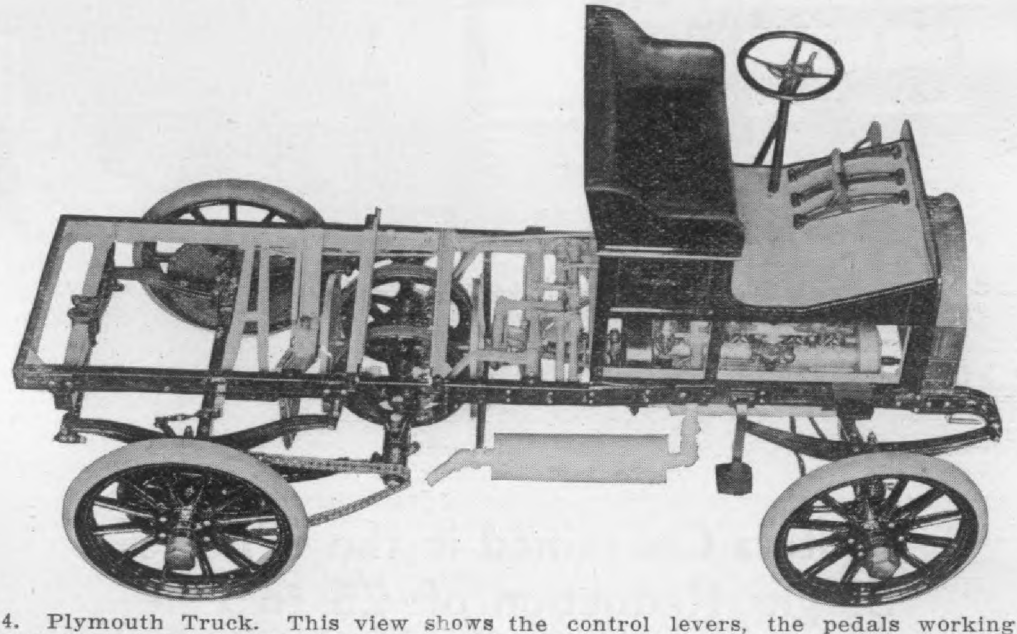

Fig. 4. Plymouth Truck. This view shows the control levers, the pedals working in long l segments, two being ratchet retained. The double wheeled friction change speed and the platform spring arrangement.

THE AXLES.

e front axle is by Timken, of I-sec- with the load carried on Timken ngs at the top of the stub axle pins. front wheels have Timken hubs and ngs. The rear axle is a 2½-inch e, steel forging, and the rear wheels n Timken rollers.

SPRINGS.

front springs are half-elliptic, 38 s long by 2¼ inches wide, 9 leaves, ed and grooved, no bands, jointed to hassis frame in front and linked in ear. The rear springs are platform side numbers 40 inches long and 2¼ s wide, 10 leaves. The cross mem- 34 inches long and 2¼ inches wide, ves, shackled to the side spring rear and fixt on top to a wooden hols- The front ends of the side springs nked to the chassis frame.

struts are revolubly mounted on the are screw adjusted for length and

CONTROL.

The single outside hand lever at the driver's left, shifts the paper wheels and changes the speed. There are three pedals in long segments on the foot board; the left-hand pedal, latched, applies the rear hub-drum internal brake shoes. The middle pedal free, effects the reverse; the right pedal, latched, is pushed forward to obtain the forward drive. The steering post is vertical and the spark and throttle levers are ratchet retained on top of the hand wheel.

ON THE ROAD.

Monday, October 21, a Plymouth truck, loaded with 3000 pounds of pig iron, which was weighed in presence of the writer, left the Plymouth shops with four persons aboard, making the total load about 3700 pounds. The designer of the truck W. C. Guilder was at the wheel,

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and life seemed really delightful as eaded over the hills for Shelby, some 15 miles or more away. The roads clay and gravel, more often clay, in one place were broken stone, fresh-id and not rolled down at all. There been recent rain, and the clay road slithery in spots, especially on north ides. We found, however, that the put the solid tires down to hard bot-and climbed several hills in good form were surmounting the steepest and est one between Plymouth and Shelby

that 5000 pounds of pig iron, and the loaded it on again after the truck once more stood astride of the back-bone of that yellow clay hill-side pike.

The adventure of the fresh laid broken stone was not quite so thrilling, tho we stopt dead in the middle of the 100-foot stretch of new road-making and the rear wheels of the truck dug right down thru the loose stone as they whirled vainly round and round while the crew looked anxiously at the pig-iron cargo. This time however, fence boards saved us, and we

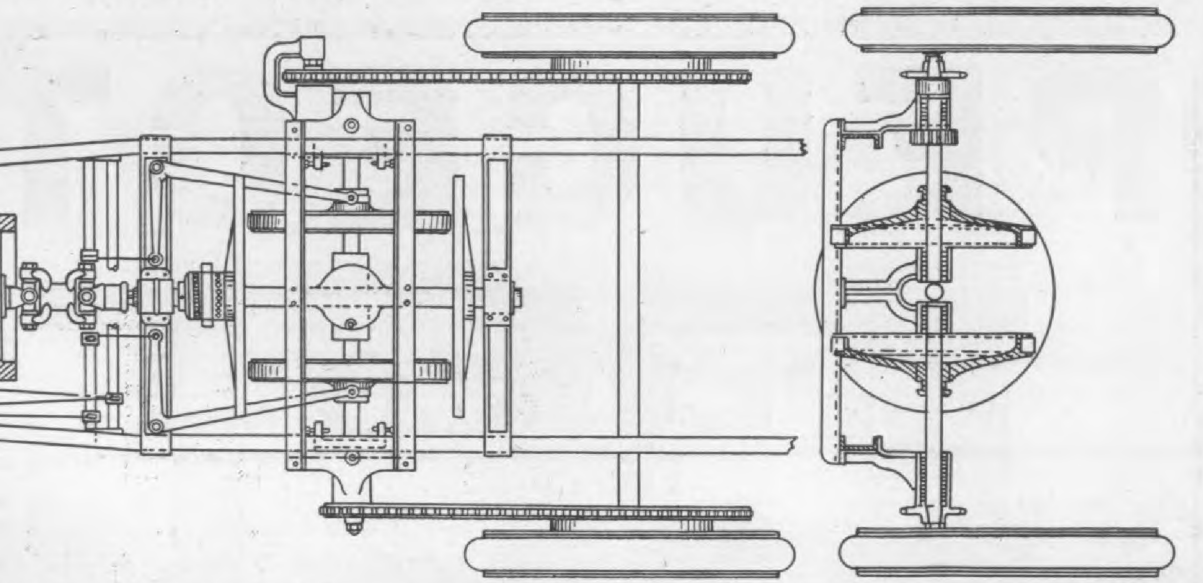
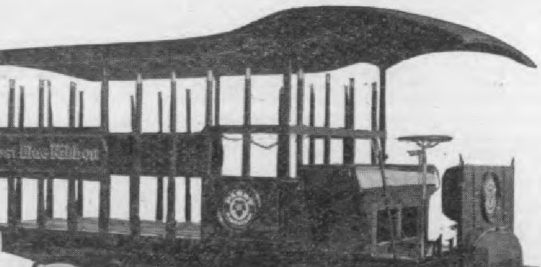


Fig. 5. Plan and elevation of the Plymouth friction change speed mechanism. Two mov- discs one for forward and the other for backing are provided. Two friction wheels, both of ch engage either one or the other disc at points at diametrically opposite sides of the disc's ter, are arranged as usual to shift across the face of the disc, but keep equally distant from center, thus sharing the transmitting of the load and obviating the tremendous bending move-t caused by the use of only one friction wheel.

nphantly, when the designer-driver ed to the observer with an exultant rk and turned the wheel as he turned head. The pike was narrow, high in middle, with a deep ditch on the right the surface was wet, yellow clay. The of the wheel was just enough to start ruck to sliding sidewise into the deep next to the high trolley track, and e it stayed in spite of all expedients, soon afterward struck hard roads and made a racing clip of 15 miles an hour into Shelby, where the observer caught a New York train.

The Plymouth truck has power and plenty of speed, which is of course a great advantage, and can do hard work much more easily and cheaply than horses can as many Plymouth truck purchasers can testify.



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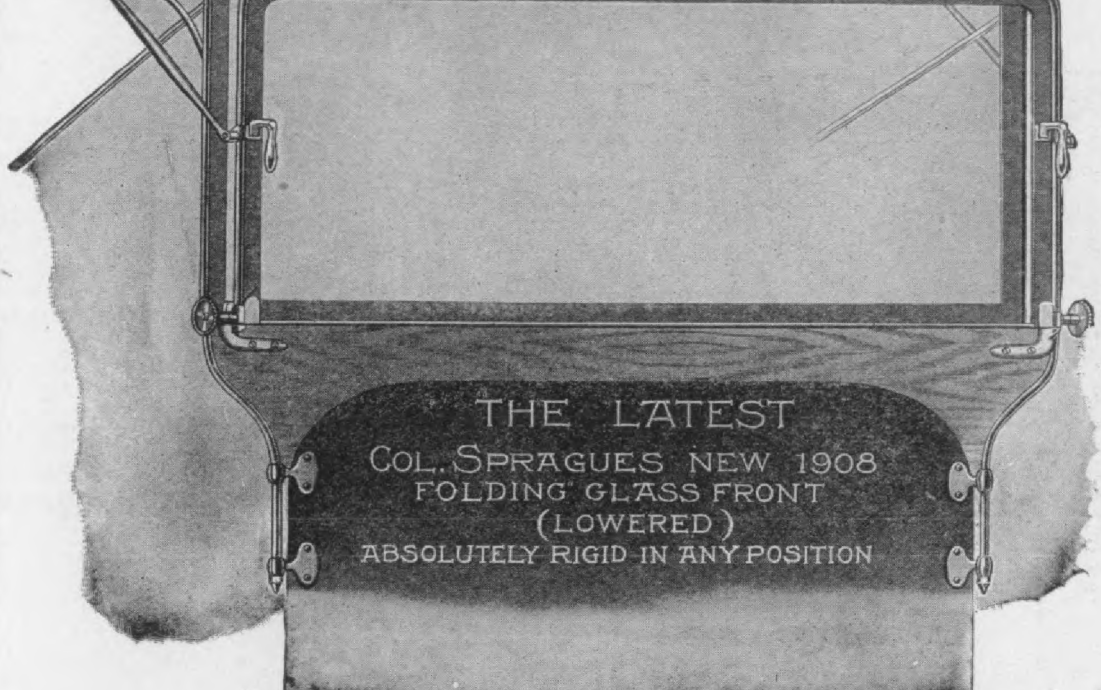

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et us prove Indestructible Steel Wheels marvels of strength and durability to you, **personally.** See ther now why they are the **only** really practical wheels for your touring car, runabout, truck or wagon. We fi

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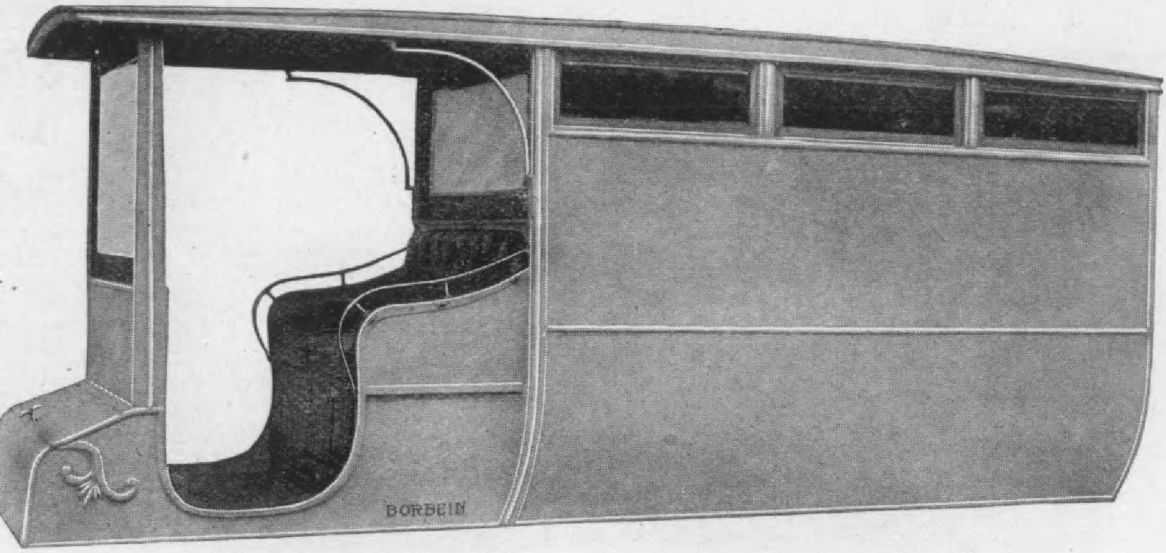

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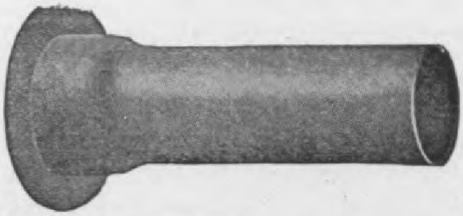

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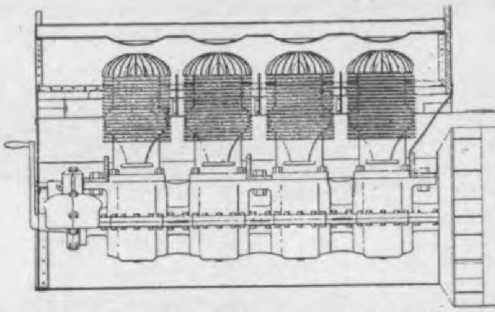

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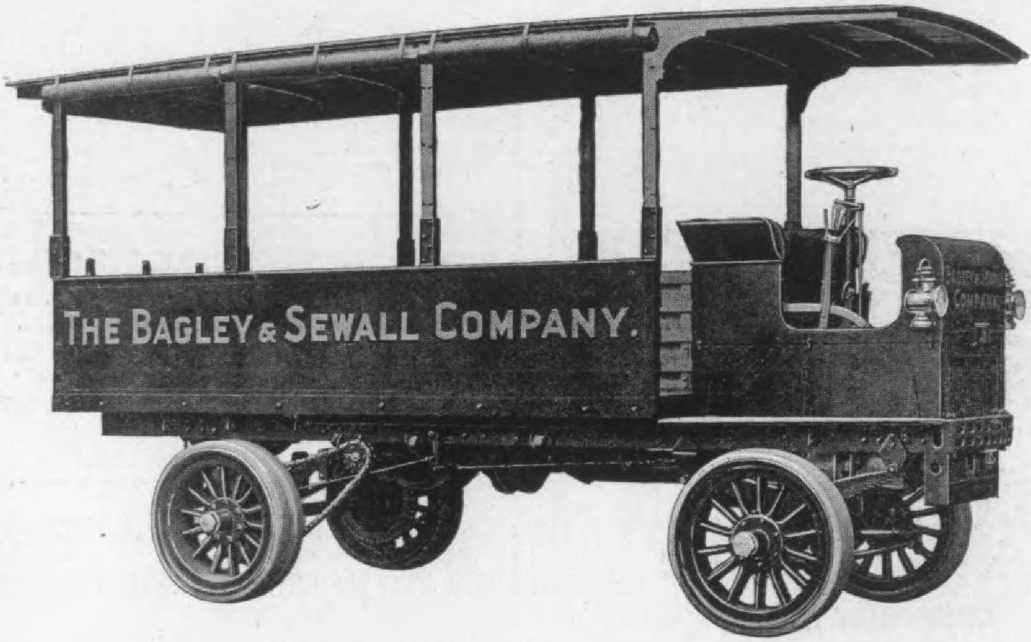
offering several new types of body re, in fact, prepared to meet prac- any requirement in 3 and 5-ton . One of the new body designs e illustrated and any can be had on the 3 or 5-ton chassis. The platform sions of the smaller cars is 5x12 feet, f the larger ones, 6x13 feet.

1908 improvements consist of sim- g the construction, making better ion for lubrication, increasing wear- rfaces, increasing cooling surface of diators and the use of dual tread n the rear wheels.

is of air tight design to insure against sparking.

The high speed clutch is of the disk type and alternating steel and hard bronze plates are now used. The transmission gear case is so arranged that a supply of oil is retained at all times. Slow speed ahead and reverse brought into operation by wide faced fiber lined cast steel brake bands. All gears in transmission have ample face, run on bronze bushings and pins with careful provision made for ample and constant lubrication. Gears are case hardened where necessary and made of nickel steel.



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piston end of the connecting rod is l with hardened and ground remov- steel bushings giving extra large g surface. Crank ends are bushed emovable babbitted bronze bushings d to fit shaft and supplied with oil grooves. Special arrangement e for ample lubrication at both ends connecting rod.

crank shaft is of the best ham- high carbon machinery steel, oil l, machined all over and ground to Five bearings of unusual length and er support the crank shaft.

cam shaft is of high-grade nery steel supported by four bear- ith removable bearing caps. These able caps allow cam shaft to be re- without disturbing position or ng of any cams. All cams are to correct contour and hardened.

Two brake drums are provided on jack shaft. Brake bands are of cast steel fiber lined, adjustable for wear. Emergency brakes are placed inside of the rear sprocket drums, arranged to take up for wear. The 1908 machines are also supplied with two drag bars to be used on hills when thru carelessness the regular brakes are not in proper adjustment.

The frame is now made of heavy steel channels, hot riveted, securely braced by cross members and gusset plates. Front end is protected by a cast steel bumper of ribbed section. Semi-elliptic springs are used.

Each machine is equipt with two front light and one tail light, horn, complete, and a full set of wrenches and tools.

Bodies are built by expert wagon makers, carefully ironed, and constructed of the very best seasoned lumber. Any

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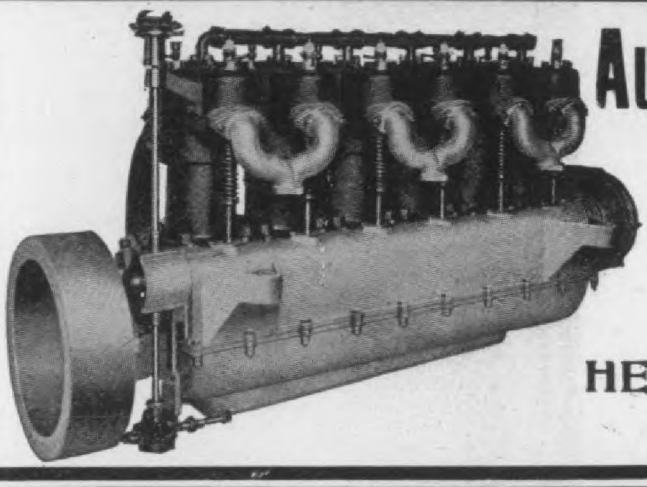
COMMERCIAL MOTOR TRUCK CO., Plymouth, Ohio.



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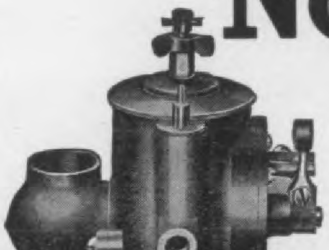

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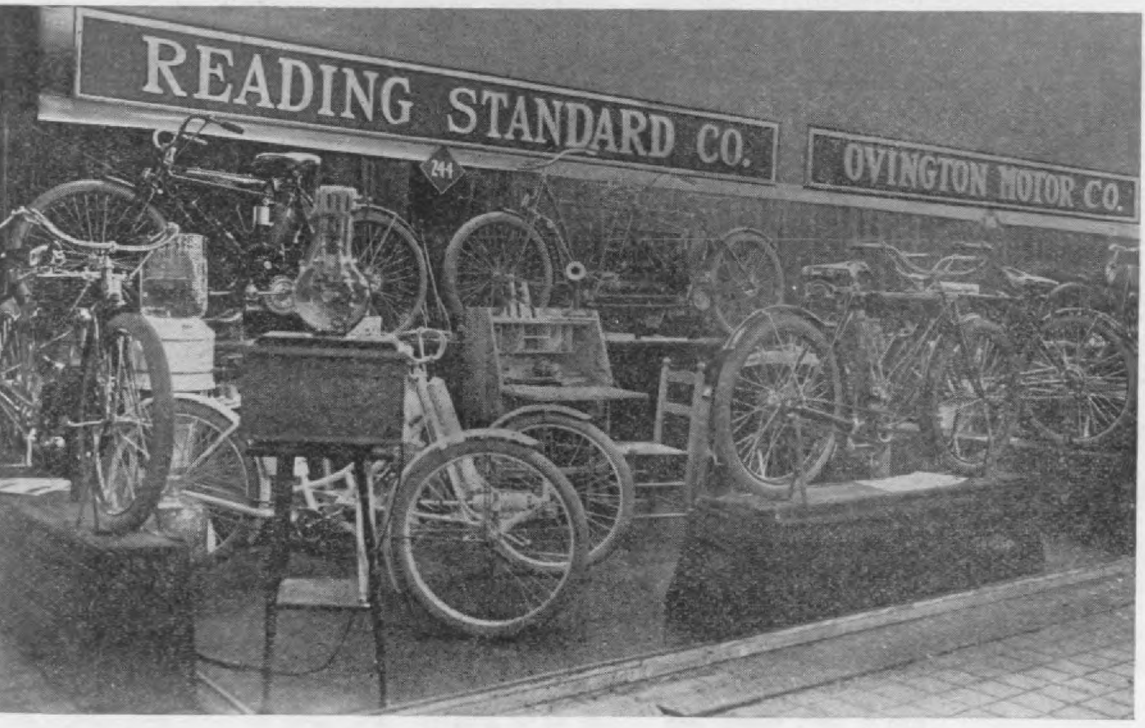
The Madison Square Garden Motorcycle Show

e grouping of the motorcycle exhibits e Madison Square Garden Show, New , November 2 to 9, proved to be an alified success. The exhibits were st all placed in the basement in the aisle, which is just broad enough lmit of placing booths on both sides a passageway of ample width in center. All of the exclusive motor- exhibits were in this aisle, with the ption of the American Motor Co., n was just around the corner, and the ra Automatic Machine Co., who ed their latest cycle motors with mobile and accessory exhibits, and placed in out-of-the-way corners, and by reason of being scattered did not make much of an impression on the public or on the trade. The grouping of the motorcycle exhibits at this show was a feature which caused considerable comment, and gave the industry the position which it deserved. A concise summary of the exhibits follow:

Reading Standard Co., Reading, Pa., 2¼ H. P. single cylinder $175, 3 H. P. single cycle $200, and 3 H. P. single cylinder gear drive $225, 6 H. P. 2-cycle $275, 3 H. P. convertible tandem $275, 3 H. P. delivery van $300, and 3 H. P. convertible tricycle **$290.**



Motor Cycle Show, Madison Square Garden—Exhibit of the Reading Standard Co., Reading, makers of the "R-S" motor cycles.

automobile motors in the concert on the second floor. The motorcycle itors were highly pleased with the ts of this plan, as the showing cer- brought more prominence to motor-

Merkel Motor Co., 1098 26th Ave., Milwaukee, Wis., 3 H. P. single cylinder $200, 3 H. P. single cylinder with magneto ignition $240.

Consolidated Mfg. Co., Toledo, Ohio, 2¼ H. P. Yale-Californa single cylinder $200.

Hendee Mfg. Co., Springfield, Mass., 2¾ H. P. single $200, 3½ H. P. single $225, 5 H. P. two-

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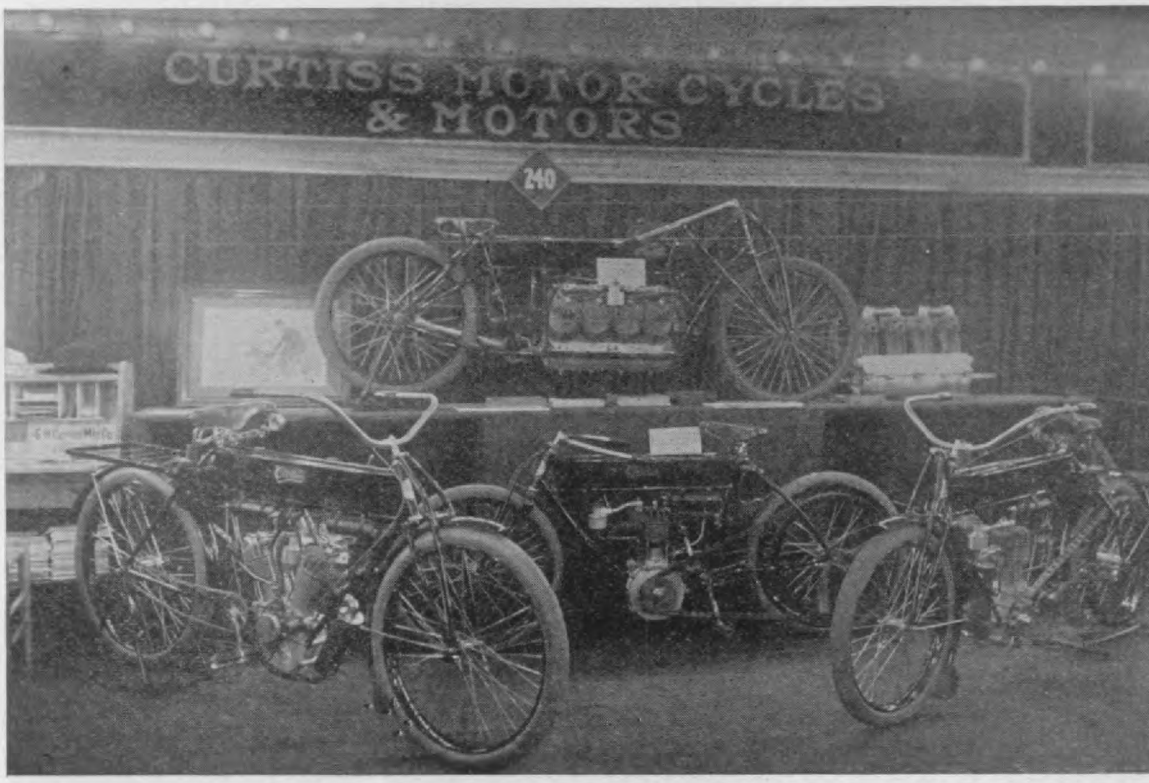
J. F. McLaughlin, 148 E. 49th St., New York, U. S. A. 1¼ H. P. single $210, 3 H. P. single $230, 3¾ H. P. single $255, 4 H. P. 2-cylinder $300, 6 H. P. 2-cylinder $320, 6 H. P. 2-cylinder tricar $500.

Royal Motor Works, Worcester, Mass., 2¾ H. P. single $200.

Ovington Motor Co., 2236 Broadway, N. Y., 1¾ H. P. single $215, 4 H. P. 4-cylinder $350, 4 H. P. tricar $475.

National Sales Corporation, 296 Broadway, New York. 3½ H. P. Peugeot single $225, 3½ H. P. 2-cylinder $295, 7 H. P. 2-cylinder $325.



Motor Cycle Show, Madison Suare Garden—Exhibit of G. H. Curtiss Mfg. Co., Hammondsp N. Y., showing the Curtiss motor cycles. The 8-cylinder, 40 H. P. racing machine in the ce is the machine on which Mr. Curtiss made the record for a mile in 25 2-5 seconds on the mond Beach, January 23, 1907.

Amos Shirley, 935 8th Ave., New York. 3¾ H. P. Styria single cylinder $285, 4½ H. P. 2-cylinder $325, 5½ H. P. 2-cylinder $350.

F. A. Baker & Co., 35 Warren St., New York. A large line of motorcycle accessories.

Aurora Automatic Machinery Co., Aurora, Ill. 1908 Thor cycle motors and parts.

Detailed descriptions of the new features on the above machines will be found on the succeeding pages.

Improvements in Curtiss Motorcycles

For 1908 the Curtiss motorcycles will not be materially changed from last year's construction, the manufacturer, G. H. Curtiss Manufacturing Co., of Hammondsport, N. Y., having found radical changes unnecessary. An option is given in the 1908 models on 26 or 28-inch wheels. The engine pulleys are hardened steel. The control of the 1908 machine is divided be-

the crank pin end.

Motorcycle Makers to Form an Association

W. F. Remppis, of the Reading S ard Company, called together a nu of motorcycle manufacturers just b the opening of the Madison Square Ga Show in New York, and those assem decided to hold a meeting during the cago Show for the purpose of formin organization of all those intereste motorcycle manufacture.

Los Angeles Prohibits Open Muff

The Los Angeles, Cal., Motorcycle is taking an active part in the fight is being made in that city against open muffler nuisance. The club has licly called attention to the fact that of its members are permitted to in in the practise that is so objectionable announces that it will welcome and in carrying out the provisions of an nance that will forbid the use of m cycles with open mufflers.

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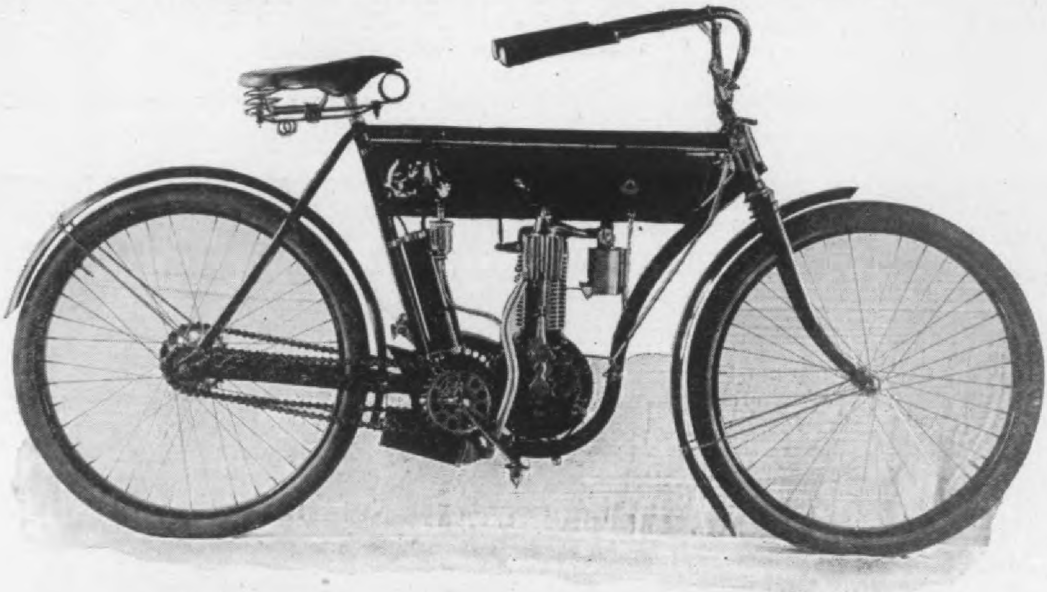
er number, page 294, but not illus-
l, as cuts were not then available.
manufacturers, Light Manufacturing
undry Co., Pottstown, Pa., have late-

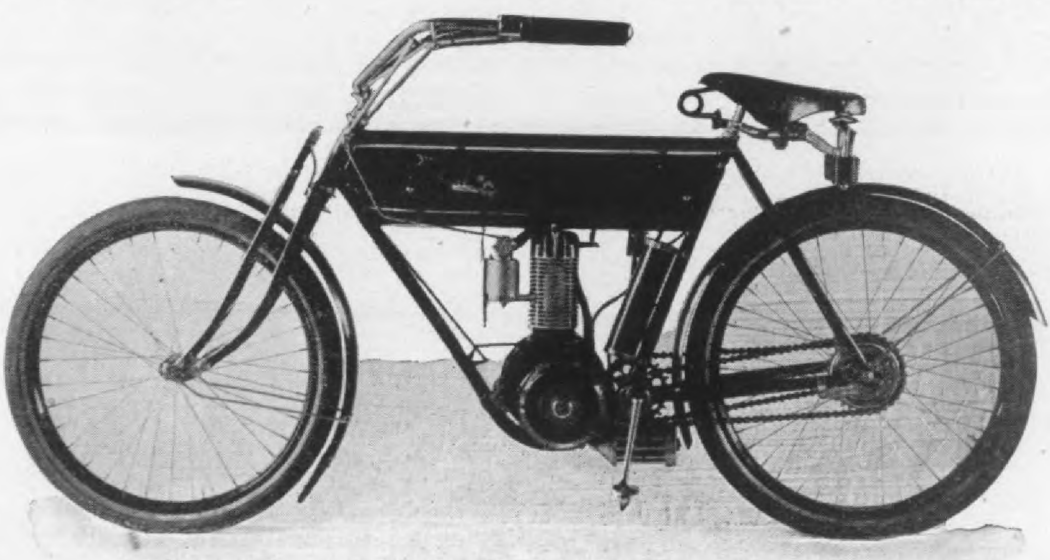
avoid the possibility of getting out of alignment or adjustment. The features of this gear drive are well shown in the accompanying drawing, in which A indi-



Light 2¼ H. P. 1908 Model A motorcycle; price $185; manufactured by the Light Mfg. & dry Co., Pottstown, Pa.

ured a separate plant, 5 stories high,
) feet, which is devoted exclusively
e manufacture of "Light" motor-
and pedal cycles.

cates the fly-wheel and C a pinion on the fly-wheel, while B is an internal gear meshing with the pinion C, and forming a cover for the pinion and a sprocket for



ight Model B, 3 H. P. motor cycle; price $225; manufactured by the Light Mfg. & Foundry Pottstown, Pa.

frames of the 1908 Light motor-
are of the truss-loop type, and con-
ed to obtain long wheel bases, very
addle position, and a comfortable po-
for the rider. Long handle bars are
and spring forks and all fittings are

the chain. The gears run on ball and roller bearings, and in oil supplied from the base of the motor.

A Thor muffler is used on Model A, but on the other two models a specially de-
signed muffler of the Light company's own

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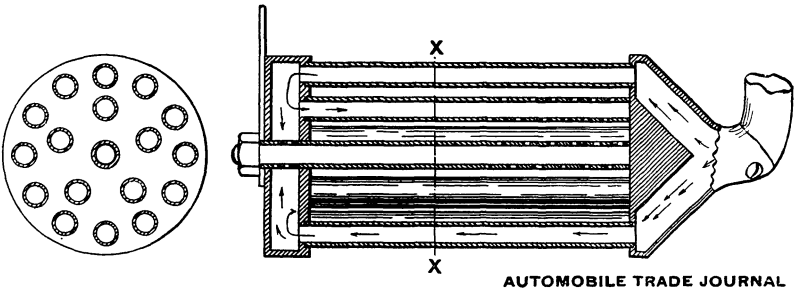
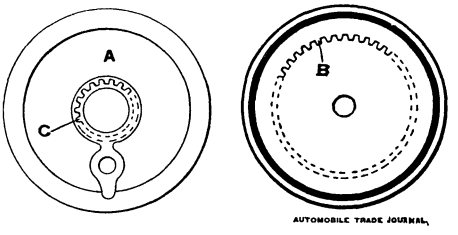


The Light tubular muffler—the longitudinal and cross section views.

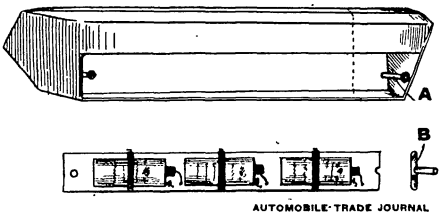
passes out into the atmosphere. This muffler is easily taken apart for cleaning or repairing.

The fuel and battery tank is another feature of the 1908 Light, being designed to contain the fuel, oil and battery without being bulky and in the way, and having



The Light one to three gear drive. A is the fly-wheel on which is the small gear C. B is an internal gear on a small disc which meshes with the gear C and this disc also forms the cover for the gear.

the battery easily accessible for inspection or replacement. The cells are rigidly held to a removable board by means of steel bands. The board is held in place by long bolts (A) and secured by a clamp (B).



The gasoline tank of the Light motor cycle, showing the battery compartment with the batteries removed. The batteries are securely held to the removable board by steel bands. The board is then slid into place on long steel bolts A, afterwards secured by Clamp B.

A Sager spring fork is fitted to Model A at extra cost but is included as regular equipment on Models B and C.

The grips are made of fabric and rubber, and are 10 inches long, the ends extending beyond the handle bar ends. This arrangement gives a flexible hold similar to the effect of a spring handle bar.

The other improvements may be summarized as follows: Improvement of valve mechanism; 30 per cent. increase of crank pin bearing surface; 15 per cent. increase of wrist pin bearing surface; increased oil space in the base; better position of the motor, giving more exposed cooling surface, and independent adjustment of the power chain and pedalling chain.

Model A lists at $185; Model B at $225, and Model C price is not yet announced as deliveries will not commence till spring.

Putnam 1908 Cycle Motors

Putnam Motor Manufacturing Co., 57 Lebanon street, Springfield, Mass., is continuing for 1908 its 2¼ and 4½ H. P. single and double cylinder cycle motors, weighing 30 and 55 pounds respectively. No radical changes have been made in these motors for this season, but the cylinders are now finished by lapping, which process the company considers best, tho costing most. The list prices for 1908 are $50 for the 2¼ H. P. motor, and $85 for the 4½ H. P. model. In this motor the exhaust valves are operated by push rods and rocker arms, while the intakes are as usual suction operated. Three rings are fitted to the piston, and the wrist pins are positively held in place so that scoring of the cylinder is impossible from that source. The connecting rods are of bronze and have large bearings at both ends. The cranks are made from special crank shaft steel, heavy enough to carry a full load without springing.

The new motorcycle club organized in Washington, D. C., has adopted the title of Columbia Motorcycle Club.

The directory of automobile, motor boat, motorcycle, part and accessory manufacturers which constitutes the most important feature of the January Journal is the most accurate of its kind, and from no other source can you obtain one so complete. Subscribers to the Journal are sure to obtain a copy, as no extra charge is made for this important number. Non-subscribers should, however, remit at once if they desire to have their subscriptions commence with the January number. The yearly subscription rate is $2.00. Single copies of the January number can be had at 20 cents each, same as any other number.

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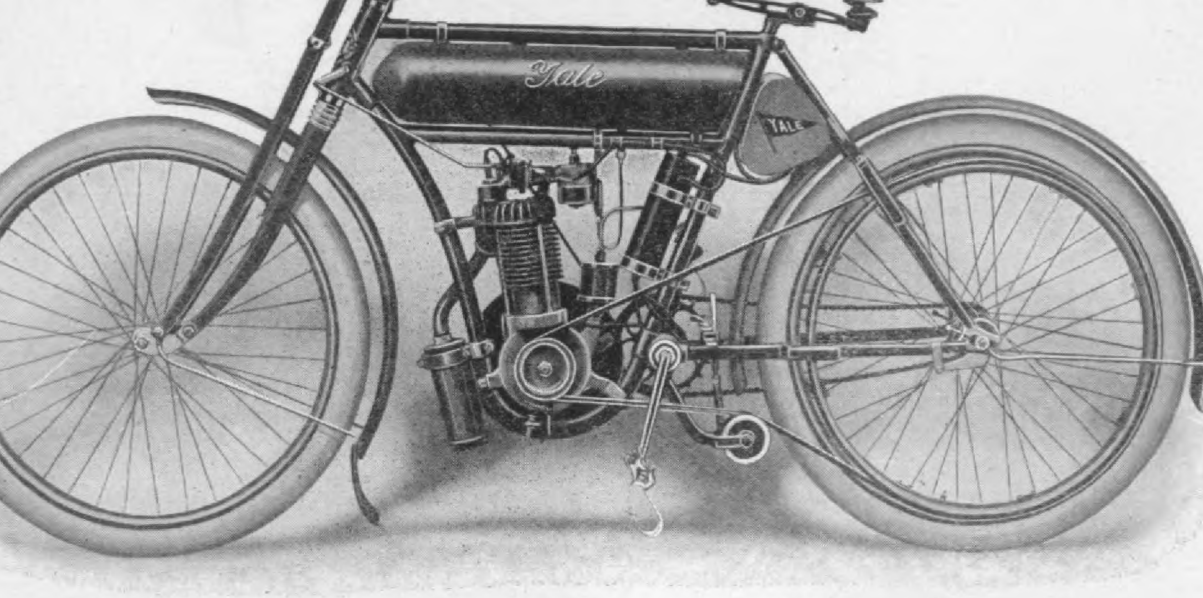
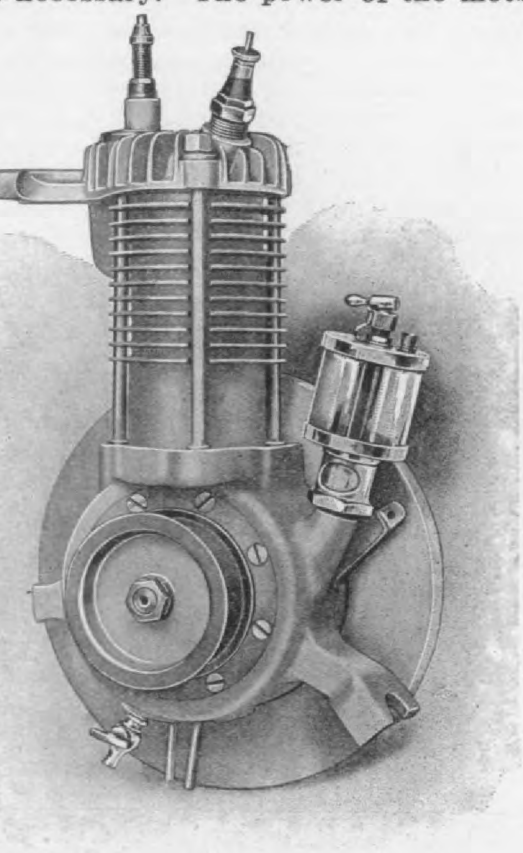


e 1908 Yale-California Motorcycle; driven by a 2¾x3¼ inch, 2¼ H. P. motor. Price $200; weight bs.

The 1908 Yale-California

s popular and efficient motorcycle, by Consolidated Manufacturing Co., o, Ohio, shows no radical changes 908, as only detail refinements were necessary. The power of the motor



used on the 1908 Yale-California Motorcycle

been increased from 2 to 2¼ horse

facturing Company, and is the Sager type. It is fitting to remark here that every part of this machine is made in the Consolidated Company's factory, no parts being purchased outside. The 1908 fork is made of ⅞-inch, 10 gage tubing, with forged tips, and the bolts and bushings are all hardened.

The battery box has been transferred from under the saddle to the lower side of the rear fork between it and the seat mast, while the coil case is now placed in front of the seat mast instead of back of it. The battery box was moved to allow the use of a large coil spring saddle, which the former arrangement did not permit.

A peculiar feature of the Yale-California drive is the lagging of the engine pulley with hard cord to prevent belt slipping. The belt is made of two plies of specially tanned, water-proof leather.

In the advertisement of The Consolidated Manufacturing Co., Toledo, O., on page 293, November Journal, the 1908 model of the Yale-California motorcycle was mentioned, while the cut price and text referred to the 1907 model.

The weight of the 1908 machine has been slightly increased, being now 120 pounds, and the price is advanced from $185 to $200.

An adjourned meeting of the Cycle Manufacturers' Association will be held at Chicago, Wednesday, December 4, the meeting of November 7 not having a quorum present.

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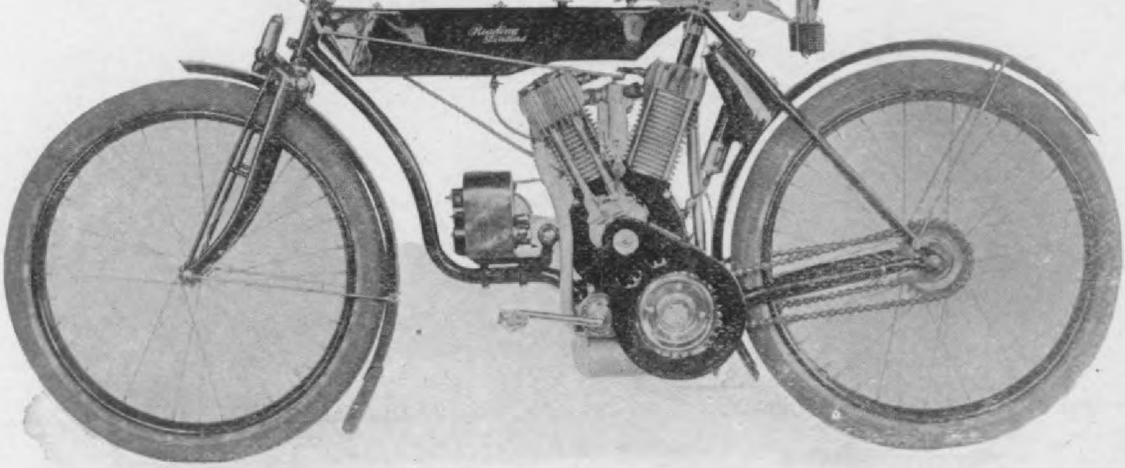


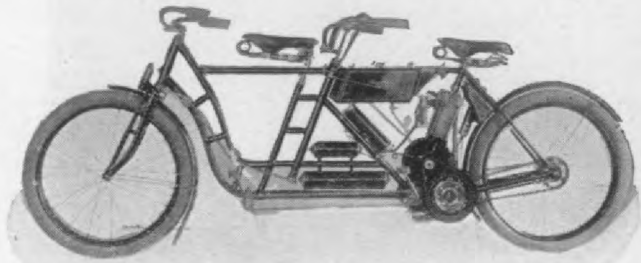
The R-S Twin Cylinder, 6 H. P. Motor Cycle with magneto drive. Price $275.

1908 R-S Motorcycles

The Reading Standard Co., Reading, Pa., offer a great variety of models for 1908, having added to the Models A, 3 H. P., at $200, and B, 2¼ H. P., at $175, previously described in these columns; a

R-S Quick Delivery Motor Tricycle. Price $300. Made by the Reading Standard Co., Reading, Pa.

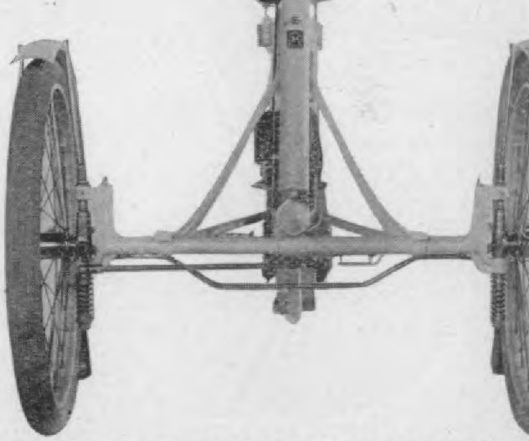
3 H. P., new gear driven model, at $225; a new 6 H. P., two-cylinder model, at $315; a 3 H. P., convertible tandem, at $275; a 3½ H. P., convertible tricycle, at $290, and a 3 H. P. motor van, at $300.



The R-S Motor Tandem, front top bar of which is removable, price $275.

All of the R-S machines are equipt with R-S motors, with the exception of the 2¼

ciated by riders, as it saves batteries
coasting. In the R-S twin cylinder
valves are reversed on the two cylin
that is, the valves on the front cyli
are on the left side, and those on the
cylinder are on the right side, the o
being to increase the cooling effect
assure the valves on the rear cylind
good draft of cold air. Were they p
on the same side the valves on the
cylinder would receive the hot air
the front ones. This placing of the v
necessitates two separate exhaust p



The R-S 3-wheel Motor Cycle, front view
ing the front spring suspension.

which enter opposite ends of the m
The R-S motor tandem, which lis
$275, is a special tandem constru
having a removable front top bar, g
a drop frame for ladies in front. T
H. P. tricycle, which is the first Ame
production of this kind, also has
movable top bar, and guards are p

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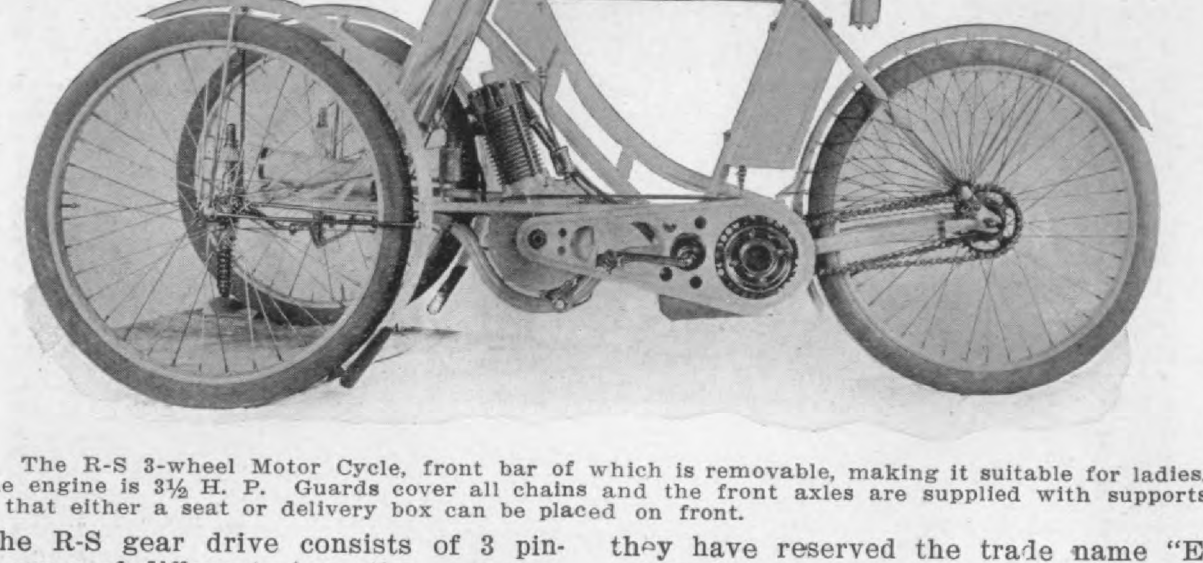


The R-S 3-wheel Motor Cycle, front bar of which is removable, making it suitable for ladies. e engine is 3½ H. P. Guards cover all chains and the front axles are supplied with supports that either a seat or delivery box can be placed on front.

he R-S gear drive consists of 3 pin- gears of different sizes. the gear case ıg an internal part of the motor base, motor in this model is vertical, and a compensating sprocket is used. More plete details and illustrations of these cial points on R-S machines will be n later.

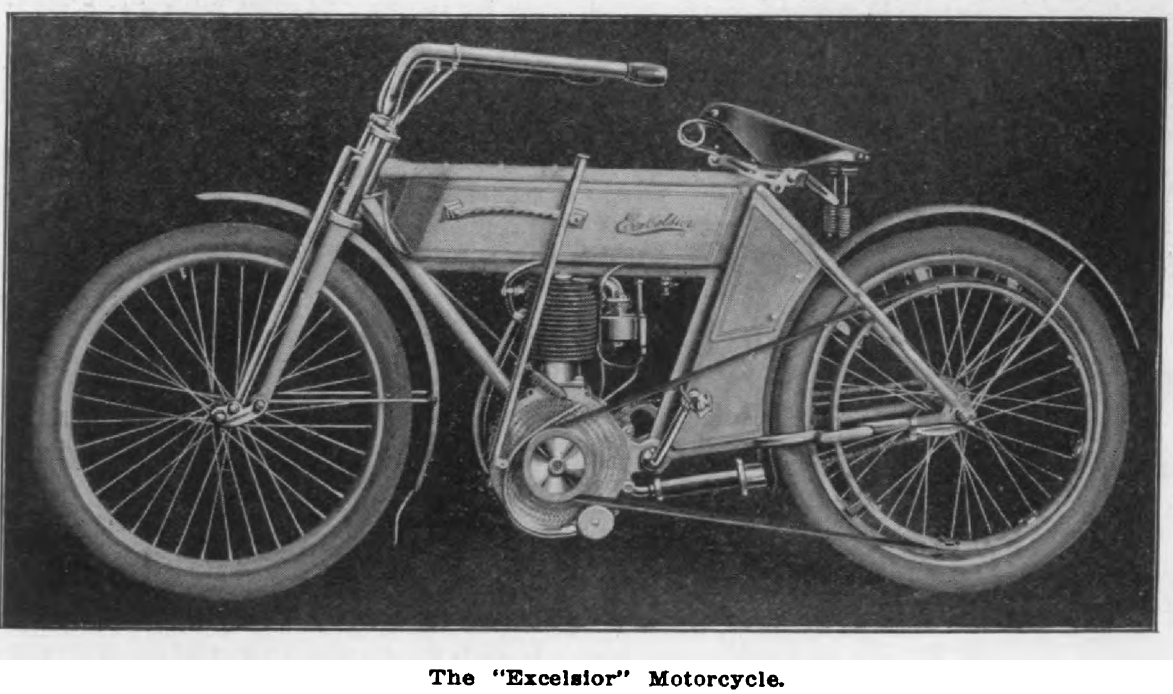
agneto ignition is an option on all machines, and special provision is e for the magneto on several models.

they have reserved the trade name "E celsior."

ENGINE.

The engine, designed and manufacture by the Excelsior Motor & Manufacturin Co., especially for this machine, has cylinder 3⅛x3½ inches, and develops 3 H. P. at the rear wheel when running a speed of 2000. It will drive the m chine under favorable road conditions a speed of from 45 to 50 miles per hour.

The engine has been designed especia



The "Excelsior" Motorcycle.

The "Excelsior" Motorcycle

xcelsior Motor & Manufacturing Co., 37 Randolph street, Chicago, very re- ly entered the motorcycle industry as ufacturers of motorcycles, their first

ly for flexibility and grade climbing powe and it is said that it can be run slowl enough to travel with perfect ease i traffic-crowded streets. The gears ar hardened steel, and the exhaust valve an cam are made integral. The valves ar

QUALITY

THE LIGHT

MOTOCYCLES

We use THOR Motors in all our Models

2½ H. P. Chain Transmission $185.00
3 H. P. Gear Transmission $225.00

Great value for little money. Up to date in every feature, Simplicity, Power, Speed. Not the "just as good" kind, but the **BEST** money and brains can produce. Prompt deliveries. Catalogue on request.

THE LIGHT MFG. & FOUNDRY CO.

Hanover and 4th Sts., Motor Cycle Dept. Pottstown, Pa.

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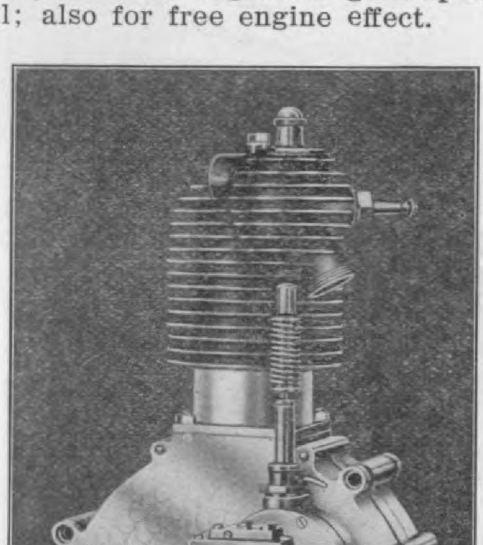
nd on three sides.

TRANSMISSION.

ie transmission is by means of 1½-
double specially prepared endless
rproof belt, which needs no dressing.
as an entirely new system of tension
iation which operates from the seat,
by which the belt is given proper
ion without exerting pressure on the
ings, or even making it necessary to
ner-face the front pulley.
a result of the special belt treat-
t and tension regulator, the belt can
lipped in traffic for very slow speed,
to allow the engine to gain speed on
l; also for free engine effect.



Motor of the "Excelsior" Motorcycle.

e belts are stretched thoroly before
are fitted, and after treatment they
ch so little that splicing is said to be
necessary for thousands of miles.
e rear frame slots are extra long, al-
g three extra links to be put in the
ng chain, thus taking up the belt
. The design of the frame gives a
long belt, which adds greatly to its
nd service.

FRAME AND FORK.

e frame head is specially designed
ace the bearings far apart, relieving
train, and is drilled out of a solid

various methods of construction, and
made to take care of the small inequal
ties of the road as well as the most sever
shock, by a carefully worked out metho
of springing. The joints have bearin
surface enough to stand the constant wea
of fork action. This fork has proven suc
a decided advantage that it is included a
a part of the regular equipment.

The case containing the dry cells an
spark coil is so located as to bring thei
weight very low. This case also has
compartment for tools and extra parts
which is supplied with a special tool ro
containing large wrench and adjustabl
spanner, small wrench, combination plier
and wire cutter, screw driver, oil can, tir
repair kit pulley remover, pump, extr
spark plug, extra chain links, wire an
sand paper. On the inside of the doo
are full directions for care and use of th
machine.

THE TANKS.

The gasoline and oil tanks are of heav
copper. The filler holes are large enoug
to take the usual large garage funnel, an
provided with removable strainers. Th
oil regulation and gasoline valves are di
rectly in front of the rider on top of th
tank, within easy reach. A special gaso
line filter is fitted to eliminate carbureto
trouble. This filter is cleaned by simpl
opening a stop cock.

The capacity for gasoline is two gallons
The oil supply is sufficient for five or si
hundred miles.

The position of the rider both for com
fort and balance, as well as effective roa
riding, has been carefully studied. Th
saddle is very low, placing the rider with
in easy reach of the ground, and yet th
pedals are located far enough forward an
low enough to give the feet and legs a
comfortable position. The cranks are
short and pedal gear very low to obviate
the spreadout foot position which long
cranks give, but not affecting easy start-
ing.

LUBRICATION.

The oiling system is a radical departure
from the usual custom, being by sight
(drop) feed to the main bearings from
which the oil enters the case to be
splashed into the cylinder.

The fly-wheels are made to act as a
centrifugal pump which regulates the flow
of oil on all average speeds. By giving
the main bearings clean oil, their life is
greatly lengthened. All engine oiling is
taken care of from one sight-feed glass.

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The Indian to the Front as Usual

At the Chicago Show Nov. 30 to Dec. 7 will be found on Exhibition 1908 INDIANS consisting of

2¾ H. P., Single Cylinder - Price $200.00
3½ H. P., Single Cylinder - Price $225.00
5 H. P., Twin Cylinder - Price $250.00

All Equipped with Mechanically Operated Inlet Valves

New Features

Mechanically operated inlet valves
Increased horse power
Improved G & J Tires
Standard No. 3 Motorcycle Pedals
More spring to Cushion Fork
Gasoline shut-off, operating with needle valve

Options

Gear or Chain Drive
Battery Case to take Standard Dry Cells
Magneto Ignition, $40 extra
Brooks B-100, B-104, B-90-4 Saddles
Blue, black or Indian red

The 5 H. P. Twin Indian is the masterpiece of Oscar Hedstrom, two powerful cylinders, exerting constant tension on the driving mechanism, using only minimum power for regular road work, and reserving tremendous power for bursts of speed and triumphant hill climbing.

Advance circulars giving full description and illustrations of 1908 INDIANS mailed on request

Made by

Hendee Manufacturing Company

Springfield, Mass.

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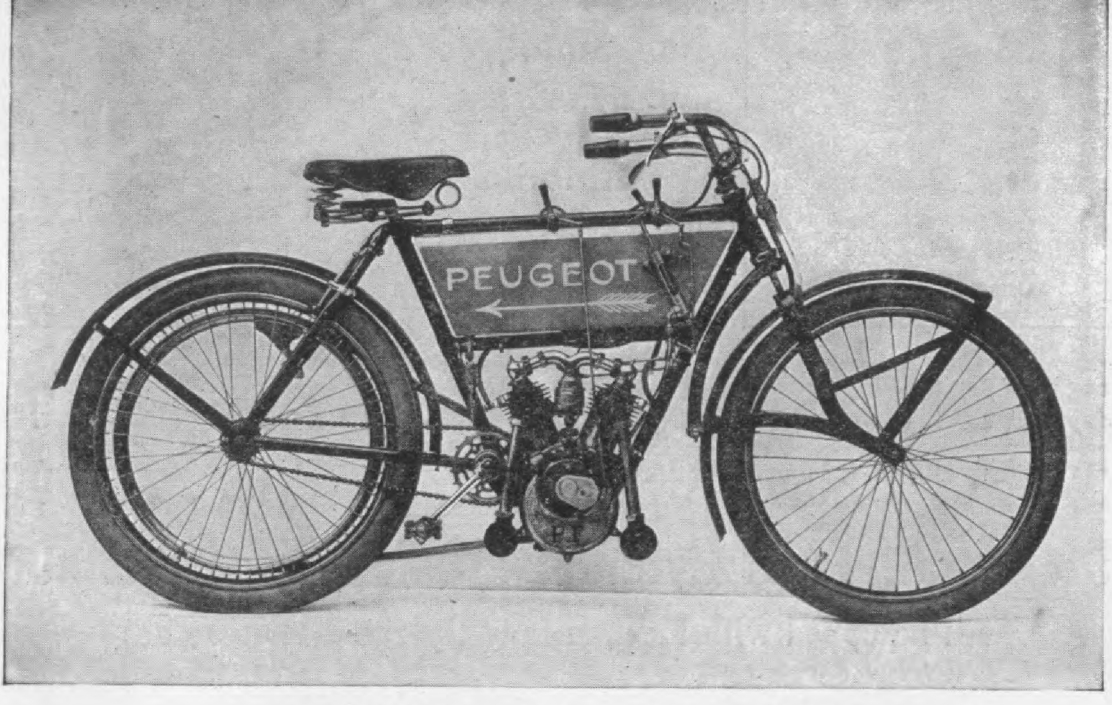
United States representative for the geot Motorcycles, which are foreign e. The latest 2-cylinder model is here trated, one of the features of which is ery efficient form of spring fork in ch is incorporated a shock absorber. main forks are bent backward just w the crown, to conform to the con- of the mud guard extending in the n of an arc about 1-6 of the wheel cir- ference, at which point they are joined horizontal swinging links carrying the

being furnished to each cylinder th branches of the intake pipe of equa length. Magneto ignition may be fu nished with this machine, and when fu nished the magneto is placed in the fron of the crank case below the front cylin der on a bracket bolted to the base of th engine. In all of the Peugeot machines trap is provided in the gasoline line to ri the fuel of impurities before it reache the carburetor.



The 1908 Peugeot 2-cylinder Motor Cycle.

and to a pair of longer arms which curved backwards slightly, and joined he lower ends of a pair of dummy s. The head of these dummy forks s in the steering head of the machine, is controlled by a concealed spring. re is a small cylinder mounted parallel the head on a single bracket fixt to crown, this cylinder carrying a tele- ing sleeve, which is linked to the my forks by means of short arms. the rebounding action of the main g is checked by the resistance of- l to the motion of the telescoping cyl- r over its plunger.

very substantial braking equipment ted to this machine, including two in- ndent brakes, of the single shoe type, g upon the inside of the rear belt y, one on the top and one on the . Both these brakes are operated by

Miami Company Now Making the Musselman Coaster Brake

The Musselman Coaster Brake, whic was described in our May, 1907, issue page 316, is now made by the Miami Cycl & Manufacturing Co., of Middletown, O the well known makers of racycles. Thi brake is a departure from the usua coaster brake constructions, and is ver compact, resembling in appearance ver closely the old style rear barrel hub. I performs its operations without the us of springs, levers, braces, or side arms and is said to be very sensitive in action not only giving a secure braking effect, bu instantly providing a free coaster effect It is the intention of the Miami Compan to market the brake thru jobbers. N

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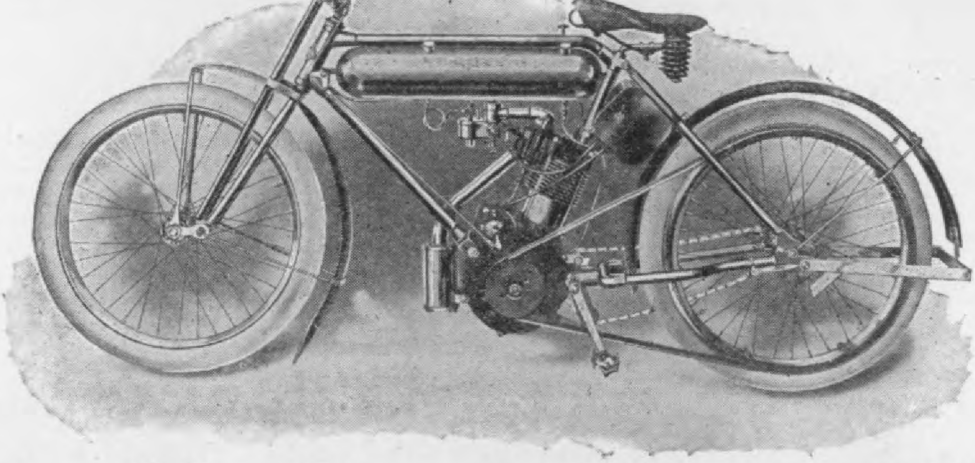

M. M. Special for 1908

THE REAL M. M. FOR 1908

is truly the greatest Motor Cycle value in the World. Think of a 140 lb. 3½ H. P. Motor Cycle, equipped with 26″ wheels, nickeled rims fitted with 2¼″ G & J double tires, newly designed cylinder and cylinder head doing away with any chance of engine over heating or causing ring trouble; special frame dropped 2″ at seat post joint, thus bringing the top of saddle in a direct line with top of frame; slightly more rakish at front or head, thus bringing handle bar back a little nearer the seat, at the same time giving machine a longer wheel base, which is a decided advantage in Motor Cycle construction.

ALSO EQUIPPED WITH THE PATENT M. M. TRIPLE PLATE SPRING FORKS, a very old idea in springs worked out to the highest point of efficiency with brand new ideas in the application to Motor Cycle building, used exclusively and only on the M. M. for 1908.

A new chain idler device, which together with the long rear adjusting jaws admit of a longer wheel adjustment, thereby taking up any and all slack that might appear in belt, doing away with belt idler and adding efficiency to the belt transmission; the belt detachable through rear stay by simply removing one bolt.

Attached to rear frame is a patent Motor Stand, ready to hold your machine at a moment's notice. On tank will be found priming device in direct contact with cupped pet cock on cylinder head, allowing of the priming of cylinder when machine is hard to start, by simply pressing a button.

Don't you think such a machine would sell in your section?

AGENTS, WRITE FOR VERY INTERESTING PROPOSITION FOR 1908

American Motor Company

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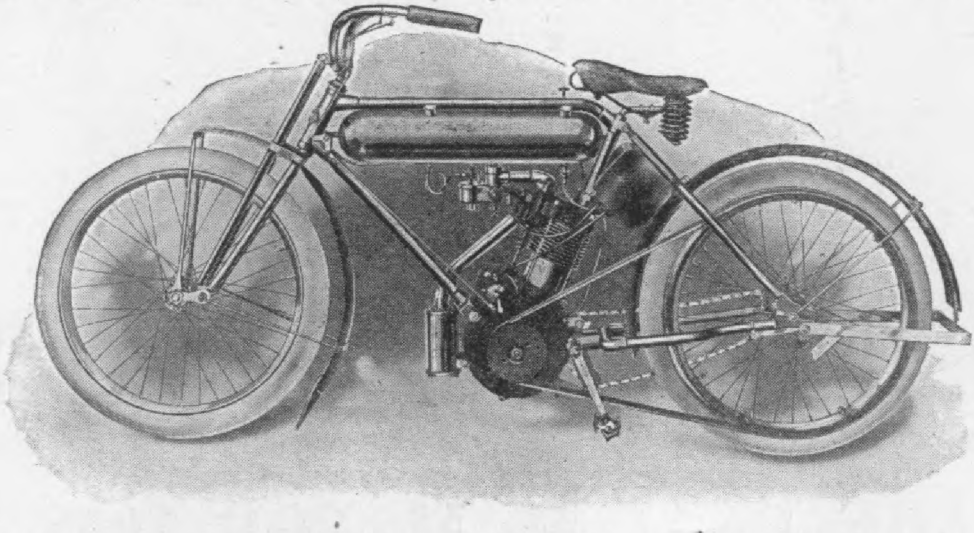
le cylinder, 2¼ H. P., model, listing at 5; a special 2¼ H. P., light weight del, listing at $200; a double cylinder, 6 P. model, listing at $250, and a 2¼ H. 100 pound model, listing at $140.

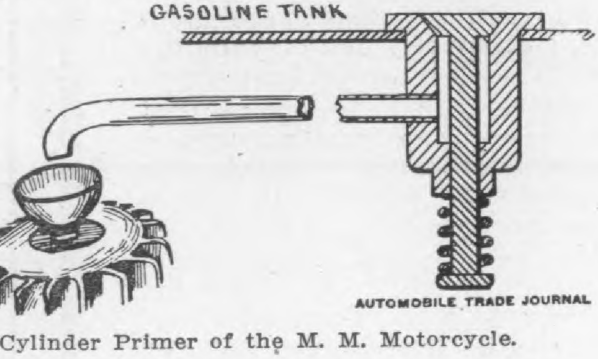
the pipe to the pet cock. A spring retur the valve to its seat as soon as pressu is removed from the button.

The new battery box is another clev feature. The box is swung between t



he 1908 M. M. Motorcycle, Roadster Type; eels, steel rims; 2¼-inch Goodrich tires, or to 50 miles per hour; wheel base 51 in.; furnished with tandem attachment at $20 cial lists at $200. It has 26-inch wheels and truss fork, triple spring suspension; 28-inch G & J 2½-inch tires; double grip control; speed weight, ready for the road, 150 lbs.; price $175; extra. A similar, lighter, model called the M. M. weighs 135 lbs.

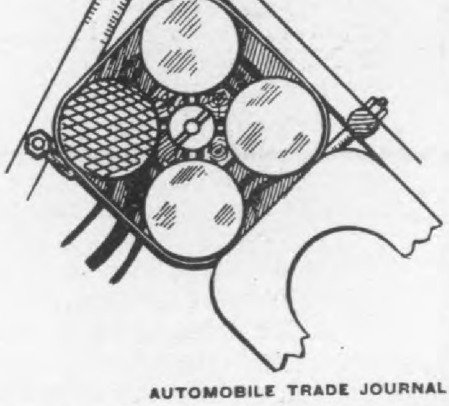
he $175 machine is a roadster of the e general lines as the 1907 machine. "M. M. Special," 2¼ H. P. model, has ery low saddle position, and 26-inch eels with nickel plated rims. It weighs 135 pounds. It is equipt with an "au- atic" repair stand, tool box, spring dle bar, detachable rear guard and im- ved battery box fastening.



Cylinder Primer of the M. M. Motorcycle.

he most important improvement on the "M. M." is the new spring fork. A 3-leaf spring replaces the extension he front mud guard. One end of this spring is held by three bolts under fork crown, and it is therefore free to in either direction so that no recoil ngement is needed. The forward end he leaf spring is hinged to a staple ped standard which straddles the front el, and has its two lower ends at-

rear fork and the seat mast, and the cel are placed transversely, regulation No. dry cells being used. Wooden triangul strips, each with one apex between tw cells, are placed in the middle of the grou of cells and coil, and an expander is pr



Battery box and batteries used on the M. Motorcycle.

vided which tightens up these wood strip thus locking the cells in place and hol ing them firmly.

One of the small things that adds muc to the satisfaction of the user is a fasten for the gasoline tank cap. This consis of a chain fastened to the cap at one en

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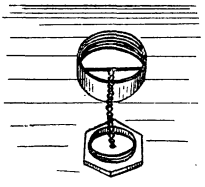
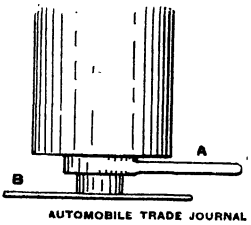
nated by making provision for adjusting the tension of the belt at the rear end of the rear fork, same as in pedal cycle chain adjustment. The slot in the end of the fork in which the rear wheel axle is held, is extra long and allows for plenty of rear wheel adjustment to take up the slack in the belt. In connection with this scheme a chain idler is used to take up chain slack. A new, light, compact stand is a

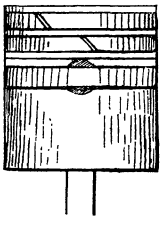


M. M. tank cap fastening.

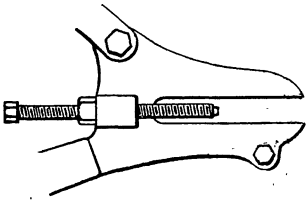


End of Muffler of the M. M. Motorcycle showing cut-out lever (A) and deflector plate (B).

part of this model. It is hinged to the rear wheel axle ends, and when not in use is securely held at its rear end to the mud guard. It can be brought into use in a few seconds. The rear frame construction is such that the endless belt can be removed by simply taking out one bolt. The rear mud guard is detachable at the



Piston of the M. M. Cycle Motor showing ring over the wrist pin.



M. M. Rear Fork end showing method of adjusting the chain and belt tension.

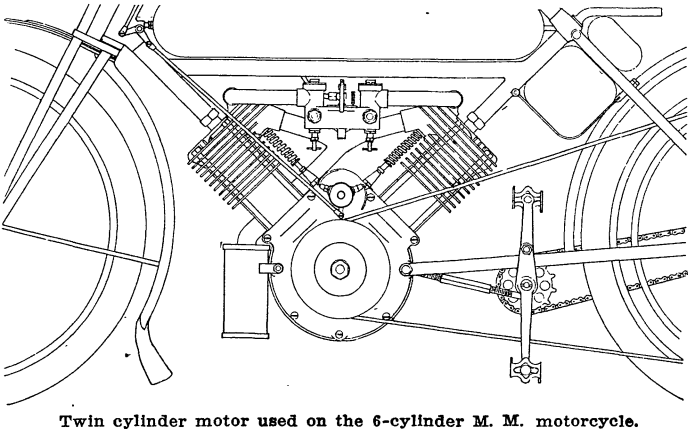
frame to allow quick access to the tire for repairing or quick removal of the rear wheel. The frame is dropt two inches at the seat cluster to give a low saddle position.

The new cylinder is turned from solid stock with deep flanges, which pass entirely around the cylinder head bolts. The new head is constructed to cause the exhaust gases to pass up and out with an effect similar to that obtained by having the valves in the head. The areas of the valve ports have been increased. The piston is fitted with an extra ring passing over the wrist pin to prevent its working out and damaging the walls of the cylinder, and eliminate the necessity for set screws or similar holding devices for the pin.

The muffler is provided with a cut-out operated by a lever, which is actuated by the rider's foot. This lever is marked A in the accompanying illustration. As the exhaust leaves the muffler it strikes a deflection plate (B), and is thus deflected at right angles instead of going straight down and stirring up the dust in the road.

The 100 pound model, listing at $140, is catalogued as Model G, and is fitted with a 2¼ H. P. motor, vertically placed in the frame. Its wheel base is 53 inches, and its 26-inch wheels are fitted with Palmer tires.

The 2-cylinder model has a 6 H. P. motor with the cylinders set at an angle of 90 degrees. The cylinder bore is 3¼ inches and the stroke 3¾ inches. Twenty-six inch wheels are used on this model, and 2¼ G & J or Goodrich tires. The wheel base is 56 inches and the frame is 20 inches high. As will be seen by reference to the line drawing herewith the crank hanger can be set at different positions by means of a turn buckle to allow for adjusting the chain tension. An M M double jet carburetor is used, and has separate adjustment for each cylinder. The gear ratio on this model is 3 to 1, and speeds up to 65 miles per hour are said to be attainable. A double priming device is fitted to this model. Price is $250. Drive on all these machines is by 1¾-inch flat, mineral tanned belts.



Twin cylinder motor used on the 6-cylinder M. M. motorcycle.

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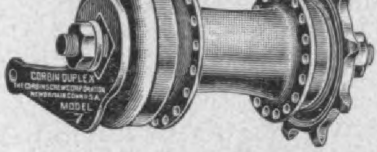
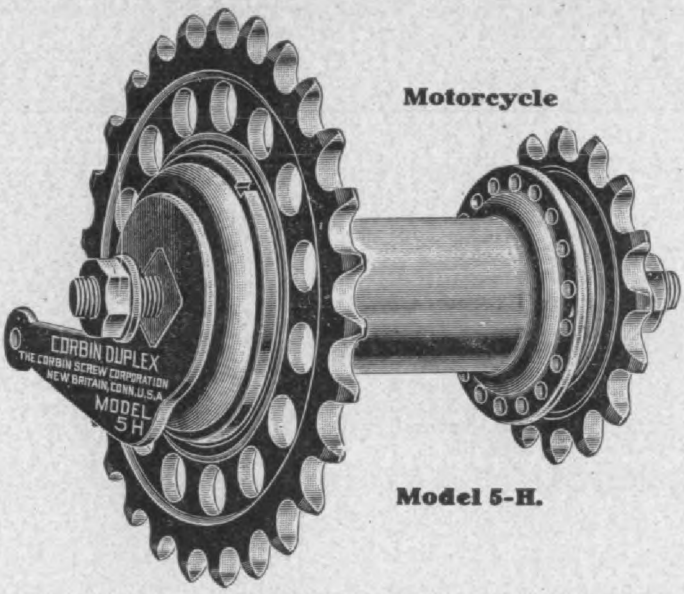


1908

Corbin's Duplex Brake.

Corbin's Two-Speed Brak

CORBIN HUBS



Motorcycle

Model 5-H.

Any size Driving Sprocket ⅝ or 1 inch pitch Spoke Holes, button-holed on dr side allowing the replacement of spokes without taking wheel from frame removing driving sprocket.

Driving Sprocket is fastened by six lugs that fit corresponding slots in hub sh

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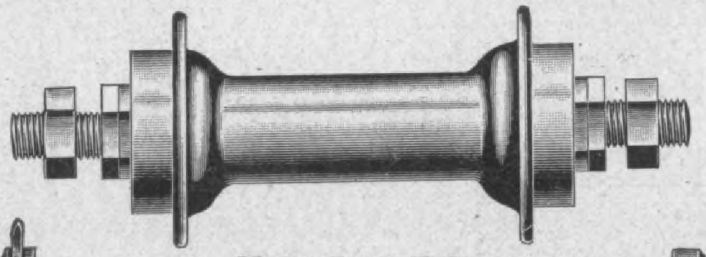
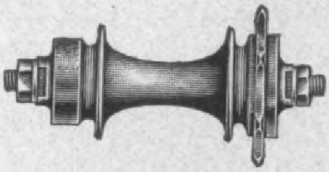
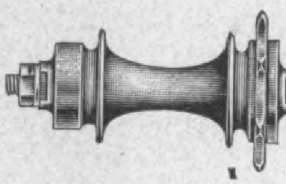
Heavy Front Hubs to match.



Motor Front Hub.



Front Hub.



Plain Rear Hub.

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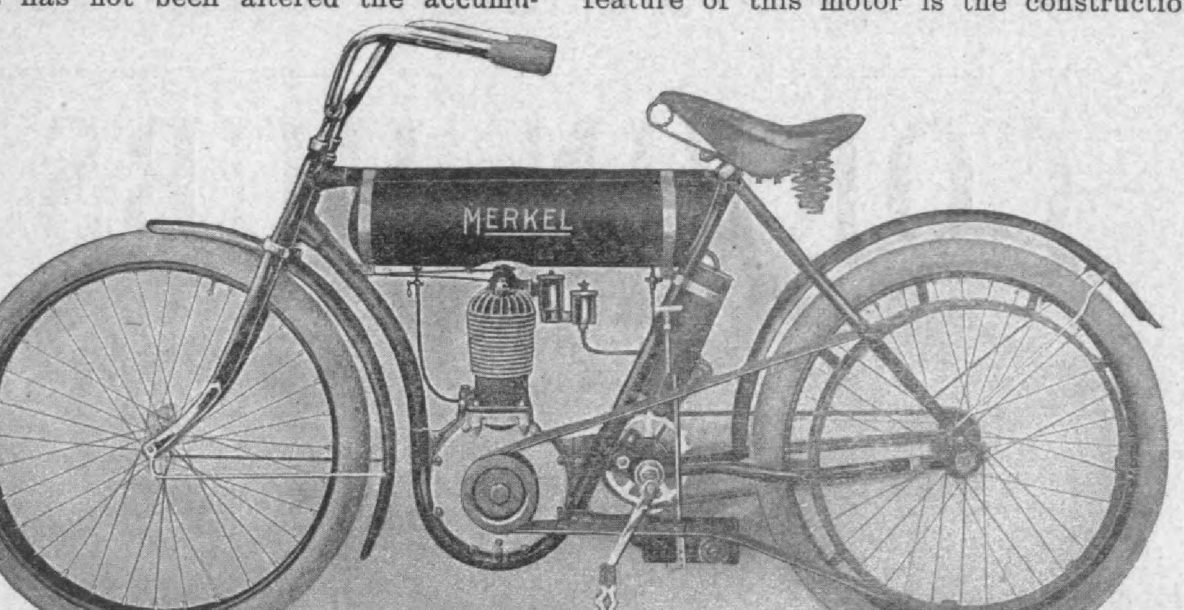
g frame feature that has brought it such prominence in the past, and the general design of this spring has not been altered the accumu-

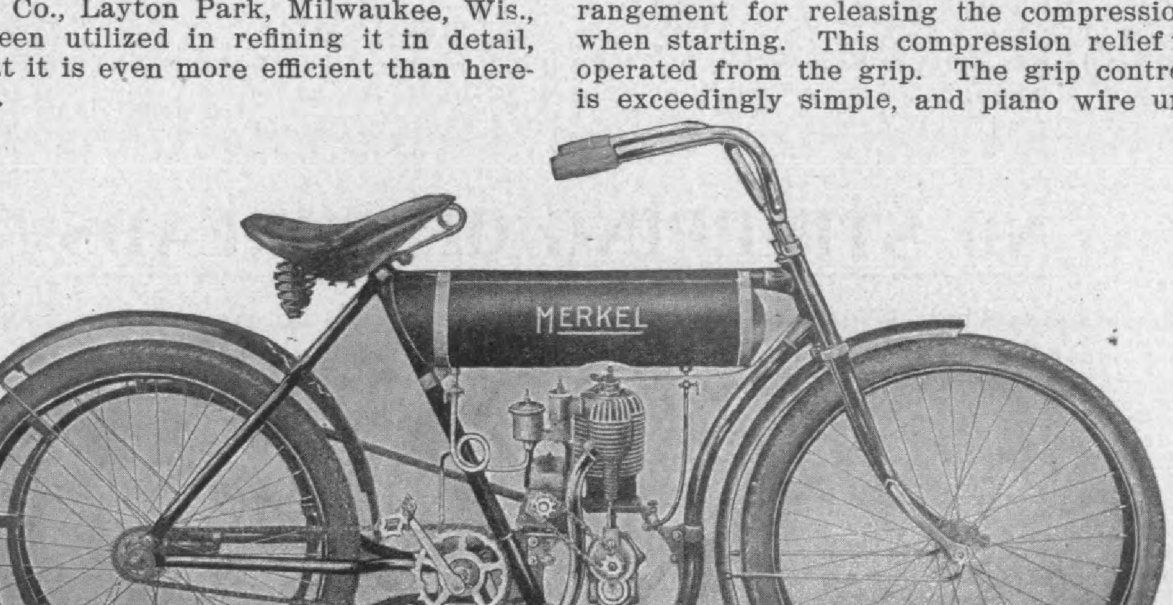
The 1908 Merkel motor is ball bearing. The bore and stroke are each 3¼ inches, and the motor develops 3 H. P. A novel feature of this motor is the construction



The 1908 "Merkel" spring frame motorcycle; 3 H. P., 3¼x3¼, ball bearing motor; double control; 28-inch wheels; 2¼-inch G & J tires; wheel base, 55 inches; gasoline tank capacity, allons; oil, 3 pints, enough for 200 miles running; speed up to 50 miles; price, $200, with g frame; $215 with spring fork; guaranteed for six months.

experience of the maker, Merkel Co., Layton Park, Milwaukee, Wis., een utilized in refining it in detail, t it is even more efficient than here-

of the inlet valve, which comprises an arrangement for releasing the compression when starting. This compression relief is operated from the grip. The grip control is exceedingly simple, and piano wire un-



The "Merkel" 1908 Motorcycle, with magnet o fitted.

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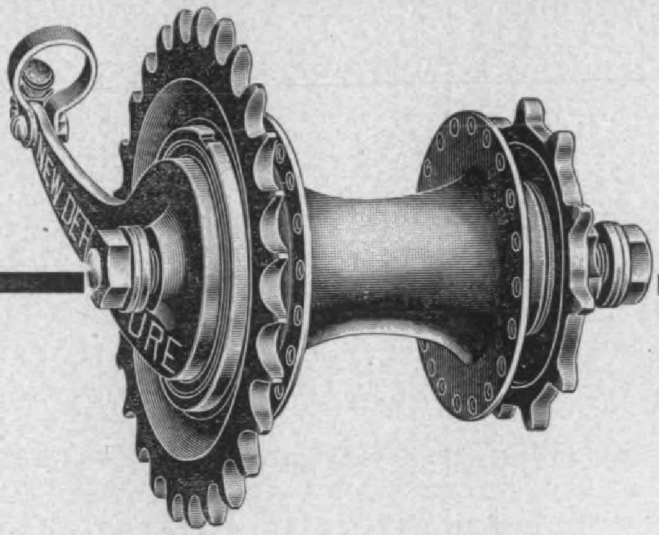
appearance of the machine does not

der tension, and not twisted is used in

New Departure Coaster Brakes for Motorcycles



1908 *Model*

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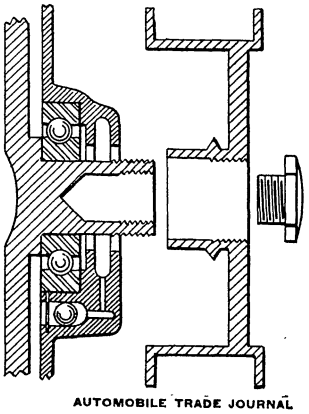
openings in the intake valve, which are uncovered by turning the right grip. The detail drawing herewith plainly illustrates this feature. The left grip controls the spark.

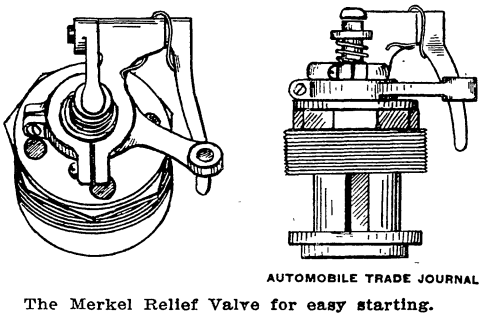
Another clever feature of the 1908 Merkel is the commutator, details of which are here illustrated. This commutator is so arranged that it can be quickly removed by simply turning to one side a



1908 Merkel Oil Reservoir in the crank case, surrounding the bearings.

blade spring as seen in the accompanying illustration.

Provision is made on the new model for the fitting of a magneto if this is preferred to battery and coil. If magneto ignition is desired, a Simms-Bosch magneto is fitted at an extra cost of $40. In such case the commutator is removed and a sprocket placed on the commutator shaft from which motion is transmitted to the sprocket on the magneto shaft by a chain. This change can be made on any Merkel motorcycle in a half hour. A small sup-

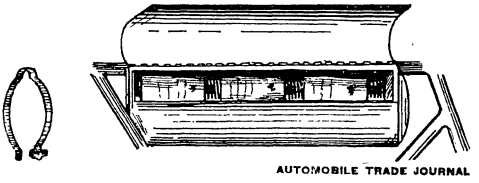


The Merkel Relief Valve for easy starting.

port is attached to the crank case to hold the magneto, and only 18 inches of roller chain is required to connect the sprockets for driving the magneto.

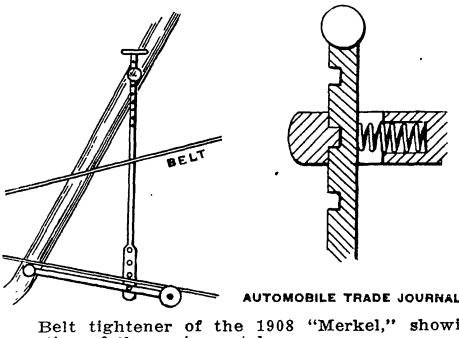
A combination tank is used, in which gasoline, oil and battery are all carried. The battery compartment is of tubular form, about equal in circumference to that of the average dry cell. The cells are placed end to end with coil springs between them and a rubber buffer at the end to prevent their being knocked about in the compartment.

Power is transmitted by means of a 1½-inch, 2-ply flat belt made of special chrome tan leather, same as has been used with satisfaction the past two seasons, but a



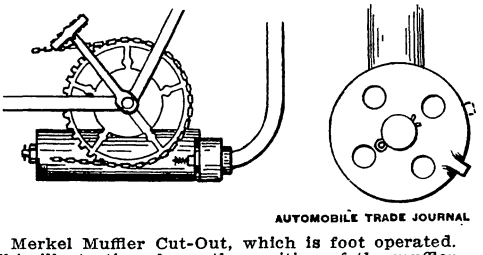
Merkel Gasoline Tank and Battery Compartment.

new idler is a feature of this model. This idler is adjustable, so that the tension of the belt can be regulated by the rider while the machine is in motion. The idler can be raised or lowered by means of a vertical rod, the handle on top of which is within easy reach of the rider. This rod is notched at intervals, as shown in the sectional view, to admit a correspond-



Belt tightener of the 1908 "Merkel," showing section of the spring catch.

ing projection in a bracket thru which the rod passes, a spring normally keeping the rod prest against the projection so that a notch on the rod engages the projection in the slotted bracket. To change the tension of the belt the rod is forced to one side against the spring (thus pulling the



Merkel Muffler Cut-Out, which is foot operated. This illustration shows the position of the muffler on the machine.

notch out of engagement with the projection), and can then be raised or lowered as desired. When again released the rod will be forced over and a notch brought into engagement with the projection. On the rear wheel a crown face wood pulley, without side flanges, is used.

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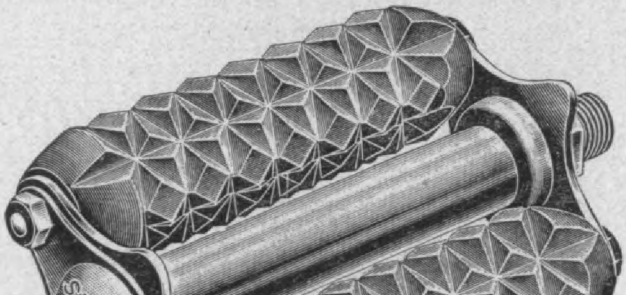
—OF—

The No. 3 Standard Motorcycle Ped



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Emblem Mfg. Co., Angola, N. Y.
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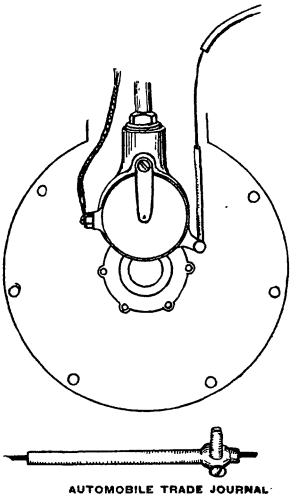
The main bearings of the motor are illustrated from oil reservoirs in the crank case, the reservoirs surrounding the bearings. The continuous oiling system is also retained. Hess-Bright and F. S. ball bearings are now used in place of the plain bushings heretofore used.



Commutator details of the 1908 "Merkel," showing the cover and its clamp; also the arm by which the commutator position is changed thru the medium of a wire actuated from the handle bar grip.

The muffler is fitted with a cut-out, which is operated by the foot of the rider, and the muffler is now placed up close against the crank bracket.

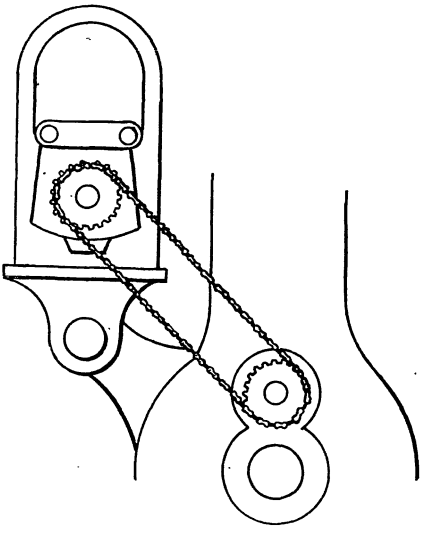
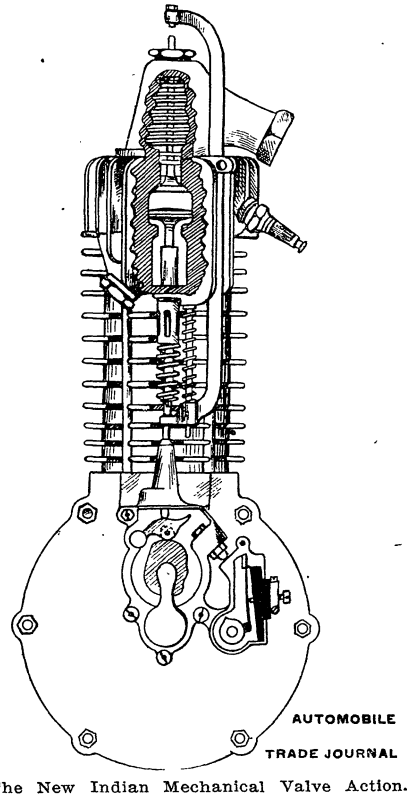


Illustration of the magneto drive from the commutator shaft on the 1908 Merkel motorcycle.

The price of the 1908 Merkel, including spring frame, but not spring fork, is $200; $15 extra is charged for fitting a spring fork.

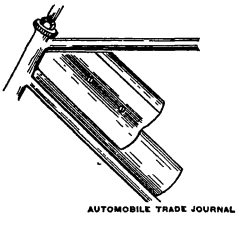
1908 Indians

The Hendee Manufacturing Co., Springfield, Mass., announces the following line of 1908 Indian motorcycles, single cylinder. 2¾ H. P., $200; single cylinder, 3½ H. P., $225; twin cylinder, 5 H. P., $250; tricar or delivery van on single cylinder, $325; on two cylinder, $375.

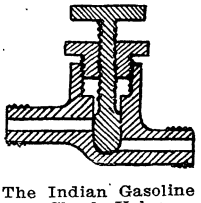


The New Indian Mechanical Valve Action.

The smaller Indian engine has been increased from 2¼ to 2¾ H. P., and the two-cylinder from 4 to 5 H. P., and the 3½ H. P. is entirely new. All Indians are equipt with either mechanical or automatic valves, gear or chain drive, or battery or magneto ignition at the purchaser's option. The mechanical valve action



The New Indian Battery Case for three size 6 cells.



The Indian Gasoline Check Valve.

is fully shown in our illustration, by means of a bar which connects with both valve

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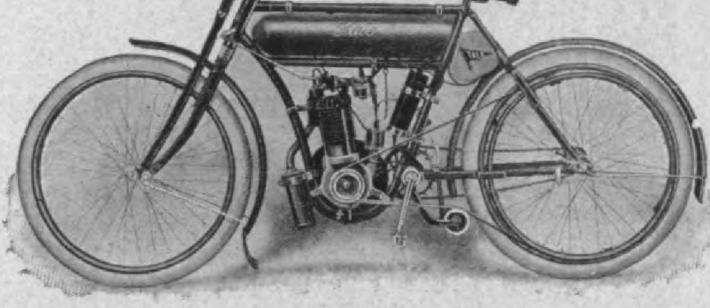
Yale-California
MOTOR CYCLE



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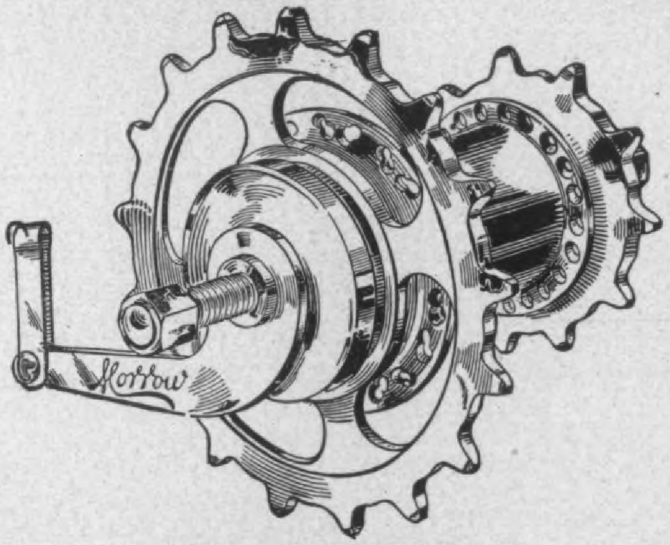
That's one reason why the

Morrow Coaster Brake



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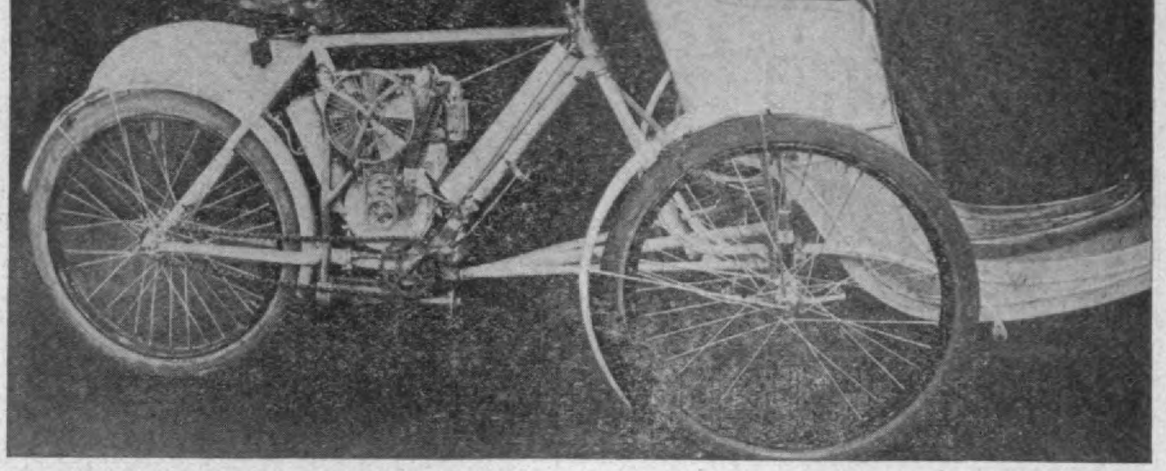
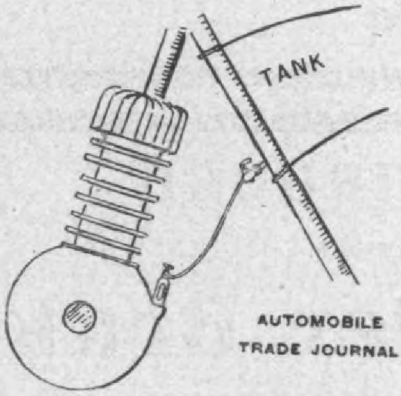


The Indian 5 H. P. twin cylinder tri-car, with passenger seat in the front, made by He ee Mfg. Co., Springfield, Mass.

ems, one cam and push rod operate both lves. In the gear drive the gears are ly enclosed in a case.

Magneto ignition is supplied at an ad- ional charge of $40, but an option of her No. 3 or No. 6 batteries is given thout extra charge, a new type of bat- y case being furnished which will hold . 3 and No. 6 cells. Another new feat-



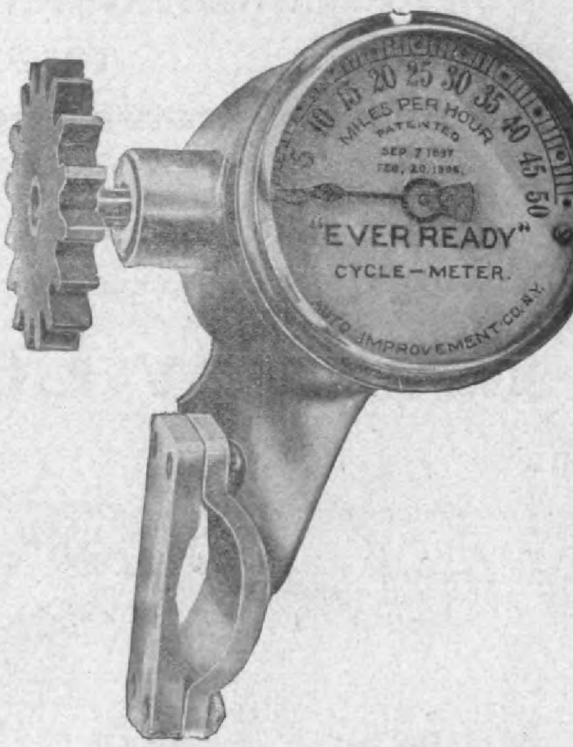
The New Indian Sight Feed Oiler.

e of the Indian is the gasoline shut-off lve, constructed on the needle valve nciple, it is located on the supply pipe ht at the gasoline tank, giving a posi- e shut-off without a leak. 1908 In-

The New Indian Muffler cut-out, operated by t.

The "Ever-Ready" Cycle Meter

The Auto Improvement Company, Hudson street, New York City, has cently placed on the market a speed dicator gotten out particularly for motor cycle and bicycle, and called "Cycle-Meter."



The "Ever-Ready" Cycle Meter.

A driving gear is fitted on the spok of the front wheel, and operates in co junction with a sprocket on the Cycle-M ter. The Cycle-Meter is attached to t fork and adjusted to a position which w enable the rider to see the dial at times. The dial is two inches in diam

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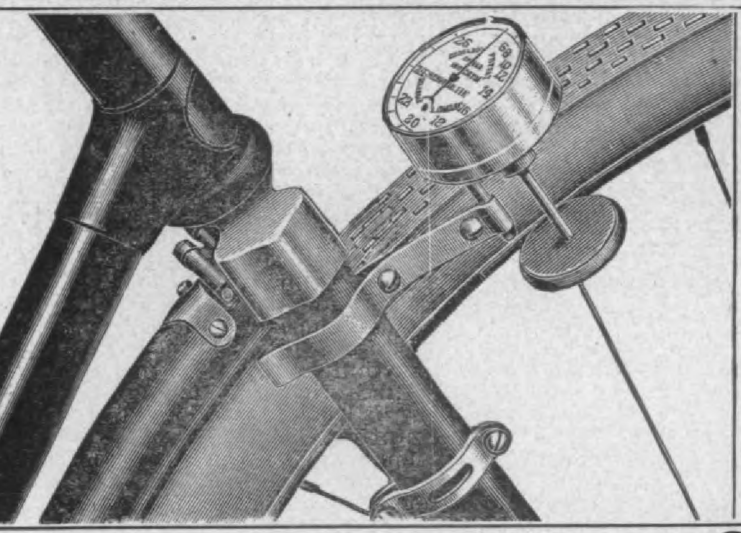

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Answers to Motor Cycle Queries

BY CHAS. H. METZ.

SALESMAN CONTEMPLATES USING MOTORCYCLE

Worcester, Mass., Oct. 13, 1907.

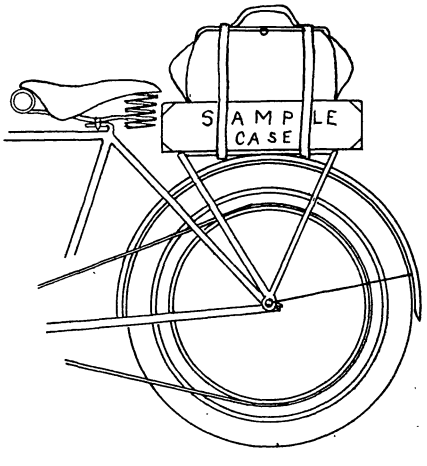
I am considering the advisability of using a motorcycle to travel over a certain territory showing up a cement machine of which I have the agency. I cover the New England States calling on contractors and builders, and in a general way cover every town of 2000 inhabitants or over. The model which I carry weighs 21 pounds, and is contained in a box the outside dimensions of which are 12 inches wide, 4 inches deep and 16 inches long. Besides this, I have a hand bag to carry necessary change of clothing and toilet articles. Weight 13 pounds. My weight is 160 pounds.

I have been using an automobile, a four-cylinder runabout 15 horse power since last April 14th, and up to date nave covered 6453 miles. While I realize that the auto is a good investment I am a little disappointed in the running cost for I find this is greater than I anticipated.

As a basis of figuring I will give you the items of cost so they can be compared with the motorcycle, the running cost of which I would like to have you inform me, if you think it feasible for my business. I have been told that a motorcycle cannot be used on muddy roads. Please inform me as to this for I shall have to take into consideration the time lost for any cause.

I hope you will be able to give me figures for comparison in the various items, also an unprejudiced opinion as to the practicability of the motorcycle for my purpose.—J. E. B.

Your items of expense agree very closely with observations I have made on a car of about the same cost and power. I figured a trifle over 7c per mile, but the average condition of roads over which I traveled was probably somewhat better, and I did not include the cost of garage or stable as I housed my machine in my own barn. To be correct the rent of the stable and the extra cost of insurance should have been taken into account. There is not the slightest question as to the practicability of the motorcycle for your purpose. A carrier suitable for your



sample box and hand bag is regularly made, and we herewith illustrate the method of attaching. A run of 60 to 75 miles per day is really no task for any man; many riders have frequently made over 200 miles in a day.

Taking up first the cost of motorcycle, depreciation, and cost to operate. A first-class machine fully equipt with luggage carrier and stand together with necessary accessories would cost $200.

Allowing a depreciation for one season of 25 per cent. (which is ample)	$50.00
108 gals. Gasoline (60 miles per gal., at 22c)	23.76
4 gals. Cylinder oil (400 miles per qt., at 75c)	3.00
1 New outer shoe for rear wheel, (rear will wear 5,000, front 10,000 miles)	10.00
Express on tire	.35
Supplies, (Estimated)	1.00
Repair and replacement (Estimated)	10.00
Batteries 8 sets of 3, at 75c	6.00
Interest on investment $200, 6 mos., at 3 per cent	6.00
Total cost	$110.11

or 1 7-10 cents per mile.

According to the above figures, which I consider on a conservative basis, you would actually save $30.00 over your railroad fares.

In comparing the speed at which it is safe to run an automobile and motorcycle over the average road I find the advantage to be in favor of the motorcycle. On runs where I have averaged 18 miles per hour on the auto, I have done 20 comfortably on the motorcycle, so it would be fair to concede a 10 per cent. advantage in speed for the motorcycle. I think I am underestimating this but I have in mind your caution for an unbiased opinion so I will not take advantage of any doubt.

Figuring, therefore, that the motorcycle is 10 per cent. faster you would be able to cover the same territory in 2½ weeks less time, and there would also be a saving in time for cleaning and adjusting which need not be at the most, more than one hour for each 100 miles traveled, or 64½ hours total time, a saving of another half week. We will estimate the delays for puctures and repairs the same as your record, for that seems a short time for an auto, but is ample allowance for the motorcycle.

Now as to the advisability for using the machine in the mud and rain. I admit it is not altogether pleasant to drive in the rain, especially when unprovided with proper clothing for this purpose, and some kind of roads when the mud is in a certain state it is almost impossible to ride at all, so we will make ample allowance for such contingency and say that in 6 months we have 200 hours in which a motorcycle cannot be comfortably used on the road deducting 31 hours from this, the time in which your auto was stopped under this condition we have 169 hours in the 6 months in which the auto is useable when the motorcycle is hung up. This is equal to 2½ weeks, counting 10 hours per day, but since we had previously gained three weeks over the auto we are still one-half week ahead, but the 200 hours allowance for loafing would be well spent by traveling in the old way by train and trolley and at least one-half the business done that could be done by the auto in that time. So assuming a net profit of $1000 as a basis in 6 months by the original method of travel by rail. You have increased your sales and profit by auto traveling 35 per cent. or

	$350.00
Less excess of traveling cost of auto	240.00
A net gain in profit over the rail method	$110.00
Traveling by motorcycle we can cover 40 per cent. more territory, so increase our sales and profit	$400.00
Adding result of 10 days work by rail	66.00
Saving in hotel bills by covering territory in 9 weeks, less time	180.00
Saving by motorcycle travel, less than railroad	30.00
A net gain over the old method	$676.00
A net gain over the automobile method	566.00

C. H. M.

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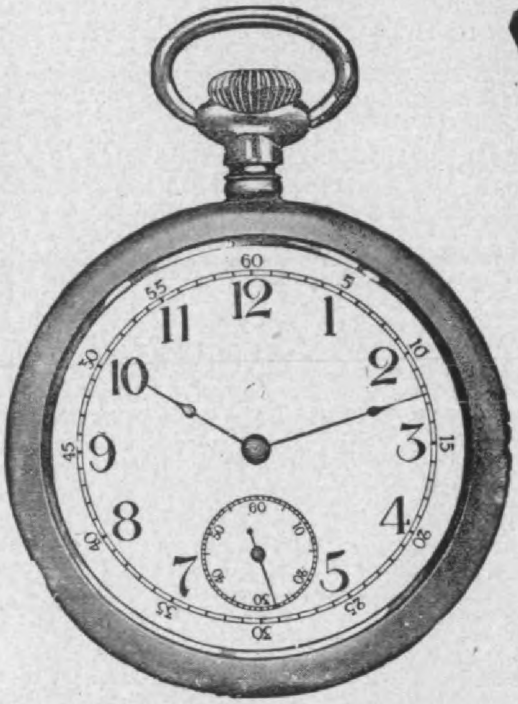

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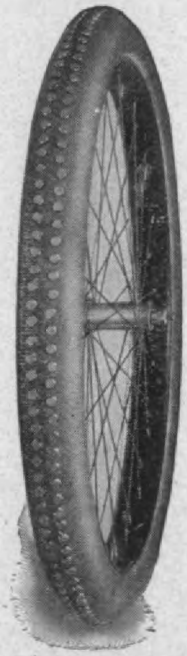

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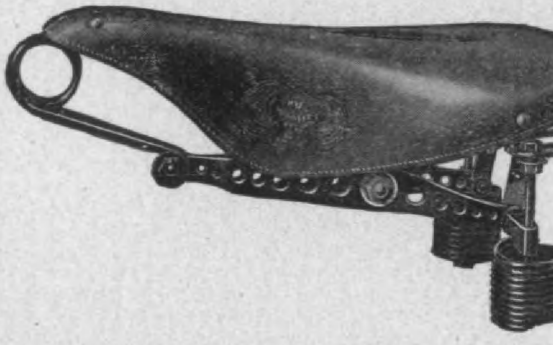

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METHODS OF DRIVING

Would it be practicable to make the proper reduction of gearing for a motorcycle by using the crypto or sun and planet transmission either at the motor crank shaft or in the rear wheel hub, with direct chain drive, and thus avoid the countershaft and extra sprocket and chain of the ordinary chain-driven machine; or the very small engine sprocket and very large rear wheel sprocket of the direct chain drive such as was used last year in the Metz, the Armac (as an option) and this year in the Torpedo?

2. Am I right in believing that the use of the last mentioned direct chain drive involved too much expenditure for chains and sprockets owing to the quick lengthening of chain and the very great wear of driving and driven sprockets?

3. Has the roller chain proven superior, in any marked degree, to the block chain as means of transmission for motorcycles?

I ask the last question because chain manufacturers have written me that they did not claim for their roller chain any less liability to lengthening—only a more agreeable action under adverse circumstances, such as mud, dust or rain. On the other hand, the R-S makers advertise that their tests have shown a very great superiority of the roller chain; and I believe that both you and the Armac makers claimed, last year, roller chains were going to obviate the difficulties mentioned in question 2. The English makers of the very finest roller chain I ever saw (the Hans Renold) wrote me (in reply to query why the ½-inch and ⅝-inch pitch chains were almost universally used in England) that they knew of no advantage of the ½-inch and ⅝-inch pitch, over 1-inch pitch except that perhaps the ½-inch and ⅝-inch, accumulated themselves to bending around small sprockets a little better than 1-inch pitch.)

They sent me a sample of the Hans Renold roller chain, 1-inch pitch, ⅛-inch width, and it certainly was way ahead of any American roller chain which I know of in lightness, in neatness, and I believe in construction. The rolls had not the slightest "play" in the rivets, or bushings I guess I should say, and yet each turned freely and every link bent freely. It may be unpatriotic to say this, but it is a fact. They mentioned a few cases where riders got 6,000 to 10,000 (I believe more) miles' use out of their roller chains. I have never been able to use any roller or block, or twin roller, 2,000 miles before they had lengthened badly.

Will you answer this question as well as you can? About what power motorcycle with efficient belt drive will equal in hill-climbing ability a chain-driven machine of 2¼ h. p., bearing in mind that the belt-driven is usually geared about 5 to 1, and one to chain-driven about 7 to 1? (Other factors in the problem being equal).—HENRY H. WHEELER.

It would be practicable to use either method you mention for reducing the gear ratio between driving, and driven shafts, but both these methods have disadvantages sufficient to prevent their use being entirely satisfactory.

The crypto or sun and planet form of gearing involves complication, noise and loss of power. If applied as you mention, for the sole purpose of reducing the size of the driven sprocket, they would not be as satisfactory as the countershaft (either chain or tooth gear) reduction now used on a number of machines. The planetary gear, however, lends itself to a two speed mechanism without much further complication, so with this additional feature it might prove itself preferable.

In the present state of the art the point on which the argument centers, is whether the direct chain drive with a small driving sprocket on a comparatively large driven sprocket is as good or a better device than the intermediate shaft reduction. On the direct drive we have the advantage of simplicity, lightness, cheapness and higher efficiency in power transmission, but the disadvantage of a shorter period of use from chain owing to the fact that the stretch of chain will assert itself to a greater degree on a very large driven sprocket than on one, say of half the size. On this type we have also the complication of a chain idler which detracts somewhat.

The countershaft meets the disadvantages of the direct drive to some extent, but does not eliminate them. When the short chain is used the driven sprocket permits of more chain stretch, but owing to the fact that the chain is shorter it wears out faster because each link passes around the sprocket oftener, and it is the oscilating movement thus imparted between rivet and block coupled with lack of lubrication and fine grit which destroys the bearing by grinding or cutting away the bearing surfaces of the joint.

The quality of the steel seems to have little effect on the life of the chain. Hardness is no preventative of wear if the lubricant gets mixt with fine grit, and it offers but slight resistance to cutting when the lubricant has been squeezed out.

The best service of a chain used on a direct drive machine that has come to my notice was one having a ⅝-inch pitch roller chain, 10 tooth on to a 60. This had driven the machine 1500 miles with ⅞-inch total stretch, and the rider anticipated 1500 miles more from the chain before it became useless, but this was done at the expense of extreme care for the chain was removed, cleaned and boiled in a preparation of oil, tallow, and graphite at the end of each 100 miles of service.

It is readily conceivable for a chain to successfully drive a push bicycle many times the mileage of the motor propelled machine for the movement of chain around the sprockets is much slower and the pressure a great deal less.

It seems to me the problem of the chain maker is a means for protecting the joints from grit, and retaining the lubricant. In regard to the wear on the sprockets other conditions being equal, these wear in proportion to the number of teeth, the wear being no greater on the direct drive than on the chain countershaft drive.

A belt driven machine geared 5 to 1 to mount a gradient equal in steepness to the steepest that can be negotiated with a chain driven machine of 2¼ H. P. geared 7 to 1, would require 1 2-5 times as powerful, or a 3.15 horse power motor, other conditions being equal but it would mount the gradient as much faster in proportion as the power is greater. That is to say if the 2¼ horse power machine will climb the hill in 35 seconds, the 3.15 machine will also climb the same hill in 25 seconds. In drawing this conclusion I have disregarded the effect of air resistance which increases with the square of the velocity. So actually the time would be somewhat over 25 seconds, under normal conditions.

If the problem is to calculate the H. P. required to bring the machine geared 5 to 1 to the top of the hill in exactly the same time as the one geared 7 to 1, the motor would require to be over geared to an extent sufficient to slow down to reduce the power output to 2¼ H. P.

We must find then a speed at which the 2¼ H. P. machine is giving out its full power. An elaborate test places this at very nearly 2800 R. per minute. Taking this as a basis and having in mind that the piston speed must be the same, the larger the cylinder the slower the speed, so for every additional increase in power of 10 per cent. it calls for a corresponding decrease in speed of motor which we will assume to be 5 per cent., that coming very close to observations made.

Since the greatest efficiency of a 2¼ H. P. motor is at 2800 R. per min., and the rear ratio on the higher powered motor is 2-5

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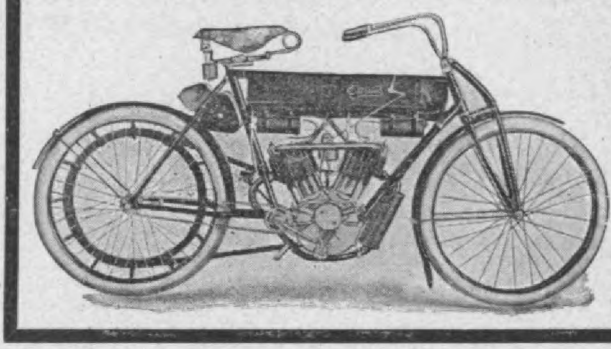

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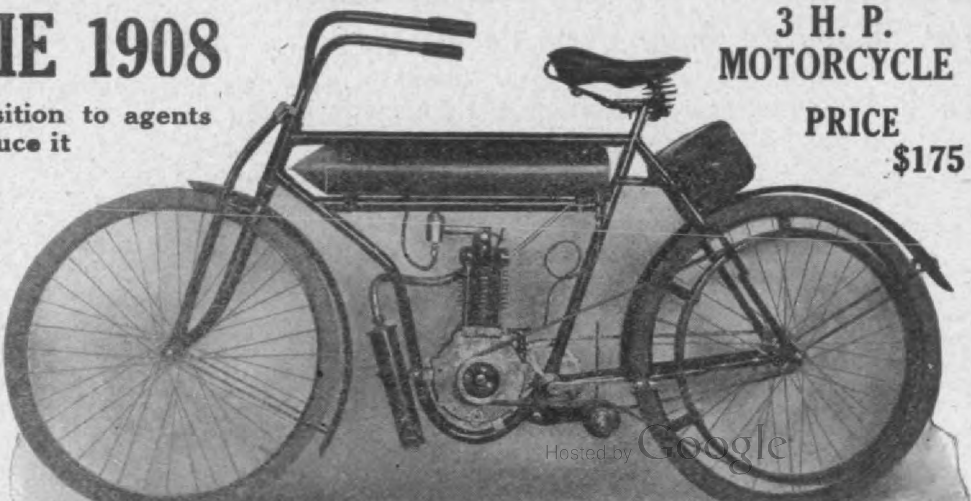

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oes not decrease in this regular ratio, but r enough for this calculation.

ow if a motor is developing 2¼ H. P. at R. per min. its normal or full capacity be found in the table compiled from the wn and assumed facts. In this table we that a motor developing 2.8 H. P. at its t efficient speed of 2480 R. per min., has a er of 2¼ H. P. running 2000 R. per min. have taken for granted the chain and transmission to be equally efficient. I not consider either method to have much antage in power transmitting efficiency r the other when conditions are as nearly fect as they can be made, so we may lect this feature and conclude broadly t a machine of 2.8 H. P. geared 5 to 1 will respond in greatest climbing capacity with achine of 2¼ H. P. geared 7 to 1.—C. H. M.

NITION AND LUBRICATION TROUBLES

4 Salem St., Charlestown, Mass.

r Sir;—

there any particular reason why a wipe tact timer will not work as well as a make break on a non-vibrator coil? I notice t motorcycle makers with one exception, use the latter kind, with its platinum nts to be kept clean and proprely ad- ed, while certainly a wipe contact, which elf-cleaning and needs no adjusting is the plest.

made a wipe contact breaker, consisting a cam which hit the end of a very short stiff steel spring, and it would miss bad- at high speeds, while a make and break work perfectly on the same engine. The ng was only about one and a half inches g, with a piece of steel brazed onto the to take the wear, and so thick that there absolutely no vibration to it, so the sing could not have been caused by the ng jumping over the cam without touch- it. The time of contact was about one- ntieth of a revolution of the cam. Per- s you can explain this trouble.

have had considerable trouble with oil king out thru bearings in the crank case; ven put a check valve in it to allow the air escape, but this did no good. I have come the conclusion that a leaky piston will etimes have a great deal to do with this l of trouble, part of the gases of the ex- sion being forced past it into the crank e, causing considerable pressure there. piston of my engine, is not leaky enough seriously affect the power, but there is a ht escape of gas past it.

machine referred to is giving very good sults. Oil does not interfere with its prop action, and when the mechanism is right y can seldom trace trouble to the timer.

In a device where the contact is made dire by a cam attached to the one-half time sha trouble has been experienced on account poor contact between shaft and its bearing The thin film of lubricating oil tending to i solate the shaft from the ground.

A direct ground contact to the end of t shaft, which is not lubricated, by means a light spring pressing a hardened steel pi or carbon against it will remedy the difficult I would advise a contact of at least one-ten of a revolution of the cam shaft for spark

A leak of pressure past the piston w produce pressure in the base which will for out the oil, but often the check valve is t main cause. In the check of the ball varie I have found trouble from the fact that t ball did not seat rapidly enough to check t incoming air. A light spring pressing on t ball improved its action greatly.

A three-inch tire is not so stable on grea roads, as the greater surface offered to t road prevents it from sinking in, which a smaller tire saves side slips owing to t groove it has made in the surface.—C. H.

GETS STALLED ON HILLS

New York

I have a new motorcycle, 3 horse pow which I cannot get to take any grade at and I cannot advance the spark only a ve little because the motor will stop if it is a vanced.

The batteries are O. K., plug, spark, co pression and valves are all right and it timed right. It will go good on the lev but you cannot advance the spark on t level and a small grade will stop it. The bo is 3-inch, 3½-inch stroke, 3 H. P. at 1800 P. M. Intake valve, 1-inch exhaust 15- Everything seems to be O. K. as far as can see. What do you think is the cau of the trouble? Would a generation val give better results on a motorcycle than carburetor, if not, why not?—J. BURTAN

The valves are too small for the size the motor. The intake valve should be 1 exhaust 1¼ at least. However, I think yo main trouble is in the carburetor which pro ably gives a mixture too rich on the hi speed. A generator valve would be no bett unless it is provided with means for adjus ing the mixture for all speeds, either aut matically or otherwise.—C. E. D.

ew "Standard" Motor Cycle Pedal

new motor cycle pedal has been ed to the line of the Standard Com-

pany, Torrington, Conn., which they ca the "Standard" No. 3. This pedal h large bearings designed for smooth ru ning, and the balls are 5-32 inch in diam ter, the same sized balls being used both ends. The shaft is made from inch stock.

A prominent feature of this pedal is excellent lines and ample proportion The rubbers are deeply corrugated, a the tread is broad, assuring a firm gr for the user's foot and a maximum of co fort. This pedal was shown on a nu ber of motor cycles at the Madison Squa Garden Show, and has been adopted, are advised, by a number of motor cyc makers for their 1908 machines.

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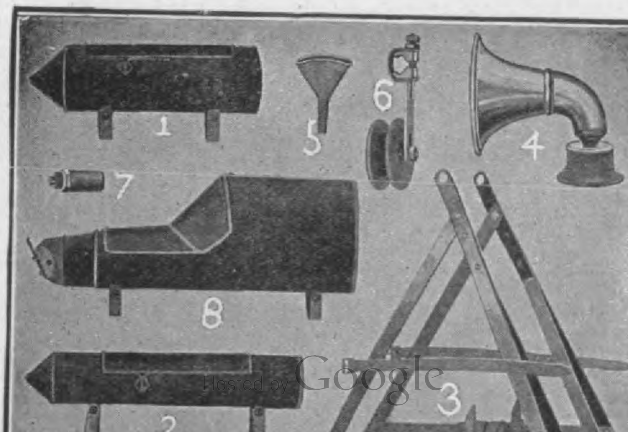

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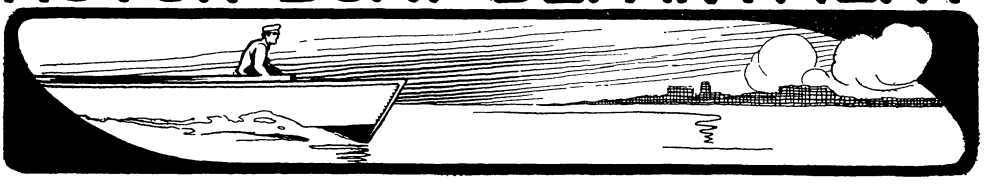

Marine Coming Events

December 7-14—Annual Motor Boat Show, Grand Central Palace, New York. National Association of Engine and Boat Manufacturers.

1908.

January 1-8—Chicago Motor Boat Show, Coliseum, American Association of Engine and Boat Manufacturers. Chester E. Campbell, Mgr., 5 Park Square, Boston.

January 14-18—Hartford Automobile Dealers' Show, Foot Guard Hall.

January 25-February 1—Boston Motor Boat Show, Mechanics' Hall. New England Engine and Boat Manufacturers' Asociations. Chester E. Campbell, Mgr.

February 3-10—Power Boat and Sportsman's Show, Convention Hall, Buffalo, N. Y.

February 20-March 7—New York City, Madison Square Garden, Fourteenth Annual Motor Boat and Sportsmen's Show.

April 6-11—Buffalo, Convention Hall, Motor Boat and Sportsmen's Show. D. H. Lewis, Mgr.

A. P. B. Association's New Ruling for 1908 Racing

At the October meeting of the American Power Boat Association sixty-two yacht and motor boat clubs were enrolled. At this meeting the association acted on, and consented to the following amendment, proposed jointly by the Thousand Island and the Chippewa Yacht Clubs.

The amendment states that races for the cup in 1908 will be limited to boats of Class X; that is to say, racing boats of not over 40 feet water-line length. There will be no restriction on the number, size and horse power of the motors, except that each boat shall contain and be fitted with such mechanical power as will drive her astern at a speed of not less than 4 knots an hour in still water. There will be no time allowance. These conditions, however, apply only to races that may take place in 1908.

All Ready for the First Motor Boat Show

Manager Chester I. Campbell, 5 Park Square, Motor Mart, Boston, Mass., has all plans ready for the first of the three great national Motor Boat shows which will be held in the Grand Central Palace, New York City, December 7-14.

The show season of 1908 opens with virtually a single great exhibition, in three sections geographically, but under a single management, that of the trade itself, and the single direction of one capable man.

The situation in brief is that the National Association of Boat and Engine Builders, made up of some of the most important representatives of the business thruout the country, will have immediate charge of the New York show, while the two local associations, the New England Engine and Boat Association in the east and the American Association of Engine and Boat Manufacturers in the west, will have charge of the other two shows, in Boston and Chicago, respectively. These three associations are working in harmony for the success of a single large show in each of the three cities, with such an arrangement of dates and such conditions as to transportation, fitting-up of spaces, signs ,etc., as will make it possible for a builder to exhibit at each of the three shows in turn at a minimum of trouble and expense. Further than this, the enterprise is a mutual one, the profits going not to outside promoters, but by a pro rata division to the exhibitors themselves.

Bermuda Motor Boat Race

Conditions governing next year's long-distance motor boat race to Bermuda, under the auspices of the Motor Boat Club of America, have been completed. The event will be for boats up to 70 feet over-all-length. The race is scheduled to start from New York Harbor on June 6, 1908, and first boat to arrive at Bermuda will be the winner, as the race will be run without time alowance, with all boats racing in one class.

The first prize will be the Bennett trophy which must be won three times in succession to become the permanent property of the winner. Trophies will be given to second and third boats to finish. A cash prize of $1000 will also be given to the winning boat and $500 to the second boat.

Buffalo's Power Boat and Sportsmen's Show will be held in Convention Hall, Buffalo, the week of February 3.

The Chicago & Alton Railway Company, of Shelbyville, Ill., is just completing its first gasoline railway car. The motor to be installed is of the 4-cycle, water-cooled type, manufactured by the Anderson Engine Co., Shelbyville. It is one of their improved 4-cylinder marine engines, and will have a bore of 9¼ inches by 11 inches stroke.

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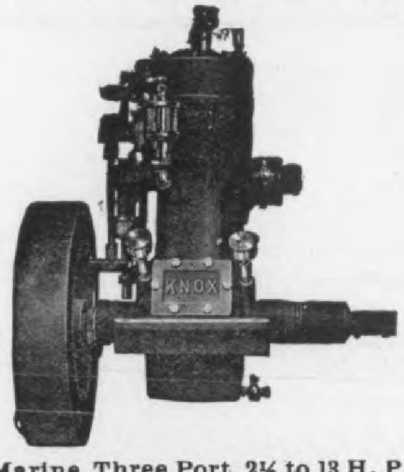
Knox Motors

Marine and Stationary.



Marine, Three Port, 2½ to 13 H. P.
Marine, Four Cycle, 20 and 40 H. P.
Stationary, Four Cycle, upright, 4, 6 & 9 H.P
Strong, Simple, Reliable, Economical.
1907 Catalogue ready.

Camden Anchor-Rockland Machine Co.

CAMDEN, MAINE, U. S. A.

BRANCHES: Boston, 226 State St.
New York, 124 Broad St.

Our propeller does wha
no other reversing whe
or gear can do.

Write for our booklet and see what we guarantee.

C. F. ROPER & CO.

HOPEDALE, MASS.

Pfanstiel Marine Coil

Besides the motorcycle and automobile oils that have been described in these olumns The Pfanstiel Electrical Labo-atory, North Chicago, Ill., manufactures type specially designed for marine use. hese marine coils are built up on the ame lines as the Pfanstiel automobile oils, the same method of wiring and the ame form of vibrator being used. The econdary is built up of 14 sections of ire and both terminals are brought out the top of the box. Unusually large idium-platinum contact points are used. ach coil is tested on an 18-volt storage attery.

The boxes of these coils are of polished ak and the brass work is heavy and sub-antial. All sizes from 1 to 6-cylinder pes are furnished.

A motor barge driven by a motor made F. A. Brownell & Co., of Rochester, Y., is used on the U. S. Battleship "Con-ecticut," the flagship of Rear Admiral obley D. Evans. It is said to be the first otor barge accepted by the U. S. Navy.

The Illinois Valley Yacht Club, of Peo-

SKIDOO

MARINE ENGINE

The 2-Cycle-Engine-Sensation of the Year. Entirely improved design introducing many exclusive feature on Gasoline, Distillate, Kerosene or

Pats. Pend.

ACTUAL 2 H. P. Bare Engine $6

COMPLETE ENGINE with Fresh Water Boat Fittings, $39.90

Swiftest, most powerful, efficient an engine of its size on earth. Drives Ca boat or 14 to 20 ft. Launch, with loa miles per hour. Reversible, easy to insta erate, unfailing endurance powers, econo safe, cannot back-fire. Sold under 5-yr. G

Catalog FREE.

Belle Isle Motor Co., Dept. 46 DETROIT,

Commence the new year right by be a subscriber to the Journal. Send $ now, before it slips your mind, and h your subscription start with the Janu number, which will contain a complete rectory of all manufacturers of mo cars, motor boats, motorcycles, parts accessories. There is no extra charge this important number—the price for

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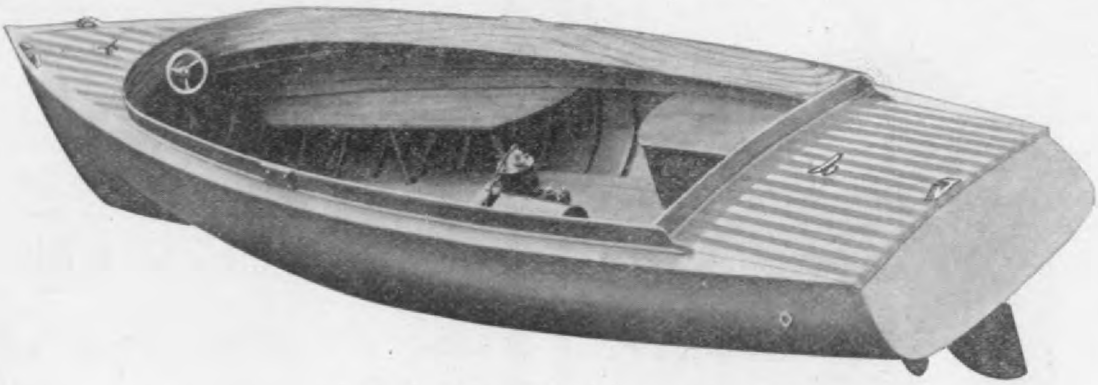
5 complete, is the latest offering made the Brighton Boat & Supplies Co., of nasha, Wis., well known builders of er boats.



The "Brighton" 17 ft. Special.

his boat is known as the "Brighton 17- Special," and it is built in the very t manner. The decks are laid with t and dark woods, adding much to its earance. The inside is finished off in same manner as the larger boats, ch makes it a regular launch in every ail. It is light, only weighing three dred pounds, thus easy to store. The t is 17 feet long, with a 53-inch beam, when under power draws about 12 nes. It is capable of carrying from 6 8 persons comfortably. The power is erated by a 1½ H. P. gasoline motor, ed with either jump spark or mechani- ignition. The speed is about seven es per hour.

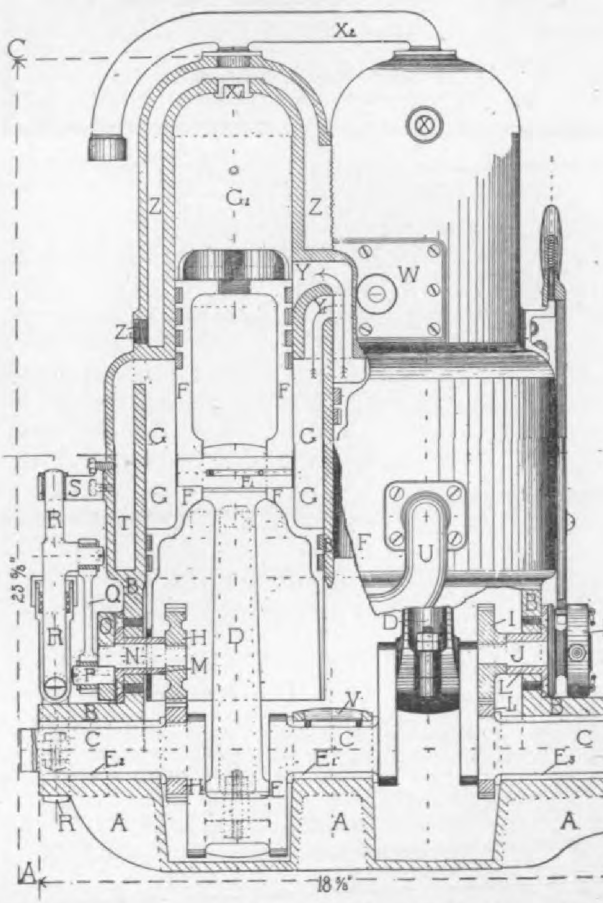
The Evolution Marine Motor

he distinctive features of the Evolu- motor, manufactured by the Foster or Co., 31 Crown street, New Haven, n., are the methods employed whereby explosive mixtures are previously com- st and transferred to the explosion mbers of the motor, which is known the Vertical Twin Cylinder, two-cycle e, with open crank case in which each on exerts a power-giving stroke at h revolution of the crank shaft.

wo cylinders are employed with bores nequal diameter and fitted with pistons ch correspond and are constructed with ably arranged ports and passages. The ger bore of each cylinder constitutes connection with its piston a gas pump- or charging cylinder for the other. ike the usual two-cycle motor, it has crank case compression, but is con- cted with a receiver into which the losive mixtures are drawn by the ac-

open truck type and are made extreme long, giving an abundance of surface bring the wear on the cylinders and pi tons to a minimum. Six piston rings a

used on each piston. The Wrist-Pins a large and made of tool steel, case-harden and ground to a perfect fit, and held place by a special device. The connectin rods are made of high-grade steel castin of new and correct design and of am



Part Sectional View of the Evolution Mari Motor.

strength, fitted with nickel bronze bushin at both ends. They are two and one-ha

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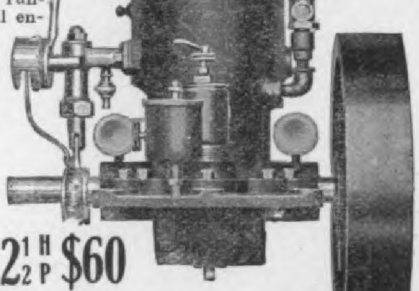
ing, most powerful engine on earth.

Quality considered, it's the lowest priced. We guarantee absolute satisfaction and

IMMEDIATE SHIPMENT

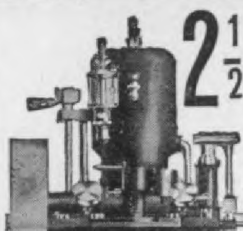
Write at once for new catalogue showing Ten sizes, 2½ to 27 H. P., at prices that will surely interest you.



2½ H P $60

(With complete equipment.)

DU BRIE MOTOR CO., 432 GUOIN ST., DETROIT, MICH.



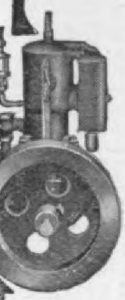
2½ H.P. Complete Outfit $6

not bare—and guaranteed to develop more than 3 1-2 H.P —in fact, it is as powerful as most 4 H.P. engines.

We built and equipped a new factory last winter—the most modern and up-to-date plant in the world devoted exclusively to marine engines. We are now moving into another new larger plant—5 stories (3 times large). This shows the enormous demand for Gray Motors. Write today for the story of the mile long distance race on Lake Erie, also ca

Engines 2½ to 40 H.P. GRAY MOTOR CO., 28 Leib St., Detroit

Perfection



MARINE MOTOR

For real service, for looks, finish and power the Perfection beats any motor ever sold at anywhere near its price—can't be beaten at any price.

2 H P $45 COMPLETE

Simple, speedy, reliable and reversible. No cranking. Price is for engine complete with full boat equipment—NOT BARE. Fully guaranteed and backed by one of the largest plants in the business. Send for handsome catalog of all sizes.

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JOE'S REVERSING GEARS and ONE WAY Clutches

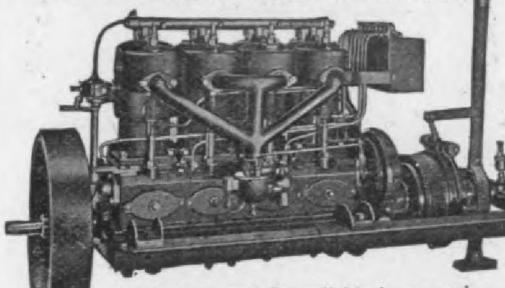
Send for CATALOG *of* MARINE SPECIALTIES

SNOW & PETRELLI MFG. CO., New Haven, Con

ANTI-CORROSIVE
REGISTERED IN PATENT OFFICES UNITED STATES, CANADA AND GREAT BRITAIN.
GAS ENGINE LUBRICANT
MANUFACTURED ONLY BY
E. H. KELLOGG & CO.
NOS. 24 & 26 & 24 SOUTH ST. NEW YORK, U.S.A.

IS THE BEST FOR AUTOMOBILES AND MOTOR BOATS

IF you want a high grade boat outfit, write for illustrated catalogue. Our motor boat outfits



are light in weight, reliable in operation, and are built for fast hard work, with the least vibration and noise. Sizes 6 H.P., 22 H.P., 40 H.P. and 50 H.P.

F. A. SEITZ CO.

151 Frelinghuysen Ave. Newark, N. J.

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Air and Water Cooled Types. For Auto., Launch and Motorcycle. Also Full Sets of Castings. 1½ to 40 H. P. One to Eight Cylinders. Putnam Carburetors, 4 sizes.

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We guarantee every clutch

STOWE MFG. CO.,

Wilmington, Del.

High Grade Marine and Auto Engines, 2 and 4 Cycle 2 to 20 H.

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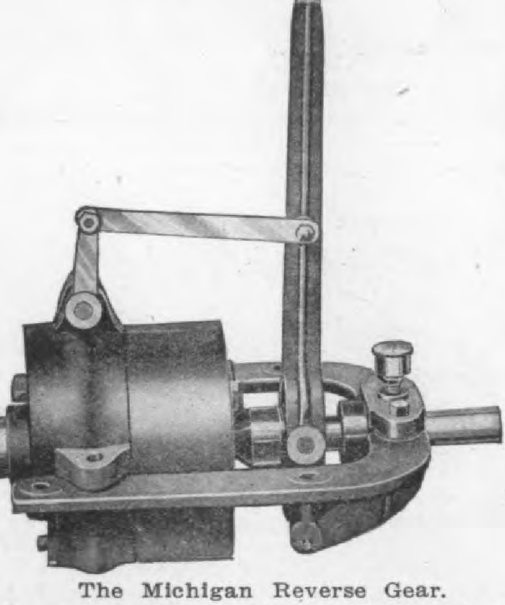
ried there by and with each fresh rge of the explosive mixture in the m of a fine spray, and is deposited on internal surface of each cylinder while piston is at its lowest position. As piston raises it becomes thoroly lubri-ed by the fresh oil, which also acts as a king for the piston and rings.

gnition is by the jump spark system. timer is driven by a pair of spur gears ated inside of the crank case. The ter is kept in circulation by a bronze nger pump also driven by spur gears ated in the crank case.

Michigan Reverse Gear

Michigan Wheel Co., of Grand Rapids, ch., has lately added to its line of rine goods a reverse gear, giving one ed ahead and one reverse, besides the tral position. The outside case is oil-



The Michigan Reverse Gear.

t, and is to be filled with thick oil in ch the gears and all working parts rate, and are thus thoroly lubricated. brake band on the outside of the drum very wide and strong, and has a large ke area for the purpose of holding the m stationary when reversing the pro-er shaft. The clutch band on the in-of the drum is an expanding ring, ch on the forward drive securely locks entire reverse mechanism as a solid ft rotating with the engine shaft. A screw is provided for adjustment to pensate for wear. Seven sizes of

tion, and at that time rotate the propell shaft at about ¾ the speed of the forwa drive. The clutch ring is expanded by dog operated by a lever, and every squa inch in the clutch or brake area is utiliz as the ring expands the full circumferen of the drum. The dog that expands t clutch is covered by the drum.

The Dietz "Neptune" Boat Light

The R. E. Dietz Co., 60 Laight stre New York City, has brought out in ad tion to its well-known line of lamps f the 1908 season a new motorboat searc light known as the "Neptune." It is esp cially designed for motorboat use and operated by acetylene gas. It is equi with a Bausch & Lomb Mirror lens, gether with a 4-inch Green (starboa side), and 4-inch Ruby (port side), Sem phore lens.

The Dietz "Neptune" Boat Light.

The outfit includes a ½-foot Dietz acet lene burner, and a special bronze brack with swivel stub and broad base. Th lamp lists at $15.50.

As a result of the many successful

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 7. PHILADELPHIA JAN 1, 1908.

December Edition, 20,231

14,255 Copies mailed.
5,101 Copies Delivered to News Company.
1,155 Copies to Philadelphia and foreign, etc., under stamps.

1,000 Copies to Chicago Show.
20 Copies held in reserve.

21,531
1,300 Back numbers sent out.

20,231 Total copies December edition.
Of these
12,279 Were paid subscriptions.
5,101 Delivered to News Company.

17,380
1,130 Returned by News Company, to December 14, 1907.

16,250 Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of the "Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the December issue was 20,231.

Of these, 23,610 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 26½ ounces, representing 14,255 copies, and 1,130 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

On page 88 of the December issue an error was made in regard to changes in the executive committee of the National Association of Automobile Manufacturers as the letters A. L. A. M. were used instead of N. A. A. M.

The Automobile Club of Italy has issued rules for the 1908 Targa Florio race, which is to be held next May over a 400 to 450 kilometre course in Sicily. The contest is open to four-cylinder cars of a bore between 120 and 130 m.m., and weighing 1000 kilogs. The number of vehicles of any one make is restricted to four.

Automobile Coming Events

January 1—Speed Trials. South Indian Motor Union.

January 1-2—Annual Endurance Run. Quaker City A. C.

January 4-11—Dublin Show, Ireland.

January 14 to 18—Hartford, Conn. Automobile Show. Foot Guard Hall.

January 18-February 2—Fifth International Auto Exposition, Palace of Fine Arts, Valentino Park, Auto Club of Turin, Italy.

February 10-15—Detroit, Mich., Tri-State Automobile and Sportsmen's Association's Show, in Light Guard Armory.

March—Ormond-Dayton Annual Race Meet, under management of A. C. A.

March 7-14—Sixth Annual Auto Show at Mechanics Building, Boston, Mass., Boston Automobile Dealers' Association, Chester I. Campbell, Mgr., 5 Park Square, Boston.

February 17 to 22—Cleveland. Automobile Show.

February 24 to 29—Auto Show and Gymkhana. Bombay, Ind.

March 7 to 14—Automobile Show. Mechanics Bldg., Boston.

March 9 to 14—Sixth Annual Automobile Show. Convention Hall, Buffalo, N. Y.

March 21 to 28—Automobile Show. St. Lawrence Arena, Toronto, Canada.

March 21 to 28—Annual Cordingly Show, London, England.

March 26—April 24—Second Annual International Commercial Vehicle and Motor Boat Show. Olympia, London. Society Motor Manufacturers and Traders.

April 4 to 11—Pittsburg Automobile Show. Duquesne Garden.

April 5-12—Third Annual Automobile and Sportsmen's Show, Montreal, Canada, Arena, M. Jaffry, Mgr.

April 6-11—Second Annual Show of the Pittsburg (Pa.) Automobile Club.

May 12—Sicily, Targa Florio, Automobile Club of Italy.

May 30—Hill Climbing Contest at Sport Hill, Easton, Conn., under direction of the Automobile Club of Bridgeport.

July 14—Paris to London, Aerial Race.

July .. —Grand Prix Automobile Race on Dieppe Circuit, under direction of Automobile Club of France. (Exact date to be announced.)

In defense of the proposed $1,000 entry fee for the stock touring car race next spring, Mr. Morrell calls attention to the heavy expense of properly policing and oiling the course, and at the same time holds out to the entrants the hope of a rebate from grand stand revenue which he thinks will practically cut the $1,000 fee in half.

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A. A. A. Outlines Plans and Policies

Following upon the experience of the fiscal year just closed, the American Automobile Association has drawn up plans and policies for the ensuing year.

The association intends to hold a national convention, with particular reference to legislation and good roads, at some central place during the summer, at which time it will also promote several technical contests.

In legislation, the present agitation looking toward the adoption of a federal registration bill will be continued.

Sanctions will be granted only by the racing and technical boards on application made thru national headquarters.

In short, sanctions, supervision and responsibility, or neither; no promoters, other than club or state associations, no graft.

1908 Executive Committee of the A. A. A.

President William H. Hotchkiss, of the American Automobile Association, announces the new Executive Committee as follows:

William H. Hotchkiss, Buffalo, N. Y.
Lewis R. Speare, Boston, Mass.
George E. Farrington, East Orange, N. J.
Charles Thaddeus Terry, New York, N. Y.
Asa Paine, Minneapolis, Minn.
N. H. Van Sicklen, Chicago, Ill.
Jefferson De Mont Thompson, New York, N. Y.
Frank B. Hower, Buffalo, N. Y.
Robert P. Hooper, Philadelphia, Pa.
A. G. Batcheldor, New York, N. Y.
Stanford L. Haynes, Springfield, Mass.
F. T. Sholes, Cleveland, O.
Paul C. Wolff, Pittsburg, Pa.
Harry M. Rubey, Macon, Mo.
L. E. Myers, Chicago, Ill.
James T. Drought, Milwaukee, Wis.
Frederick H. Elliott, New York, N. Y.

The committee comprises seventeen members. The membership consists of four officers, six chairmen of boards, and seven directors at large.

Washington D. C. Run

Sixteen of the 26 starters in the sealed bonnet contest of the Washington, (D. C.) Automobile Club on December 10, finished with perfect scores. The survivors of the 118 mile run over Maryland roads numbered twenty-three.

A. A. A. Technical Board

The Technical Board of the A. A. A. has been announced as follows. Chairman, N. H. Van Sicklen, of Chicago, Ill.:

David Beecroft, Chicago, Ill.
H. O. Smith, Indianapolis, Ind.
Edgar Apperson, Kokomo, Ind.
Walter C. Baker, Cleveland, O.
Henry Souther, Hartford, Conn.
S. N. Colburn, Minneapolis, Minn.
E. R. Thomas, Buffalo, N. Y.
Clarence E. Whitney, Hartford, Conn.
E. T. Birdsall, Rochester, N. Y.
Angus Sinclair, Newark, N. J
J. C. Kerrison, Boston, Mass.
Henry Ford, Detroit, Mich.
H. M. Rowe, Baltimore, Md.
A. C. Newby, Indianapolis, Ind.
A. L. Riker, Bridgeport, Conn.
Roy F. Britton, St. Louis, Mo.

Long Island A. C. Banquet

The Long Island Automobile Club held its annual election on December 4th, and on the 6th the annual dinner took place at the club house, 360 Cumberland street, Brooklyn, N. Y. The chief feature of the evening was the presentation of trophies which had been offered at different times during the year for club runs, tours, etc. The new officers are Charles Jerome Edwards, president; Dr. C. P. Parker, vice-president; Russell A. Frield, secretary, and Louis T. Weiss, treasurer.

October Exports Show Increase

Statistics for the month of October, 1907, show an increase in automobile exports of $70,974 over that of the corresponding month in 1906, and $106,195 over those of the month of September, 1907.

	October 1906	October 1907
Exported to—		
United Kingdom	$43,633	$118,470
France	15,475	29,199
Germany	12,423	5,776
Italy	184	154
Other Europe	17,782	6,613
British North America	48,600	38,438
Mexico	67,389	44,772
West Indies and Bermuda	4,665	13,693
South America	18,923	23,865
British East Indies	655	239
British Australia	5,563	16,386
Other Asia and Oceanica	6,611	17,651
Africa	4,847	450
Other countries	344	2,362
Total automobiles and parts of	$247,094	$318,068

Atwater Kent Continues Test

The Atwater Kent Company, of Philadelphia, Pa., it will be remembered conducted a demonstration in New York city at the two shows with one of its generators, showing the high battery economy obtainable from its use. At the close of the demonstration with the odometer reading 4249.3 miles the batteries were tested and showed 6 amperes each. With the batteries showing at 4½ amperes three weeks later, the outfit was shipped to the Chicago show, where it was again sealed and started. At the time the spark plugs began to miss the odometer reading was 5328.8 miles, and the batteries were again tested, showing three amperes.

This is certainly a remarkable record for dry batteries, and substantiates the claims made for the generator by its maker.

The following have been appointed as chairmen of the different boards comprising the American Automobile Association: N. H. Van Sicklen, Chicago, Technical Board; A. G. Batchelder, New York, Publications Board; Charles T. Terry, New York, Legislative; Robert P. Hooper, Philadelphia, Good Roads; Frank B. Hower, Buffalo, Touring, and Jefferson De Mont Thompson, New York, Racing.

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General Index

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Detroit's Noteworthy Show

The first of the two shows planned for Detroit this winter was held in Riverview Park auditorium, December 7 to 14 under the auspices of the Detroit Automobile Dealers' Association and proved a very successful exhibition. The building was artistically decorated with banners and streamers, the color scheme being gold and green.

The exhibition space was all taken up for car display, there being about a score of exhibitors showing thirty-one makes of cars.

The E. R. Thomas Detroit Company inform us that the agency for Chicago territory for the Thomas-Detroit car will be changed on January 1, as the company expects to close a direct agency or open a branch. Coey & Co., will continue to handle the Thomas Flyer.

Writ of Certiorari Issued in Acetyelene Burner Suit

We are informed that the United States Supreme Court has granted the petition of M. Kirchberger and J. Von Schwarz for a writ of certiorari allowing a review of the decision of the U. S. Circuit Court of Appeals of the 6th circuit which recently decided against the validity of one of the Von Schwarz patents on acetylene burners. Writs of Certiorari are seldom issued we are told, and only when the Supreme Court feels that the lower court has made a gross error, and in view of this fact the Kirchberger and Von Schwarz interests have great hopes of a favorable final decision in about one year. In the meantime they warn infringers that they will not be immune from the payment of damages should the decision be, as is expected by Kirchberger and Von Schwarz, in their favor.

A. A. A. Adds Members

The following clubs were elected to membership at the meeting of the American Automobile Association in Chicago, December 6: Savannah A. C., of Georgia; A. C., of Hawaii, and Calfornia State A. A.

A. C. A. Will Manage Beach Races

At a recent meeting of the contest committee of the Automobile Club of America the committee ratified the agreement with the Florida East Coast Automobile Association that the A. C. A. manage and run the Ormond races in March, 1908.

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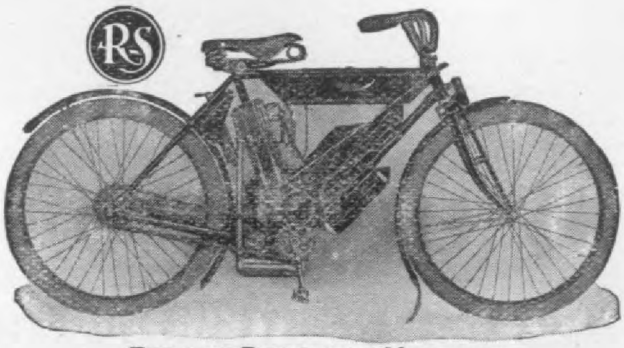
"America's Best"

Reading Standard Bicycles *and* "R-S" MOTORCYCLES

The Irresistible Line for 1908.



BUILT AND TESTED IN THE MOUNTAINS.

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Philadelphia, January 1st, 1908

The Demoralizing Effect of the Shows

In the early history of the automobile industry there was, doubtless, urgent need for the enlightenment of the buying public in regard to the mechanism, operation and general utility of automobiles. For this purpose, automobile shows were early instituted at which an opportunity was afforded the public to learn of the new vehicles. However, as they became more and more familiar with automobile construction and operation, the necessity for such shows gradually disappeared and the shows became more and more a society function and a place at which the dealers were enabled to meet a large number of manufacturers and arrange for agencies. But the time of year at which the shows took place was not entirely suited for this latter purpose, and so, even in this respect the shows did not fill as extended a field as could have been possible.

At the present time, as far as pleasure cars are concerned, there is very little, if any, necessity for such exhibitions and their continuance has become not only an enormous burden to both the automobile manufacturer and the accessory maker, but has also a very disturbing influence upon the routine work of nearly every automobile factory in the country. It is well known that for a considerable period, previous to the large shows, there is, in nearly every factory, a period of unrest, unprofitable and hasty work, usually upon a few show cars, while the preparations for the work of turning out the season's output are almost, if not entirely, lost sight of. During the shows, the chief men are usually away from the factory where, in many cases, the business is practically at a standstill, letters remaining unopened until their return, in fact the entire factory force is, for the time being, in a disorganized state.

If this is true of the automobile makers it is doubly true of the accessory manufacturers, who are unfortunate enough, owing to the multiplicity of shows which they are almost forced to attend, to be absent from their plants for a considerable period and are required to bear extremely heavy expenses. Owing to the peculiar patent situation and the efforts of the importers to make a specially brilliant showing, as the demand for foreign cars in this country gradually diminishes, there have been held in New York City alone this year a series of shows which have, without question, had a very disturbing influence on the various automobile factory organizations.

The part which the automobile show has played in the advancement of the industry, it is not our intention to belittle. Unexcelled opportunities have been offered the makers for copying ideas in design and also methods of construction, resulting in the general betterment of the product. The public has gradually been enlightened and educated to appreciate the many advantages attendant upon the use of the new means of conveyance, until now the primary reasons for such exhibitions have almost, if not entirely, ceased to exist, yet the shows still multiply in number.

History repeats itself, however, and the very success of the shows must be their unmaking. From a few representative exhibitions in the large cities, the fever gradually spread until every small town also held its local automobile show and at the present time the number of these shows are entirely out of proportion to the results obtained and are exercising a decidedly demoralizing influence upon the industry as a whole.

One or two representative exhibits, with no admission fee, without excessive decorations, divorced from the idea of a society function and placed on a strictly business basis, could doubtless be made very profitable to both the accessory and car makers, without, as at present, demanding almost their entire attention for a prolonged period.

In the realm of the commercial car the situation is entirely different from that of the strictly pleasure vehicle, and business shows for business people will probably be held, with advantage, for many years to come.

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In conclusion, let it be said that the sooner those interested in the future welfare of the business eliminate all the unnecessary ostentation, trumpery and display which has been altogether too prominent in the past and base their efforts solely on conservative business principles, the sooner will the manufacture of automobiles, accessories and parts assume its rightful place among the important and permanent industries of our nation.

Lack of American Made Taxicabs

The sudden and now rapidly growing demand for Taxicabs has found the American automobile makers almost, without exception, totally unprepared. The steady increase in the number and popularity of these vehicles abroad has been persistently overlooked by our manufacturers, although several car makers were asked as far back as 1905 to design and test out such cabs. They, however, were apparently not far-sighted enough to forsee the extent of the open field and at that time refused. The fact that the step from pleasure making to that of producing a serviceable cab is much less radical than the step to the manufacture of successful heavy trucks and offers a comparatively easy entrance into the Commercial car field was also set aside. Even at the present time there is no lack of those who fail to appreciate the breadth of the awakening demand for this class of vehicle which is surely and rapidly destined to replace our horse-drawn cabs in all of the larger cities of the country.

Owing to the hesitating attitude and lack of preparedness of the American makers, the promoters of the large New York companies who are introducing Taxicabs were forced to look elsewhere for vehicles which have been tried out, and could show actual records of continued successful performance for any considerable length of time. The result has been the loss to the American makers of some very large sales and the importation in quantity of foreign made motor cabs.

It is unquestionably true that Taxicabs are as far superior to horse cabs as our present street cars are to the antiquated bob-car with its walking specimen of horse anatomy. A motor cab can easily cover from 90 to 100 miles paying distance in a day, as compared with about 25 miles as the most for a horse cab, even under the most favorable conditions. They are not only capable of doing the same work in a much quicker and more satisfactory manner than the horse, but at once open up an entirely new field peculiar to themselves, which field is absolutely beyond the realm of the horse-drawn vehicle. In other words, a new era of transportation conditions is instituted. Regular service can be maintained between comparatively distant points, short pleasure tours can be made into the country and even communication between suburban points can be regularly and satisfactorily carried on. Another feature which cannot be overlooked is the increased cleanliness and improvement in the sanitary conditions of the streets caused by the retirement of the horse.

European experiences show clearly that the public will not use horse cabs if Taxicabs can be had, and will even stand in the rain waiting for such means of transportation. These cabs easily do two and three times the work of the ordinary vehicle, and when the tires are maintained by contracting companies, injured ones being daily removed and replaced by new tires from other cabs, the upkeep is not excessive. When the chauffeurs are required to furnish gasoline and oil, with of course an increased salary, economy of operation is secured. Yet in spite of all the advantages known to accompany the use of motor cabs, only a few American makers are even now preparing to supply such machines and none can show any record of continued service such as demanded by most companies before installing new vehicles. To be sure, several American makers have recently announced their intention of entering into the manufacture of motor cabs and at least two have already placed such cars on the road, but the fact remains that the average American automobile manufacturer has been so completely occupied with the production of strictly pleasure vehicles that he has not noticed or has not drawn the natural conclusions that would be expected from an investigation of the conditions existing abroad in regard to the new type of cab.

European makers have had several years start in the manufacture of motor vehicles and the European public have also had the same advantage in regard to the use of these machines, and it is but fair to suppose that, with few exceptions, where peculiar conditions may affect the attitude of the public, the general demand in this country will be the same as that abroad. It is somewhat surprising that, knowing these facts, American manufacturers do not profit more largely by the panorama of experiences constantly spread before them and take a short cut instead of following blindly a longer, more circuitous and more costly route to the same goal.

Is Finality of Chassis Design Reached?

A careful observer, having had the opportunity to visit all of the recent automobile shows, could not overlook the marked improvement in all of the American-built cars, in the finish, material used and in changes of detail, but must also have been impressed with the fact, that particularly among the licensed makers, very few radical changes have been made

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for 1908. This might lead to the supposition that finality in motor car chassis design has at last been reached; we say chassis, because the bodies will always vary to suit the ever-changing weather-vane of public fancy.

A survey of the machines shown particularly at the licensed exhibition, indicates the intention on the part of the makers to cater almost entirely to the exclusive few, as extremely high-powered, high-priced runabouts and most luxuriously-appointed limousines were largely in evidence. When it is considered that the mass of the future automobile buyers will not be purchasers of these types, it is very evident that the makers must eventually change their present designs to types which will appeal to the largest number of purchasers.

Of course, it is understood that there will always be a few manufacturers of cars for the elite, but these must necessarily be limited in numbers. There is no question but that the manufacturers have been allowing themselves to be carried along by the passing fancy of the public, and that just as soon as the present wave of enthusiasm for high-powered, high-priced, speed cars has subsided, the horse power of the runabouts and even of the touring cars and the weights, which are in some cases excessive will be cut down.

At the present time the high-priced American car is to a large extent based upon foreign practice. When the good features are followed intelligently there is certainly no objection, but when a blind parrot-like imitation is made it would seem that such designs cannot remain final. Take, for example, the arrangement of gear shifting levers and the steering wheel. In parts of Europe, where rules of the road require vehicles when meeting to pass to the left, there is every reason for placing the driver on the right side of his car, but in this country where operators are required when meeting to pass to the right, there are great advantages in driving on the left side. The present arrangement in nine out of ten machines entirely blocks the entrance to the car on the driver's side, which is necessarily the side next the sidewalk, unless the driver goes to the trouble of heading the machine in the opposite direction. It is thus necessary to step into the street and walk around the car in order to enter the front seats. At once many will raise the objection that changing the driver to the left would bring the gear shifting levers in a position to be operated by the left hand, but this does not necessarily follow. With the steering wheel on the left exactly the same arrangement of levers could be placed between the front seat passengers, leaving both sides of the car entirely free, shortening the linkage necessary to connect with the change speed gears, and also allowing the operator to look ahead when endeavoring to pass vehicles going in the same direction, and also accurately judge his clearance of vehicles which are going in the opposite direction, which latter is a decided advantage, as an accident by machines when meeting is always followed by much more serious consequences than the touching of vehicles going in the same direction. Every argument seems to be in favor in this country of left front seat operating, yet retaining the right hand gear shift and brake lever control, and it is believed that when the public reaches the discriminating state of automobile knowledge it will demand left front seat driving instead of accepting blindly just what the other fellow has.

There is, however, a class of builders who are comparatively recent entrants into the field, who are building machines to suit American conditions. We refer to the high wheel, power-buggy builders. The latest advances in these machines show longer wheel bases, accessible motors, unobstructed entrances and suitable clearance for American roads, and it is believed that if for no other reason than that of the influence of these new high wheelers, there will be developed an intermediate type of automobile which will be a comparatively light, low-priced, large-wheeled, long wheel-based machine, which partakes of both the features of what is to-day the standard touring car, and also of the latest types of the high-wheeled vehicles.

The large number of new arrangements shown in these vehicles at the Chicago Show, indicates that finality of design in them is yet distant. The ever-increasing number of 2-cycle motors, air-cooling arrangements, and friction change speed devices, is also clearly indicative of transition in the buggy types, and altho the lack of changes in the product of the licensed manufacturers might be construed to mean finality, we firmly believe it simply indicates the pause on the crest of the wave before the return to lower powered, lower priced and lighter weight machines.

Asa Goddard has tendered his resignation as secretary of the Cleveland Automobile Club, as he intends to devote his entire time to the good road movement. Mr. Goddard has been appointed on the Good Roads Board as the Ohio representative.

The Massachusetts State Automobile Association has changed the date of the annual meeting from April to October, thus giving the new officers all winter to prepare for their duties, instead of entering upon them at the beginning of the out-door season.

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Chicago's Automobile Show

The palm for automobile exhibits is now justly claimed by the progressive city of the Middle West. The recent Chicago show not only brought together the largest collection of self-propelled vehicles ever exhibited on this Continent, but was noteworthy on account of the optimistic feeling everywhere present, being in marked contrast to the depression felt by many at the New York shows on account of the financial situation.

A spirit of independence and a general freedom from the gloomy aspect of the East was everywhere manifest. The entire atmosphere was much more of a businesslike and substantial nature than in any previous show, and the segregated commercial exhibit, undoubtedly marks the beginning of the future, free business commercial shows.

In line with this thought, is the Trade show, for dealers only, leaving to the agents in the various cities the unrestricted show business where a curious public gathers to inspect the various styles and select vehicles for their immediate use. In shows, as in other things, specialization will eventually reach this point, and the quicker it is brought about by show managers, who properly should be those most interested in the product, namely the builders, the better it will be for the trade generally.

A DIVERSIFIED EXHIBIT.

This show was unquestionably the largest and most diversified gathering of the year. The variety, from motorcycles and auto buggies thru a wide range of styles and prices in touring cars up to the limousines, speedy race-abouts, not to forget the splendid electric vehicle display, was sufficiently varied to meet all desires and purses, and a separate building devoted to commercial vehicles augurs that in future, exhibitions of this class must be held separately and without admission fees; for, being strictly a business product, the public will not pay a price and the manufacturers will not exhibit, where men coming with an eye to business only, cannot have easy and uninterrupted access to the exhibits.

BRIEF MENTION OF NOVELTIES.

While there were no startling novelties, the Hobbs-Renault self-starter shown on the Lorraine car, appears to be a quite simple solution of the self-starting problem, and holds forth promise of the time when gasoline motors will start as easily as steamers or electrics to the great delight of many, who but for the cranking would be users to-day. The device consists of a piston which pushes a rack and is returned by a spring, compressed air being the working force.

The two-cycle motor was not only shown on pleasure vehicles like the Atlas and the largest trucks as made by the Reliance Company, but was found in a slightly modified form at the booth where the Teg motor was exhibited. Its principal novelty was the built up crank-shaft, having on one crank side, a small crank pin which fits into the hollow full size pin carried by the other crank side. The connecting rod is solid and slips on the full size pin before the two halves of the crank are assembled in the case. A further novelty is the arrangement of the transfer port which opens from inside the piston, out thru the cylinder wall and then back into the cylinder, thru the usual admission port; the new charge being forced to pass cooling ribs in the piston before entering the ports and thus keeping the piston much cooler than is customary. Thus permitting perfect air cooling in a 2-cycle motor three and one-half by three and one-half, which it is claimed has delivered as high as nine horse power, per cylinder.

BUGGY TYPES.

Several new auto buggies were shown, making a total of ten or more. These exhibit a wide variety of designs from the simpliest buggy forms to constructions strictly of conventional automobile design. In one the balance gear is omitted and in its stead are substituted friction disks at each end of the counter shaft, the thought apparently being that instead of the rubber tires slipping on the ground to their detriment in turning a corner, the friction disk would slip and thus permit one wheel to go faster than the other without detriment to anything. In still others, no balance gear is used, because having a rope or friction drive, they depended upon the slipping of the driving surfaces, rather than the slipping of the wheel tires. In still a different form there was a proposed connection between the steering lever and the friction tightening rods, so that in turning a corner the belt, or driving device, to the outer wheel would be tightened in contact, while that to the inner wheel would be loosened, with the result that the outer wheel is driven and the inner wheel runs free in a manner theoretically superior to a balance gear. The fact that this device has been patented some years, yet seems not to have found any extensive use, may be an argument against its efficiency and may indicate some defects not apparent by inspection.

While the conventional friction drive employing disks in planes at right angles to each other, and as used on Lambert cars, was generally seen, one exception secured two speeds forward and reverse by fitting the motor shaft with stepped cone pulleys and parallel but underneath, the propeller shaft is similarly equipped, the two being connected by a wide short belt which can be tightened by lowering the

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propeller shaft and thus serve as flexible joint, friction clutch and transmission gear. A V-grooved set of pulleys or gears at one end gives the reverse motion when the propeller shaft is lifted so as to bring the grooves into mesh.

On still another the engine shaft carries on each of its opposite ends two flat faced pulleys, the smaller telescoping into the larger by means of a push pedal. Each rear wheel is connected by a chain to a short counter shaft on the inner end of which is a two-step pulley the smaller step of which comes into contact with the large engine pulley when the countershaft is raised; but with the smaller telescoped pulley extended, a slightly less raising of the countershaft brings the large step of the countershaft pulley into contact with the smaller of the crank-shaft pulleys, and so gives a slow speed forward. Slipping of the friction surfaces on one side or other of the engine permits turning corners without the use of the balance gear and reversing is accomplished by pushing idlers against both sets of the pulleys when the countershafts are not raised.

At a private show room was a novelty that goes far to indicate still further chances for improvement in friction driven autos. This machine has cylinders lengthwise of the body, but located high in the bonnet, a most unusual position for a 2-cylinder opposed engine. The crank-shaft is vertical with the fly-wheel on the bottom end and the friction disk slidably mounted on the propeller shaft is brought into contact with the undersurface of the fly-wheel.

The rapidly increasing diversity of forms indicates that the day of conventionality and its iron-clad rule has passed and that merit rather than fashion coupled of course with price, will determine the commercial success of the future automobile designs. A consummation certainly to be desired.

Trade Changes and Removals

Autolyte Mfg. Company has acquired the automobile department of Messrs. Sibley & Pitman, of 26 Warren street, New York City, and has moved to that address.

Coppock Motor Car Company has removed from Marion to Decatur, Ind.

Continental Caoutchouc Company has removed its Detroit branch from 226 Jefferson avenue to 260 Jefferson avenue.

Dragon Automobile Company, of Philadelphia, Pa., has been succeeded by the Dragon Motor Company, with a capitalization of $1,000,000.

Gray Motor Co., of Detroit, Mich., has filed articles of incorporation, increasing its capital stock from $30,000 to $70,000.

Hornecker Motor Mfg. Company, of Whiting, Ind., makers of the Torpedo motorcycle, will move to Geneseo, Ill., about January 1.

Keith Electric Company, The, Beaumont, Tex., has filed an amendment to its charter, changing its name to Keith Electric Auto Co.

Matheson Motor Car Company, of Wilkes-Barre, Pa., will hereafter deal with the trade direct instead of thru the Palmer & Singer Mfg. Co., of New York as heretofore.

Reliance Motor Cycle Company has removed from Elmira to Oswego, N. Y.

Smith & Co., D. B., Utica, N. Y., has been succeeded by the Yankee Muffler Co.

Thomas Auto-Bi Company, of 1573-1575 Niagara street, Buffalo, N. Y., was recently reincorporated under New York laws as the The Auto-Bi Co., with $50,000 capital.

Willyoung Appliance Company, Yonkers, N. Y., has been succeeded by the Westchester Appliance Company.

Fires, Judgments and Failures

Berkshire Motor Car Company, Pittsfield, Mass., Fred T. Francis, has been appointed temporary receiver.

Crocker-Wheeler Company, East Orange, N. J., garage damaged by fire to the extent of $100.

Duplex Ignition Company, 307A West 36th street, New York City, schedules in bankruptcy show liabilities $8,387, and assets $3,131.

Electric Vehicle Company, of Hartford, Conn., went into the hands of a receiver on December 10, owing to its inability to repay a bond issue of $2,500,000, which matured on November. 1. Halsey M. Barrett, of Newark, and Henry W. Nuckles, an officer of the company, were appointed receivers.

Goodman Cycle Company, Union, S. C., store destroyed by fire, partially insured.

Huntington Automobile Company, Huntington, N. J., receiver has been appointed.

Knox Automobile Company, of Springfield, Mass., for sometime past in financial straits, is now on a fair road to recovery. The liabilities will be capitalized and the creditors will practically conduct the business until their claims are discharged.

Leather Tire Goods Co., Newton Upper Falls, Mass., plant destroyed by fire. Loss aggregates $50,000.

Peacock Inn., Mayville, N. Y., garage, totally destroyed by fire. Damage amounts to $10,000.

Star Ball Retainer Company, of Lancaster, Pa., suit for infringement of ball retainer by Sartus Ball Bearing Company, New York City, was denied by court.

Shoemaker Automobile Company, of Elkhart, Ind., recently placed in the hands of a receiver, has been granted an extension of six months.

St. Louis Motor Car Co., Peoria, Ill., bankrupt, machinery and unfinished product purchased by Harry G. Finklistein and Warren Kinsey, of Peoria, Ill.

Trident Tire Company, New York City, judgment for $1,890, granted in favor of the Standard Welding Co., Cleveland, Ohio.

Muncie Auto Parts Company, of Muncie, Ind., went into the hands of a receiver on Nov. 29, owing to the financial stringency.

Legislative and Legal

MISSOURI.

St. Louis.—Council passed bill prohibiting the storing of gasoline within garage buildings.

PENNSYLVANIA.

Philadelphia.—The State Superior Court in reversing a Philadelphia Common Pleas Court decision, held that when a chauffeur runs down and kills a person in an automobile when not attending to the business of its owner, the latter can not be held liable for damages.

Chas. Brandenburg, of Silver Lake, Ind., was fined $1.00 and costs and sent to jail for ten days on a plea of guilty in the Circuit Court, on the charge of placing a log on the road in order to wreck an automobile owned by Olinger & Marvel, of North Manchester.

Autolyte Mfg. Co., New York City, has acquired the automobile department of Sibley & Pitman, of 26 Warren street, same city, and has moved into the latter's building where offices have been taken on the first floor. Mr. Pitman has been elected treasurer of the company, and A. H. Funke remains general manager.

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Haynes Car Wins 600 Mile Chicago Reliability Run

Frank Nutt, driving a 30 H. P. Haynes roadster, won the three-day reliability run of the Chicago Motor Club on Tuesday, Wednesday and Thursday, November 26, 27 and 28. Nutt achieved his great victory over a field of thirty-five starters in the most exciting and exhaustive test ever given American motor cars.

Of the twenty-five cars to survive the contest the Haynes was the only one to finish with a perfect score and is therefor the winner of the $1000 trophy. In addition, Pilot Nutt, of the winning car, gets the McElligott cup, which was given for the winning driver.

Second place was given to No. 29, the Pierce Arrow 40 H. P. 6-cylinder touring car, entered by N. Paulman & Co., and driven by Arthur Kumpf, the well-known boy driver. This car was penalized two points because a grease cup lacked two turns of being tight. The $400 silver ale set offered by the Goodrich Company goes to this car. The Oldsmobile car, driven by Ralph Owen, won the third and last prize, the New Southern $300 cup. Altho the car went thru without incurring any penalties, it was discovered in the final inspection that the emergency brake could only be classed as in medium condition and a driving shaft universal joint boot being loose; 6 points were herefore imposed.

The first day's run was to South Bend, Ind., and return, a distance of 227 miles, and of the 35 starters only twenty-three survived with perfect scores. The second day's run was to Rockford, Ill., and return, a distance of 190 miles, at the finish of which sixteen cars remained without penalty. The third day, Thanksgiving, the run was made to Ottawa, Ill., and return, a little less than 200 miles, and the perfect score list was reduced to ten.

Of the twenty-five starters, only one, the Wayne roadster, was penalized for failure to make controls on schedule time. When the last day's run had been made the reports of observers showed that ten cars had finished with perfect scores so far as road work was concerned, but this was reduced considerably after the technical committee had gotten in its work of penalization, which work occupied their minds from the finish of the run until Friday noon, when a decision was reached.

Penalizations were made for loose nuts, lamps, lamp brackets, mudguards, grease cups, speedometers, bonnets, aprons, spring shackles, damaged lamps, bent guards, brakes not working properly, dead batteries, missing cylinders and for the breaking of seals.

On December 3, 104 members were received into the Automobile Club of Buffalo, which now makes a total of 1,127.

Tire Chains Prohibited on Automobiles in New York City Parkways

Notification was sent us by the Automobile Club of America to the effect that after December 16 the following ordinance would be in effect in New York City:

"No automobile or horseless or other vehicle, wearing chains over the tires of their wheels shall enter the public parks or the traffic roads under the jurisdiction of the Board of Parks, without permission of the Commissioner having jurisdiction."

This ordinance will be enforced on the following traffic roads under the jurisdiction of the Park Department:

Manhattan Riverside Drive, West 72nd Street, West End Avenue, West 86th Street, Morningside Avenue West, Cathedral Parkway (West of Seventh Avenue), 122nd Street, West of Morningside Park, 123rd Street, West of Morningside Park, Fifth Avenue from 59th Street to 110th Street.

Brooklyn: All macadam roads, such as the drives in Prospect Park, Eastern Parkway, Ocean Boulevard, Shore Road, Bushwick Avenue from Eastern Parkway to the extension to Jamaica Avenue, etc.

Bronx Spuyten Duyvil Parkway, Rockwood Drive, in Van Cortlandt Park; Van Cortland Park Avenue, in Van Cortland Park; Pelham Avenue, in Bronx Park; Eastern Boulevard, in Pelham Bay Park; City Island Road, in Pelham Bay Park; Crotona Avenue, in Crotona Park; Mosholu Avenue, in Van Cortland Park; Gun Hill Road, in Van Cortland Park; Mosholu Parkway, Bronx and Pelham Parkway, Shore Road, in Pelham Bay Park; Crotona Parkway.

Items

The proposed Austrian automobile show has been abandoned.

H. H. Van Tine, recently connected with the Sidney B. Bowman Co., has joined the forces of the Garford Motor Car Co., of New York City.

The Bedford Branch, Young Men's Christian Association, of Brooklyn, will soon start a course in automobile engineering.

The Automobile Club of America, on December 10, redeemed $20,000 more of its second mortgage bonds at par and interest.

A second international alcohol congress will be held in Paris at the time of the next automobile salon, under the presidency of the Minister of Agriculture.

C. S. Johnson has resigned as treasurer and general manager of the Continental Auto Mfg. Co., of New Haven, Conn., having sold to the company a large part of his holdings.

In the Mechanical & Technical department of our October number, page 114, it was inferred in an answer to a query regarding the "Hedgeland Anti-Skid" axle that it was probably no longer on the market, but since the publication of that answer the Hedgeland Mfg. Co., has commenced to actively push the sale of the latest model of this axle which was fully described in our December number, page 146.

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ompany, Chicago, Illinois, U. S. A., was rganized in 1907 to exploit the motor car aventions of Mr. John O. Hobbs in self-tarting devices and "elastic" or spring-ushioned driving-shafts. This elastic haft is not a universal-joint substitute sed to drive through angular variations f the transmission line, but cushions the orque to avoid undue stress from excep-ional road-resistances or when starting.

Operations began in March, 1907, to per-ect the Hobbs self-starting motor car, rst placed on the road in 1903. Hobbs ad long been aware of the value of the ushioned drive and used his "elastic" ropeller shaft in the first Lorraine Model esigned by him, and placed on the road n May, 1907. Since last May this first Lorraine Model has been subjected to con-inued severe road tests with no revelation f defects, and it was shown without hange of any kind at the Chicago Decem-ber, 1907, exhibition as the Lorraine Model L.

passenger limousine body $5,500.00. gentleman's roadster body, two front se one or two rear seats, $4,250.00. Model "L" motor is four-cylinder, inches, 4-cycle, water-cooled, 55 H. P. n nal.

The Lorraine Models "M" and "N" the same in general design as Model but are smaller and lighter, having inch wheel base, with 30 H. P. four-c der motors. Model "M" has tires all inches. Model "N" has a roadster b two front seats and one rumble seat has tires 36x3½ inches front and inches rear.

NOTABLE FEATURES.

All the Lorraine cars are large, l large diameter tires, and are driven b cylinder, 4-cycle, water-cooled motors, "Triple Action" springs are fitted.

In addition to these features of e lence along conventional lines and in well-beaten paths of established const tion, the 1908 models are equipped

Fig. 1. Lorraine 1908 Model L, seven-passenger touring car, wheel base 124 inches, gage inches; tires all 36x4½ inches; motor, four cylinders, 5x5 inches, 4-cycle, water-cooled, 5 H. The cylinders are offset 1¼ inches. Jump spark ignition, with 4-coil box and special dyn current supply, fitted witn automatic cut-off. As an option the Lorraine ignition No. 2, sisting of jump spark plugs, 4-coil box, 6 volt storage battery and Simms-Bosch high ten magneto, is fitted. Cone clutch, leather-faced, with six, gradual engagement spring plun placed under the leather facing at the large end of the cone. Sliding gear speed change, t speeds forward and a reverse, with universal joints at each end of the Hobbs elastic peller shaft, and bevel gear to the divided and full floating rear axles. Weight, pounds. Price, with seven-passenger touring car body, $4500. With extra seven-passenger lim sine body, $5500. Model L chassis, with seven-passenger limousine body, $5000. Model L c is, fitted with Gentleman's Roadster body, seats for three or four passengers, $4250.

The 1908 line of cars includes four separate and distinct models of chassis, as follows:

Model "L," a seven-passenger touring car, same chassis fitted with a limousine body. Wheel-base 124 inches, gauge 56 inches. Tires all 36x4½ inches. The motor is self-starting from the driver's seat in all Lorraine cars by means of Hobbs modification of the Renault air-driven pis-

special devices in the way of the H self-start, the Hobbs cushioned drive the electric lamp lighters.

THE SELF START.

Unquestionably, the self-start is a damental requirement of elegant, c nient and safe motor car driving. No could be more discordant and misp than the necessity for hand-cranki magnificent and impressive 60-mile to

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, two cylinders, driven from the cir-
ing pump and magneto shaft. Com-
ed air is piped to a tank 10 inches
eter by 32 inches long, located under
onneau seat. This tank is piped to
ir-starting cylinder, 3½ inches diame-
nd to a pressure gauge on the rear of
front board. When this air gauge
s 60 pounds pressure the driver throws
ir pump out of action by disengaging
isk driving clutch. This air start
e is clearly shown in the diagram,
3, on the next page.

structions endangering a powerful ca
with rigid transmission which must drive
the wheels at a certain rapid rate or break
the shafting or the transmission gears
although both motive power and strength
of transmission are abundant to push the
car through or over the road obstacle if
a small margin of propeller-shaft elasticity
were available. The Hobbs spring-cush
ioned drive supplies this needful element
of automatic accommodation, and thus re
duces to its lowest terms the probability
of disablement through sudden stress, and

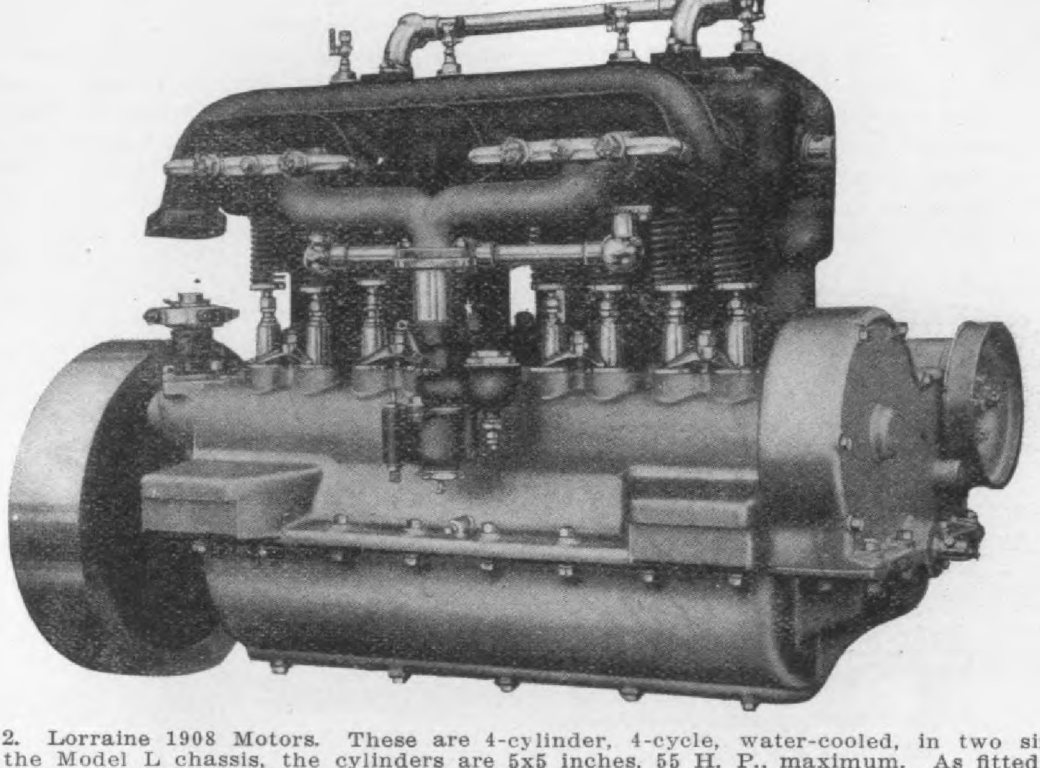

Fig. 2. Lorraine 1908 Motors. These are 4-cylinder, 4-cycle, water-cooled, in two sizes; as
l to the Model L chassis, the cylinders are 5x5 inches, 55 H. P., maximum. As fitted to the
ine 1908 Models M and N, the motor cylinders are 4½x4¼ inches, 30 H. P., maximum. The
r construction is of the best throughout, both as to materials and workmanship. The valves
all on one side, the lubrication is splash, with mechanical oiler. All gears and the cam
t are enclosed and are open to crank box splash lubrication.

th the self-start, all necessity for the
e muscular exertion of cranking and
anger from "back firing" disappears
ether, and the gentleman or lady
r is neither endangered in life or
at starting, nor in these cars is the
r forced to stop and descend from the
o perform the menial duties of lamp
ng. What horse owner would submit
e performance of the stableman's
? Yet the cranking of a large motor
for more strenuous muscular exer-
than is demanded of the common
er in the streets and the ordinary
mp lighting, though not so laborious,
ne the less an act of menial servi-
and nothing but the newness of the

it is not too much to say that the self-start and the cushioned drive must become indispensable features of the successful automobile, so soon as the motoring public is made aware of the value of these possibilities.

The chassis is fitted with A. O. Smith Company axles, all wheels on ball-bearings, but Timken axles and bearings are placed to order. The steering actions and speed change gears are of their own design and construction.

THE LORRAINE SPRINGS.

The springs are "Triple Action" half-elliptics hung on coiled springs above, these coiled springs being placed under flat-spring ends; this flat spring having its

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principal flat spring as to straighten the second, shorter, spring-leaves more rapidly than they would be straightened were they applied in direct contact with the leaf of the first spring in the usual manner. This peculiar triple-spring is a recently patented arrangement, for which

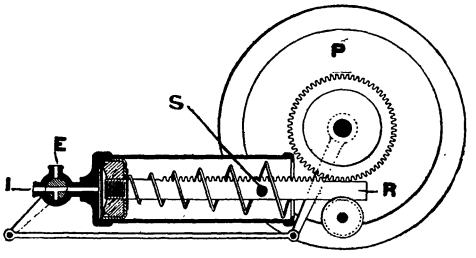

Fig. 3. Lorraine Air-Start Diagram. The air cylinder, 3½ inches diameter, has a cupped leather piston fixt to a rack engaging a pinion, one-way clutched to the line shaft; this starting pinion is located close in front of the gear box and the driver's foot-board. The rack is under the starting pinion, and is held up to the pinion engagement by a roller underneath. The rack is surrounded by a helical spring which returns it, and the pinion and piston, after making a working stroke. The piston three-way valve is shown in section at the left, in intake position, the compressed air being piped to the valve at I. When the piston moves to the right it turns the crank shaft by means of the rack and pinion, R and P, until the rack stud S moves the valve linkage and valve so that the valve right side moves upward 90 degrees, cutting off the compressed air supply to the starting cylinder and opening the cylinder to the exhaust passage E, when the helical spring returns the air piston to the position shown in the diagram, where it remains until the three-way air valve is turned by the driver to give compressed air to the starting cylinder and cause the starting piston to make another working stroke. The air tank holds air enough to give several starting piston strokes with an initial 60 pounds tank pressure. The air pressure gage on the front board informs the driver as to the air tank pressure so that the air compressor can be started and stopped as may be needful. Air from the tank can be used to inflate the tires.

new advantages are claimed. Since it is not intended that the coiled springs should ever close so that the coils touch each other, it is evident that the coiled spring resistance or supporting power must be suitably proportioned to that of the principal flat spring, and the coiled spring tension also has a fundamental relation to the extension of the second flat spring. The action of this triple spring is very easy on good roads and the total spring resistance is rapidly increased by the tension of the second flat spring due to the bell-crank leverage increase as the first, or longer, flat spring yields to the load so that this triple spring is claimed to have more total resistance to closing than an equal weight of spring in ordinary form, and this triple spring is also said to toss the car much less than an ordinary half-elliptic spring of the same total resistance or load supporting capacity.

THE LORRAINE ELECTRIC LIGHTING.

This is a recent Chicago invention, in which a peculiar armature winding is employed in a small dynamo, gear driven from the motor, so that the dynamo always has a positive drive. This gear-driven dynamo is certain to be operative because the gear turns it when the motor runs. It is asserted that the armature winding is such as to make it possible to thus gear the motor and dynamo together, giving the dynamo large speed variations, and yet obtain a satisfactory lamp-lighting current. About 170 Chicago cars have been fitted with this new electric lighting system, patents applied for, which is not yet ready for detailed description. The inventor of this electric lighting, which is, of course, readily controlled from the driver's seat, said that it had been fitted to only some seven or eight cars in New York city, and that the first cost was about $80.00, or something like twice the cost of an acetylene lighting plant; the operating costs of this electric lighting are, however, much less than those of acetylene lighting, being limited to rare replacements, while the convenience and self-generation of the lighting agent are vastly in favor of the gear-driven dynamo car-lighting equipment.

R. E. Hardy Co., 86 Watts street, New York City, is making a special style of the No. 4A "Sta Rite" spark plug. The new style is for use with magneto and has four grounded points to which the spark may jump from the central electrode.

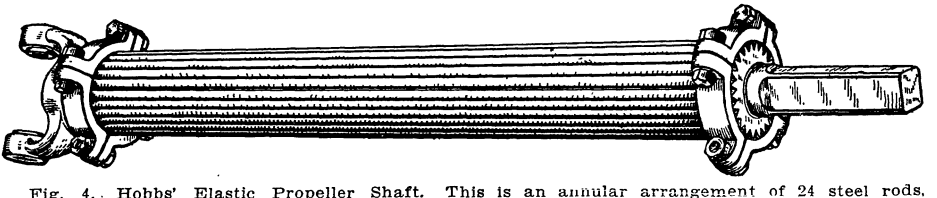

Fig. 4. Hobbs' Elastic Propeller Shaft. This is an annular arrangement of 24 steel rods, each 5-16 diameter, spaced close together and retained at each end in grooved hubs. The rod ends are forged three-cornered, all 60 degree angles so that when the rods are clamped in the notched hub disks by the screw adjusted, 4-piece clamps as shown, twisting the assemblage of rods bodily also twists each rod individually. The torsion of the 24 steel rods is sufficient to transmit a powerful torque, but to limit this torsion, solid jaw clutch members are introduced, having 22½ degrees of jaw clearance, which is the limit of spring driving in this arrangement. The effect of this peculiar elastic shaft is exactly the same as the ordinary 2-spider drive with coiled springs between the spider arm ends, and the operation, of course, lessens the effects of road obstacle shock on the transmission elements.

The Studebaker Bros. Mfg. Co. exhibit of automobiles, street sprinklers, garbage and dump wagons, contractor's wagons and trucks at the Jamestown Exposition was awarded a diploma and gold medal for vehicles.

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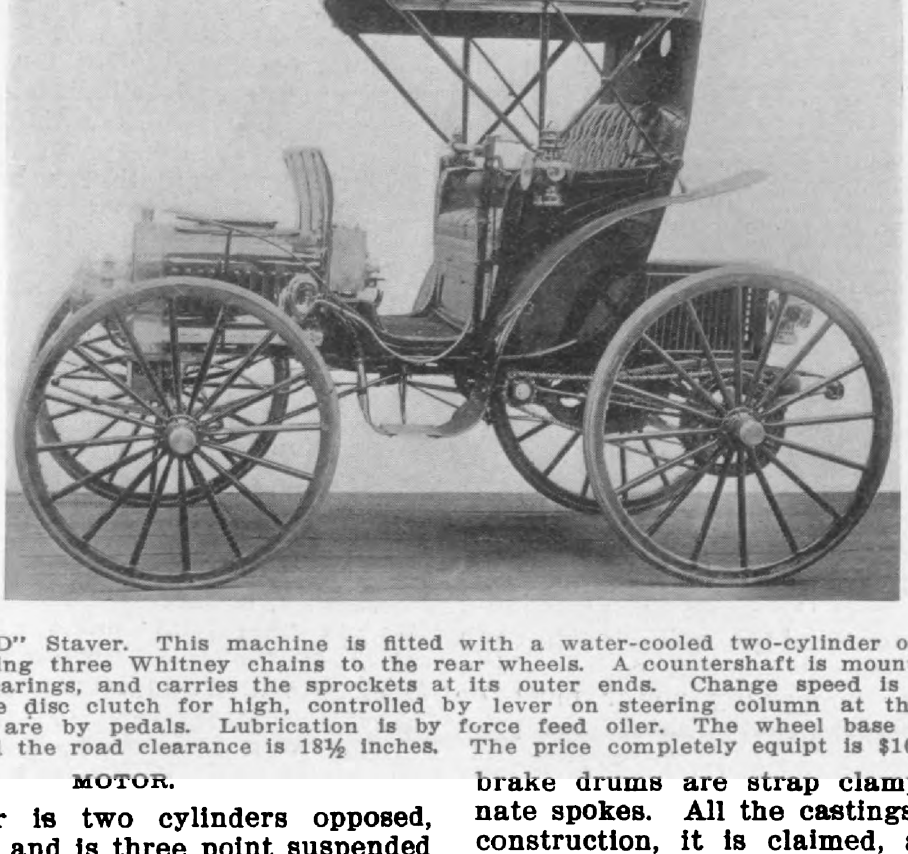
k, Ill., has announced its 1908 Model
' a cut of which is herewith shown.
he body is of stanhope pattern, of
handsome design, with one piece
el in the sides. The seat is 40 inches
e on top of the cushion, and is 19 in-
s deep. The back is 24 inches high,
from the top of the footboard to the
of the cushion is 16 inches. The
ght of the car is 1700 pounds, and the
enger capacity is two. The price,
plete with top, side curtains, storm
n, two gas head lights, two oil side
ts and one tail light, is $1000. The
el base is 78 inches, and the tread 56.

change gear on phosphor bronze bearing
is used. The high speed clutch is of th
multiple disc type lined with gray fibr
and is controlled by a short lever on to
of the steering column at the left of th
car. The slow speed ahead and revers
are operated by pedals. Steering is b
lever with spark and throttle contro
levers on the steering column. Emer
gency brakes are supplied on each rea
wheel.

Whitney roller chains, 1-inch pitch an
½-inch wide, drive from a countershaf
mounted on Standard roller bearings, t
the rear wheel sprockets, which with th



Model "D" Staver. This machine is fitted with a water-cooled two-cylinder opposed motor 5x5, driving three Whitney chains to the rear wheels. A countershaft is mounted on Stand- roller bearings, and carries the sprockets at its outer ends. Change speed is by planetary h multiple disc clutch for high, controlled by lever on steering column at the left. Slow l reverse are by pedals. Lubrication is by force feed oiler. The wheel base is 78 inches, d 56, and the road clearance is 18½ inches. The price completely equipt is $1000.

MOTOR.

e motor is two cylinders opposed, r-cooled, and is three point suspended r the body. The valves are all me- ically operated. The bore is 5 in- l of 5⅛, as last year, and 5-inch stroke sed instead of 4½ inches, as in the ious model. The engine is rated as H. P. at 950 R. P. M. A honey- radiator with fins made entirely of er with brass shell is used. The fan a shaft extending to the rear, friction en from the flywheel. The water p is gear driven, and the system car- about 5 gallons. About one-half gal- of oil and 8 gallons of gasoline are

brake drums are strap clamped to alter nate spokes. All the castings used in th construction, it is claimed, are made o Vanadium steel.

Full elliptic springs with scroll end are used at the rear, and in front three quarter elliptics are fitted. The shackle on the rear scroll ends allow for chain ad justment. The high wheels are fitted wit 1¼-inch solid side wire tires in front, an 1½ inches on the rear. The car has 18½ inches road clearance.

The Columbus Buggy Co., Columbus Ohio, announces that it has secured th services of Mr. D. W. Henry, formerly wit

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ble thing about it. The bodies have prac-
cally the same general lines, but are
omewhat more commodious and luxur-
ous. The general finish also shows a de-
ided improvement.

than ever before. Two entire separate
nition systems are now a regular eq
ment. They consist of the usual sto
battery and coils and the Bosch high
sion magneto, each operating on a s

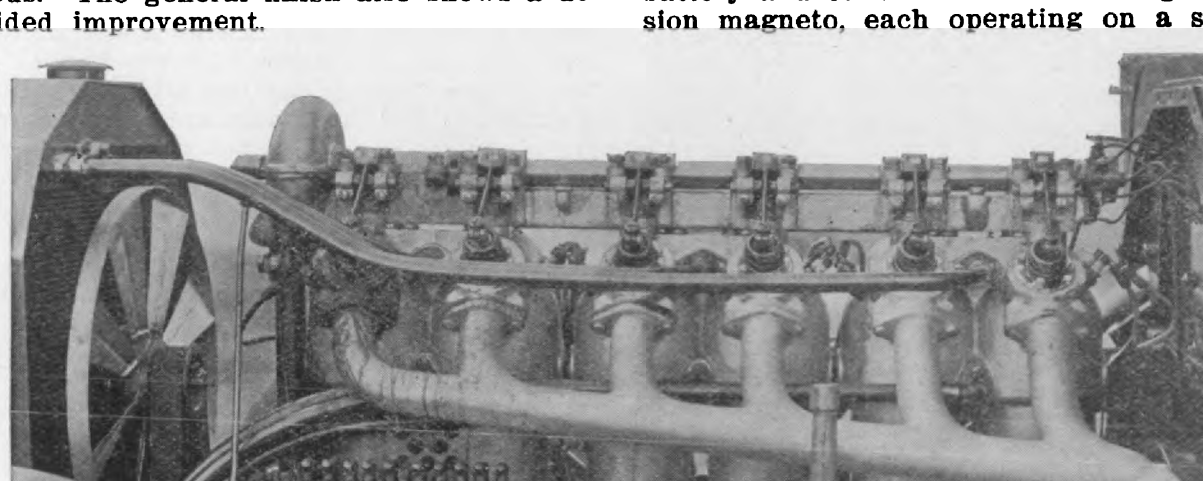

Fig. 1. Left side of 1908 Welch 6-cylinder motor, showing the overhead cam shaft w
timer at the rear end and the double sets of plugs in the sides of the cylinder heads betw
the pairs of cylinders. Note the effective curves of the exhaust manifold and the use of th
separate water pipes to and from the radiator, each dual cylinder unit having a separate p
for its supply and another for the return.

The past year's experience has failed
o change to any appreciable extent the
Velch constructions, such as hemispheri-
al polished combustion chambers, inde-
endent clutch transmission, honeycomb

rate spark plug, and being complete i
self.

The four models offered for 1908 ar
two chasses, one being a four and
other a six-cylinder car.

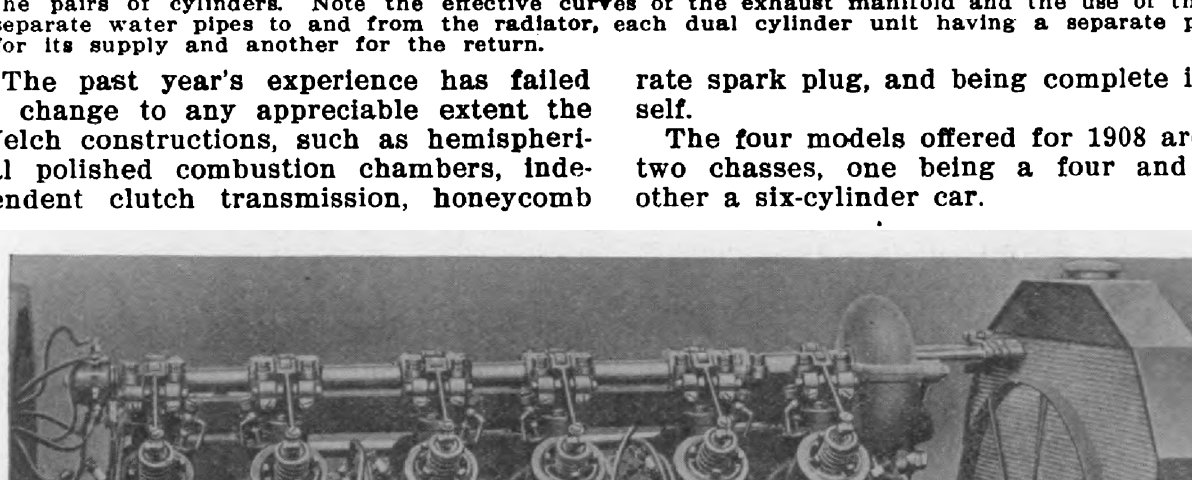

Fig. 2. Inlet side of 1908 Welch motor, showing the peculiar radiating inlet pipes, also
special worm steering gear, the location of the high tension magneto and the neat boxed-in
ing.

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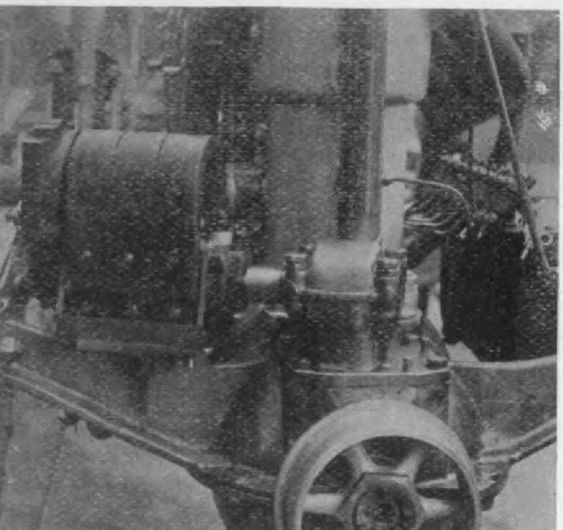

g. 3. View showing the method of mounting driving the magneto on the 1908 Welch, and supporting arms of the engine which also cross frame members.

GENERAL CHASSIS SPECIFICATIONS.

he 4-cylinder motor is rated at 50 P. The mechanically operated valves their cages are quickly removable. pump with sight feeds, and cooling is the Welch patent honeycomb radiato carrying 2½ gallons in the small car an 4 in the larger machine. The chang speed gear has three shafts, one in eac side of the main shaft, upon which ar the individual clutches for the speed This change speed has not been materia ly changed for several years. The gear are always in mesh. The clutches are the multiple disc type, and run in th oil of the case, giving smooth engagemen Each clutch has 150 square inches of har ened steel against bronze. This chang speed also gives a direct drive on th high with the gears idle and two speed to the rear. There are three forwar speeds.

The brakes are inside and outside o the rear hubs. The front axles are on piece drop forgings. The rear axles ar live and of chrome nickel steel. Th wheel bases are 129 and 138 inches, an the tires 4½x36 inches on the smaller ca and 5x36 on the 6-cylinder machine. Th tread is standard in each case.

A reserve gasoline tank containing gallons is used on each car, the total gas line capacity being 28 gallons. The roa clearance of each is 9 inches.

The 1908 White Steamers

uring the season of 1908 the White pany, of Cleveland, Ohio, offer two els "K" and "L," which are the suc- ors respectively of last years models and "H." Model "K" is 30 H. P., and is a 20 H. P. machine.

llowing the usual custom of the White pany, very few changes have been e with the exception of some slight re- arrangements and shifts in the body line and constructions. However, Model "K has a longer wheel base than its predece sor, this being 105 as a runabout, 116 a a limousine and landaulet, and 122 inche as a touring car. It is hung lower an has consequently a lower center of gravit and is easier of access. The Model "L has a larger generator, the 1907 Mode "H," and in both of the new cars a chang has been made in the position of th

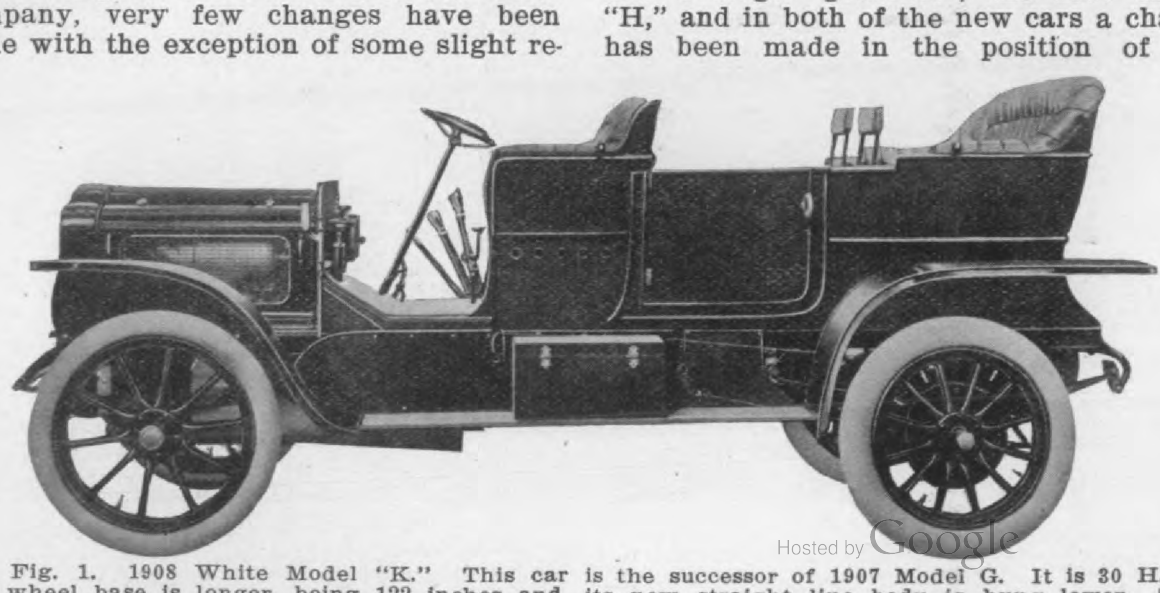

Fig. 1. 1908 White Model "K." This car is the successor of 1907 Model G. It is 30 H. P. wheel base is longer, being 122 inches and its new straight line body is hung lower. The

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essibly located in the steam line connect-
ng the generator and the engine. The
evice is readily adjustable and can be
eplaced within a few minutes. A ther-
nometer which can be read from the
river's seat is also fitted to the steam
ne, so as to be at all times an indication
o the driver of the steam temperature.

As in previous models the generator is
ocated in the middle of the car is heavily
agged and surrounded by a circular draft
pace, the products of combustion passing
ut at the bottom, while the compound
ngine is under the hood. All speeds from
ero to the maximum are obtained by
hrottle control, the engine being very
exible and can exert greater power at
tarting than at almost any other time.
he generator like the engine has suffered
o radical changes in several years. The
evelopment which has taken place being

rated as 20 "Steam H. P." The stro
3½ inches. The front and rear tires
each 34x4. The gasoline capacity is
and the water capacity the same as in
larger car, 17 gallons. As a touring
the price is $2500, as a runabout $2
and with a limousine body $3200.

Haynes' Chicago Branch

Following the great strides made in
automobile industry, the Haynes Auto
bile Company, of Kokomo, Ind., was
cently compelled to secure larger quar
for its Chicago branch under the man
ment of Joseph B. Deibler and accordi
leased the new building at 1702 Michi
avenue for a term of ten years.

The new building is a modern two-s
structure having a frontage of 30-feet
a depth of 176-feet. The building ha

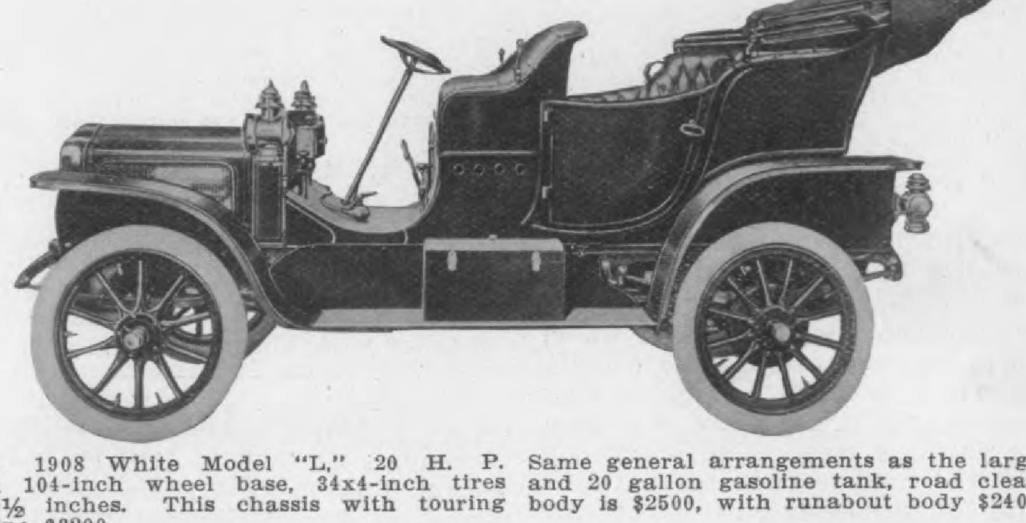

Fig. 2. 1908 White Model "L," 20 H. P.
out with 104-inch wheel base, 34x4-inch tires
ame, 10½ inches. This chassis with touring
limousine $3200.

Same general arrangements as the larger mo
and 20 gallon gasoline tank, road clearance
body is $2500, with runabout body $2400, and

long the lines of refining the automatic
ethods of regulation so that in the 1908
odels, it is claimed the pressure and tem-
erature of the steam remain constant
hether the car is running fast or slow,
oasting or climbing the steepest hill.

The features to which the company call
ttention are: no "water-level" to main-
in, therefore no need of water glass or
age, float, fusible plug or other devices
sed on ordinary boilers. That the gene-
tor tubes do not become encrusted, and
at the cars are noiseless, odorless and
s easy for the novice as the initiated, to
rive.

Model "K," with touring body sells for
700. The 30 "Steam H. P." engine has
high pressure cylinder of 3 inches, and
low pressure cylinder of 6 inches diame-
The front tires are 36x4 and the

total floor space of 12,320 square feet,
its cost of construction was $30,000.
front is very attractive, being largel
plate glass and glazed tile constructio

The Packard Motor Car Company
nounces that after January 1, 1908, Mr
Ralph Estep will be located at the h
factory, Detroit, Mich., as adverti
manager.

A. T. Mollenhour, Mentone, Ind.,
commenced to build buggy type motor
and will soon be ready to fill orders.
Mollenhour car is powered with an
posed type, air-cooled 12 H. P. motor,
is designed to meet popular requireme

The temporary factory of the Comm
cial Auto Co., manufacturers of the
nigin cars, at 1408 W. Fifty-sixth str

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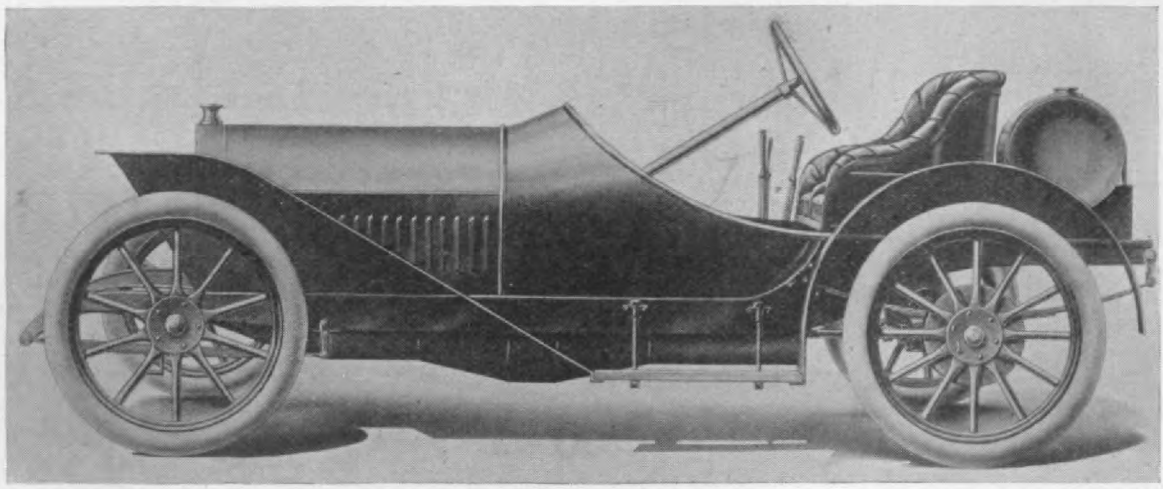
he past, for the coming season, by ding a well-hung racy roadster of 35 P. which will take the place of the -known Dragon runabout heretofore



1908 Dragon Roadster. This new model takes the place of the conventional type of roadster eviously marketed. It carries a 4-cylinder, 4½x4½ motor, of 35 H. P., cylinders cast in pairs h valves on one side. A cone clutch is used and a progressive change speed gear with two eds ahead and one reverse is mounted on ball bearings, and its case is integral with the rear e housing; wheel base, 96 inches; tires, 32x3½ inches, brakes metal to metal, internal and ernal on the rear hubs. The car has 10½ inches clearance. With gas lamps, tail lamp, horn, ls, etc., it sells for $1850.

luced by the Philadelphia factory. A ned edition of the standard touring car 907 will also be marketed for the com- season. Its price has been increased , being now $2100.00.

ne new Dragon product has a wheel of 96 inches and a clearance of 10½ es. It will seat two, no rumble seat g supplied, but in its place will be a ndrical gasoline tank. The entire ap- rance of the roadster will be that of a fortable and speedy little car for ngth and easy handling. The engine four cylinders of 4½-inch stroke and same bore cast in pairs with the valves ne side. The change speed gear is of progressive type with only two speeds ward in addition to the reverse and is ted on the rear axle and mounted on bearings. The frame is of drop pat- prest steel and the brakes are metal netal internal and external on drums he rear wheels. Thirty-two-inch wheels used, with ten spokes on the front els and twelve on the rear. The body f prest steel and the hood is prolonged nake a curved dash reaching around to seats on the side.

he new runabout weighs 1000 pounds the stock color is red. The wheel base 6 inches. The ignition is jump spark n storage batteries and lubrication is

of seamless steel rings for chucks, gear blanks, pails, poles, etc. The rings ar made from bessemer, open hearth, o crucible steel, copper, brass and bronz

stock, rolled and welded by electricity. B means of the electric welding proces every particle of steel is joined togethe making a perfect uniform joint of soli stock, and therefore, better adapting it fo gear work. Special rings can be furnishe to order from blue prints and specification

Empire Tire Repairing

Empire State Tire Co., 198-200 Terrac street, Buffalo, N. Y., in addition to manu facturing the Greenwald extensible trea tires, tire protectors, and reinforced inne tubes, is also doing a general tire repa business and soliciting work from an point. The Greenwald tires and prote tors were described in the July, 1907, nun ber of the Journal, page 136.

The Empire Company also plan an superintend the instalation of complet tire repair plants for garages and repa shops. Mr. Lemon Greenwald, formerl the head of The Akron Pneumatic Ti Co., and previously superintendent of th factory and branch repair departments o the B. F. Goodrich Co., is superintender of the Empire State Tire Co.

This company's vulcanizers will be de scribed and illustrated in an early issu of the Journal.

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The Maynard Steel Foundry Co., 71

Considerations of Motor Car Elements

HUGH DOLNAR.

(The name of the writer of these considerations is well known to our readers as a describer of new cars, and his extended experience as a machine designer and constructor gives value to his deductions and suggestions. Should any of our readers dissent from the conclusions reached in these articles, the columns of the Journal are open to all, in the full belief that free discussion and interchange of opinion is the shortest road to perfection.—Editor.)

The Principles Underlying Magneto Current Generation

The action of the high tension magneto is not commonly well known, and this description, written in ordinary language, is intended to give the reader who is not an electrician a clear understanding of the principles underlying the action of such devices.

PRIMARY CURRENT GENERATION.

If a coil of wire is moved so as to pass close to a permanent magnet, a current of electricity will be generated in the coil of wire, and this electrical impulse can be conducted from the wire coil and turned into heat, light or motion.

The magnets used in magnetos are of horse-shoe shape of steel, permanently magnetized, each of the free ends of the horse-shoe forming a stationary magnetic "field" which is constantly "excited," or in an active electrical condition, coacting with an "armature," which is a soft iron spool wound with coils of insulated wire and mounted on a shaft so that this spool of wire can be revolved and made to pass close to the magnetic fields and thus "cut the lines of magnetic force," constantly passing between the fields. This movement of the armature coil excites or "generates" a "low tension" electrical current in the armature coil, which may be conducted from the coil and made to produce various effects such as light, heat or power.

The low tension current thus produced in a single continuous winding of insulated wire, which may be in several layers about the armature spool, has volume or amperes but has little tension or voltage and cannot jump across a gap between fixt conductors in a way to light a charge in the cylinder of a gas engine, but will produce a useful spark when the armature reaches a certain speed and the previously continuous electrical conductor is broken. This is the "make and break" magneto spark.

The magnetic fields at the two free ends of the horse-shoe magnet are spoken of as "poles," one being "north" and the other "south." In the magneto these poles each occupy, say, one quarter of the circle swept by the armature coil, while one-quarter of the circle is open space between the ends of the fields. This open space between the fields at each of their two ends is spoken of as "the field-gap."

The lines of magnetic force are supposed to be passing constantly from one field to the other and the armature revolution has most generating effect when the armature coil leaves one field and passes thru the gap between the two fields, so that the armature coil receives two distinct and separate or "alternating" electrical impulses in each revolution.

So far this elementary statement refers to the production of the low-tension or primary current only, which can be made to produce a make-and-break, or "hammer," spark, but has not sufficient tension, or "pressure," to enable it to leap over a gap between two fixt electrical conductors.

INDUCING THE SECONDARY, HIGH TENSION, CURRENT.

If the armature has its winding of coarse insulated wire surrounded by a second winding of very much finer wire, insulated so that there is no direct electrical connection between the inner, primary, coil of coarse wire and the outer, secondary, coil of fine wire, there will yet be a current of electricity "induced" in the outer coil when the primary circuit, or current of the primary armature winding is interrupted or broken. This secondary, high tension current has vastily greater pressure or voltage than the primary current and can be used to produce a jump-spark.

It should be said here that there are two distinct jump-spark effects, the one a single, instantaneous, spark leaping across the gap, from one conductor to another, and the "arc-flame" in which the gap is bridged by a continuous hot flame for an appreciable length of time, and that the arc-flame gives a much more certain and rapid charge combustion than the single jump-spark of instantaneous disappearance.

The single jump-spark may be produced by stationary, primary and secondary coils, but the arc-flame can be had only when the secondary coil is wound over the primary coil so as to form a single armature and this armature is revolved between magnetic fields, as described.

TIME OF INTERRUPTION.

An alternating primary current is strongest when the armature coil is passing between the two fields, and if broken at this time induces the strongest current in the secondary winding of the armature, hence the primary current must be interrupted at the time when the armature is passing from one field to the other to produce maximum secondary current effects.

SPEED OF THE ARMATURE.

The generation of current in the primary coil of the magneto is greater as the velocity of the armature is increased, and the greater the current generated by the primary coil the higher the tension of the

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current induced in the secondary winding.

Hence it is plain, that to make a magneto give sufficient jump-spark when the motor starting-crank is turned slowly, to ignite a charge there should be some device placed between the motor crank-shaft and the magneto armature shaft, which will give the armature a high-speed movement when the coil is passing between the fields, no matter how slowly the motor starting-crank may be turned. This has been but recently done in the Unterberg & Helmle high tension magneto as described elsewhere in this issue.

THE PRIMARY CURRENT SPARK.

To induce the secondary current the primary circuit must be broken, with the possible result of an undesirable spark at the breaking point, and to obviate this difficulty a device called a condenser is used not only in magnetos but also in the ordinary spark coils.

THE CONDENSER.

If the primary coil circuit terminates in a series of sheets or disks of tin-foil, insulated from each other, so as to connect these insulated foil disks in interposed pair, this arrangement of connected pairs of alternated disks, called a "condenser," prevents an injurious spark when the primary circuit is interrupted.

Clutches and Standardization

It is fashionable at this moment to assert that motor cars are now as good as they ever will be, that it is folly on the maker's part to change models every year, and that because of this attained perfection of motor cars the millennium of standardized production is either already here or is soon to begin. The frigid fact is, that at this moment motor cars in good and regular standing which are making real money for their builders and are giving real satisfaction to their buyers and users, are as different from each other in form, materials, mechanical details and minor function as they can possibly be, and yet stand on four wheels and have a general resemblance to each other in outside appearance. From the radiator or mock-radiator in front to the half-elliptic, platform or full elliptic or coiled springs mounted on the tubular or solid, steel or wooden rear axles with bevel-gear or chain-driven rear-wheels, from side doors swinging to front or rear, or no side doors and side levers or no side levers, the 1908 motor cars show every variation conceivable when looked at from front, rear or either side, except three—wheel support on the road surface and front-wheel traction, and when the reflectively perceptive eye of trained mechanical observation is directed to the principal details of the "perfected" 1908 fire-wagons, the diametrically opposed lines of thought and practice in 1908 motor car designs and construction are not less obvious than amazing, nor more evident than indefensible.

On every side and in the middle 1908 motors cars show costly details that are inconvenient and inefficient in one car, and low cost, highly satisfactory and functionally perfect constructions fitted to meet the same demand in another car of the same rank and price.

Granting the need for placing toothed change-gears in a car, the clutch becomes a necessity. The requirements of the clutch are: First—that it should let go, wholly and completely, altogether disconnecting the motor from the wheels instantly, surely and easily, because the quick stop is a matter of life and death in motoring same as in many other pleasure and business functions of humanity. Second—the clutch must hold lightly, very firmly or be little, much, or absolutely locked, as the driver wishes, and must also take hold easy and hold on hard. Third—the clutch should handle easily, with as few foot-pounds of muscle-energy expenditure as may be. Fourth—it should be durable, and last of all it should cost as little as possible, and yet be good and convenient.

And what are the 1908 clutches? Everything, cones, cylinders, external, internal, exterior bands, interior bands and shoes, screw, lever, toggle and motion actuated, self-engaged thru the automatic action of 1000 pounds springs or springs down to 15 or 20 pounds tension or compression, or no springs at all, enclosed or exposed, everything can be found in the 1908 "standardized" motor car clutches.

Speaking of clutch cost, the best clutch of all, in the writers' opinion, does not cost, all told, so much as the four, machine-cut, tool-steel and tempered 1000 pound clutch springs of a 1907 clutch, which the designer thought was the best ever. This best clutch of all has no spring, or a heavy light coiled spring costing only a few cents, as may be thought best by the designer. It is an exterior cylinder for the driving member, integral with the fly-wheel, as large diameter as it can be, and not have any part of the clutch outside of the steel radius. The clutch band is ordinary band iron fibre or leather lined, no finish, simply turned over on itself at each end and riveted, two levers and a sliding cone, pedal-actuated both ways, or light-spring engaged and pedal-disengaged complete the mechanism. The clutch drum, integral with the fly-wheel, costs nothing for material and not more than one cent for finishing. The entire labor cost of this best clutch need not be over 50 cents, overhead charges included, and the total flat cost, labor and materials included, need be no more than dollar and a half.

The action is simply perfection. When released it completely lets go, when the band, leather or fibre lined, begins to touch the clutch-drum the drive begins and increases with band-pressure until, with little engagement power expenditure the clutch holds all the motor can give.

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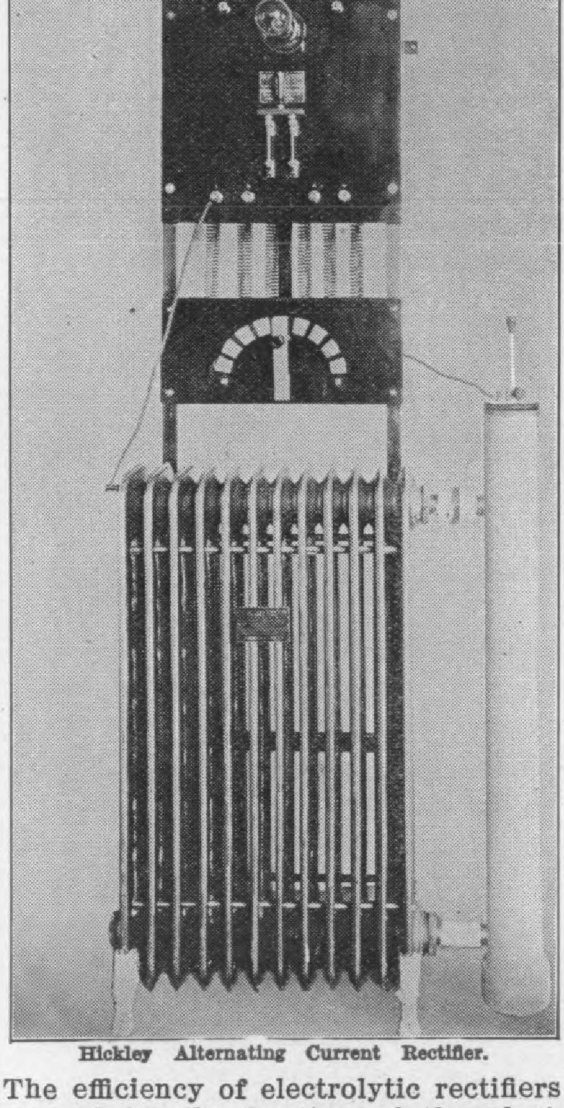
ith offices at Asbury Park, N. J., is a evice for charging batteries, and are parcularly adapted for changing alternating ito direct current. It is an electrolytic ectifier, and altho the principles of its peration are not new, the arrangements or their use are new.



Hickley Alternating Current Rectifier.

The efficiency of electrolytic rectifiers is nproved by the heating of the electrote as the current is increased, thus causng constant attention and necessitating equent changing of the electrodes and ectrolite. In the Hickley rectifier this as been overcome by combining a new ectrolite with a radiating surface, this rface acting as one of the electrodes nd by creating an automatic circulation f the electrolite, keeping it at the temerature of greatest efficiency.

The rectifiers are absolutely automatic use of several aluminum electrodes, pulses of the alternating current are ized, and on this depends the action the rectifiers. For the same reason i impossible for the current to pass but way, consequently there can be no b ing up of the batteries being charged.

Specially prepared aluminum rods used, and the electrolite is a new c pound that gives the highest efficiency is claimed the rectifiers can operate any frequency, from 25 to 133 cycles clusive, and on any commercial alter ing voltage, a range of from 0 to 75 v on 110 volts and from 70 to 145 volts c 220-volt current can be obtained. efficiency of the rectifiers varies with voltage delivered. By tests, it is st the 12 ampere type has given from 75 cent. at less than half load to 85 per c at full load. This will hold good types of larger capacity, the power fa remaining nearly constant for high or voltage charging. The panels are contained, and only require to be nected to the A. C. mains and the l The claims are made for them that t are very flexible, reliable and inexpens and free from two great objections to vices for changing alternating into di current—i.e., constant attention and of up keep. The Hickley rectifier is a g anteed instrument, fully protected United States and foreign patents.

"Raybestos" Brake Lining

The Royal Equipment Co., of Bri port, Conn., manufacturer of automo brakes, was among the pioneers in manufacture of brake linings, and still placing on the market the br lining first produced by them, their " bility" brand, which ranks high and product of merit. The basis of the li is a closely woven duck which is give special treatment, securing the adhe and wearing quality. It has a life of wards of 10,000 miles, and is well ada to the work of light cars and on he cars when the car is not subject to l steep grades in a mountainous countr

To meet the demand for a lining c bining great wearing qualities and at same time resisting the heat necessa generated by the incessant use of brake in descending sharp hills, of a or more in length, the Royal Equipm Company has recently placed on market the "Raybestos" brand of li

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This year, as in previous years, the entire output of the Elmore factory is pledged and sold—with agents urging an increase of their allotment

Far and away the most active car in the American sales market today is the valveless two-cycle Elmore.

For five years it has been the steadiest selling car in this country.

These are positive effects due to a fixed and positive cause.

The stability and prosperity of the Elmore, past and present, has arisen primarily from the fact that it is a *two-cycle* and a *valveless* car.

The history of all four-cycle cars has been one of change and caprice in public choice—largely due to caprice and change and uncertainty in construction.

The history of the valveless two-cycle Elmore has been one of steady progression and steady popularity due to the gradual evolution of a fixed principle of whose correctness every Elmore owner has been enthusiastically convinced.

Thus, today,—no Elmore owner can be coaxed or coerced away from the Elmore. This is due to the riding and operating results he gets *because* it is valveless; and *because* it is two-cycle.

Owners of four-cycle cars may and do waver in their allegiance, change cars, become discouraged and abandon any and all four-cycle cars—the Elmore owner will remain supremely loyal because he is supremely satisfied.

After the Elmore two-cycle engine was perfected and all valves eliminated, only one thing remained to emphasize and widen the gap between the Elmore and all other cars, to wit: the ignition system.

In the 1908 car has been installed an ignition system substantially as amazing in its results as the action of the two-cycle engine itself—a system, for instance, which will run the car 2000 miles on one set of six-inch dry cells.

The paragraphs give you in the rough some idea why the sales of the Elmore are impervious to changing conditions which affect four-cycle cars—why we are inclined to bend a listening ear to the appeal of our agents that each and all of them be alloted more cars.

THE ELMORE MFG. CO.

904 AMANDA ST., CLYDE, OHIO.

MEMBERS A. L. A. M

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MECHANICAL AND TECHNICAL DEPARTMENT

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.

Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

GASOLINE CONSUMPTION AND TIRE MILEAGE.

Schnectady, N. Y.

Will you kindly answer the following question in your columns. I am thinking of purchasing an automobile and would like your advice on the following points. 1. How many miles to the gallon (on average roads) could be expected from the Olds, Maxwell and Ford standard runabouts, assuming the machines to be in proper condition and driven intelligently. 2. How long should tires (the best maker) last on these machines if given proper attention and driven with care. State length of wear in both time and miles. 3. Would solid tires (of the Swinehart type) answer on these machines. How long should these solid tires last?—C. A. WOLFE.

The best way to get information regarding any particular machine is to write to the makers or to users. I do not know by experience the mileage per gallon, but would expect about 20. Much depends on the operator. Many tires are guaranteed to run 5000 miles, and if not overloaded should do twice this. Tires often deteriorate with age so this mileage should be expected the first year. Solid tires wear off on the tread unless very large, and as they wear off they lose their original resiliency and become of less value until they are worn down too much to use. Then they bring very little for scrap. The air tire retains practically its full value as a shock absorber until it will no longer hold air, and is, therefore, the best form; altho for those who do not care to be troubled with air tires and are content with a somewhat less perfect riding tire, the solid will give satisfaction.—C. E. D.

WHAT IS THE TROUBLE?

Philadelphia, Pa.

We have an old single cylinder gasoline auto. We have had nothing but trouble with it. We do not seem to get power enough and would request you, and thank you if you will go through the following data and see if you can find our trouble. The engine is 4-cycle single horizontal cylinder, 4½x5¾; intake opening, 1⅜; exhaust opening, 1⅝; intake valve is automatic and raises at the full opening 5-16-inch; exhaust opens at all times ¾-inch may be a fraction more; into the intake and exhaust are, of course, screwed pipe which we presume are 1-inch and 1¼-inch; carburetor Kingston. The exhaust begins to open about 15 degrees before the dead center and closes at the other dead center. We fire at 15 degrees past dead center to about 10 degrees ahead of dead center. We have no trouble in getting the machine to start. We cannot help but believe that the exhaust does not open enough.—WEST & CO.

The exhaust lift is a trifle small, but this does not affect it except at high speeds, so this is not the trouble. You will understand that at 500 R. P. M., a valve need only lift half as high as where the speed is 1000. Your trouble is probably either with the spark or the mixture. Most likely your batteries are weak and give a few sparks all right, but are unable to continue. When they rest a few moments they will spark all right, but run down almost immediately. If the fault is not there, it might be in the carburetor. A bit of dirt on the needle will make a lot of worry. Possibly the mixture is too rich so that it misses fire when hot, altho it starts easily when cold. Look to the timer contact and make sure that it has not moved on the shaft and is giving the spark at the wrong time; also test your compression, if very weak you may have a scored cylinder, due to a broken ring or loose wrist pin. The engine should develop about 8 H. P.—C. E. D.

ABOUT GAS TURBINES.

Indianapolis, Ind.

I n ticed in the April number of The Cycle and Automobile journal, where you refered to Cassier's magazine for a description of gasoline turbines; that you said that you had built one. Now, I would like to have all the information on the subject that I can get. Would you please tell me where I can get that magazine? Also your opinion of their weak points. Any information that you may give me will be highly appreciated.—WILLIS E. LA RUE.

Any news stand will order the magazine for you, or you can see it at almost any public library. The weak point of the gas turbine is the high heat of the gases, and the fact that this heat simply increases the speed of the gas instead of increasing the weight. High pressure steam is more dense than low strikes the turbine blades a harder blow than pressure steam, and so has more weight and

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does low pressure steam, both because of this density and because of the higher speed. With the gas the high temperature increases the pressure, but no additional matter being added, the density does not increase but rather decreases, and so it does not strike the blades so hard as steam. Further, steam yields a vast amount of heat before turning to water and so can be utilized at slightly over 212 degrees with little likelihood of its falling lower or turning to water, but gas loses its heat without limit and falls in temperature and efficiency rapidly. The heat arrangement will doubtless be a combination of the two using steam to prevent excess of temperature and add weight and efficiency to the gas. Or it may be possible to add weight by letting the hot gas act on solid particles like air on sand for sand-blasting and utilize the impact, but this method is questionable. —C. E. D.

WANTS TO USE FOUR AIR-COOLED MOTOR CYCLE MOTOR CYLINDERS.

Chelsea.

Will you kindly answer me the following questions? I am building a 4-cylinder air-cooled motor, 2¾ bore by 3¼ stroke, the writer has built several of these motors for motor cycles and has had fine success; what I would like to know is this, by putting four of them together and putting them in my runabout with the use of two fans, in your opinion will they overheat? One man especially, claims that four of them would overheat so I could not possible run. What success do the Franklin and the Marmon people have. Kindly advise me or give me any instructions or information, same will be appreciated by a constant reader of The Trade Journal.—JOHN W. WOOD.

You will have no trouble with cylinders of the size you mention if they are designed and made in good shape. They should be regular in shape so that in expanding they do not warp out of round, and the rings should fit well and so hold the gases perfectly for the escape of the gases not only causes loss of power, but leaves the heat of the gases in the cylinder walls and also blows away the oil, with the result that the friction heats the walls rapidly. Get a good oil if you have trouble at first. The air-cooled motor is sure to win out for it has less parts and altho not so constant or regular in its working conditions and, therefore, likely to require a little greater care, is perfectly practical and may be more economical than a water-cooled.—C. E. D.

HOW TO RESTORE TRANSPARENCY TO SCRATCHED CELLULOID.

St. Joseph, Mo.

The fiberloid in the drop to the front of the top of my car has rubbed so that the surface is not as transparent as it should be. Can you tell me how to benefit it?—S. D. WESTHEIMER.

The best way is to get a new piece of celluloid. It can usually be supplied by carriage makers, and is often kept by stationery and novelty dealers. A celluloid varnish will partly restore the surface. Any varnish house can supply you with the transparent varnish or lacquer used to protect bright metal, and this will largely smooth out the rough scratches and permit the light to pass thru without distortion. Have it very thin and use a very fine brush or flow it over the surface.—C. E. D.

WOULD INCREASE THE POWER BUT BE WASTEFUL.

I am applying for a patent on an improvement on the 2 cylinder opposed 4 cycle type of gasoline motor and I would like to have your opinion of it through the columns of the Journal. In my motor the mixture is drawn first into the crank case through one ordinary suction valve by the spreading of the pistons. It is then forced into the cylinders alternately through automatically operated valves placed in the heads of the pistons. If the crank case is made as small as possible, the compression stroke will start with almo s twice the amount of mixture in the cylinder of an ordinary motor of this type. This arrangement will permit a larger explosion chamber and still keep the compression up to the proper point, thereby making a much more powerful motor with fewer moving parts and the same piston travel as in other types. Would I get more power with this motor and if so about what per cent?

Would not the intake valve momentum be about the same as the momentum of the pistons and mixture? What is the reason that an automatically operated intake valve is'nt as efficient at high speeds as a mechanically operated valve?—W. E. R.

Your plan is not broadly new as you have doubtless learned from the Patent Office. You can get double the amount of mixture into such an engine by that method but you cannot use it economically and this is the weak point. You begin the working stroke with the usual pressure but with twice the quantity of gas which you must exhaust at a single stroke length instead of expanding it to double stroke length as such double quantity should be expanded. It would be powerful, for the pressure is high and would fall but little but the exhaust would be very noisy. This arrangement for emergencies when great power is needed would be fine, but this makes a lot of complication. At a guess I would say that you would get 60% more power but you would burn double the fuel to do this and so be quite wasteful.

The intake valve in the piston could be balanced or placed crosswise, but if made very light it would open all right. While its inertia would be the same as the inertia of an equal weight of the piston it must be lifted by the mixture but the piston is returned by the flywheel. Just at the dead center it would lift freely but the piston would quickly be forced against it.

It is assumed that the inlet valve offers too much resistance to the incoming charge at high speeds if automatic and in the craze for high speed all other considerations have been sacrificed. I favor a light suction operated inlet and feel sure it will meet all legal requirements in a superior manner.—C. E. D.

CALCULATING THE SPEED

BRIDGEPORT, CONN.

Will you kindly give me the speed per hour a car should make engine revolution 1000, or what speed the engine would have to travel for a speed of 35 miles per hour, ratio of car 4 to 1, 31 inch wheels. Also if four cylinders, 4x4, is not ample enough to handle a car weighing 2,100, geared at this ratio, 4 to 1.—CHARLES H. SHANNON.

Easy problems like this you can figure out for your self and be more able to handle the next one, for practice makes perfect. A 31 inch wheel rolls 8 ft. per revolution. This is not the absolute theoretical distance but it is easier to handle and is more nearly correct than the exact figure which is slightly larger, because a drive wheel always slips some. Second the the answer to such a problem is almost always only an approximation and it is needless to carry fractions. 5280 divided by 8 equals 660 which is the number of revolutions per mile. At 35 m. per hr. the car will travel $\frac{1}{60}$th of 35 mi. or $\frac{7}{12}$th m. in a min; and $\frac{7}{12}$th of 660 equals 385 which is the number of wheel revolutions per min. The engine makes four times this or 1540. I doubt if your engine can easily do this and would advise a higher gear for this speed, say 3 to 1. At 1,000 revolutions of the engine the car would do slightly under $\frac{2}{3}$ of 35 m. or about 23 m. per hr.—C. E. D

ROTARY GAS ENGINE VALVES

ROCHESTER, N. Y.

I wish Mr. Duryea would tell us of his experience with the rotary valves which were described early last year. It seems to me that the construction was better than poppet valves and I would be interested in knowing if practical test and use have proved that.—W. H. BOARDMAN.

Not many of the rotary valves were made for reasons not connected with the valve. On this account the experience was not so complete as could have been wished. I had very little time to stand over the experimental work and it is usually true that a workman will produce the result he is expecting, so I had difficulty getting the men to see how to make the rotary valves better, simply because they did not believe they could be good. For example I have had them report that "the valve leaked and there was no compression" when a few drops of oil on both valve and bushing showed the valve to be tight and the leak around the bushing. We were not fixed to

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properly fit the hole in the cylinder to the valve seats or bushings and had most of our trouble there. They either leaked around the bushing or in clamping the bushing in place the valve was caused to run hard. In spite of these difficulties, they were carried up to a point where they developed as much power per cylinder as some well known engines of the poppet valve type are doing to day and the better they got the more confidence the workmen had, with consequently more rapid improvement. Such a statement seems silly but it is what often happens when one is not pretty closely on the job himself.

They were as quiet as a steamer and gave no difficulty from lack of cooling or lubrication. I look to see them used more in future. The speed was very slow and once fitted properly and made of proper material there would seem to be no reason why they should wear out in any reasonable length of time.—C. E. D.

MATERIALS USED IN COILS

Will you please answer the following questions in the next issue of the Cycle & Auto. Trade Journal.

Is either primary or secondary winding of a spark coil magnet wire?

What are the best materials for insulating between the layers of the secondary winding?

I have been a subscriber for about two years.—GEORGE PAPE.

Magnet wire is used for both coils. The primary coil is usually wound with cotton covered but will be smaller if silk covered wire is used. The secondary wire is usually silk covered but I believe some makers simply varnish it and others wind a thread between the wires which holds them apart.

Paper waxed with paraffin (not grease or butter), is usually placed between the layers. It is common not to wind the secondary in one coil but to make two or more spools of it and separate them by mica or any similarly good insulator.—C. E. D.

NO ADVANTAGE IN AIR COOLING FOR MARINE MOTOR

NEW YORK, N. Y.

Would you mind informing me through the columns of the C. & A. T. Journal the reason why air cooled motors are not considered serviceable for marine work—if there is a good reason?

If in your opinion air cooled motors are adapted for marine work what special precautions should be taken with regard to the care of a 4 cyl. 4 cycle? Are the valve springs liable to rust and deteriorate more rapidly with an air cooled motor subject to great heat and all air? Must lubrication be more free than with water cooled? Would an air cooled if used be disadvantageously placed under a closed hood? Is a pan absolutely necessary? Would a dash of spray consequent upon shipping a sea crack cylinders when running at top speed?

Suppose on a speed hull any regular light weight water cooled 4 cyl. 4 cycle 4½x5 motor developing its power at 1,000 R P M were to be installed and a choice were given of a 4 cyl 2 cycle 4¼x4½ air cooled motor developing its H. P. at 1,000—(in addition the air cooled 100 to 120 lbs. lighter) which would be the most advantageous and which develop the greater power and in what proportion? Or, would you recommend a 3 cyl. air cooled, same bore and stroke.

I am presuming an answer favorable to air cooled, probably because I am aware of your contention that a gasoline motor is a heat engine.

Motor work however, on the sea and somewhat exposed is a problem differing from automobile practice. Your opinion and expressions regarding air cooled for marine work from a practical point of view would be valuable.—F. W.

Water has great heat absorbing qualities. As it changes into steam it absorbs 5½ times as much heat as would be used to raise it from freezing to boiling and yet the steam is no hotter than the water. On this account a wide variation of conditions may take place without any complaint that the engine overheats. And in this sense water is a much better cooler than is air. Makers are anxious to avoid trouble and even users are not particular so long as they get along somehow, so the water cooled motor gets the preference. But the fact that thousands of aircooled motors are in use every day of the year and that some of them are doing any stunt that the watered motor does, proves that when they are right and kept so, there is no objection to them. This means tight piston rings, proper lubrication, proper mixture and no unnecessary overloads; all of which should be looked out for with the water-cooled motor but often are not. For marine use however, the water is handy and it seems wise to use it. Nothing is gained by using air instead. There need be no valve spring trouble. If a spiral spring softens at its ends and gets shorter, use a shear spring. I have used these in places where a red hot abutment would soften a helical spring every time. An air-cooled motor should be exposed to the air and being down in a hull or cock-pit, most air-cooled motors would require a fan which is bigger and just as troublesome as a pump. I do not think a splash of water would hurt an aircooled motor but if the cylinder was so shaped that it was under a stress the sudden additional strain might break it. Cast iron sometimes cracks with very little provocation.

Of the two motors quoted I would expect to get the most power of the 2-cycle and given an equal choice I would favor it. The 2-cycle has not been developed so fully as has the 4-cycle so very often falls short of its intended power. Four cylinders will give more power than three of the same size and I must not be misunderstood in my preferences. For the average family 20 H P is enuf auto power and three cylinders of the 4-cycle type will give this with less parts and cost than more. Eventually when the 2-cycle is to be depended upon with the same reliability, two cylinders will be enuf. This is not saying that for racing speeds or special purposes or for boat work this number should not be exceeded. The same explanation holds with reference to the method of cooling. In auto work the heat must go to the air and it looks right to get rid of it directly instead of thru a lot of piping with water and a radiator. The simplest way usually survives provided it does the same or nearly the same work as a more complex way. I fully believe that the final form of auto motor will be air-cooled.

I also believe that heat should not be carried off thru the walls of the cylinder needlessly; but it does not follow that an air cooler is hotter than a water cooler. To make sure that there is no trouble in extreme cases the maker usually provides more air and cooling capacity than is needed with the result that very often the air cooler runs less hot than its water cooled brother.

To better illustrate my faith in both air cooling, and the 2 cycle I will say that the motor buggies I am now building are both air cooled and 2-cycle.—C. E. D.

OILLESS BUSHINGS.

BUTTE, MONTANA.

Kindly inform me though the Cycle & Automobile Trade Journal how to re-graphite the bushings on Duryea transmission. Oil splashed out of crank case and dissolved out the graphite that was originally there.—O. A. T.

The oilless bushings used in the Duryea transmissions are fitted with plugs specially prepared by the N. A. Metaline Co of Long Island City, N. Y. You can get from them full information with prices. I have used this method of lubrication for probably 15 yrs. in auto work and it has the advantage that it is clean and permanent. It requires no attention but does not run quite so free from friction as an oil bearing. This is of little moment in a light vehicle with plenty of power particularly when those bearings were only used occassionally.—C. E. D.

An appeal is being made by the American Automobile Association to have the retail dealers throughout the country lend their support to the Federal bill requiring uniform laws in the various states. The effort to put such a bill through Congress enlists the sympathy of all motorists and those having no club affiliations should support the national body by taking out an individual membership for $2. Particulars concerning the Federal bill and membership privileges can be had from Secretary F. H. Elliott, 437 Fifth Ave., New York.

Work on the Long Island Motor Parkway has been progressing quietly, but the signs of activity have been more apparent of late. A plot of ground was purchased recently and the contract awarded for erecting an administration building at Mineola and the engineers are now engaging for the actual work of construction which will be begun very early in the spring.

REMEDYING LOOSE BEARINGS

DONIPHAN, NEB.

I have a 5x7 opposed engine that has given me lots of trouble all summer. It seems almost impossible to keep the connecting rod bearings tight, seem to pound loose, have tried all kinds of babbitt some as high as 50c. per lb. I very carefully tinned the connecting rods before running the metal but it was no

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good, after running 100 miles would have to take down bearings and adjust them, and in a very little while they would be loose again.

It seems to me that the 7″ stroke is too long for the speed of the engine. I have not tried a pressure gauge on the cylinders but it is almost impossible to pull the engine over. The cylinders have the valves both in the head and the compression space is 1⅝″. What would you advise me to do? Don't you think I would get about as much average power if I was to put in a 6″ crank shaft and have a smoother running engine? Could I use the same connecting rods and have a little lower compression if I was satisfied with a little less power? It seems to me that the engine with 6″ stroke could be run enough faster to make up for the less piston travel and what difference there would be in the compression stroke or would that figure anything. I would like to use a storage battery but as we have no way close here to have it charged could I rig up some wet cells and charge the storage battery at night if so what style battery would you advise me to get Salamoniac or Sulphuric Acid? I would prefer the Salamoniac if they will do the work. How many would I have to have?—HARRY WILSON.

You do not give the size of bearings so I do not know what to say about that important point. If the crank pin is not parallel with the shaft your bearing is on one edge at a time and will wear out fast. If your crank shaft is weak enuf to spring or is sprung it will give this effect. A lower compression ought to help it. You can put on a temporary addition to the compression space by screwing a gas pipe T into the spark hole with the plug at the side of the T and a piece of pipe on the end. If this pipe is large and short it will give a big chamber and yet not take a lot of room. You can get at the effect of lower compression by this method and so decide whether to make a change in the position of the piston. To change the crank is costly and reduces the power because it reduces the amount of new mixture drawn in. It is better to use a shorter connecting rod and usually much cheaper. This will reduce the compression but use the same quantity of mixture and so keep the same or nearly the same power. You may be able to save the bearings by using a loose bushing in the place of the babbitt. This bushing will turn about half as fast as the crank pin and so reduce the speed and wearing effect. I have saved bad bearings by snapping a bracelet of very thin spring steel around the crank pin. This was not true in shape but it worked. Be sure there is no grit in the crank case and use a heavy oil so that it has some body when hot. A very little graphite will often help.

You can charge a storage cell very nicely by the use of wet cells. The salamoniac cells will do the work all right. Set up enuf wet cells to give a voltage greater than the voltage of the storage cell. Then connect like terminals together and the increast pressure of the wet cells will force the electricity back thru the storage cell and restore it to the charged condition. The rate depends on the difference in pressure and by putting in or taking out a wet cell you can arrange to recharge at a slow rate which will not hurt your wet cells much and yet will fill the storage if left connected over night. You ought to have a volt meter for this work but if you have not you can count salamoniac cells at ¾ volt each and caustic soda cells at ½ volt each, so for a 4 volt storage you would need 8 to 10 of one or 10 to 12 of the other. C. E. D.

REBORE OR REGRIND?

NEWARK, N. J.

I have removed both cyls. from my opposed engine for examination as they have been in constant use for nearly three years. Before dismantling, the compression (when cranking) did not seem to be as good as it should be so I concluded reboring and new pistons would be necessary. However, I now find that the cylinders show no perceptible wear (using a caliper) but are not perfectly smooth on the inside. The piston rings seem to be slightly worn.

It does not seem to me that reboring is necessary but I want to get the maximum efficiency out of the engine and do not want to re-assemble it without having everything right.

Now, would it be alright to have both cylinders ground, only to a perfectly smooth finish and put in new piston rings? If not what is the best thing to do? Bore is now 4¼″, stroke 5″.—THOMAS E. DENTON.

I do not see that I can advise intelligently. If the roughness is deep it will make the cylinder larger to grind it out. New rings will fit the cyl. but if the piston is too loose the rings cannot hold the gases because as the piston moves from one side of the cylinder to the other the rings are forced into the bottom of their grooves and do not get out quick enuf to avoid leak. If the cylinder walls need work I would advise a larger piston and new rings. If there is not much wrong, I would put in new rings only.—C. E. D.

WILL ACETONE CLEAN CYLINDERS?

Will you kindly give me any imformation you may have on the use of acetone, a chemical said to be the only thing for cleaning carbon out of automobile cylinders without taking engine down and scraping, in other words it is said to be the greatest solvent of carbon known. Would like to know if it should be mixed with oil or any other liquid also what quanity to use. Would also like to know where exhaust valves on 1903 Franklin should open and close, also if possible at what speed of car, air valve on Schebler carburetter should start to open? Have Franklin with one of these carburetters on and don't seem to be able to set air valves so it will work properly at all speeds.—W. R. WICKE.

I have been unable to learn anything about acetone as a solvent of carbon. It is my understanding that the carbon particles themselves are not soluble in any known solvent but it does not follow that we may not find such a solvent some day, nor does it follow that it is necessary to dissolve the carbon in order to clean the cylinder. If the binder that holds the particles together can be dissolved, this should do the work. I imagine that in most cases the particles immediately in contact with the cylinder wall are not burned much unless the wall has been red hot and on this account acetone or any good solvent can get under the real carbon and loosen it by dissolving the oil which holds it to the wall. Kerosene is good for this purpose. There is a decarbonizer on the market that I have heard recommneded by those who have used it.

Acetone is a combustible organic liquid much used for dissolving difficult fats, etc, but its principle use in connection with auto work is as an absorbent of acetylene gas. A tank half full of acetone will take ten times as much acetylene as it would at the same pressure without. Acetylene at such pressures is liable to detonate if separated from the acetone so the tank is first filled with some asbestos or other absorbent of acetone which overcomes this danger. This is certainly an aggregation but it illustrates how difficulties are overcome. Acetone boils at 56 degrees Centigrade, about 133 degrees F.—C. E. D.

ANTI-FREEZING SOLUTION QUERIES

WAYNOKA, OKLAHOMA.

As I have been a reader of your Journal for some years I would like you to answer the following question, thru the Journal.

Can denatured alcohol be used for anti-freezing solution the same as wood alcohol? Is it as safe from explosion? In what proportion should it be used?—G. F. GREEN.

ROCHESTER, N. Y.

Being a subscriber to the Cycle & Automobile Trade Journal, would like you to give me the formula to prevent cooling water on a gas engine from freezing, and about what it will cost.

I have a single cylinder engine in a shop in the yard and use ¾ iron pipe between the engine and barrel, which holds about 17 gallons of water. The only time when the shop will be warm is in the evenings and on Sundays. I would like the formula so made that when mixed with the cooling water it will not freeze in zero weather, nor freeze in the pipes and the pump. I suffered once from cracked cylinders caused by freezing and do not want the same thing over again.

Please state about what the H. P. will be from a four cylinder, four cycle motor, with 3¾″ bore and 3¼″ stroke, with 1½″ valves with ¼″ lift at 400 R. P. M. and at 800 R. P. M. If you have any idea as to what amount of gasoline the engine will consume at the above speeds for 1 hour would be pleased to hear of it.—CLARENCE W. HEFNER.

MONTMORENCI, IND.

What is the best prescription you have for an Anti-Freezing Solution.—HARRY W. STYNER.

Denatured alcohol is now so cheap that I imagine it will go to the front this winter as a preventative of freezing. It will not get gummy like glycerine nor crystalize or attack metal as calcium chloride will sometimes do. On the other hand it does not stand so low a temperature as does the other solution so if the cold is likely to be intense it may be safest to stick to the calcium chloride.

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25% alcohol and 75% water freezes at 0° F.
35% alcohol and 65% water freezes at 15 below 0° F.
40% alcohol and 60% water freezes at 25 below 0° F.
20% alcohol, 20% glycerine and 60% water at 25° below.
Calcium chloride, 5 lbs. to a gallon of water, at 35 below 0°.

A good way to use the latter is to make a saturated solution and then use equal parts of this and water. It will stand down to 0° or below and if it freezes, the ice is mushy and not likely to do damage. If the water boils furiously there is some escape of alcohol vapor and some care should be used to make sure that the proportion of alcohol does not get too little. I think there is no danger of an escape of vapor fast enuf to get a fire or an explosion. In regard to Mr. Hefner's engine will say that as auto engines vary so widely in their fuelconsumption it is not safe to guess what yours will require. Your engine should give 10 H P on a gallon and a half of fuel per hour at 800 rev's and half that with slightly increased rate of fuel consumption at the half speed.—C. E. D.

2 Cycle Engines

HUGH DOLNAR.

NO ADVANTAGE IN USING SLOTTED CROSS-HEAD.

Is the slotted cross-head a practicable means of converting reciprocating to rotary motion for a pair of opposed cylinders? If not, what are the principal objections? While I have no mechanical training, I am intensely interested in the gas engine.—C. M. J.

The slotted cross-head is "practicable" in this connection, but it is by no means suitable. With opposed cylinders having pistons connected to cranks at 180 degrees, the linkage is in standing and running balance, because the pistons move toward or from the center equally. With the slotted cross-head linkage, the pistons and cross-head move all together in one direction giving an unbalanced mass travel, which would cause prohibitive vibration at ordinary speeds. At best the slotted cross-head is fit for only slow work, and it is always costly, difficult to maintain and takes up much more room than the connecting rod linkage for the same piston stroke.

At one time English engineers favored the slot at large, but it is now rearely used save for very slow movements. The slotted cross-head is wholly unfit for the use specified.—H. D.

A CRITICISM.

New York, N. Y.

Although not a subscriber to your interesting paper, I generally manage to read the same with a great deal of enjoyment every month as it comes out, and wish to express my surprise at the evident sarcasm in Mr. Hugh Dolnar's reply to John P. Bates' letter regarding the horse-power of an opposed motor on page 90 of your December issue.

Mr. Dolnar says: "It takes 2 cylinders to make an opposed motor, consequently . . . if you mean a pair of opposed cylinders . . . , as I guess you do mean, etc."

It seems to me that this takes for granted a knowledge of technical terms on the part of the public which many of the talent in the automobile business do not possess themselves, and is unnecessarily severe on Mr. Bates.

On running over the pages of your interesting magazine, I notice on page 4 an advertisement of the "Auburn." This, I see, is described as a two-cylinder "double opposed" 5¼x5. On page 157 I see that the "Reeves" is described as "10 B. H. P., 4x4 "double opposed air-cooled." On page 245 the "De Tamble" is described as "two cylinders, 4x4, "double opposed." On page 375 I note that the "Beilfuss" has "double opposed" cylinders. Of course, these are all extracts from advertisements, which I presume you do not read very carefully, but it gave me pain indeed on reading your description of the "Reeves" engine on page 230, an article evidently written in your own office for the public to read, that "the engine employed is 10 H. P. "double opposed, etc.," with a picture of a two-cylinder air-cooled motor accompanying the text. In view of this, I do not think that Mr. Dolnar has any right to give a public call to a man seeking information for errors you make yourselves."—LANE K. STONE.

[We are pleased to publish the above criticism as we feel that it is particularly true in regard to the pre-supposed knowledge of terms possessed by our correspondents, and furthermore, do not entirely agree with Mr. Dolnar's statement of the case. The term "double-opposed motor" is commonly used to designate a two-cylinder motor of the opposed type and is, without doubt, a contraction of the original term "double-cylinder opposted motor," the word "cylinder" simply being dropped as understood or superfluous, and is, therefore, not an incorrect apellation, altho "two-cylinder opposed motor" is more explicit. In the same way "double opposed motor" has been furtner abbreviated to "opposed motor," and this term is commonly taken to mean a two-cylinder motor, which is evidently what Mr. Dolnar understands by it, altho an opposed motor may have two, four or any even number of cylinders. When four cylinders are meant, it is customary to state the fact by saying "4-cylinders opposed, motor," or as has been done by some makers of such engines, the term "quadruplex opposed motor" is used. The very prevalent use of the designation "double opposed motor" by our advertisers, shows clearly the accepted meaning of the term.—Ed.]

Difficulties Successfully Overcome by Users

Under the above heading we will be pleased to publish how *you* solved *your* automobile difficulties. Many troubles have been successfully overcome by means of the answers in these columns. We earnestly urge those who have been thus benefited or any who have overcome such difficulties to send a brief account of the same to the Editorial Department of the Cycle and Automobile Trade Journal.

SUGGESTION FOR ELECTRIC TRUCK CONTROLLER.

Galen Hall Co., of Atlantic City, N. J., which use electric trucks, suggests the following as an improvement in controllers.

"We believe that a great improvement might be made in electric controllers for automobiles. Our controller has 3 speeds forward and one backward. Getting the control lever exactly at the proper notch is a matter of practice and judgment, and if not properly done the contacts burn or "arc." The work could be done much better if there was less extended motion required, and control effected by a device more instantly at hand, and more conveniently situated. A "Perkins'" wall switch works like a charm in house lighting, and why a switch-board with push button spring escapements could not be devised in this age of electric ingenuity, is not clear to us. Of course, there are several contact points for each speed. Why

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could they not be arranged in "gangs?" They would also have to be locked on reverse when any of the forward points were depressed, or in 'contact.'

"Will take a new controller for each of our machines in exchange for the idea."—GALEN HALL COMPANY, S. NUISELL.

[We shall be pleased to publish in this department any communications which throw light upon this subject.—Ed.]

HAS USED KEROSENE BURNER TWO YEARS.

Effingham, N. H.

Some time since, the editor of a journal said (in substance) in answering an inquiry as to the relative merits of gasoline and kerosene as auto fuels: "Gasoline is easier vaporized, more cleanly, and will probably give less trouble." Perhaps no clearer or fairer statement has been given of the subject, as far as its general use is concerned. One of the largest oil companies wrote me that kerosene had never been successfully used and probably never would be as an auto fuel. Now I have been using it since 1905, and several of my acquaintances a year or two longer, and no one of us would for a moment think of changing for any of the other fuels. The question arises, if it has given in our experience such success, why has it not won its way into general favor? I will give a few of the many reasons as they impress me.

First, the makers of good burners have not been full and explicit enough in their directions, have failed to impress the ordinary user with the importance of following directions.

Second, it has been assumed that users have made a study of the rather complex problem and understand it. The answer of the editor tells the rest. Now if the user will spend a day or two at the makers of any of the good burners, and have the whole subject gone over, get some practical knowledge of the burner, of what to avoid as well as what to perform, and will then use care, intelligence and caution, kerosene will be found a cheaper, safer and more satisfactory fuel than the others in general use. If, however, the user assumes that because he understands a gasoline burner, that he is a past master with so simple a fluid as kerosene, and that he can handle it "any old way," he will find he has been dreaming, and probably awaken suddenly and condemn the fuel. I do not write to exploit any burner. I do not have the slightest primary interest in any one, nor do I know by experience who makes the best, but from comparing those used with gasoline find they do not suffer in efficiency, economy or safety.

To one contemplating buying a kerosene burner I would say I would never trust to one lighting apparatus on extended trips. Have found that the beginner has most of his trouble in his first firings, and tho he may have the very best torch and use it with care, there are times when it is a great benefit to supplement it and make assurance thoroly sure with another good device. When running give care to the pilot, and see that it is burning well and the gage on the main fuel line clean, and the pressure at the points best suited for the work, and then a little study and experience will give results that will be gratifying and repay any one for their study and care.—H. W. HARMON.

SUGGESTIONS TO H. N. CROSS, M. D.

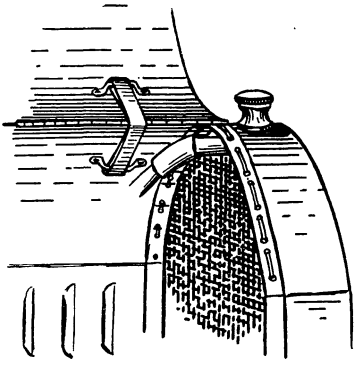
Mountain View, Cal.

If H. N. Cross, M. D., of Stockton, will change his four-cylinder two-cycle engine ports to the following dimensions he will get all the speed and power he can wish for. Exhaust port, ⅞-inch long;inlet port, ½-inch long; inlet to crank case, ⅞-inch long; piston, 5 inches long, "to come to top of crank case port;" connecting rod, 8½ inches C. to C. He does not show nor state how his crank pins are set, but they should be 90 degrees apart.

Deflection on top of piston should be 1¼-inch high, and on the edges clear the cylinder wall .004 of an inch. Passage for gas from crank case to combustion chamber should have a clear 2-inch area. He has too much space in crank case. Should have at least 5 pounds pressure.—T. J. HENDERSON, M. E.

A PRACTICAL HOOD CATCH.

The careful motorist dislikes to see the highly polished hood becoming scratched when folded back, but very few hoods are so arranged that they will not be marred, after continual opening. In the accompanying cut



is shown a simple device which will prevent this. It consists as shown simply of a heavy strap passed thru two small cleats riveted to the two parts of the hood.

LAYING UP STORAGE BATTERIES.

In laying up storage batteries for any length of time care should be taken to thoroly pour off all the acid, letting the cells drain at least ten minutes. Then fill the cells with clear water, rain water preferred, and then let this after a few minutes drain off. Then fill the cells with distilled water until the plates are completely covered. Clean and oil the connections and screw in the vent caps. The battery should not be exposed to very great temperature fluctuations.

When wanted for use again electrolyte should be prepared as follows: In a clean porcelain or earthenware vessel place distilled water in the proportion of three and one-half parts, liquid measure, to one of chemically pure sulphuric acid, testing 66 degrees Beaume. Care should be taken to pour the acid into the water, stirring continually. The mixture should test by hydrometer when cold about 1260 specific gravity. This electrolyte should then be carefully poured into the cells until the level is about one-fourth inch over the plate tops.

CARBONIZED CYLINDERS AND BROKEN CRANK SHAFTS.

Many automobile owners and even professional drivers do not apparently realize the importance of keeping the engine cylinders free from carbon, the deposits of which are probably responsible for more broken crank shafts than any other one cause. Knocking due to premature ignition, caused by dirty carbonized cylinders, puts more strain on the mechanism than it is intended to work under.

To clean the cylinders use kerosene occasionally, and run as weak a mixture as possible. A thoro cleaning can only be made by taking down the engine and scraping. A judicious selection of lubricating oil will also help keep the cylnders free from deposits.

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HERZ TIMER 1908

with **Ballbearing.** The Standard Circuit-Breaker of Europe and America.
Scientifically accurate timing. Lowest possible current consumption. Toolsteel contacts. Made in 20 different models to fit any make of motor.

BOUGIE MERCEDES 1909

Acknowledged all over the world as the best spark plug ever made. The best for high tension ignition. Proof against oil or soot. The only plug that is absolutely self cleaning. No porcelain. Insulation of double stone.
Guaranteed never to crack. No packings. Guaranteed for one year.

HERZ
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B. B. PUMP

The success of the Paris Salon.—A Double Piston Power Pump driven by gear, belt chain, etc. No leather packing but Piston Rings. Nickel-Steel Crank. Used for high speed and continuous use. Special model for garages. Guaranteed pressure 100 lbs.
Used on U.S.S. Connecticut. Highest indorsement.

MOTOR-WHISTLE

Special Petticoat Chime Whistle. An aristocratic signal for car or boat.
WHISTLE TANK with check and safety valve.

OSCILLUM Spark Gap.

All metal and glass. Spark intensifier and spark indicator.

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LAFAYETTE ST.
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HERZ DISTRIBUTOR

For Dashboard.—Will work for years unattended. Special model for boat work. Double swivel base. Plate glass cover. Connections flexible. Adjustable spring contacts. Toolsteel vs. Toolsteel. No moving parts exposed.
3 cyl. 4 cyl. 6 cyl. 8 cyl.

HERZ-DISTRIBUTOR —Compact 1909.

Our newest European design first exhibited at Paris Salon 1907. Outside dimensions: Width 3¾. Length: 4 in.
Assembled and taken apart in 5 seconds. Quick detachable cable connections. 4 cyl. 6 cyl.

VI KÖNIGSKLOSTER 67
WIEN
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The Shock Absorber
PATER-NOSTER Model 1908

Newest improved model. First exhibited at Paris Salon 1907. Will be used as regular equipment on: Mercedes, Pipe, Isotta Fraschini, Saurer, Etc.
Two types: with or without Roller Clutch. Ball joints. Write for prices.

Patent FLYWHEEL
Hand Lever PUMP—Tandem

A newly invented Hand Pump driven by friction from the Flywheel while held against it by the Lever. A necessity on every car.
Write for information.

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ASBESTOS-COPPER-GASKETS

By far the largest stock in America. Over a million Gaskets in stock. More than 700 sizes. Send us your requirements. All forms, all sizes in stock. Exhaust Gaskets.

COILS

The Cream of the French Market. Guenet Coils with Carpentier Interrupter. Gianoli Coils. Exceedingly low current consumption. Ask for 1908 prices.
Would'nt you prefer a Fine French Coil to a Domestic at the same price?

35 QUEEN VICTORIA ST.
LONDON
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SWITCHES

Puck, a double throw switch with all contacts under dust-proof cover.

FOOT LEVER SWITCH—Emergency Brake. Current Interruption through Foot Lever.

PNEUMATIC Patent SYPHON

A New Apparatus for filling up the Gasoline Tank and Water Tank without spilling by simply pressing a rubber bulb. No funnel. An exceedingly smart arrangement.
Write for particulars.

HERZ
On Automobile Material
MEANS THE VERY BEST
All Over The World.

STORAGE BATTERIES

Made by Gottfried Hagen, Kalk, Germany

IMPORTED HERZ TIRES

Made in Austria. Enormous reduction in price. Unsurpassed quality. 99.9% pure para gum. Will outlast any 3 other tires.

Cables and Wires

Steel Armored Cables.
Complete Wiring Outfits
Cable and Wire Terminals
Detachables.

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6, capital stock $100,000.00, to exploit a cylinder touring-car design by Mr. Charles Cutting, who had previously had six years erience as a motor car designer. The first tting Six" was on the road in February, 7 but the C. V. I. was first publicly ex- ted at the Chicago 1907 December Show. he C. V. I. Company has a factory in kson and expects to work carefully and d only about 50 cars for 1908, fitted with er 5 or 7 passenger touring car bodies or e or four passenger runabout bodies, price 00.00.

THE MOTOR.

he cylinders are dual units with valves on osite sides. The motor base and the oil bottom are aluminum castings of the

cam-shafts are set ¼ inch outside of the vertic plane of the valve-stems.

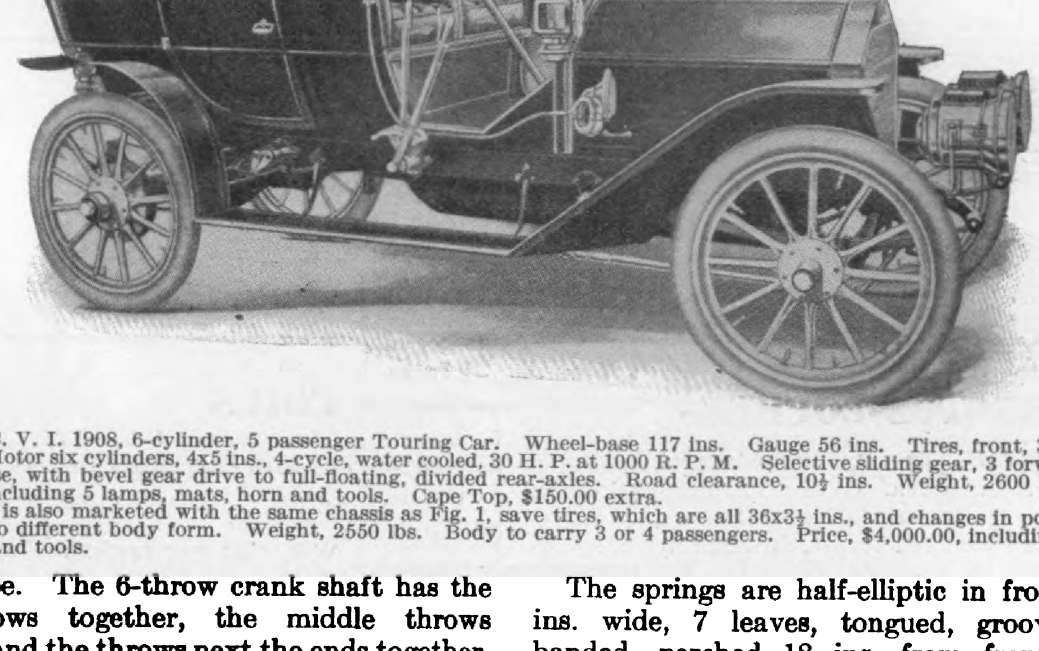
The cam-shaft gears are not keyed to t cam-shafts, but are engaged by six-stud ba drivers, having squared eyes on the squar cam-shaft ends.

NOTABLE FEATURES.

This C. V. I. chassis was designed with view to reliability first of all, but with t comfort and convenience of patrons desiri a speedy car constantly in mind. Exce the motor everything is on ball-bearings, Hes Bright for the line and side shafts and F and bearings everywhere else.

THE AXLES AND PRINGS.

The axles are Garford, with bevel balan gears. No ball thrust bearings are fitt except in the clutch-hub groove.



. 1. C. V. I. 1908, 6-cylinder, 5 passenger Touring Car. Wheel-base 117 ins. Gauge 56 ins. Tires, front, 36x3½, re ins. Motor six cylinders, 4x5 ins., 4-cycle, water cooled, 30 H. P. at 1000 R. P. M. Selective sliding gear, 3 forward spee reverse, with bevel gear drive to full-floating, divided rear-axles. Road clearance, 10½ ins. Weight, 2600 lbs. Pri 0.00, including 5 lamps, mats, horn and tools. Cape Top, $150.00 extra.
adster, is also marketed with the same chassis as Fig. 1, save tires, which are all 36x3½ ins., and changes in positions a s due to different body form. Weight, 2550 lbs. Body to carry 3 or 4 passengers. Price, $4,000.00, including 5 lam horn and tools.

l type. The 6-throw crank shaft has the throws together, the middle throws ther and the throws next the ends together. e three groups of two cranks each are set degrees apart. This shaft is mounted n annular F. S. bearing at the front, five n bearings between the cranks and two S. bearings at the flywheel end.

he valve ports are all $1\frac{13}{16}$ inch dia. exhaust es lift $\frac{3}{8}$, intake valves $\frac{5}{16}$ lift. The cams pplied to the $\frac{7}{8}$ cam-shafts which are each annular F. and S. bearings. The cams retained with one Woodruff Key and one r pin in each. Each cam-shaft is in a long an of its own, cast integral with the motor- , and is capped with one long cover, in-

The springs are half-elliptic in front, 42x ins. wide, 7 leaves, tongued, grooved an banded, perched 18 ins. from front-eye t center of axle, jointed to the chassis frame i front and linked in the rear. The rear spring are plain full-elliptics, 38x2 ins., 7 leave fixed to the rear axles and revolubly secured t trunion brackets on top.

STRUTS AND TORSION ARM.

Both are fitted. The struts have fla vertical joints at both ends, with screw length adjustment

The chassis frame has parallel sides, all 3 ins. wide, and is raised 2½ ins. at the rea A subframe is used to support the motor whic is mounted on six lugs. The change spee

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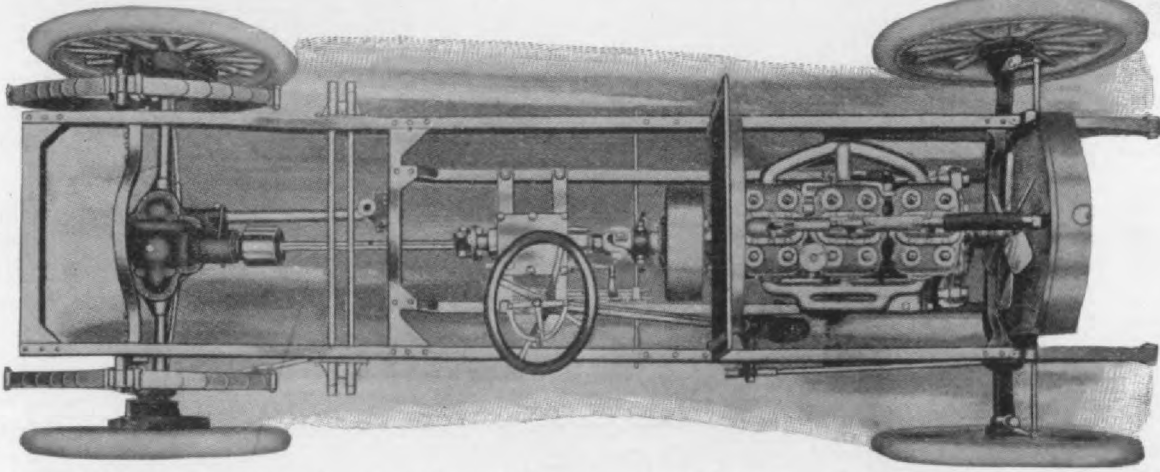

Fig. 2. C. V. I. Six-cylinder Chassis. Plan. The sub-frame is used and 3 point suspension is ignored, the motor base l lugs and the gear box 4 lugs. Four universal joints are placed, two in front of the gear-box and two on the propeller he front springs are half-elliptics. The chassis-frame is prest steel, 4–31-32 ins. greatest dept by 1½ ins. side-frame he chassis frame is all one width, 32 ins. The clutch is a leather faced cone with cork inserts, 14–9-16 ins. large dia., 1 ngle. Torsion arm and struts, screw-length-adjustment, are fitted. The chassis design is strictly along thoroughly tested

BRAKES AND CONTROL.

The brakes are exterior and interior on and n a steel-casting brake-drum 14x2 ins. The xterior band is camel's hair lined and 3-hole ever applied. The internal shoes are bronze aced, metal to metal contact.

There are two pedals on the foot-board. That at the left is pushed forward to disngage the clutch. The right pedal is pushed

at one o'clock P. M., Monday, Decemb from the Armory northward over Ch streets in a driving snow storm, was acce more to please the "Father of the Baby" from any expectation of personal enjoyn The writer's solitary previous experienc touring in a snow storm, included an covered car and the company of a broke and other unusual conditions which did

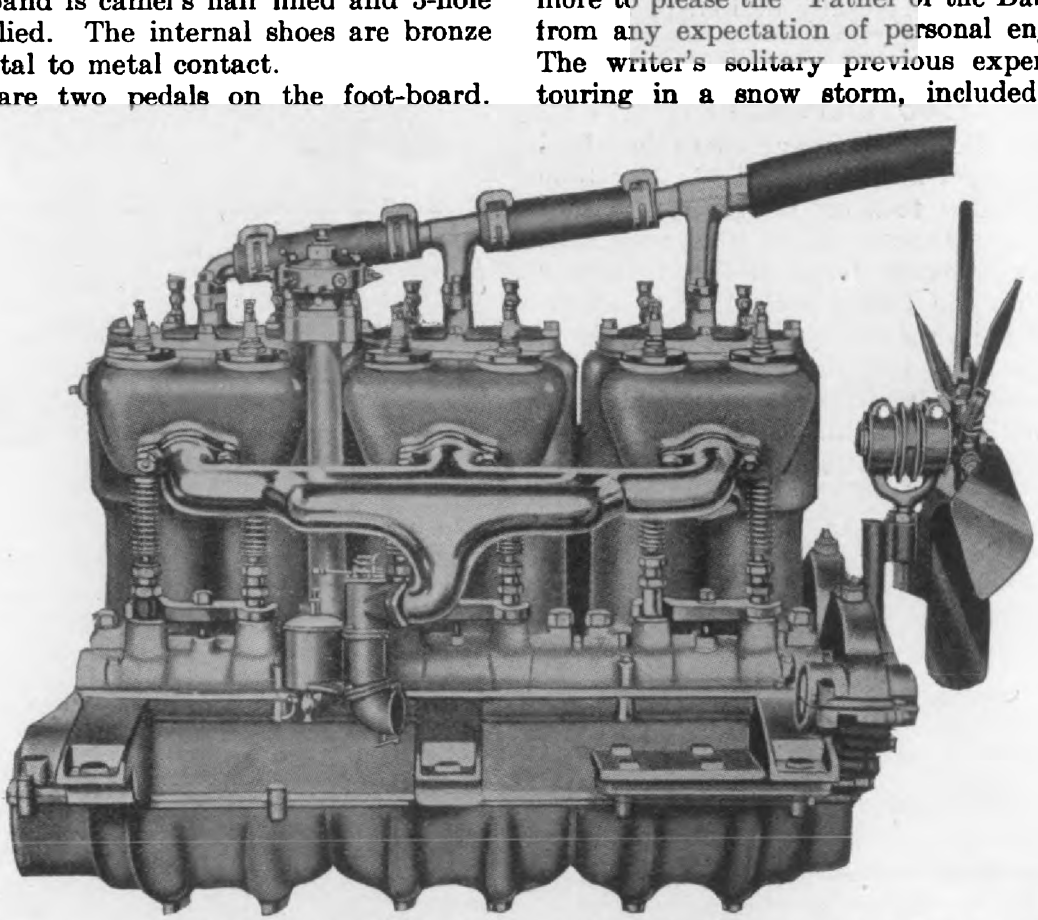

Fig. 3. C. V. I. motor, right side. The cylinders are dual units, valves on both sides, two cam-shafts, cams applied, nd pinned. The lubrication is splash, with mechanical oiler.
The ignition is one jump-spark plug in each cylinder with storage battery and coils and Bosch magneto. The motor-ba il-basin are aluminum castings and except for a slight modification of the intake and water-piping, the motor design i ractice.

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ged the sinister aspect of this wintry rsion in the most unexpected manner. e six-cylinder drive gives an undeniable riority in smoothness of movement and big C. V. I., 117 inch wheel-base, handled a runabout in the crowded street and ing snow storm from the head of Michigan ue to Rush Street Bridge, the slow pace igh gear enabling the C-Six to take in- advantage of any opening in the tangle orse-drawn trucks and carriages. Our r was evidently unfamiliar with streets ded to capacity limit and viewed the ahead of us with apprehension as we Michigan Avenue, but he handled the car perfect certainty.

e return run was rapid and really de- ful, though we were headed into the storm, this C. V. I. blizzard excursion gave the r an entirely new conception of the de- s of mid-winter motoring made possible big car, well covered and driven by a r which can give any desired pace, slow st, on high-gear.

1908 Cleveland

e 1908 Cleveland changes were described r December issue page 67 but at the time vere unable to show photos of the new bout or the motor which is entirely new. os are herewith shown of these. It will en that the 1908 Cleveland is to all in- and purposes an entirely new creation, many novel features, such as the oiling m, conoidal multiple disc clutch, piston direct drive on third speed and in little ls of construction such as the method of ting the mesh of the bevel pinion with ear axle bevel gear, the construction of

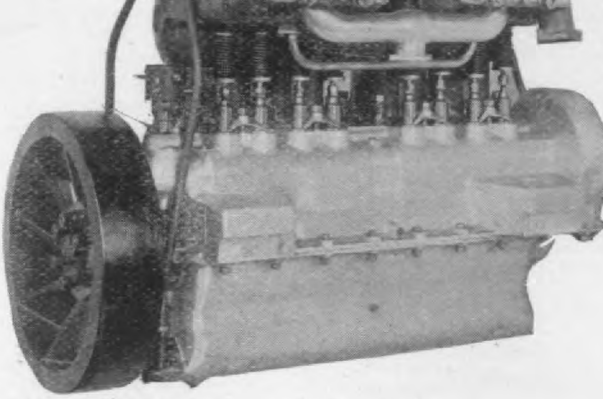


Fig. 2. Right side of the 1908 Cleveland 40–45–H. P. moto Bore and stroke each 5 inches. Valves intake and water pip and also the exhaust manifold are on one side. The valve ro guides and piping are held by yokes for rapid removal. Th oil pump and shaft for the distribution as well as the two t one gears are all enclosed in housings integral with the cran case.

the dust proof universal joints, the large siz of the brakes and the locking of all nuts an adjustments throughout the construction.

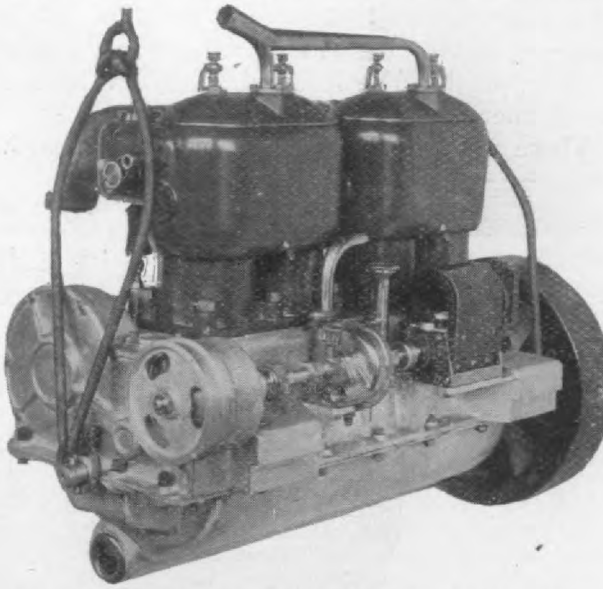
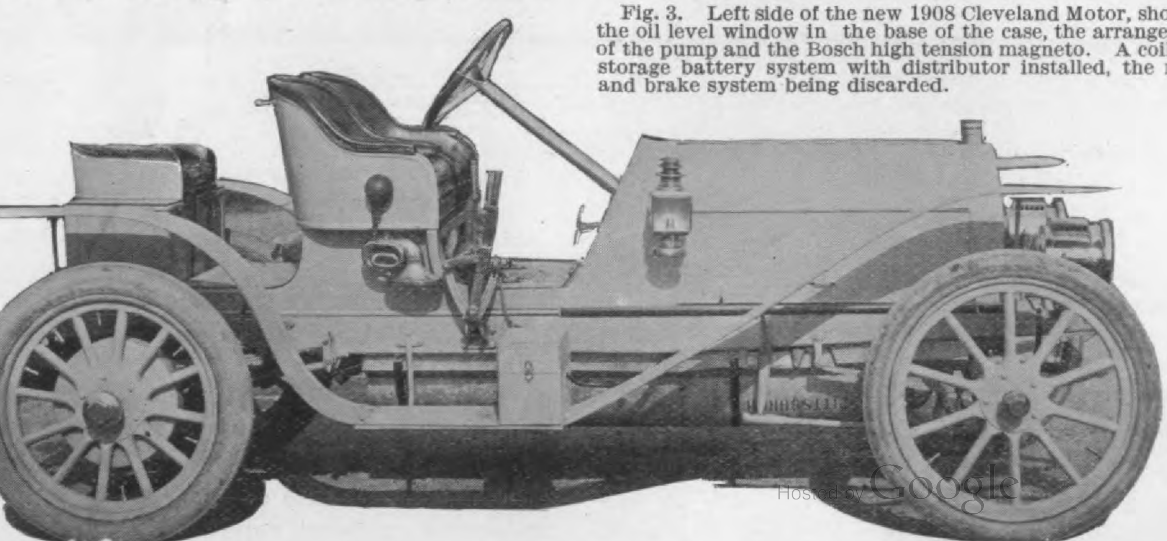


Fig. 3. Left side of the new 1908 Cleveland Motor, showin the oil level window in the base of the case, the arrangeme of the pump and the Bosch high tension magneto. A coil an storage battery system with distributor installed, the mak and brake system being discarded.



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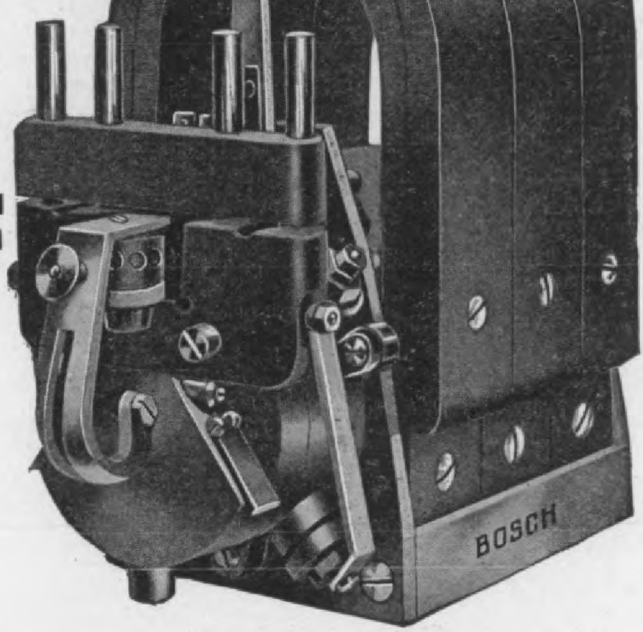

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mpany to make up its cars into dis-
ctive models to be known by the cal-
dar year, but rather to incorporate im-
ovements, as fast as they are proven
, in the current output of the factory.
ere are, however, a number of inter-
ing and important changes in the 1908
dels known as the Berliet cars. Three
ferent chassis models will be made, one
them being entirely new, with a six-
inder motor. The other two regular
asses will correspond to the 1907
dels in being of forty and twenty-two
rse power, respectively, but each em-
lies several changes.

over the rear of the frame 3 or 4 inch
The chief modifications, however, are
the ignition and lubrication. Jump spa
ignition is used with high tension Bos
magneto. The advantages are a red
tion in the number of working parts,
ing away with all the make and bre
mechanism, thus reducing the noise. T
proper adjustment and synchronizing
the make and break ignition is not
tirely understood by the great major
of chauffeurs, and with a high tensi
magneto this difficulty is eliminated.
sults of tests made with the Bosch hi
tension magneto abroad and here indica

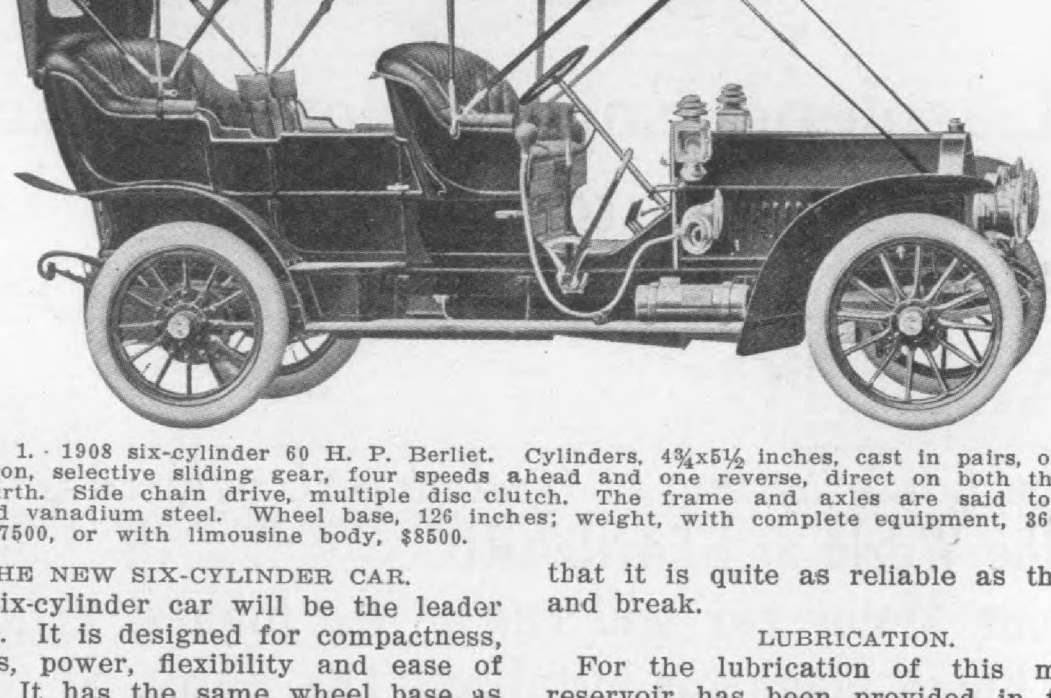

Fig. 1. · 1908 six-cylinder 60 H. P. Berliet. Cylinders, 4¾x5½ inches, cast in pairs, of vana
um iron, selective sliding gear, four speeds ahead and one reverse, direct on both the thir
d fourth. Side chain drive, multiple disc clutch. The frame and axles are said to be o
ported vanadium steel. Wheel base, 126 inches; weight, with complete equipment, 3600 lbs.
ice, $7500, or with limousine body, $8500.

THE NEW SIX-CYLINDER CAR.

'he six-cylinder car will be the leader
1908. It is designed for compactness,
ntness, power, flexibility and ease of
trol. It has the same wheel base as
forty horse power car, 126 inches, and
weight is only 300 pounds more. The
cylinders are 4¾-inch bore by 5½-
h stroke, and the length of the hood
no greater than that of some four-cyl-
er models. This car, as well as the
ty, has a direct drive on both the third
fourth speeds. The ignition is by
h tension magneto; it has a force feed
rication, multiple disc clutch, double
in drive, sliding gear transmission
h selective control, four speeds for-
rd and reverse and four brakes, and it
claimed is capable of making 70 miles
hour.

n specific detail, the six-cylinder
ssis is similar to the 1907 forty horse

that it is quite as reliable as the ma
and break.

LUBRICATION.

For the lubrication of this motor,
reservoir has been provided in the b
tom of the crank case with a capac
of about two gallons. This is kept fill
with oil and is piped to a gear pu
driven from the exhaust cam shaft
spiral gears. This pump delivers oil in
a tube running thru the bottom of t
crank case from end to end, and co
nected in the most direct manner wi
the main line bearings. The oil is the
fore forced into these bearings on t
underside of the shaft, giving a positi
and absolutely reliable force feed lub
cation at all times. Pet cocks are p
vided at the side of the crank case
the purpose of gaging the height of t
oil when filling the case, the same as
the other models. No constant feed

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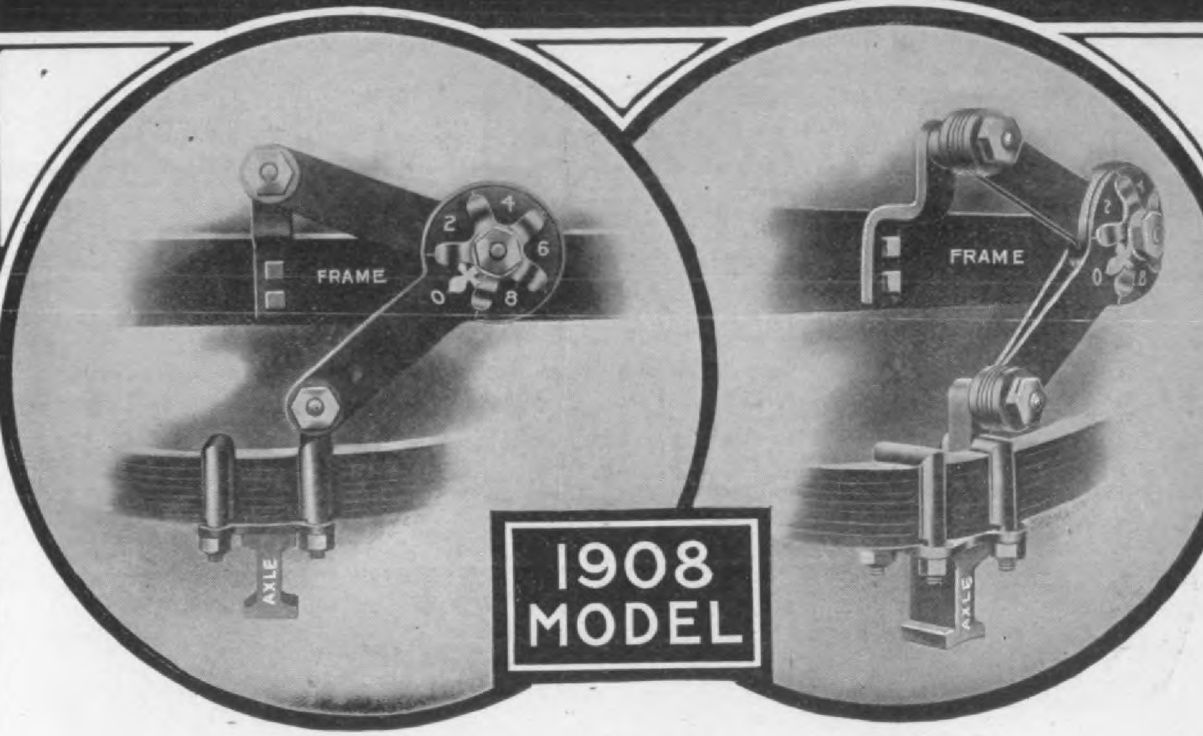
TRUFFAULT-HARTFORD SHOCK ABSORBER



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This control of the springs can be secured only by the use of TRUFFAULT-HARTFOR Shock Absorber—the device that has made SAFE, ECONOMICAL AND COMFORTABL automobiling possible.

In the 1908 model we believe that we have practically obtained perfection.

A distinctly new feature has been added, consisting of a regulating dial with indicator, makin possible for even a novice to obtain a perfect and uniform adjustment to suit the exact requirements the car as measured in terms of its gross weight, and easily secure the maximum benefit.

The Truffault-Hartford is the only spring retarding device manufactured with a regulating dial. is automatically lubricated, absolutely dust and water proof, interchangeable, practically indestructible fully guaranteed.

The superiority and individual qualities of the Truffault-Hartford Shock Absorber are best dem strated by the fact that it has been adopted exclusively as equipment by such prominent cars as the :

PIERCE GREAT ARROW, STUDEBAKER, STEVENS-DURYEA BIG SIX, STODDARD-DAYTON SIX CYLINDER, MARMON, CONTINENTAL, LANE, CONOVER, SULTAN, FRONTENAC AND ACME SIX CYLINDER.

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lf, which is embodied in the magneto. transmission is of the same type as l on the 40 with direct drive on both third and fourth speeds, but is some- t heavier all the way thru. In other ects this car is identical with the y horse power. The price fully equipt he six-cylinder, with touring or run- ut body, is $7500; with a limousine y, $8500.

an overflow pipe to the tank.

No change has been made in the ca buretor or ignition. The steering gea has been slightly modified. Instead being attached to the frame, it is now a tached to the crank case, and bolted thr the supporting arm of the case and th frame, making a somewhat more substa tial construction, and at the same tim giving more rake to the steering post. Th

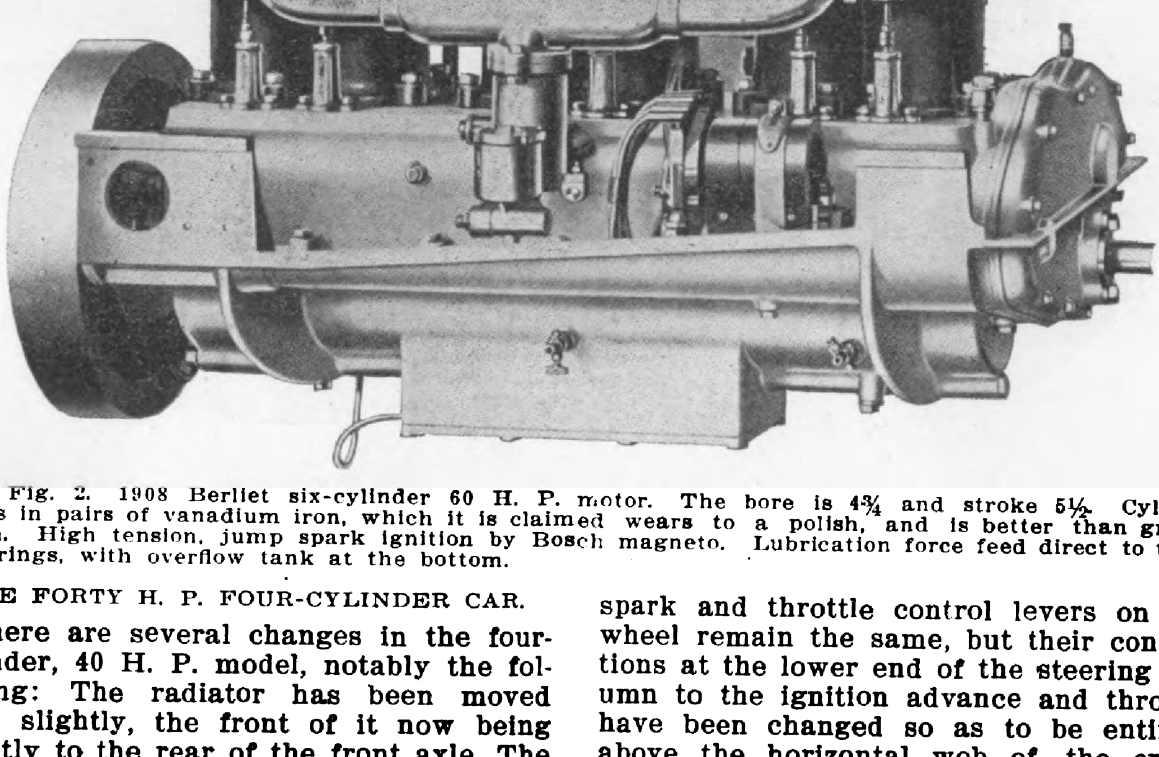


Fig. 2. 1908 Berliet six-cylinder 60 H. P. motor. The bore is 4¾ and stroke 5½. Cylin- s in pairs of vanadium iron, which it is claimed wears to a polish, and is better than gray . High tension, jump spark ignition by Bosch magneto. Lubrication force feed direct to the rings, with overflow tank at the bottom.

E FORTY H. P. FOUR-CYLINDER CAR.

ere are several changes in the four- der, 40 H. P. model, notably the fol- ng: The radiator has been moved slightly, the front of it now being tly to the rear of the front axle. The fly wheel has been discarded, and a iron fly wheel substituted, and a belt en fan placed directly back of the tor. The oil tank, instead of being to the left side of the car and cut- in the running board, is carried at eft side of the crank case, just under horizontal web connecting the case the frame, and its filler cap projects ru the case, making it very accessi- or filling. Instead of forcing the oil this tank to a float chamber in the cator, it is now forced into a sight on the dash by means of a small gear driven from the cam shaft by spiral . The oil delivered from this pump rried to two sight feeds in which the

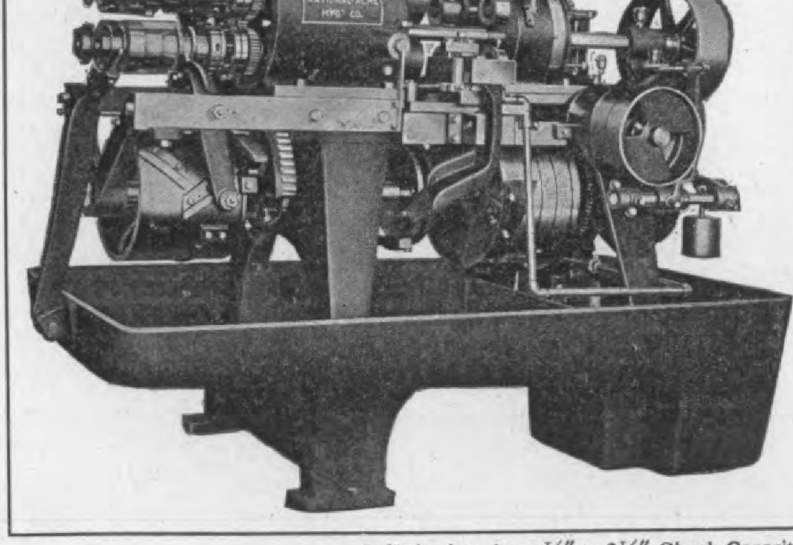
spark and throttle control levers on th wheel remain the same, but their connec tions at the lower end of the steering col umn to the ignition advance and throttl have been changed so as to be entirel above the horizontal web of the cran case where they are entirely protecte from water, mud, etc. The multiple dis clutch remains the same as before, an the same transmission is used, with thir and fourth speeds direct. The contro levers have been changed, so that th brake lever is outside of the gear shiftin lever. The price of this model, with tour ing or runabout body, is $6500. Limousin or landaulet bodies cost $1000 more.

TWENTY-TWO H. P. SHAFT DRIVE CAR.

In this car, the general lines remai the same as heretofore, the location o the motor and radiator being the same The transmission is entirely new, becaus of changing from a side chain to a shaf

ACME

AUTOMATIC MULTIPLE SPINDLE SCREW MACHINE



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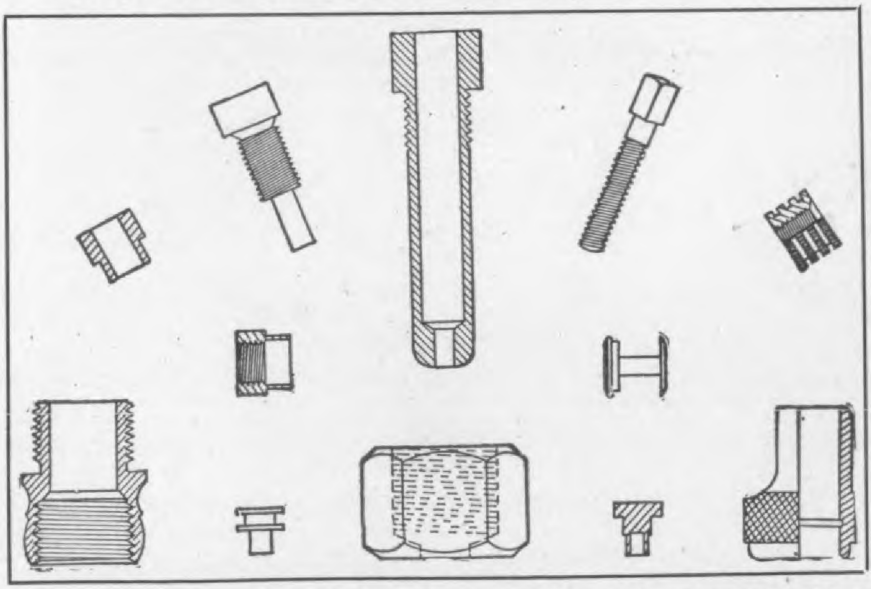

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applied to the driving shaft, the ght of the vehicle being carried on the ionary part of the axle. With this ar- gement it is also possible to remove driving shaft without removing the eel. The differential housing is made one piece with a removable cover, so igned that the entire differential and el driving gears may be removed by ply taking off this cover. In fact, all driving mechanism may be taken out, the axle without even jacking up the or removing the wheels. This con- uction also renders the working parts ly accessible for inspection, and also adjusting in the factory. The axle is ssed and of comparatively heavy con- uction. No camber is given to the eels. Radius or strut rods are used necting the axle with the frame sides, propeller shaft or transmission. The co tracting brakes are operated by a peda and the expanding brakes are operated b a hand lever. Air space is provided b tween the drums of these brakes to faci tate radiation of heat. The gasoline tan is placed under the chassis just back the axle, as heretofore. Gasoline forced to the carburetor under pressur as in the previous models. As this ca is built specially for town use, the whe diameters have been slightly reduce tires being 880x120 m.m. rear and 870x9 m.m. front. This car, limousine or lan aulet, sells at $6000.

All the models, it is claimed, are mad of imported materials, vanadium steel an iron truout, and all cars are sold full equipt for use, including tops.

Single Center Buggy Company's Runabout

the accompanying photo is shown a high wheeler, which, in the language he maker, Single Center Buggy Co., of nsville, Ind., is, "Not a buggy but a looking automobile runabout." This has 36-inch front and 38-inch rear els, fitted with solid rubber tires. It a long wheel base, and is more of a engaging a special metal disc at the rea of the flywheel. The frictional engag ment is obtained by means of a foot leve The drive to the rear wheels is by sid chains, the cross shaft carrying twelv tooth sprockets, and 52 tooth sprock wheels being clipt to the rear wheel The foot brakes act on the countershaf The car is steered by a hand wheel thr a worm and segment. The speed is 3 t 25 miles per hour, the changes being o

Single Center Buggy Company's high wheel-ed "Roadster Runabout." The motor is two ders opposed, 4½x4, rated at 12 to 15 H. P. Sarven wheels, 36 and 38 inches in diameter, used, with 1¼ V or round solid tires. A friction change speed is used, consisting of tra- ng friction rimmed wheel on the countershaft engaging by pedal action the rear of the fly- l, which has a special metal face. Plenty of parcel room in the rear, and 17 inches road ance. Timken roller bearings are used in the wheels. Price, $675. Another car on similar but with 32-inch wheels and 3-inch pneumatic tires is offered for $800.

ster than anything heretofore shown large wheels. The motor is a two- nder opposed type, 4½x4, rated at 12- I. P., is 4-cycle, and has automatic in- valves. A Schebler carburetor is . The ignition is by jump spark, ob- tained by means of a hand lever whic serves to move the friction wheel.

The body has panel back seat, and fitted with mud guards. It is finished i purple lake, the running gear is either re or Brewster green; made wide or narro

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A COMPLETE FLOP

Certain speedometer manufacturers, who until recently had the nerve to talk a **mysterious quality to reconcile an outrageous price,** have now completely somersaulted, an acknowledgment that either the outrageous price was not offset by quality, or that there is a sacrifice of not only size but also quality in their new low-priced instrument.

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is the medium that has brought them to time.

Mr. Motorist, we make the

Best Speedometer in the World

Our competitors instantly recognized in it a winner, and realized that it would spell DOOM for them if they did not meet the competition, but they can not turn the stampede by offering only diminutive, undersized, unattractive Speedometers.

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Our American Model

Sells for $25

It is full size, 4-inch, has enclosed Odometer, and is equipped with the famous Stewart Flexible Shaft and Stewart Swivel Joint.

STEWART & CLARK

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rs cast in pairs. The valve chambers
y underneath the valve a longitudinal
ke port, and the gases are introduced
these ports thru a flanged T fitting
veen the pairs of cylinders, making the
uretor connections very short and di-
, and insuring an equal draw for each
nder. The T intake connections be-
en the pairs of cylinders provide for
expansion and contraction between
cylinders, and stuffing boxes insure a
t joint.

ne top and bottom manifolds are pro-
d with long risers, and due to the
paratively thin and flexible material
which they are made, they take care
ne movement between the various cyl-
rs due to contraction and expansion.

ne cover plates on the top and side of
cylinders are made of aluminum, and

crank case is a 3-jaw clutch couplin
This coupling is marked, and upon remo
ing a cylinder, it is not necessary to r
time the spark, for if the clutches are r
assembled as marked, the timing is sur
to be the same as it was before dismoun
ing.

The electrical connection between th
igniters and the wood enclosed buss ba
battery connection is thru a roll of coppe
tubes mounted within the buss bar, usin
switch plugs fastened to the end of th
cables for connectors, and providing facil
ties for testing out each individual ign
ter.

The igniter points on the make an
break system are located over the inne
edge of the intake valve, as the incomin
charge must at all times pass this poin

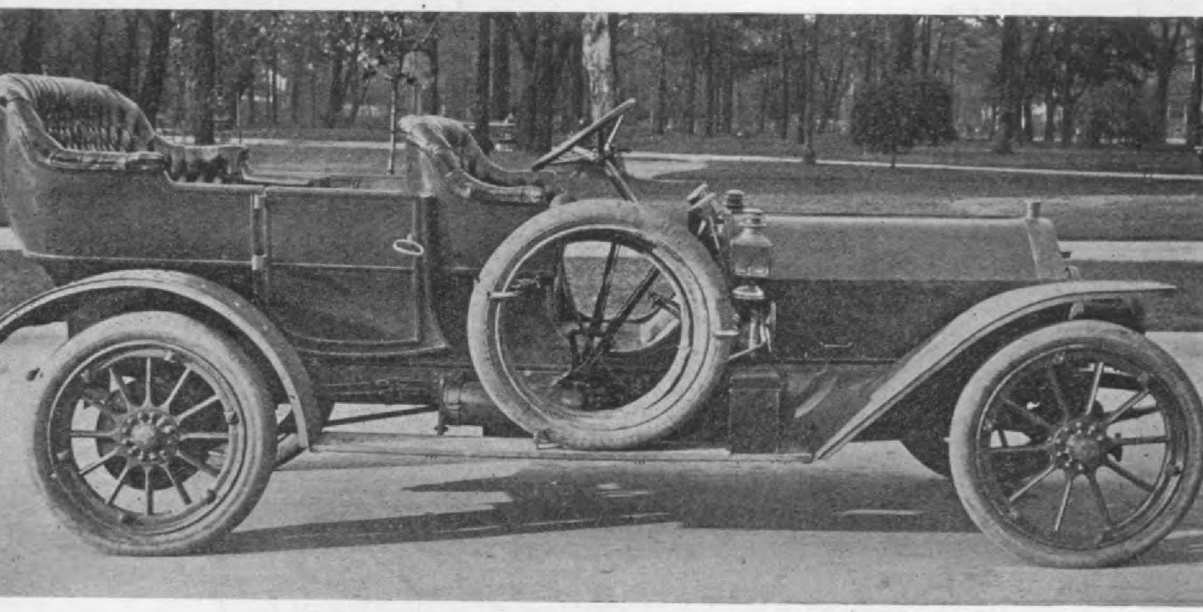

Fig. 1. 1908 Premier, Model 45. Passenger capacity, seven. Body of aluminum. Six-cylin- water-cooled motor, cylinders cast in pairs with valves on opposite sides. Make and break tion has been adopted, and a special cushioning device is used on the igniter points, giving ammer break and automatically takes care of the wear of the points. Current is supplied by osch magneto. Jump spark from storage batteries is also provided. The three speed and reverse sliding gear is on annular ball bearings, and the rear axle, of the floating type, is on the same kind of bearings.

astened to the water jackets by small machine screws, and will give way in of a freeze-up, preventing the crack- of the cylinders.

MAKE AND BREAK IGNITION.

r regular use on this 1908 model low on make and break ignition has been ted. The Premier system differs from conventional make and break spark- device, on account of a cushioning de- for the igniter points. This feature natically takes care of the wear of

keeping the igniter points cool and clean This position is the most advantageous lo cation possible, as the charge, it matter not how small, must pass the igniter points.

The make and break system is used as the running spark. The source of curren supply is thru the latest type importe Bosch magneto, which is driven by a 3 jaw clutch.

In addition to this low tension systen there is a second or auxiliary system con sisting of a single coil and a high tension

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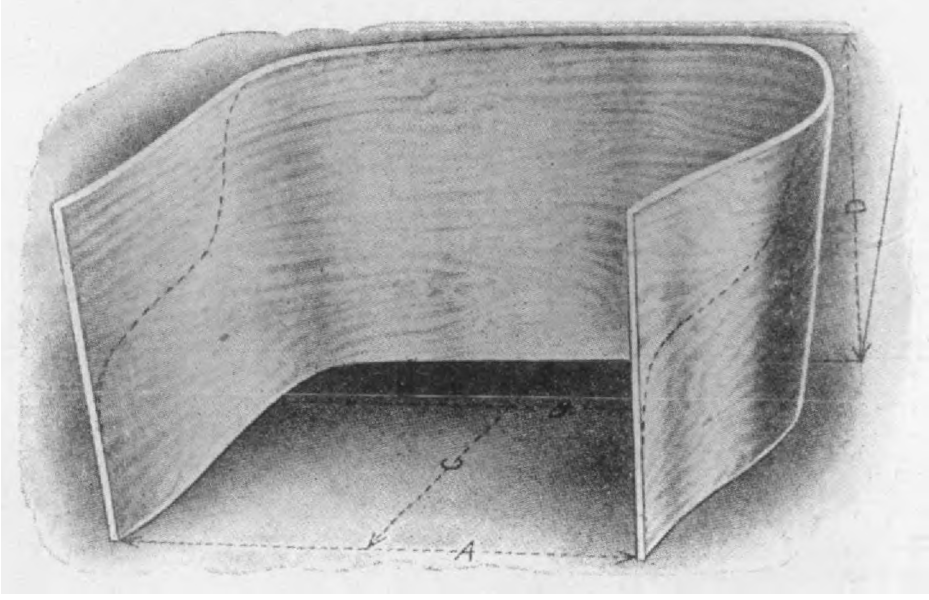

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ed in the cam shaft gear housing. pinions are supported between a g on either side, doing away with erhang found in the usual construc- The cam shaft gears are bolted on diameter flanges integral with the haft in the same manner that fly- s are usually fastened to a crank

innovation for 1908 consists in mak- e lower half of the crank case of steel instead of aluminum.

COOLING.

water manifolds are of solid copper enously welded, and are made up of easy curves to properly proportion ow to each individual pair of cylin- The circulating pump is of un-

causes.

The sliding gear change speed is mounted on Hess-Bright bearings, and gives three speeds forward and one reverse, the control being of the H-slot type.

DRIVE AND REAR AXLE.

The drive is thru two universal joints of special construction. The joint is a combination universal and slip joint at both ends, doing away with the usual small diameter squares for taking care of the longitudinal slip. These universal joints at both ends are fastened to their respective spindles thru hardened taper squares and retained by castellated nuts, differing somewhat from the conventional way of fastening these joints by straight

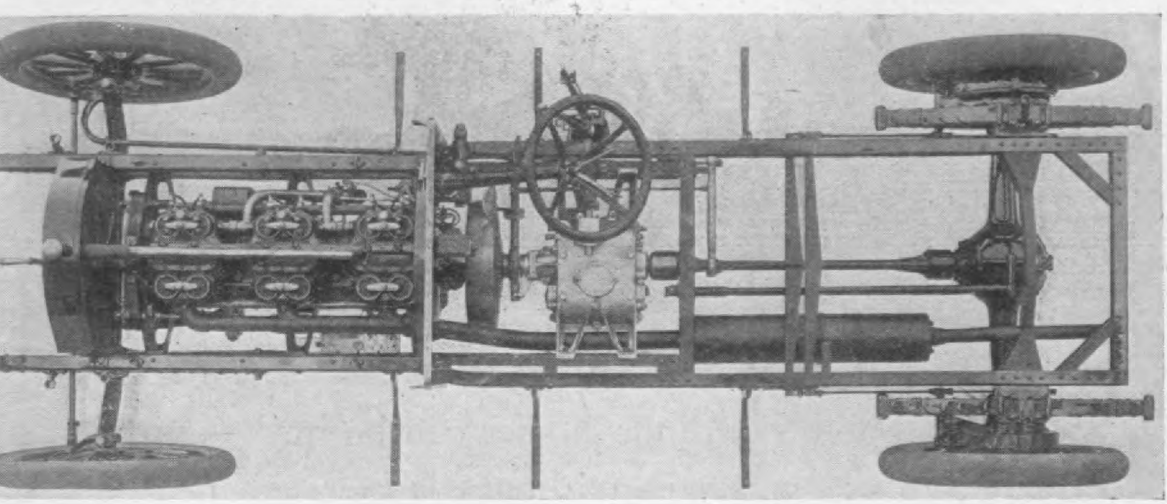

Fig. 2. Plan of Model 45 Premier, showing the frame construction, brake equalizers, rear elliptic springs and the general arrangement of the units.

y large capacity, and is provided renewable bearings for the spindle. clutch driven by a fiber pinion ted in the cam shaft gear housing. rain cock being located in the pump n pipe, and this being the lowest the entire system can be drained by he fan back of the radiator is ted on an aluminum bracket on top cam shaft gear housing, and is pro- with a neat and effective eccentric djustment.

lubricating is by a force feed oiler, gear driven from the exhaust cam and is mounted under the hood. than ordinary care has been taken ut to provide ample means of lubri- . The spring shackles are lubri- by compression grease cups thru bolts.

clutch is enclosed within the fly- and made absolutely dust proof and

squares or round taper with keys. The driving pinion in the rear axle is integral with its spindle, and is mounted between two Hess-Bright bearings. The differential is mounted in the rear axle in special ball bearings on its hub extension, and the connection to the driving axle is made thru the hardened squares.

The rear wheels are clutch driven, and the load is carried on unusually large Hess-Bright bearings, practically within the load center. The axle being of the semi-floating type, the load is carried on the axle housing, the bearing of the driving axle next to the differential acting as a support in resisting lateral strains.

All parts constituting the right and left halves of the rear axle system are interchangeable. The tri-angular torsion rod which has been a feature in Premier construction for five years is retained.

Two sets of brakes are used, both be-

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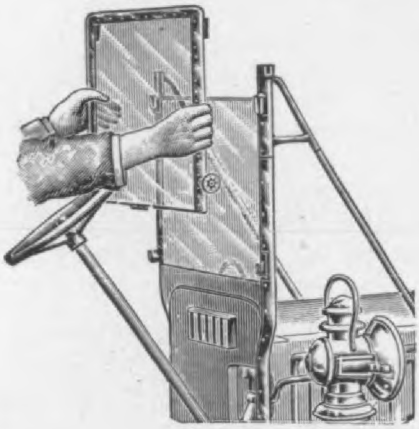
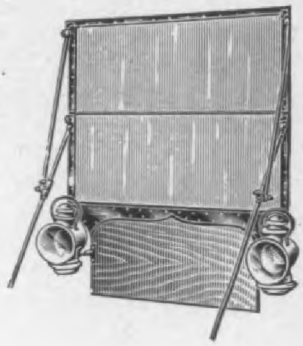
The 3 Best Divided Wind Shields



The Voltz

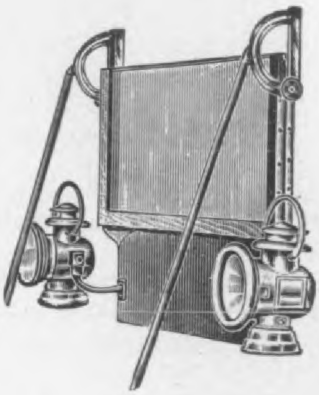
Its simplicity causes its popularity. No explanation of this clever shield is necessary as the cut is self explanatory. It is the lightest, strongest and simplest shield made. All brass—no top rods or hinges—quickly operated. Furnished to fit any car.

The Schildback



This Wind Shield is not new—over 1000 are now in use. Its construction is such as to entirely do away with hinges. One advantage of which is the top appearance of the Shield, being the same when up or down.

Furnished in full brass or solid mahogany, with brass trimmings, to fit any car.



The Beecher

The most practical and easily worked low priced Shield made.

The small wheel on either side holds the Shield at any angle firmly and securely. Mahogany finish standard—natural ash or painted frames to order, to fit any car.

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The Limousine Carriage Mfg. Co.

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The external contracting brake is camel-hair lined, and operated by side lever. Provision is made for the external adjustment for wear on both internal and external brakes. Both brakes are equalized thru a prest steel brake beam, sliding in two slots in the side frame members. The emergency brake is inter-connected with the clutch.

The usual prest steel frame construction is adhered to and the sub-frame is riveted to the top flange of the main frame, making the forward end of the frame practically box section, and carrying the weight in a straight line section. It is so arranged as to substantially re-inforce the main frame. The lower edge of the sub-frame members is turned inward, and provides a means for fastening a prest steel pan, completely protecting the under side of all mechanism from the radiator support in the front to the cross girt back of the transmission.

1908 Babcock Electrics

The well known line of Babcock electrics made by the Babcock Electric Carriage Co., of Buffalo, N. Y., is offered for 1908 without material change. There are in all five models, known as Model 1 Special, Models 5, 6 and 10, and a Brougham.

CHANGES IN MODELS 5, 6 AND 10.

In Models 5, 6 and 10 there are some features not previously shown. The principal change is in the controller and method of operation. In these models the speed is controlled almost entirely by means of a foot lever. There are five speeds forward and two reverse. After the controller handle has been placed at the desired speed, it is not necessary to again touch it, unless the rate of speed is changed. Once under way the car can be slowed down, allowed to coast, or the countershaft brake applied and the car brought to a stop, all with one movement of the foot lever. There is besides a foot lever, operating brakes that act on the rear wheels. This method of control makes the operation of these models extremely simple, and reduces to a minimum the amount of power lost while changing speed.

BRIEF SPECIFICATIONS.

Model 5 is a roadster, intended for long distance. Its makers claim for it the highest speed and greatest mileage capacity of any electric automobile on the market. The range of speed is from 6 to 26 miles an hour. On the third notch, 16 miles per hour, 85 miles it is claimed can be obtained on a single charge, if properly operated. It weighs about 1600 pounds, has a 78-inch wheel base; 32-inch wheels equipt with 3½-inch pneumatic tires. The power is obtained from a 36-cell battery, made by the Babcock Company, distributed half in front under the hood and half in the rear of the body, and the motor is suspended from the chassis under the seat. It has a double chain drive of the latest improved type. The price of this car is $1500.

The Victoria phaeton, Model 6, is a strikingly handsome vehicle, and is particularly adapted for use by women. It is hung low and has continuous mud guards, which make it impossible for the garments of the occupants to get soiled. It is very roomy, but very light in appearance; is capable of high speed and great mileage. It weighs about 1700 pounds, the wheel base, wheels and motor being the same as on Model 5. It is equipt with specially constructed 3½-inch double tube tires. The battery is the same as on Model 5. The upholstering is of the finest quality of broadcloth, and the price is $1700.

A light weight vehicle of coupe type is known as Model 10. It has a very roomy seat, and all the windows can be dropped, thereby making a comfortable vehicle for warm weather. A special arrangement of the steering wheel makes it possible for the operator to enter from either side. It is claimed by the builders that because of its light weight it has greater mileage and speed than any other coupe. The chassis is the same as that of Model 6, and the body is so arranged that it can be removed, and the Model 6 Victoria body put on in its place. It sells for $2100.

The Stanhope Model 1 Special is intended for very large people. This car hangs low, and also has continuous mud guards. It has a wheel steer with tilting mast, making ingress and egress extremely easy. It has a 66-inch wheel base, wheels being 32 inches front, 36 inches rear. Solid tires will be furnished if desired. The power is derived from a 40-cell battery, made by the Babcock Company, giving a radius of 50 miles—65 miles on level roads. This car is capable of climbing a 28 per cent. grade, and sells for $1800.

The Brougham, which is a splendid type of the luxurious town car, is upholstered in French goatskin, and has on the inside all the appurtenances that one using such a vehicle could need for calling and theatres. Five persons can ride inside and two outside, beside the operator. The controller is of special design, and is operated by a handle on the steering mast, under the steering wheel. There are four speeds forward and two reverse. Powerful internal brakes act on the rear hubs, and there is, besides, an electric brake. The operation is similar to that of the clutch lever on a gasoline car. The wheels are of special construction, fitted with standard pneumatic tires, 3½-inch on front, and 4-inch on the rear. The price of this car is $4000.

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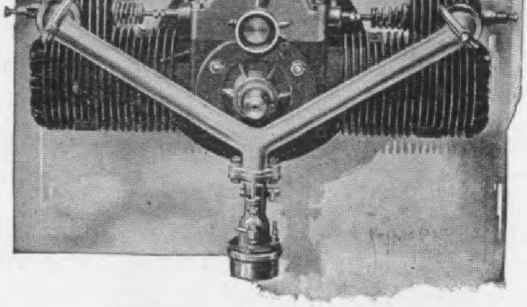


DeTamble

Buggy-Type

ENGINE

The one best engine for buggy-type automobiles; also suitable for any light runabout or light delivery wagon.

Two cylinders, 4 x 4, opposed. Air-cooled, 10-12 H. P. (conservative rating.) Weight including flywheel, 180 lbs. Over-all dimensions, including spark plugs: length, 30 in.; width, 16¾ in.; depth, 17 in.; depth without flywheel, 11½ in.

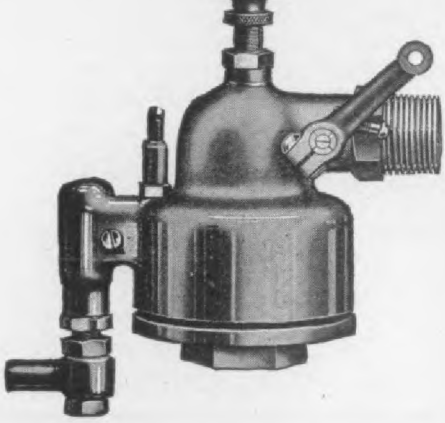
This is a high grade, carefully constructed engine, perfectly balanced and free from vibration. Every engine fully warranted to deliver the rated power and keep cool. Has been run at full speed for six hours without a sign of distress.

Prompt Deliveries
Attractive Prices in Quantities

We Also Build The Famous

CARRICO
Air Cooled ENGINE

4-Cyl. 4 x 4. 20-24 H. P.



The SPEED
Carburetor

Guaranteed to give greater mileage per gallon of gasoline than any other carburetor.

Guaranteed to increase the power and the flexibility of any good motor, make it respond instantly to the slightest movement of the throttle, and to eliminate all jerky motion.

Guaranteed to give an absolutely constant and perfect mixture in any climate, any temperature, on any grade or around curves, with unequaled economy.

Purchase Price Refunded to any manufacturer or private owner who tries a Speed and is not convinced that we have precisely what we claim.

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n is the 16-20 H. P. town car, put y the E. R. Thomas Motor Co., of lo, N. Y. This is after the design frame, which lowers the center of gravity of the vehicle. The radiator is placed directly over the front axle. The bodies

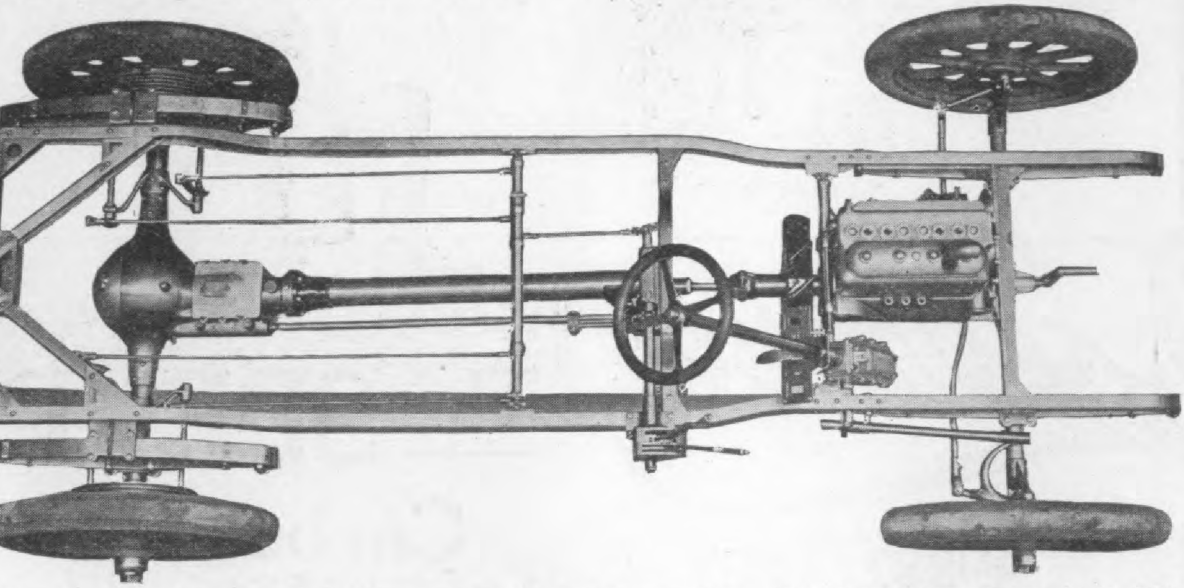
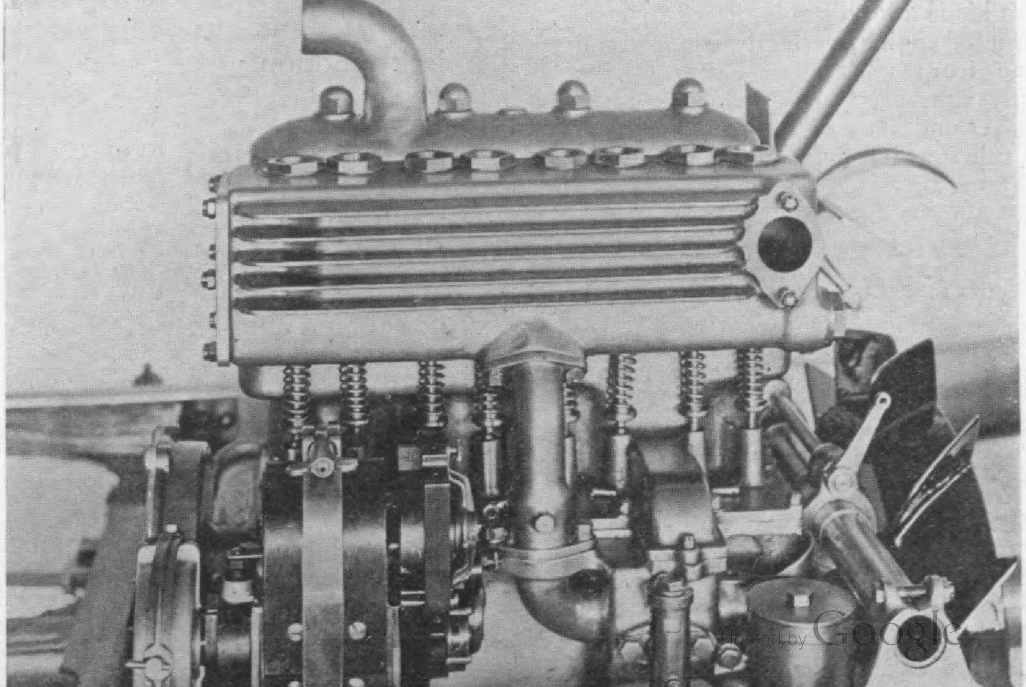


Fig. 1. Chassis Plan of the New 4-20 Thomas Town Car. The 4-cylinder motor is a two-e casting, cylinders of grey iron, case of manganese bronze. Change speed and rear axle bined, cardan shaft housing acts as a torsion arm. Semi-elliptic springs front and full scroll d springs at the rear. Note the frame construction, narrowed at the front and dropped, g low center of gravity and easy acess, and the rear special bracing. The double brake ns on the rear wheels are provided with cooling pins to prevent over-heating. As a Cabriolet ing four, a Landaulet, Brougham or Doctor's car seating five; the price is $3000, and as a ousine, seating five, $3250.

onsieur Gustave Chedru, chief of the has designing forces, and is essen- a French design, with many refine- s and improvements. The wheel is 103 inches, with 32-inch wheels, front having 10 spokes each, while ear have the regulation 12.

with which these cars are equipt are typically French.

The steering mechanism consists of a cross steering rod in the rear of the tubular front axle, actuating Elliott type steering knuckles. The longitudinal steering rod has the new Thomas self-adjusting



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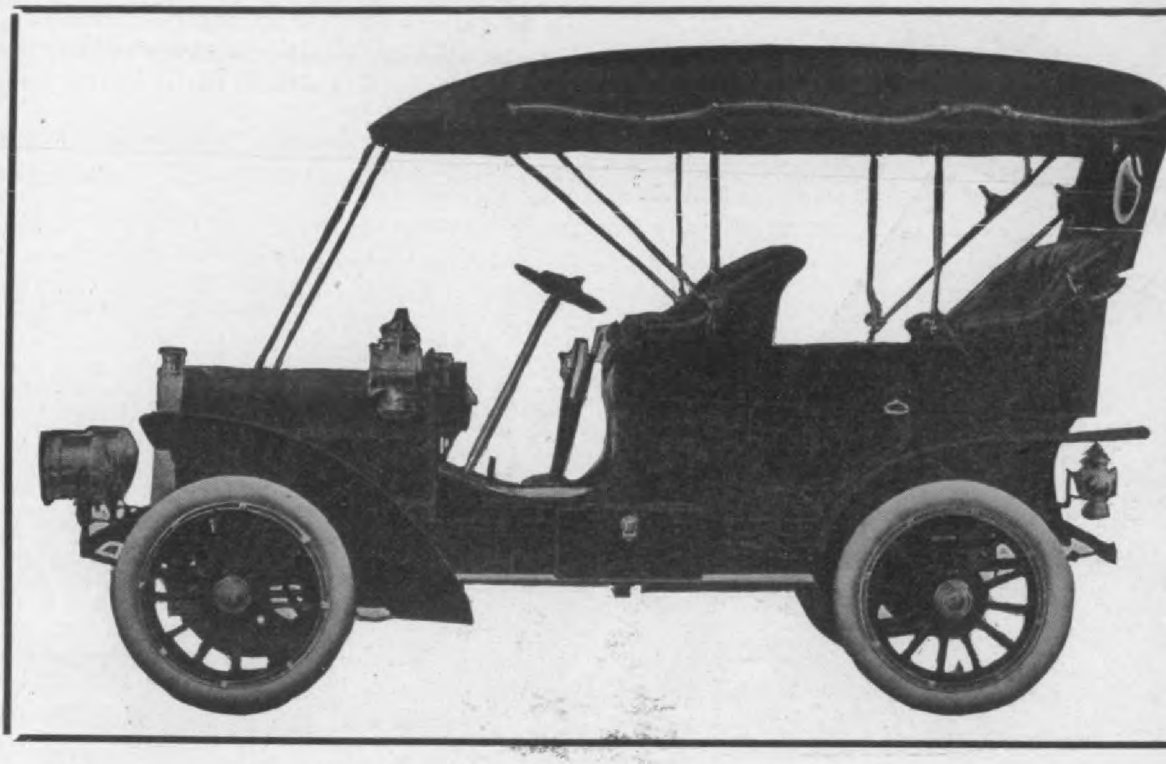
The Springfield Metal Body Co.



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We are now closing contracts for 1908 delivery.

Write for information and prices.

SPRINGFIELD METAL BODY COMPANY

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is a most unique mechanism with idea in mind of having this vehicle ated by coachmen and unskilled dri- Monsieur Chedru made it trouble- by eliminating most of the ordinary es of trouble, and condensing the r plant into two castings. The first ese is of special high grade grey iron, contains the four cylinders cast inte- with very large water jackets, the ntake manifold, the exhaust manifold,

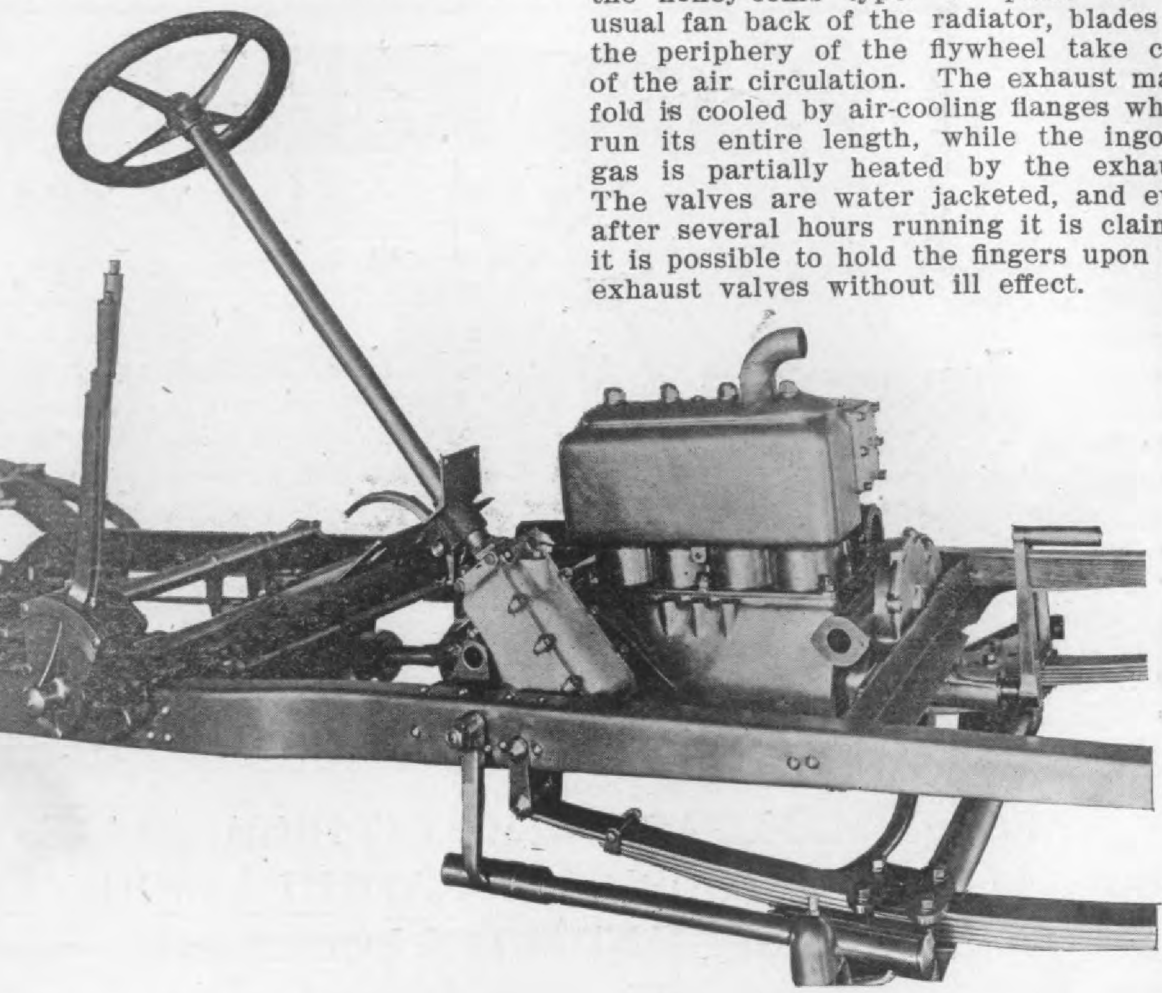

Fig. 3. Forward end of new 4-20 Thomas town car, showing the right side of the two-piece tor, the heavy steering linkage, the control levers on the side and the foot accelerator. A throt- lever is also on the wheel, but there is no spark lever. The clutch is of the three disc type, the change speed gears are in a manganese bronze housing integral with that of the floating r axles. Compactness, simplicity and foolproofness, combined with light weight, are the feat- s.

water outlet manifold, the latter being red with a brass cap. The forward of the two gas manifolds are covered a plate. These constitute the only ings in the casting, and, therefore, only chance of leakage. Danger of is reduced to a minimum by having e carefully fitted and held by large s. The other casting is of manganese ze and contains the engine base, k case, water intake manifold, water

single cam shaft on the left side of the machine. An additional gear drives the Bosch high tension magneto, which, following the French practice, is the only means of ignition.

COOLING.

The cooling is by the thermo-syphon system. This is rendered very effective by the large water jackets of the cylinders and large manifolds. The radiator is of the honey-comb type. In place of the usual fan back of the radiator, blades on the periphery of the flywheel take care of the air circulation. The exhaust manifold is cooled by air-cooling flanges which run its entire length, while the ingoing gas is partially heated by the exhaust. The valves are water jacketed, and even after several hours running it is claimed it is possible to hold the fingers upon the exhaust valves without ill effect.

CLUTCH, CHANGE SPEED AND BRAKES.

The clutch is of the well known 3-disc type, and is placed in the flywheel. Back of this is a single universal joint connecting with the main drive shaft which runs thru the oil tight casing direct to the change speed gear set on the rear axle. This casing is filled with oil for the lubrication of the shaft, and also acts as a torsion rod for the axles.

The rear axle is of floating, ball bear

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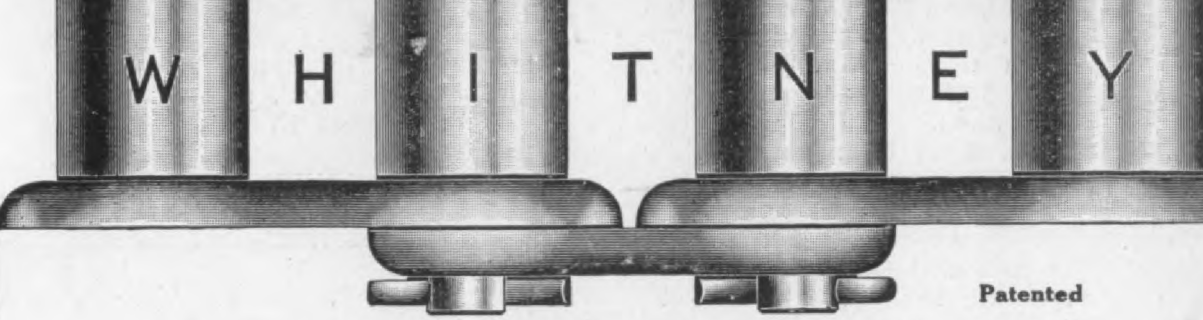


Patented

"WHITNEY" CHAINS

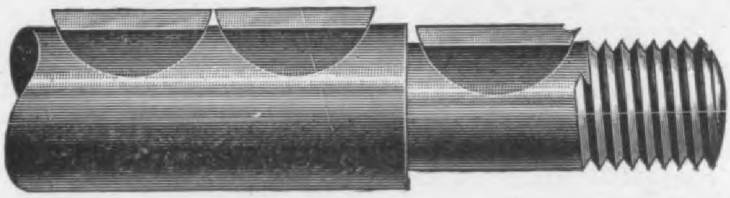
January 1, 1907 to November 1, 1907, conditions as follows

On January 1, 1907 we were renting about 38,000 sq. ft. of floor space in a building not adapted for our growing business. At the same time we were giving much attention to our new buildings which were under construction and not complete until July 1907. During this period we moved our entire equipment to our new factory and for a number of weeks were obliged to operate machinery in both plants. We also carried on important experiments and constructed much special apparatus for our new factory. While thus handicapped we could not fully meet the increasing demand for "Whitney" Chains. Nevertheless, we succeeded in shipping a greater number than ever before for an equal period of time.

"WHITNEY" CHAINS

November 1, 1907, to December 31, 1908, conditions as follows

New fire-proof factory, one of the best, strongest and safest in the country. Floor space over 70,000 sq. ft. Best of light and excellent condition for employes. Location one of the best in Hartford. Private side-track connecting with main line between New York and Boston. Land area over ten acres. Large increase in new machinery and tools. Improved methods. Inspection system more rigid than ever. Greater accuracy. Increased strength by the use of new materials and improved treatment. Greater durability. Better finish.



"WHITNEY" MACHINE KEYS AND KEY-SEAT CUTTERS
(For The Woodruff Patent System of Keying)

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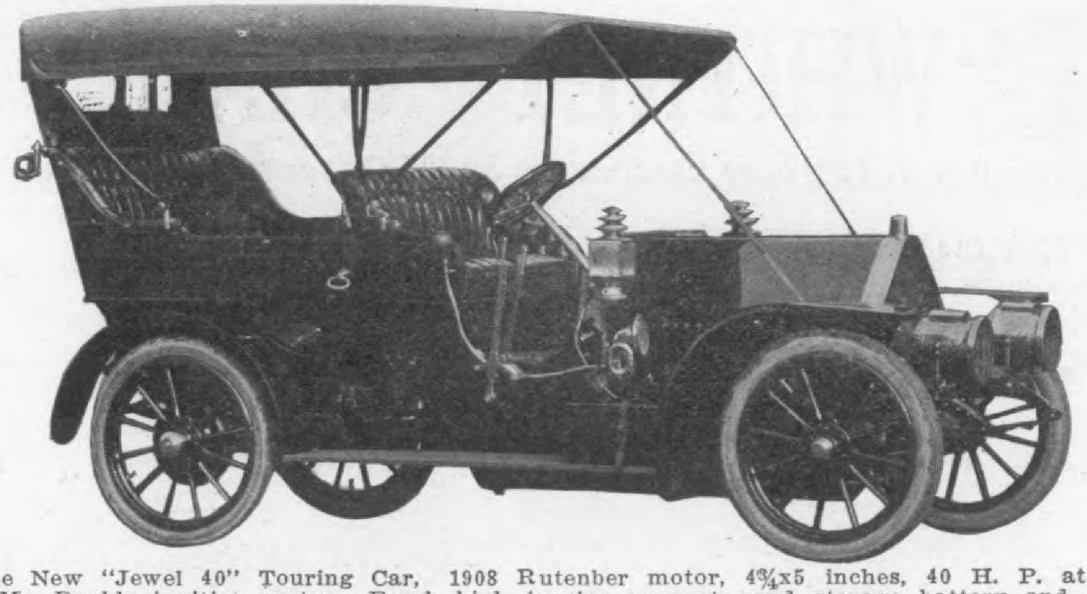
THE WHITNEY MFG. CO.

ed with air flanges, such as are found air-cooled engines. Even in mountnous countries it is claimed no diffity will be experienced by the overting of the brakes.

'his chassis is used both as a public vice cab, for which it is equipt with a y of rather plain finish, and also as a n car, some of the bodies for the latbeing very rich and elaborate. These lude brougham, limousine, cabriolet landaulet designs. As a cabriolet it ts four passengers, and as a brougham, ousine, landaulet or doctor's car five. e prices of these are $3000, respectively, h the exception of the limousine, ich is $3250.

1908 "Jewel 40" Touring Car

'he Forrest City Motor Car Company, Massillon, O., well known as the mak of the Jewel two-cycle runabout, are ering for the season of 1908 in addition the little runabout a new 4-cylinder ring car, built along conventional lines known as the "Jewel 40." This new del is provided with a 1908 Rutenber tor, and not a two-cycle engine as ght be expected. The bore is 4¾ and oke 5 inches, and the rating is 40 H.



The New "Jewel 40" Touring Car, 1908 Rutenber motor, 4¾x5 inches, 40 H. P. at 100 P. M. Double ignition system, Bosch high tension magneto and storage battery and singl il with distributor. Selective sliding gear with Timken roller bearings, three speeds forwar d one reverse. Floating rear axle on Timken bearings and an I-beam section front axle dro rged in one piece without weld. Two sets of brakes on separate drums separated by air spac r cooling. Wheel base 117 inches, 36-inch wheels, 4-inch quick detachable tires, seats seven ice, fully equipt as enumerated in text, $3000.

at 1000 R. P. M. Speeding up to 1500 P. M. is said to be practicable, a conuent increase of power being obtained. e cylinders are cast separately with inral jackets. The valves are on one

bowl contains the float, valve, and fastenings.

The clutch is a cone faced with sp cial prepared leather, and provided wi a series of springs to ensure gradual e gagement.

IGNITION.

In the installation of the ignition syste the maker states that economy and abs lute reliability for the owner have be the two objects in view. Two sets spark plugs are used, one set being ope ated in connection with an import Bosch high tension magneto, and the oth set with storage battery and coil. Bo systems are separate and independe Should either of them become unavailab the other can readily be put into use turning a conveniently located switch.

The change speed gear is of the proved three speed sliding type operat on the selective principle by a single si lever. This method allows of a chan from any speed to another without pa ing thru any gears. The aluminum ca is said to be oil tight. The shafts a mounted on Timken roller bearings.

A large muffler is mounted on the l side in a fore and aft direction, and sists materially in making the car ve quiet running at all speeds.

The cardan shaft is provided with t ball bearing joints, thus providing fle bility and insuring good wearing qua ties.

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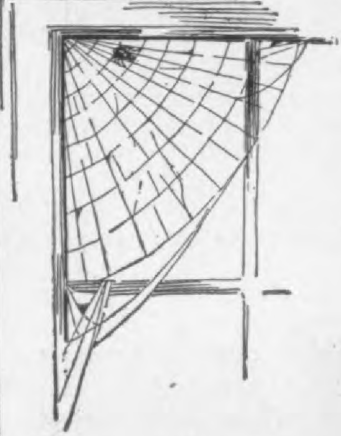
STEERING GEAR AND BRAKES.

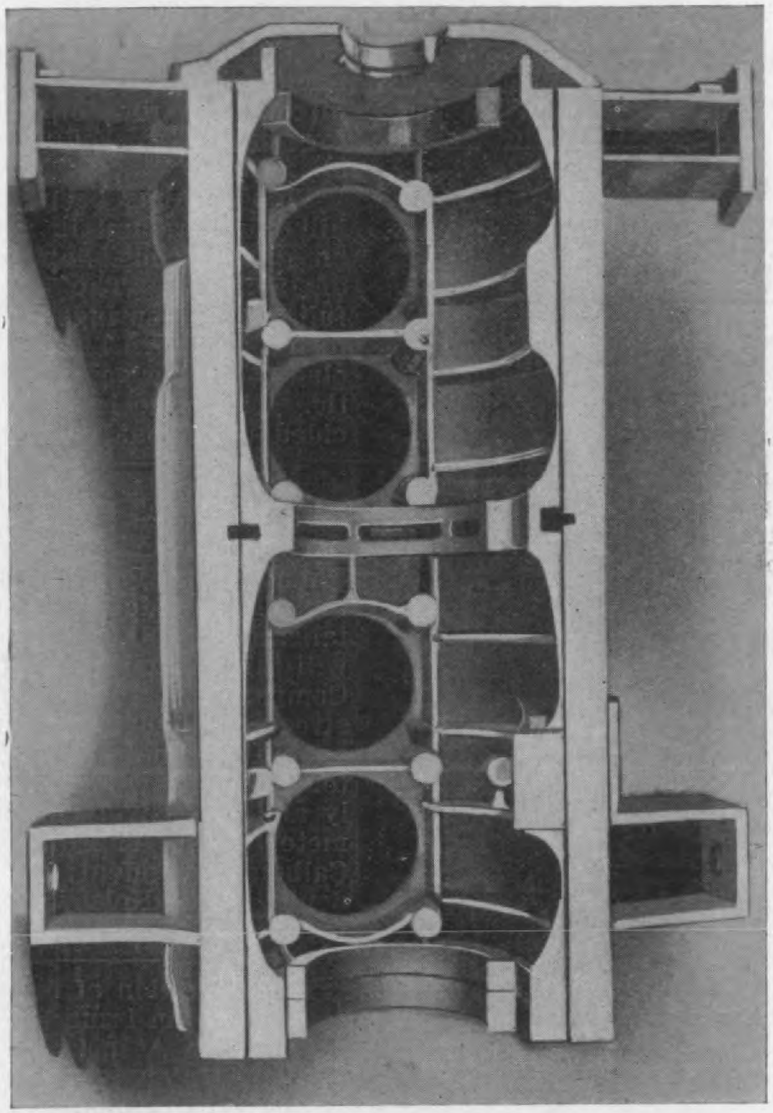


Automobile Brand

Aluminum Castings

Are the best from CAUSE, not accident. Goo patterns help the cause.

Webs and Ribs are nature's method of producing great strength with economy of weight



When designing patterns for aluminu castings, cut out thick sections where possible using webs an ribs to distribut the strai

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emplayed. The brakes are both on rear wheel drums, and are of the in-al toggle expanded type. The outer n is 14 inches and the inner 12 inches diameter, 2 inches face. They are rated by an air cooling space of one , and as each brake is on a separate n overheating when negotiating an emely long hill is not as likely to oc- as when both brakes act on a single n. This arrangement also gives posi- braking for both the foot and hand rs, and without the braking effort ing thru the differential as with pro- er shaft brakes. Both brakes are pro- ed from dust and dirt.

THE AXLES.

ne front axle is a Timken 1⅝-inch I- n section with roller bearings in the s and in the knuckle heads. The axle s 3¼-inch in the center, and is a one- e drop forging without weld. The s steering rod is placed behind the t axle to provide against damage due oad obstructions.

ne rear axle is also by Timken, and is ll floating or clutch type with shaft e. The load is carried on the tubing, axle shafts being used only as driving torsion members. By removing the caps, the shafts can be easily with- vn without jacking up the car. The ing clutch dog has six fingers or ches, and is very simple and strong. top half of the housing being remov- , permits immediate adjustment of ings being made. Webs are cast at ortant points inside the housing, giv- additional strength.

ne frame is of standard design of prest l. Semi-elliptic springs are used at front and platform at the rear, insur- easy riding qualities. The wheels are e, being 36 inches, and fitted with 4- quick detachable tires of any make uit the purchaser. The car has 117- wheel base, and is provided with two fortable auxiliary folding tonneau s, making its capacity seven.

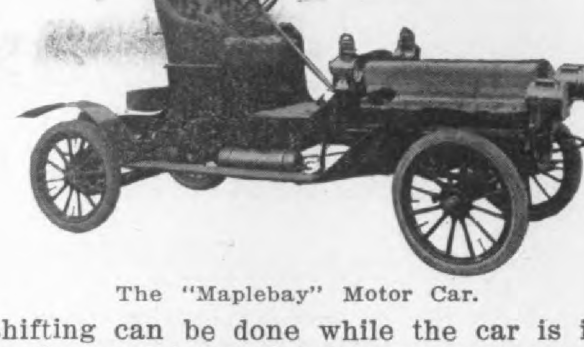
EQUIPMENT.

ith the following equipment the car for $3000. Two eight-inch acetylene s, two large square side oil lamps, tail light, gas generator and oval horn screen, a complete tool kit, tire p, tire repair outfit, robe rail, foot rail jack. Concealed top irons are also ched to each car.

The "Maplebay" Motor Car

wheels are used, fitted with 3-inch tir in front and 3½-inch in the rear. Goo rich clincher tires are used.

Drive is thru friction wheels, and th lever which brings the friction whee into contact is the only lever on the m chines. Speed is of course varied b shifting the friction wheel toward c away from the center of the disk. Th



The "Maplebay" Motor Car.

shifting can be done while the car is i motion, and is regulated by a screw mov ment which is operated by two buttor directly in front of the seat, where the are easily worked by the heel of th operator.

This car has been found to be a goo hill climber, and is also a good travele on rough roads, having a road clearanc of 15 inches. The body is hung on fou full elliptic springs, and is a very con fortable rider. The regular equipment i cludes oil and gas lamps, and chime whi tle. The price has not been definitely d cided upon, but will probably be $1400.

Changes in the Dragon Co.

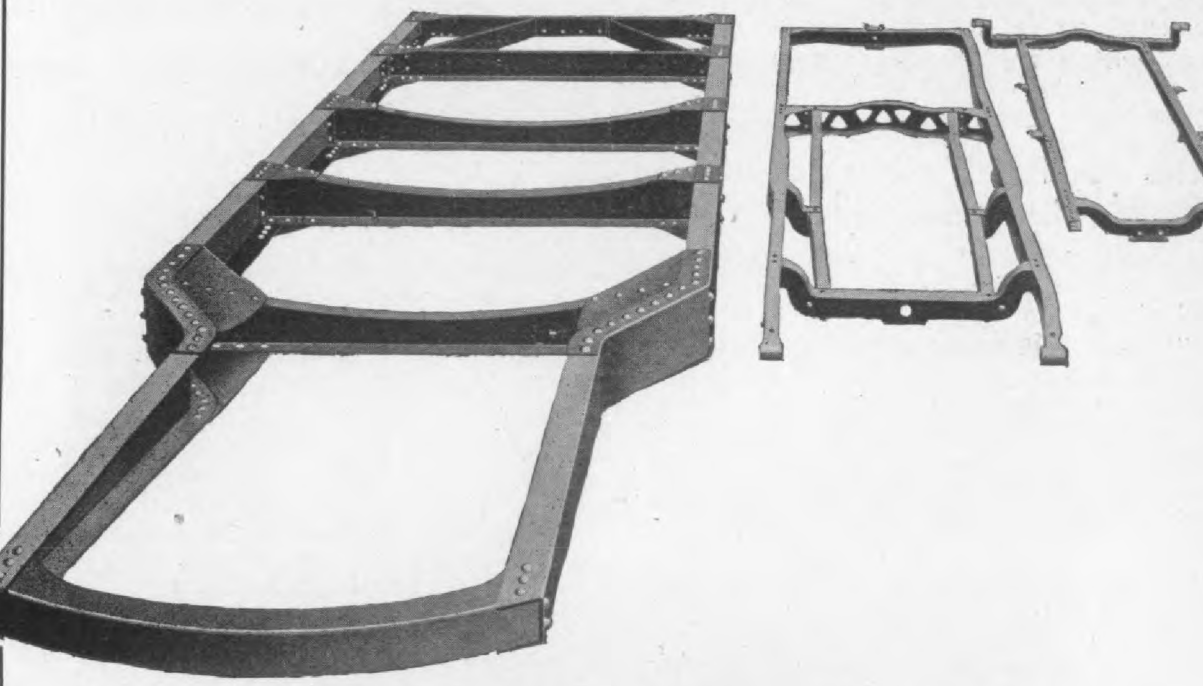
The Dragon Automobile Company, c Philadelphia, Pa., has been superseded b the Dragon Motor Company, with a cap talization of $1,000,000. The new compan will take over the plant of the old Drago Company at Thirty-first and Chestnu streets, Philadelphia, and has inaugurate an entirely new policy. The Dragon Mo tor Company will be interested immediat ly and extensively in the building of tax meter cabs. The officers are: J. Edwar Calhoun, president; A. L. Kull, vice-pres dent; R. G. Kelsey, secretary and trea urer.

The definition of an amateur has at las been made an issue between the America Automobile Association and the Amateu Athletic Union. The A. A. U. objects ver strongly to competition between the ama teur and the professional on the autom bile tracks, and at the last meetin

SMITH FRAMES

From Smallest to Largest Pressed Steel Automobile Frames

High Carbon, Nickel or Chrome Nickel Steel



A. O. SMITH CO.

257 Clinton St., Milwaukee, Wis.

Largest Producers of Pressed Steel Automobile

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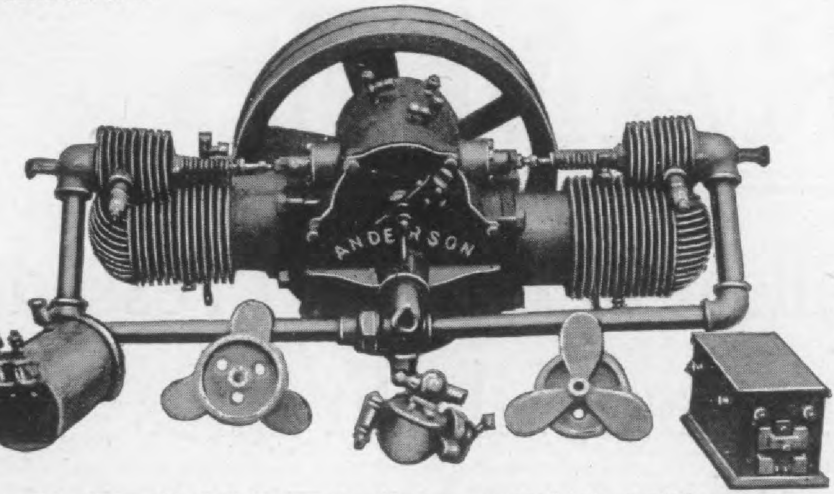
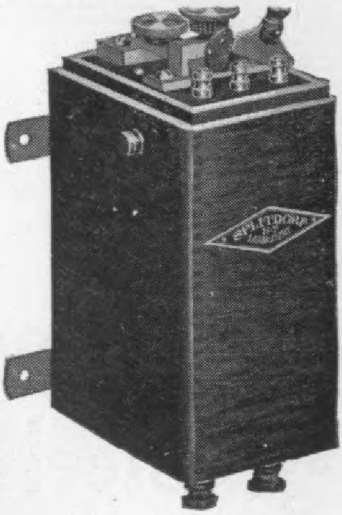
he Anderson Engine Co., Shelbyville, for use in motor buggies and light bouts, and has already been adopted a number of prominent motor buggy ufacturers.

mentioned, is obtained by the introductio of the patented auxiliary condenser i conjunction with the other vibrator part



e "Anderson" 4x4-inch, 2-cylinder opposed air-cooled engine.



"Splitdorf" Synchronized Distributing Coil.

ne cylinders are 4-inch bore and stroke. fly-wheel is made with fan spokes and nall auxilary cooling fan is fitted to cylinder. The cooling ribs, or fins, made extra thin and are placed close igh together to afford sufficient radiat- or cooling surface to prevent engine overheating under any circumstances.

The "Splitdorf" Synchronized Distributing Coil

he feature of the Splitdorf synchron- distributing coil, manufactured by C. Splitdorf, 1679 Broadway, New York , is that it ignites multi-cylinder gaso- engines with a single vibrator, there- firing each and every cylinder at the per time, current being past thru each from a different unit.

he distributing vibrator is a separate rument from the coil units, and is so ed in the coil box that it can be read- adjusted at any time. The adjusting ator parts are of the tension vibrator with a ratchet screw for adjusting vibrator point, and a thumb screw for isting the tension of the vibrator ng.

he vibrator spring is operated by a ble pole magnet situated underneath base of the vibrator, and is excited by primary current from the battery thru commutator on the engine, the com- ator being connected in series with vibrator to the various units of the The vibrator part is fitted with a

On the top of each individual unit is l cated a small cut-out spring, the pressin down of which will cut out the individu coil. Thus it will be seen that the engin can be tested out the same as with th regular four-unit coil.

These coils are mounted in high polished mahogany boxes of the same d mensions as the regular standard Spli dorf coils, and are equipt with as mar units as are necessary for multiple cyli der engines, from two to eight units bein placed in one box. These coil boxes a all fitted with the Splitdorf double po plug cut-out switch, so that two sets batteries or a battery and a magneto ca be used. The amount of battery for used on this type of coil is from 6 to volts of dry or wet cells, and the amou of current consumed is exceedingly sma being from one-quarter to one-third of a ampere.

Triumph Grease

Triumph Grease is the product of th Perfection Grease Co., South Bend, Ind and is distributed solely by the Exce sior Supply Co., 233-235-237 Randolp street, Chicago.

It is composed of a combination of hig grade oils with other secret ingredient and can be used on every part of the a tomobile with the exception of the engin cylinders.

The makers claim it to give a degr of lubrication that is absolutely perfect

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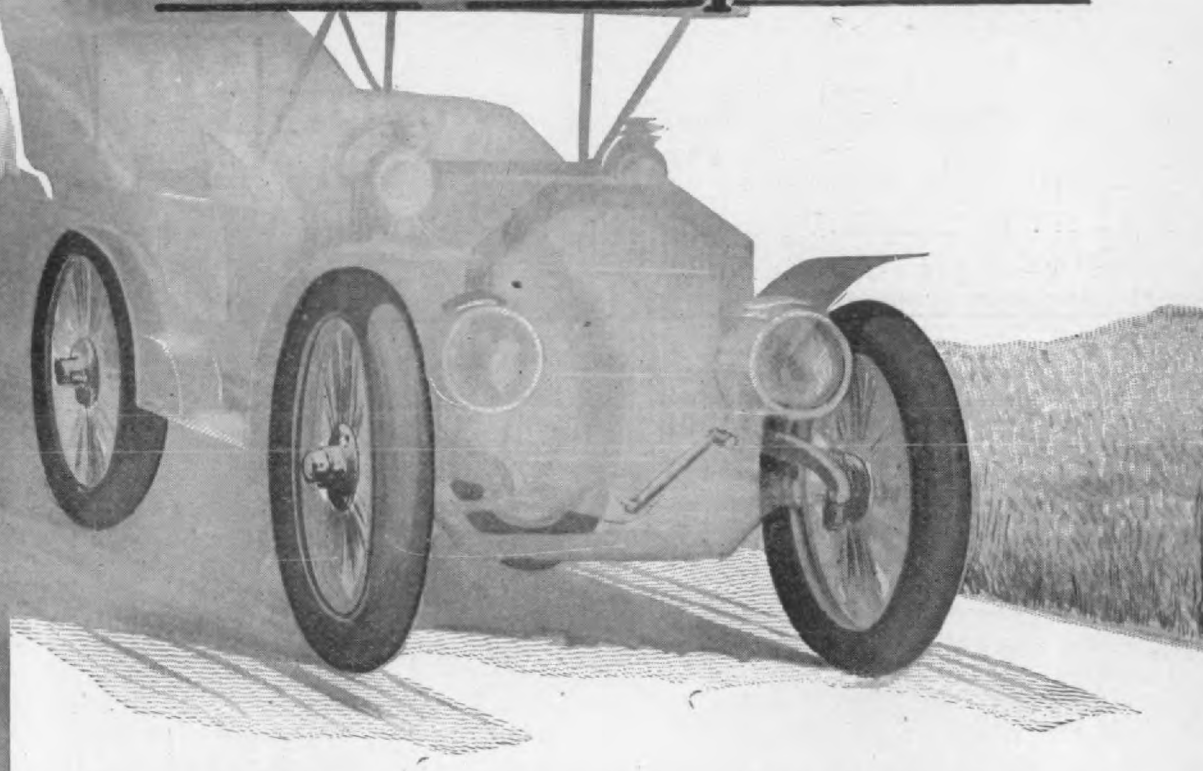
Most Conspicuous



ACTUAL count in many localities will show Goodrich tire preference—and numbers are a pretty good argument too; but, better argument and bigger evidence is found in the fact that all these Goodrich tire users have a prime good reason for their choice—they have been attracted to Goodrich Tires by

GOODRICH TIRE DOINGS

It is popularity derived from everyday occurrences of notable good work, as well as from the service given in such long distance endurance events as the Glidden Tour where *Goodrich Tires were conspicuously ahead in both numbers and final honors.*

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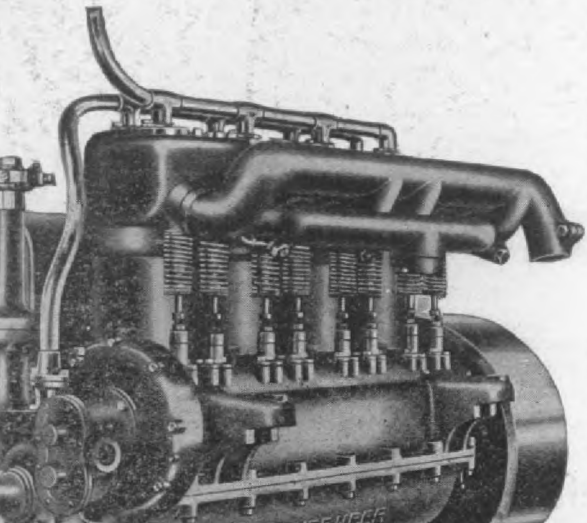
odel U is a 4¾x5-inch motor, designed ake the place occupied by the ordi- 5x5, and is claimed to develop prac- ly the same power, altho considerably er in weight. It is equipt for mag- attachment, and will develop as high 0 H. P., altho rated at only 40.

l parts of the Rutenber motors are dardized, and have the new Rutenber e lifts, and special piston pin con- ction.

e Model U has a very unique, double, an base, which consists of a single ng, having two separate compart- s. The lower compartment is used n oil reservoir, which is connected



Rutenber Model U 4-Cylinder Motor.

ne oil well, and from which oil is ped by a gear pump, to the upper partment, in which rotate the crank and connecting rod.

overflow is provided in the upper partment, so that the oil remains at a tant level as long as there is any oil in the reservoir below. The piping he pump is all enclosed in the crank and there are no external joints in piling system to cause leaks.

e Model U is fitted with extra large hardened tool steel wrist pins, using Rutenber locking construction.

e bearings of these motors are of the prest nickel babbitt. The gen- construction of the 1908 models of Rutenber motors has not been ged in any particular, as their form onstruction has proven exceedingly factory the past five years. Each r is given careful inspection during

McAdamite Metal

McAdamite is the product of the Unite States, McAdamite Metal Co., 18 to 2 Rapelye street, Brooklyn, N. Y., the chie features of it being its high tensil strength, elasticity, and lightness. It i an aluminum alloy, and an exhaustive tes made by Prof. Collins P. Bliss, Director o Engineering Department of the New Yor University shows the following: Com pression strength per square inch 126.00 pounds; elastic limit—before yieldin point, 84,000 pounds; torsional strengt per square inch 60,000 pounds, and ten sion strength per square inch 44,00 pounds. Its specific gravity is 3.20, an its melting point 1040 degrees Fah. Th manufacturers claim that this metal ca be cast into gears and similar article without necessitating finishing of the cast ing, only a slight buffing being required a the most. It can be tooled and machine with ease and the finest screw thread can readily be cut in it.

New Robinson Lubricants

In addition to their other well-know lubricants Wm. C. Robinson & Son Co. Baltimore, Md., are now offering Robin son's "Greoil," Journal Compound Graphite Machine Grease and a new heav Transmission Oil. Greoil is of a consis tency between oil and grease. It is mad in two grades, thin and soft, and is in tended for gear and transmission cases Journal compound is a pure grease an can be used in compression or other cups on open bearings and cased gears adapte for grease. Graphite Machine Grease i a combination of high grade grease an pure graphite and is adapted for lubrica tion of chains. Their transmission oil i recommended for transmission or gea cases where a heavy bodied oil is particu larly required. All the oils and grease mentioned are put up in 3, 5, 10, 25 and 5 pound cans, ½ barrels and barrels.

"B" Line Auxiliary Air Pump

Randall-Faichney Co., Boston, Mass. maker of "B" line oil and grease guns, ha brought out an auxiliary air pump of simi lar construction, and designed for the pur pose of providing air pressure on the gas oline tank when, as on a hill, for any rea son the flow of gasoline to the carbureto is likely to stop. The "B" line air pum looks and is like the grease and oil guns but is fitted with a special valve which

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McCORD & COMPANY

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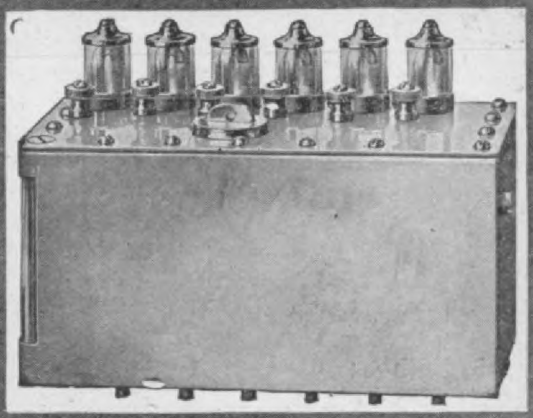
CHICAGO, U.S.A.

NEW YORK OFFICE, 24 BROAD ST.



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FORCE FEED LUBRICATORS

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CIRCULATING PUMPS

McKIM COPPER ASBESTOS GASKETS

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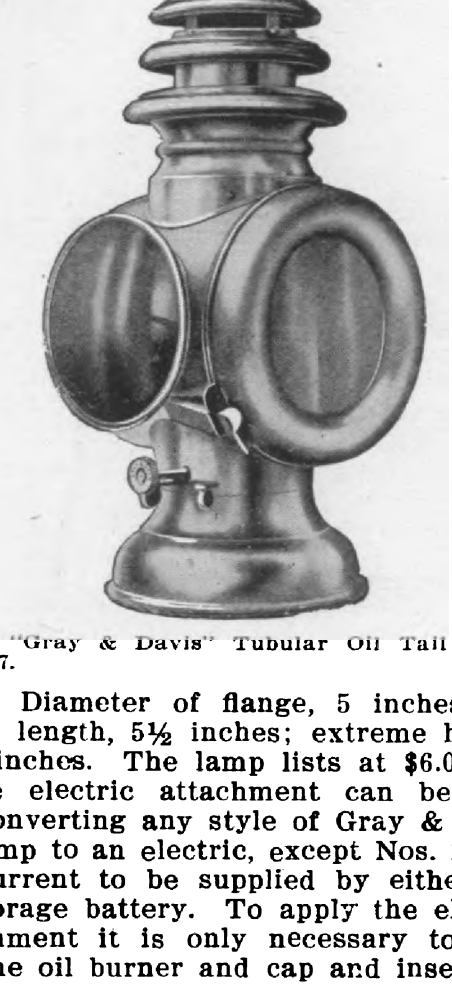
& Davis, Amesbury, Mass.

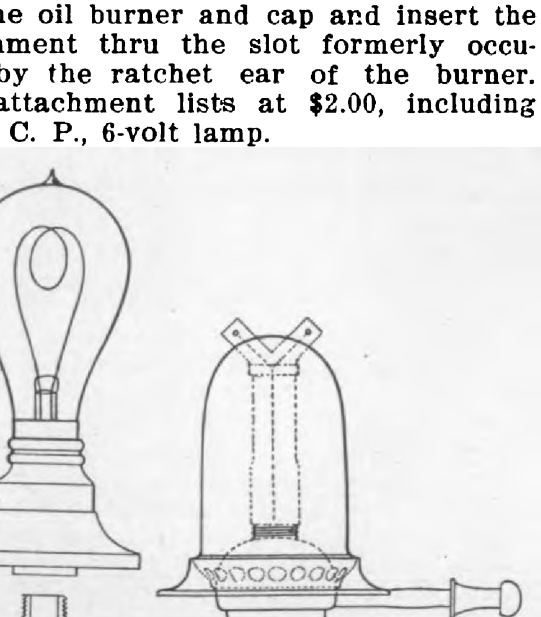
e new Gray & Davis Tubular Oil Tail
is a very popuar design for large
ng cars. The dimensions are as fol-



"Gray & Davis" Tubular Oil Tail Lamp.
7.

Diameter of flange, 5 inches; ex-
length, 5½ inches; extreme height,
inches. The lamp lists at $6.00.

electric attachment can be used
onverting any style of Gray & Davis
mp to an electric, except Nos. 21 and
urrent to be supplied by either dry
orage battery. To apply the electric
ment it is only necessary to take
e oil burner and cap and insert the
ment thru the slot formerly occu-
by the ratchet ear of the burner.
attachment lists at $2.00, including
C. P., 6-volt lamp.

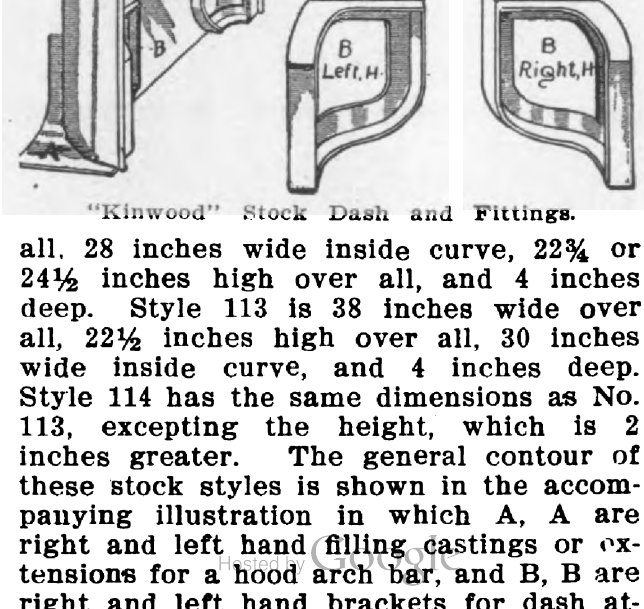


"Gray & Davis" Attachments for Convert-
Lamps into Electric or Gas Lamps.

Gray & Davis are also furnishing an attachment for acetylene generators to permit the use of the generator in connection with a gas tank as a reserve in case the gas tank supply becomes exhausted. This attachment consists of five branch connections, two from generator to lamps, two from tanks to lamps, and one gas tank connection. If the generator is needed it is only necessary to change the two tubes leading from tank to lamps, so that they will lead from generator to lamps.

"Kinwood" Prest Steel Dashes, Etc.

The Kinsey Mfg. Co., Dayton, O., in its latest catalogue calls attention to its facilities for manufacturing prest steel dashes to meet any requirements. This concern's line of prest metal specialties is constantly being added to, and the manufacture of dashes puts them in a position to more fully cater to the requirements of the automobile trade. Several stock designs are offered. Style 111 is 32½ inches greatest width, 24½ inches least width, 29¼ inches high over all, and 4 inches deep. Style 112 is 38 inches wide over



"Kinwood" Stock Dash and Fittings.

all, 28 inches wide inside curve, 22¾ or 24½ inches high over all, and 4 inches deep. Style 113 is 38 inches wide over all, 22½ inches high over all, 30 inches wide inside curve, and 4 inches deep. Style 114 has the same dimensions as No. 113, excepting the height, which is 2 inches greater. The general contour of these stock styles is shown in the accompanying illustration in which A, A are right and left hand filling castings or extensions for a hood arch bar, and B, B are right and left hand brackets for dash at-

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GUARANTEED FOR 5,000 MILES RIDING

Why is it that no other tire manufacturer will give an equal guarantee of quality?
Could any manufacturer afford to give such a guarantee if he was not prepared to stand squarely behind it?

SEND FOR COPY OF GUARANTEE, STATING SIZE TIRE YOU ARE USING
DEPT. G.

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Chicago, 1418 Michigan Ave.
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Seattle, 1102 Broadway.

AGENCIES:
Baltimore, 20 St. Paul St
Philadelphia, 1413 Race St.
Boston, 819A Boylston St
Washington, D C. 602-604 E St., N W
Pittsburg, 201 Wood St.
Indianapolis, Ind , Fisher Automobile C
St Louis, 3948 Olive St.
Seattle 1419 Broadway
Minneapolis Nicollet St
Jacksonville, Fla., 317 W. Forsythe St
Cincinnati, O., 331 East 5th St.
Joseph Straus & Sons Co., Buffalo, N.
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Dayton, O., Borderwish & Glancy mobile Co.
Des Moines, Iowa, Automobile and S Co
Sioux City, Iowa, Wm. Warwick.
Porto Rico 32 Marina, San Juan.
Tampa, Fla., James Bros.
Watertown, N. Y., Warner Automobile
Springfield, Mass., Geisel Automobile C

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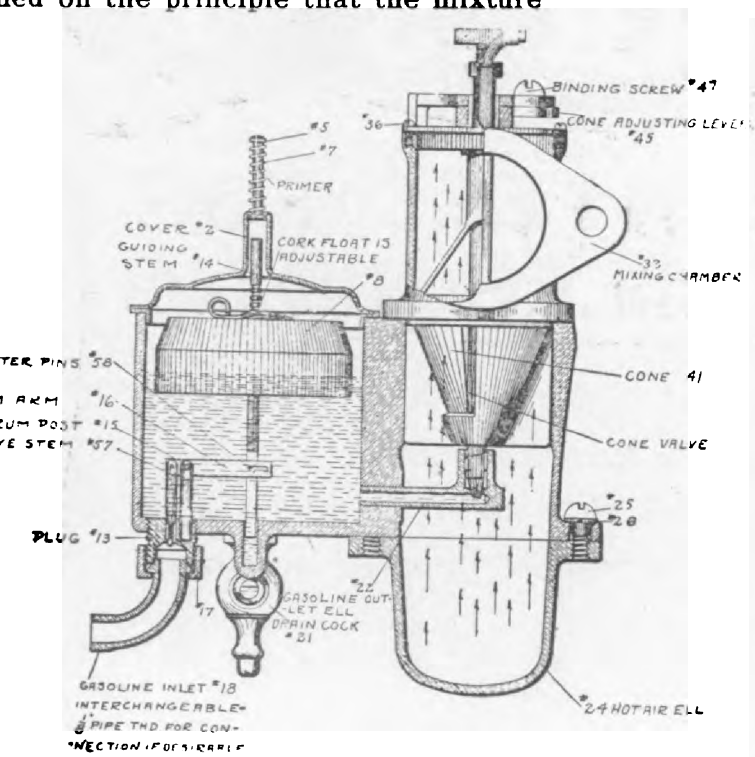
e word. No movements are auto-, nor do atmospheric conditions al-s operation. This carburetor, which e product of the Buffalo Carburetor 887-889 Main street, Buffalo, N. Y., is ned on the principle that the mixture



ional view 1908 "Buffalo" carburetor thru at chamber and vertical air passage.

d be variable at the will of the opera-suit the load imposed on the motor. attempt has been made to get away springs or other mechanism depend-n atmospheric conditions for success-peration. All members are direct connections, giving the operator ete and positive control of his ma-

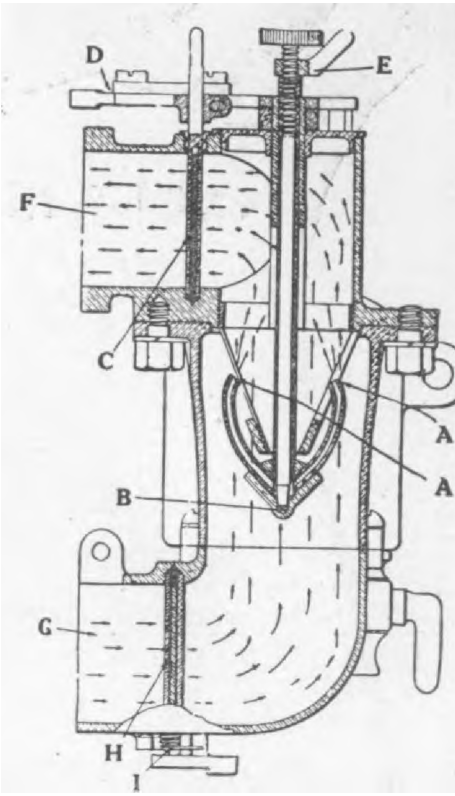
air inlet and the gas outlet of the Buffalo are interchangeable, and the ne inlet is also interchangeable.

intake of gasoline is thru the into a float chamber circular in and differing in no wise from last float chamber. The float is of cork, a priming stem placed immediately it at the centre of the float cham-The gasoline is conducted by a pipe midway of the mixing portion of the to the base of the mixing chamber, it is fed to the nozzles at the base cone valve.

entering column of air passes the ne nozzles at adjustable openings in cone valve. The cone valve and le are link connected and move in n. Both are adjusted to give the

burned, and hence insures great economy.

The interchangeable gasoline intake is provided with a screen which keeps out practically all dirt and scale from the tank. In case foreign matter gets into

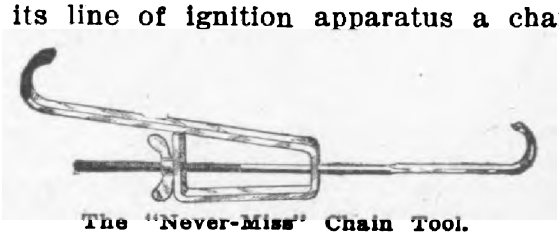


Vertical sectional view 1908 "Buffalo" carburetor, showing the passage of air past the gasoline nozzle and the mixture to the motor. A. A, gasoline nozzle; B, needle valve; C, throttle valve; D, throttle lever; E, lock nut; F, gas outlet, interchangeable; G, air inlet, interchangeable; H, starting valve; I, spring.

the nozzles the carburetor is very easily cleaned by removing the needle valve and float, and, after placing the finger over the gasoline intake to the nozzles, blowing out the obstructions.

The "Never-Miss" Chain Tool

Never-Miss Spark Plug Co., Lansing, Mich., is putting out for 1908 in addition to its line of ignition apparatus a chain



The "Never-Miss" Chain Tool.

tool here illustrated. With this tool can be drawn together the heaviest chain. It retails at 50 cents.

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Did you ever notice that the average man begins to apologize when he takes out a dollar watch, says his real watch is at the repair man's?

The same is true of a man with a cheap speedometer on his car, says he is going to get a new one this spring, or that his car is a cheap one and he does not care on this car.

No one has to apologize with a Warner Auto-Meter on his car.

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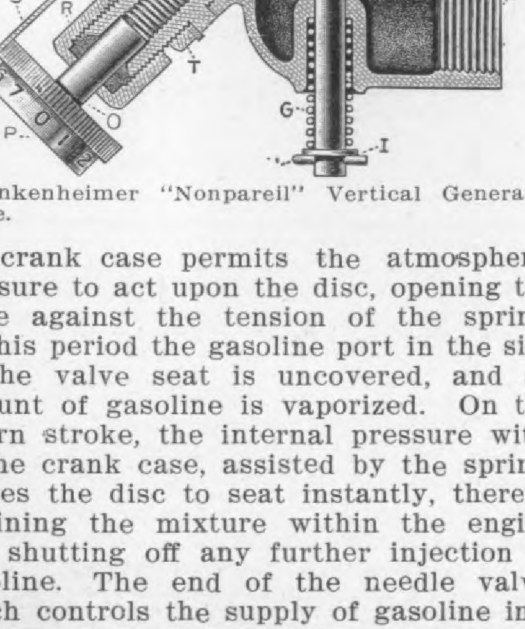
npareil" generator valves, described in July, 1907, issue, page 162, the Lunheimer Company, Cincinnati, O., has ntly placed on the market a vertical npareil" generator valve illustrated with.

o better adapt it to the different es of engines, the valve is made either t or left hand. With the inlet to the and the needle valve in front, the t hand pattern has the gasoline union ne right and the left hand pattern to left.

hen this generator valve is applied to crank case of a two-cycle engine, it bines both the functions of a cartor and the usual check valve placed een it and the crank case. Its operais dependent upon the alternate per of pressure and partial vacuum exg in the crank case at different per of the cycles. When the piston of engine moves in on the compressionosion stroke, the resultant vacuum in



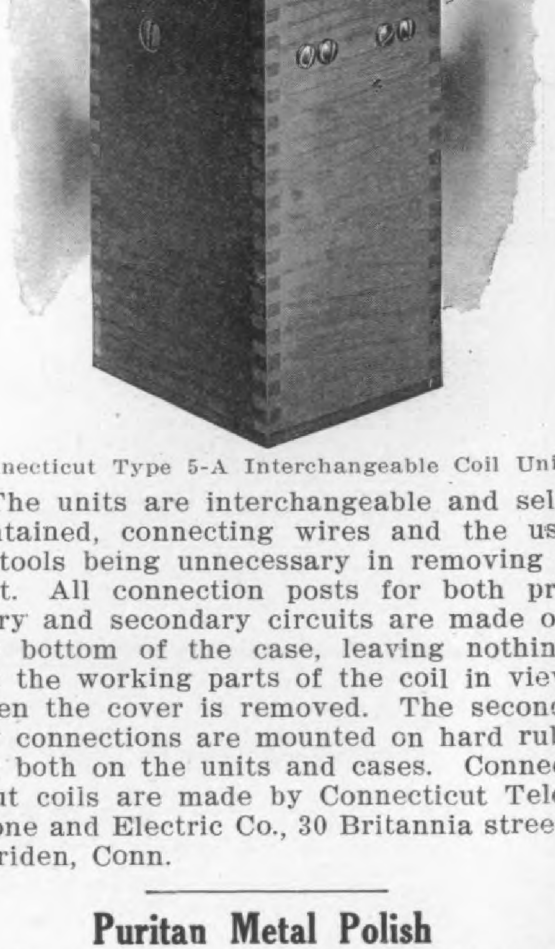
nkenheimer "Nonpareil" Vertical Generator e.

crank case permits the atmospheric sure to act upon the disc, opening the e against the tension of the spring. his period the gasoline port in the side he valve seat is uncovered, and an unt of gasoline is vaporized. On the rn stroke, the internal pressure withne crank case, assisted by the spring, es the disc to seat instantly, thereby ining the mixture within the engine shutting off any further injection of line. The end of the needle valve, h controls the supply of gasoline into generator valve body, is placed as near ossible to the outlet of the gasoline the valve, very little clearance being ved. The result of this is that the

gine.

"Connecticut" 1908 Coil Improvement

The latest type of unit used in "Connecticut" coils is shown in the accompanyin illustration. These coils have been improved by refinement in details for 190 The contact springs are now in the insid of the coil case, not on the unit itself, a in former models, and the little contac screw heads that bear against the spring when the unit is placed in the box, ar all that are visible on the case of thi Type 5-A unit.



Connecticut Type 5-A Interchangeable Coil Unt

The units are interchangeable and sel contained, connecting wires and the us of tools being unnecessary in removing unit. All connection posts for both pr mary and secondary circuits are made o the bottom of the case, leaving nothin but the working parts of the coil in vie when the cover is removed. The secon ary connections are mounted on hard rub ber both on the units and cases. Conne ticut coils are made by Connecticut Tel phone and Electric Co., 30 Britannia stree Meriden, Conn.

Puritan Metal Polish

Puritan metal polish is manufactured b the Puritan Soap Co., 500 Exchange stree Rochester, N. Y., who claim it to be e tirely free from acids and to be no explosive. It is made on the principle c cleaning by dissolving the oxidation c discoloration, rather than by rubbing

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QUALITY LAMPS

Skill in the building, care in selection of material, and practicability as well as beauty in designs have made the Atwood Lamps and Generators the foremost product of their kind in the world. Constant improvements, the most severe tests upon completion, and careful and minute inspection through every process of construction have conserved the reputation for quality so consistently earned during 35 years in the building of lamps.

Write for Catalogue

ATWOOD MANUFACTURING CO.
Amesbury, Mass.

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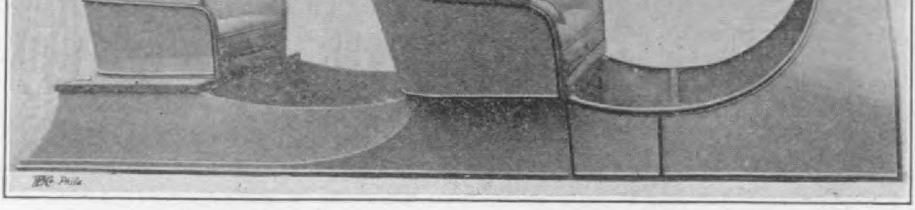

The "Barndt-Johnston" Roadster Body.

"Barndt-Johnston" Roadster Body

e Barndt-Johnston Auto Supply Co., Donaldson street, Columbus, O., is of- g the trade a new roadster body n can be converted into several dif- t kinds of combinations.

r instance, with the back end and seat taken off and a turtle back put he result is a runabout body for two engers only. The turtle back can be ved, and the rear part of the body ack on with 4 bolts, and a mechanic's put on, or the mechanic's seat can be n off and a 2-passenger seat put on, ng a surrey body. The dash and are made of aluminum coated steel. rest of the body is constructed of the best of white ash and poplar panels; ct, the entire body is constructed of metal and wood, utilizing the differ- materials wherever the best results be obtained. This body is furnished lete, including the dash and with kind of seats that the customer may e.

"Le Janus" Horn

new horn known as "Le Janus" has tly been introduced by the Motor Equipment Co., of 55 Warren street, York City.

"Le Janus" Horn.

e horn, as its name implies, is two- rubber bulb and musically tuned reed An adjustable swivel bracket is fitted which allows the horn to be placed on any part of the machine. The horn takes up only 9 square inches of space, and pre sents a neat and attractive appearance.

The "Rough-Rider" Cushion Ventilating Button

The Ventilated Cushion and Spring Co. Jackson, Mich., maker of the well-known Rough-Rider cushion springs, described in our May, 1907, issue, page 141, also make ventilating buttons to be used in conjunction with the Rough Rider springs. In order to allow full play of the springs it is necessary to avoid air compression on the one hand, or any vacuum on the other. The accompanying cut clearly illustrates the construction of this device. It will be observed that the shank of the button is made so that it makes a hollow connection with the interior of the cushion, every button acting as a ventilator. Besides adding to the resiliency of the

Cross Section of the "Rough-Rider" Side Ventilated Button, showing air circulation.

cushion it is claimed for these buttons that they prolong the life of the cushion, the ventilation keeping the interior perfectly dry and free from must or mould, and leaving no chance for the leather, hair and cloth to rot out. Two styles of these buttons are made, one style allowing the air to escape from the periphery of the button, and the other from the top of the button.

The manufacturers sell these buttons only in connection with Rough Rider springs. They have a department in their factory devoted to making new cushions in any size or making over old ones.

Mr. E. R. Benson, who for a number of years has been connected with the Hart-

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The Sensation of the Shows

Ask someone who attended them : : :

We Conclusively Proved to Thousands that

Reliance

Spark Plugs

ARE INFALLIBLE

¶ ANY MAN OF EXPERIENCE knows that a plug that will spark in water will spark under any condition found in a gasoline engine cylinder, for soot, oil, carbon or their combinations cannot be compared with water as short-circuiting matter.

NO CLEANING REQUIRED

¶ A SET OF RELIANCE SPARK PLUGS will make you forget your motor has a spark plug in it. They will start your motor the first twist of the crank, give more power, save your batteries, reduce your gasoline bills, and do a lot of other things that go with **PERFECT IGNITION.**

PRICE $2.50 EACH, POSTPAID

[*One Half Inch, Metric, Autocar or Association Threads*

Money back if not satisfactory in every way

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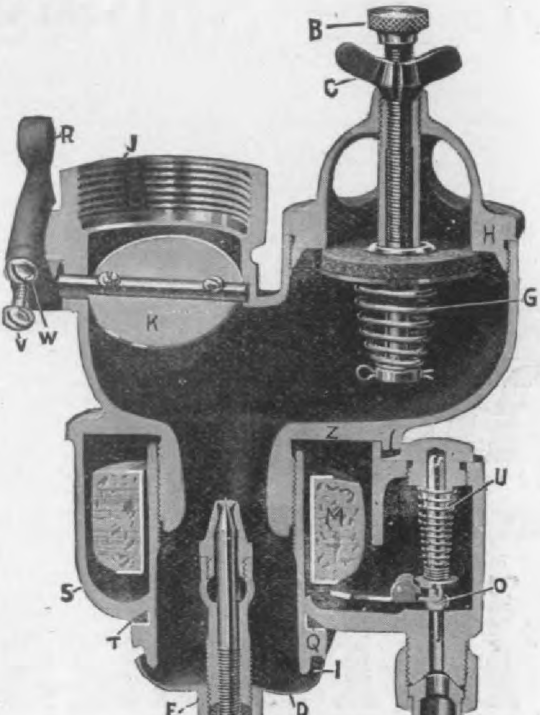
JEFFERY-DEWITT CO., DEPT

of improvements, all of which are in-
porated in the seven new models of-
ed.

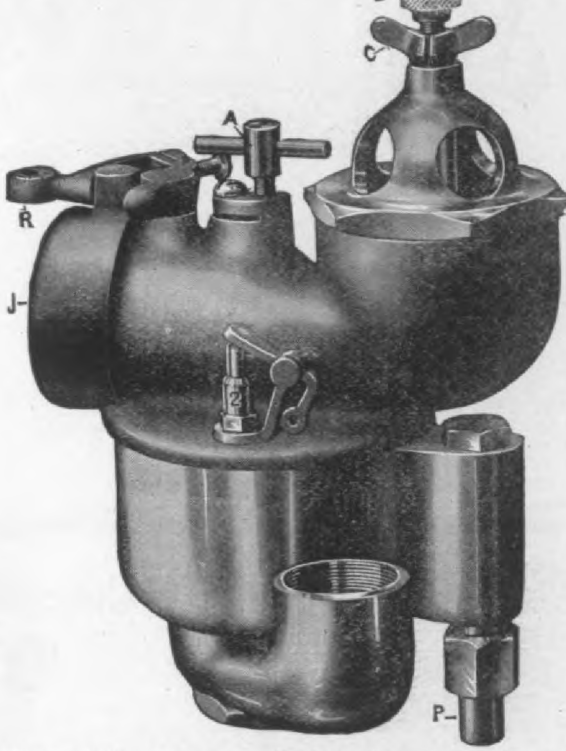
One of the main features of this year's
dels is that the auxiliary air valve ad-
tment is placed on the top of the car-
etor, thereby making it easily accessi-
and adjustable from the top of the car
boat. The float feed arrangement has
o been materially changed, the gasoline
et being normally held closed by means
the pressure exerted by the adjusting
ing V.



he 1908 Kingston Carburetor, Type C, verti-
outlet, sectional view A, Needle valve;
Auxiliary air-valve adjusting screw; C,
mb locking nut; D, Priming trap and
ld thru which air passes; E, Packing
; F, Auxiliary compensating air-valve; G,
iliary compensating air-valve spring; H,
iliary air inlet valve cage; I, Normal
t; J, Gas outlet to motor ; K, Throttle
e; L, Spraying nozzle; M, Cork float, metal
athed; N, Float valve operating lever; O,
ing float-valve; P, Fuel inlet union connec-
; 2, Primer or flusher; R, Throttle operating
r; S, Constant level or float cup which is
centric to spray nozzle; Q, Center member
ough which the constant air and fuel passes,
used to lock float-cup in any required posi-
; U, Spring for float-valve; V, Throttle ad-
ing screw; W, Locking screw for throttle ad-
ing screw; X, Locking screw for needle-valve
horizontal type; Y, Fuel entrance from con-
nt level-cup to spraying nozzle; Z, Body of
uretor.

The auxiliary air valve is operated by
suction from the engine, thereby act-
in the same manner as an automatic

either with or without connections for p
ing warm air. For marine purposes tw
models are offered, known as Type F a



The 1908 Kingston Carburetor, Type D, w
Horizontal Outlet.

Type G, respectively. One model is al
furnished for motorcycle use. These ca
buretors are made in ¾, 1, 1¼, 1½, 2, 2
and 3-inch pipe sizes. Either horizon
or vertical outlets are furnished wi
these carburetors in all sizes, except t
2½ and the 3 inch size, which are ma
horizontal only.

The prices are $12.50 for the ¾-in
pipe size up to $50 for the 3-inch pipe si
The warm air connection is furnished
tra from $2.50 to $5.00, according to size

Continental Tire Now Made In Ameri

The Continental tire, formerly import
from the parent factory of the Co
tinental Caoutchouc Co., at Hanov
Germany, is now being made in Ameri
in the large plant of the Revere Rubb
Co., at Chelsea, Mass. The Americ
product first made its appearance
October 24th, on which date there al
went into effect a new scale of Americ
prices, in the making of which bo
freightage and import duties are elim
nated.

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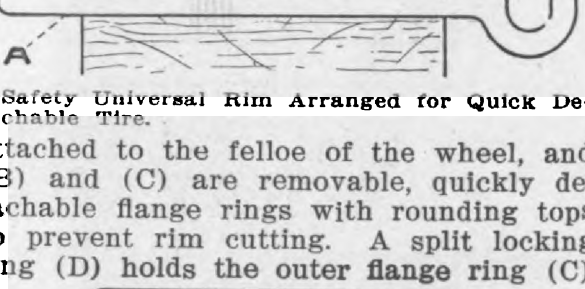
The Pittsburg Automatic Vise & To

niversal Rim, that have not heretofore een described in these columns. This

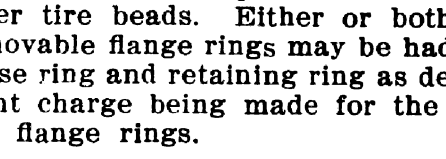
Safety Universal Rim Arranged for Clincher ire.

m is the product of Firestone Tire & ubber Co., of Akron, Ohio, and as shown two of the drawings is suitable for ther detachable tires of the Dunlop type clincher tires. The base rim (A) is



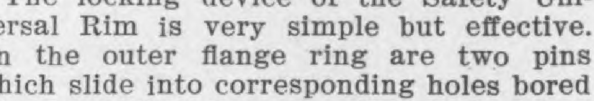
Safety Universal Rim Arranged for Quick De-chable Tire.

tached to the felloe of the wheel, and B) and (C) are removable, quickly de-chable flange rings with rounding tops prevent rim cutting. A split locking ng (D) holds the outer flange ring (C)



The only tool needed to manipulate the Safety niversal Rim.

place on the base rim (A). Another rawing shows this rim with different ange rings, so shaped as to receive incher tire beads. Either or both sets removable flange rings may be had with e base ring and retaining ring as desired, slight charge being made for the extra t of flange rings.



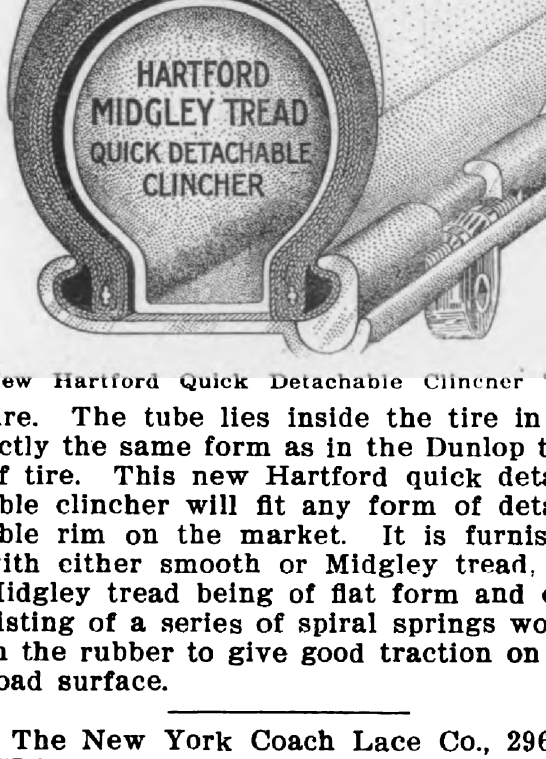
Locking Device of the Safety Universal Rim.

The locking device of the Safety Uni-ersal Rim is very simple but effective. n the outer flange ring are two pins hich slide into corresponding holes bored

this rim and this consists of a handl which is pivoted a small lever on the end of which is a small pin correspon in size to holes in the ring (D) that placed to the right and left of the h which engage with the pins in the fla ring (C). On the corresponding end the handle portion of this tool is a sim pin. To manipulate the split ring these pins on the tool are inserted in th additional holes and the two ends of split ring drawn together.

New Hartford Quick Detachable Clincher Tire

The Hartford Rubber Works Co., Hartford, Conn., have added to their for 1908 a new quick detachable clinc tire which we show herewith, on Midgley Universal Rim. This tire ha non-extensible wide edge somewhat sim to their Dunlop tire, but with a heel its side which fits into the clinch of rim. There is no toe to the clinch of

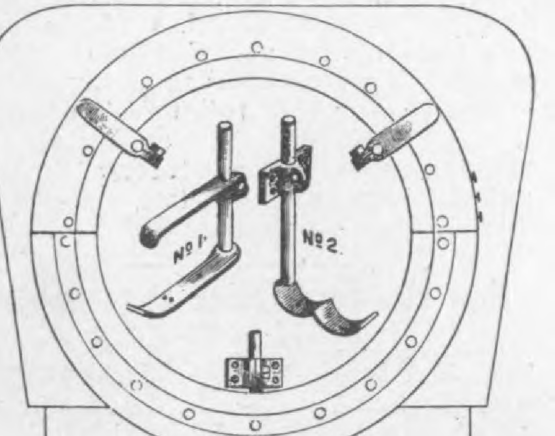


New Hartford Quick Detachable Clincher

tire. The tube lies inside the tire in actly the same form as in the Dunlop t of tire. This new Hartford quick det able clincher will fit any form of det able rim on the market. It is furnis with either smooth or Midgley tread, Midgley tread being of flat form and sisting of a series of spiral springs wo in the rubber to give good traction on road surface.

The New York Coach Lace Co., 296 157th street, New York City, manufactu and imports laces for automobile trimmi in both silk and worsted goods, silk

added to its line some new styles of holders illustrations of which are wn herewith.



e "Allen" Tire Holders for top of limousine back of car.

he Allen tire holder for limousines is le to fit on the top of the body, or it also be attached to the back as shown he accompanying cut. It is made of

The "Allen" Tire Lock No. 1.

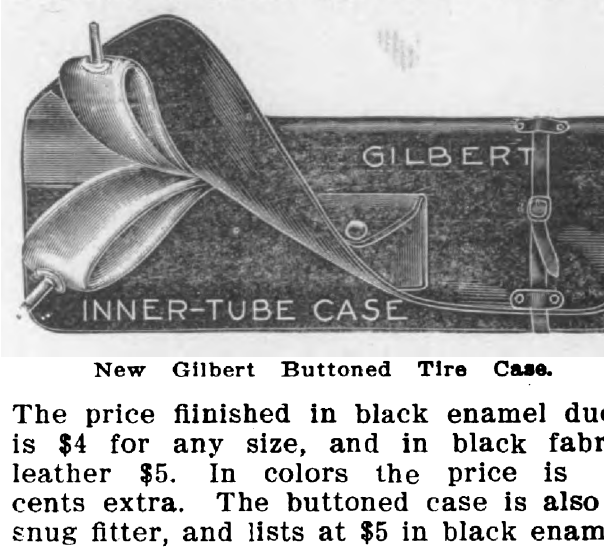
nze and is adjustable to hold from one ch to two 5-inch tires. Two styles of eners are furnished as indicated by . 1 and 2 in the cut. The list price per of any three pieces is $10.00. Single es list at $3.50.

The "Allen" Tire Lock No. 2.

of having a Yale Chest Lock, fitted in the casting, a high grade Yale Padlock furnished, which is used in the manne shown in the accompanying cut. Pa ticular attention is called to the lock co struction which is shown in detail. Th tire lock has a capacity of two 5-inc tires and lists at $7.50.

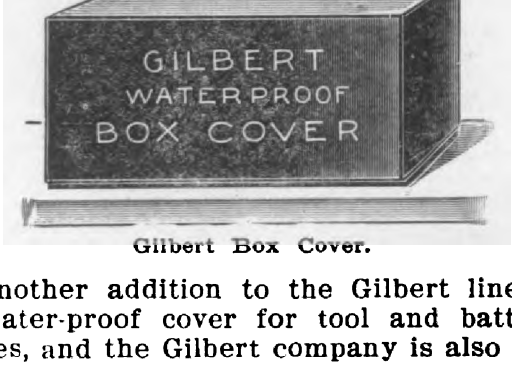
1908 Additions to the "Gilbert" Line

Gilbert Manufacturing Co., New Have Conn., has made several additions to i line of fabric specialties for the comin season. It includes in its 1908 line tw new tire cases, one a wire edge case, ar the other a buttoned case. The wire edg case fits smoothly and snugly around th tire, and is quickly put on or taken o



New Gilbert Buttoned Tire Case.

The price fiinished in black enamel duc is $4 for any size, and in black fabr leather $5. In colors the price is cents extra. The buttoned case is also snug fitter, and lists at $5 in black enam duck or $6 in black fabric leather, cents extra being charged for colors. Bo of these styles are guaranteed wate proof by the maker.



Gilbert Box Cover.

Another addition to the Gilbert line a water-proof cover for tool and batte boxes, and the Gilbert company is also fu nishing water-proof baggage covers in tw sizes for enclosing one or two suit-case The battery and tool box covers are fu nished for all sizes and styles of box used on standard makes of cars. Price

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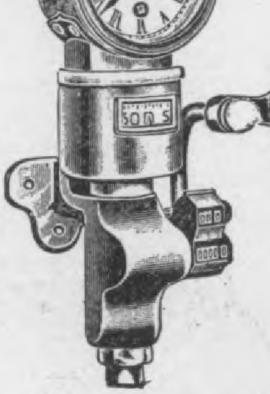
"You Get What You Pay For."

Warner

the manufacture of speed indicators we promised ourselves that we would make the best article that skill and money could produce. That promise has never been broken. It never will.



We believed that fair dealing and an honest article could be made to pay dividends. How well that belief has been borne out is proved by the measure of our success.

We have striven in every way to make the name of "Warner" a synonym for "quality." How well that has been done is best known by those who are best acquainted with the

Warner Auto-Meter

the only practical speed indicator on the market—the only one in which the correct principle (magnetic attraction) is used.

There is no other speed indicator on the market that is not subject to wear and consequent change and variation.

The Auto-Meter positively has no parts that can wear—it's built like a chronometer—the "Warner Guarantee" stands behind it.

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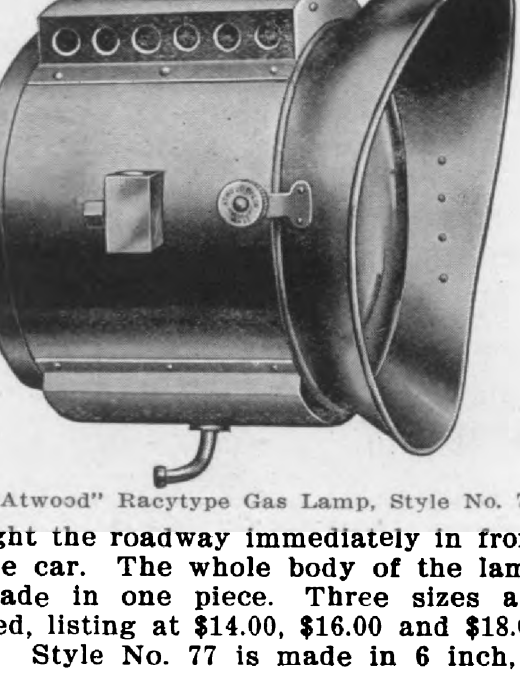
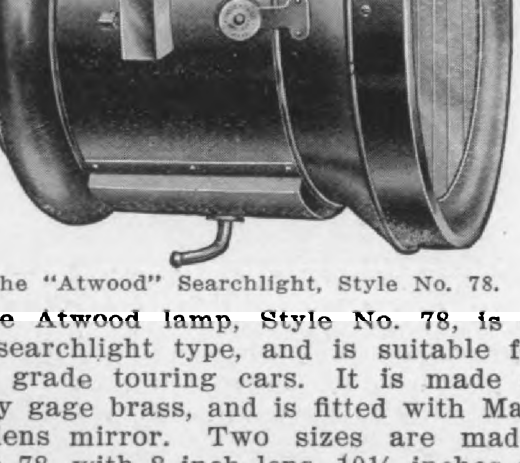
s of lamps; also an improved form
enerator.

e Atwood gas lamp is made of full
, highly finished, and is supplied
the best quality Mangin Lens mir-
warranted to project a powerful light
g ways ahead, and at the **same time**



Atwood" Racytype Gas Lamp, Style No. 77.

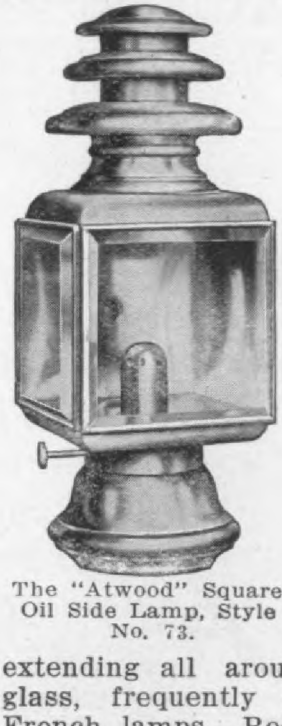
ght the roadway immediately in front
e car. The whole body of the lamp
ade in one piece. Three sizes are
ed, listing at $14.00, $16.00 and $18.00
Style No. 77 is made in 6 inch, 7
and 8 inch sizes, and lists at $13.50,
0 and $17.00. It is an attractive and
looking gas lamp, and is fitted with
finest quality Mangin Lens mirror.
body is all brass.



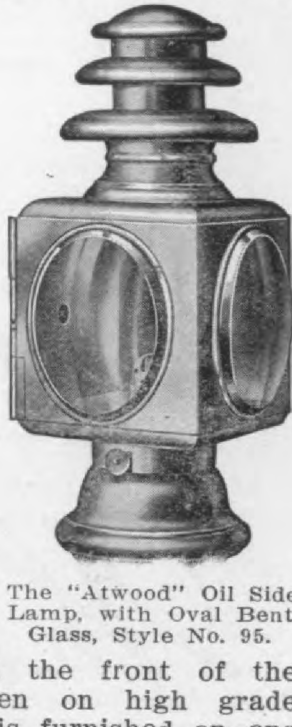
he "Atwood" Searchlight, Style No. 78.

e Atwood lamp, Style No. 78, is of
searchlight type, and is suitable for
grade touring cars. It is made of
y gage brass, and is fitted with Man-
ens mirror. Two sizes are made;

green and red enamel border, ⅝-inch wide
just inside the bevel on the glass, and



The "Atwood" Square Oil Side Lamp, Style No. 73.



The "Atwood" Oil Side Lamp, with Oval Bent Glass, Style No. 95.

extending all around the front of the
glass, frequently seen on high grade
French lamps. Red is furnished on one
lamp and green on the other, which makes
it very attractive without interfering with
the light. This lamp is made in two
styles, listing as follows: No. 73, 4¾x4¾
size of body, and 13 inches high, $15.00 per
pair, and No. 74, 5¼x5¼ size of body and
14¼ inches high, price $18.00. Style No.

The "Atwood" Oil Lamp for small touring cars or runabouts, Style No. 76

The "Atwood" Generator, No. 44.

73, special, with colored border lists at
$17.50, and Style No. 74, special, with
colored borders price $20.00. The At-
wood, Style No. 95, oil side lamp is similar

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The Atwood side oil lamp for small touring cars or runabouts is constructed on the tubular or cold blast principle, and is made of full brass silver lined. One size only is offered. It is 12 inches high (without handle), 6¾ inches long, and has a 6⅞-inch flange. It lists at $10.50.

Style No. 90 is fitted to burn electricity. It is made in full brass, silver lined and highly polished. The size of the glass is 4¾x4¾ inches. This style lists at $20.00 per pair.

The Atwood No. 44 generator is made of heavy seamless drawn brass. It is fitted with a carbide basket of 4 pounds capacity, and will supply from 1½ to 2 feet of gas per hour according to size of gas tip. The generator is divided into three principal parts: Top part, lower part and carbide basket. The top part constitutes the water tank which holds the water that drips upon the carbide. The lower part is a receptacle for holding the residue or ashes, and No. 44 is surrounded by a water jacket. The carbide is likewise contained in the lower part of the generator. One of the features of this generator is an improved quick cam adjustment, which has a nut on same to take up any wear. This generator lists at $15.00 with water jacket, and at $13.00 without water jacket.

Kalamazoo Carburetor Model B

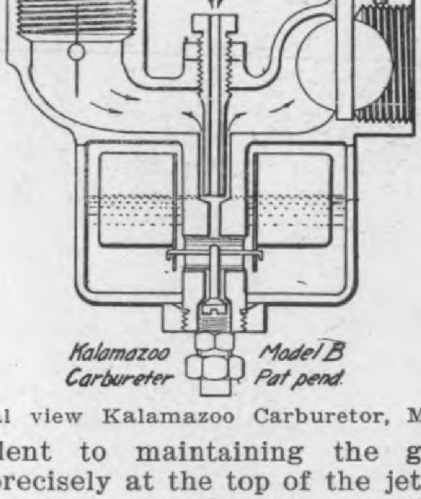
Kalamazoo Carburetor Co., 1301 Grand avenue, Kalamazoo, Mich., is now ready with a new model of the Kalamazoo carburetor which is cataloged as Model B

This carburetor is supplied with either vertical or horizontal outlet. It has a butterfly valve at each end of the main air passage, one serving to throttle the engine and the other to reduce the proportion of air and produce a richer mixture for starting with a cold engine. The float in the new model is concentric with the gasoline jet. A brass tube, inserted in the float is guided on the central stem and the gasoline valve is operated by a pin thru the tube and valve stem, the central post being slotted to allow vertical movement of the pin.

A novel feature of this model is the manner in which the gasoline is drawn from the float chamber into the main air passage. This is done by applying the principle of the airlift, as successfully used by hydraulicians in pumping deep wells.

ward, outside the adjusting screw, the main air passage. The proper mi is obtained by regulating the depth o screw in the enclosing well, one pos of the screw giving the proper mi for all throttle positions.

For this arrangement several advant are claimed. The float is adjusted so the point of the adjusting screw b touches the gasoline or is slightly mersed in it, with no danger of lea This makes the carburetor very sens at low speeds and when cranking.



Sectional view Kalamazoo Carburetor, Mod

equivalent to maintaining the gas level precisely at the top of the jet i ordinary form of carburetor. Anothe vantage is that the gasoline may rise siderably above its ordinary level wi leaking or accumulating in the air pas thus putting increasing pressure upo float valve. This also prevents dri of gasoline on stopping the motor when driving rough roads.

This model B is very compact and be readily attached to almost any n without change. Several throttle posi and movements are offered to adapt various steering post levers. This will also continue the manufacture of multiple-jet carburetor, which wil furnished in the 1908 model both horizontal and vertical outlet.

"Crown" Soap and Metal Polis

The Crown Soap Co., Syracuse, N makes a specialty of soft oil soap after a secret formula. A special fe of "Crown" soap is its quality of prese the finish of a car body and the m states that it can be used on the highly polished surfaces without fe results. It is a vegetable soap conta no free alkali.

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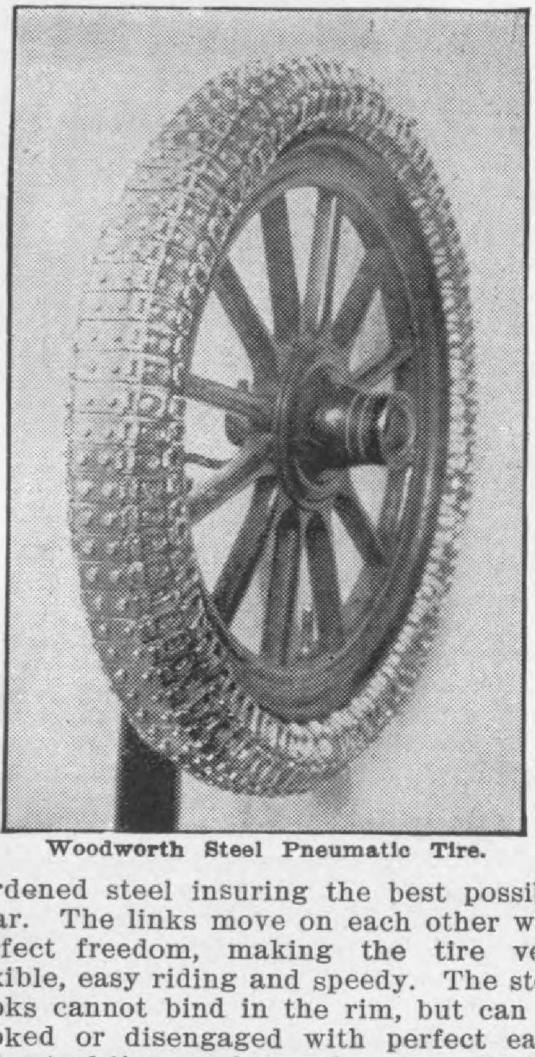
ther, forming a complete covering ed with chrome leather and having a ther covered rubber tube. The steel ates along each edge are turned up rming hooks to engage a clincher rim. The tire is, of course, puncture-proof d non-skidding. The plates are made of



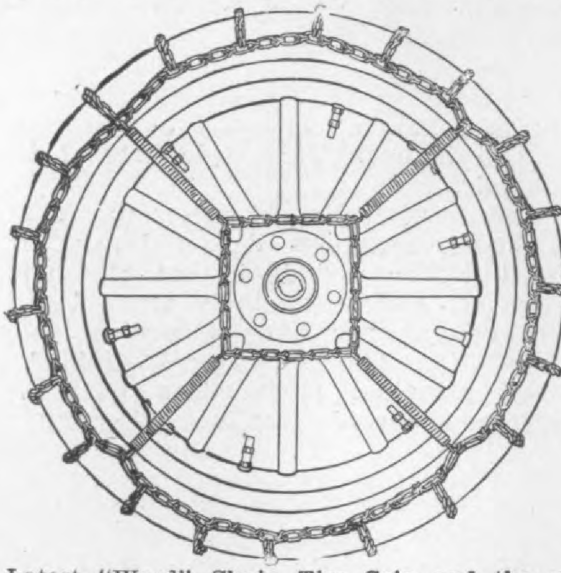
Woodworth Steel Pneumatic Tire.

rdened steel insuring the best possible ar. The links move on each other with fect freedom, making the tire very ible, easy riding and speedy. The steel oks cannot bind in the rim, but can be oked or disengaged with perfect ease. is steel tire can be used on any clincher either quick detachable or old style. The tube is made of pure rubber covered h chrome leather insuring the best holding quality with immunity from in- y.

The Weed Tire Grip Adjuster

Veed Chain Tire Grip Co., 28 Moore eet, New York City, is now making an omatic adjuster for use with the Weed in tire grip. This adjuster holds the in grip taut, automatically takes up etch in the chains, makes the grip seless and, it is said, lengthens the life he same. It is very simple indeed con- ing of a four extension springs ex-

touches the ground and thus elimina the clanking of chains on the roadway pavement. It also prevents unnecessa wear on the chains by beating them on t ground. At the same time it allows t



Latest "Weed" Chain Tire Grip and the n automatic adjuster on tire.

chains to creep slowly around the tire a thus prevent wear on the tire. The chai naturally stretch somewhat when su jected to wear as these chain grips a and this adjuster automatically takes this stretch, keeping the chains at t same tension all the time. The adjuste sell at $1 per pair.

Mossler-Hoffman "Protector" Coats

The Mossler-Hoffman Co., 46-50 Jacks Boulevard, Chicago, designers and make of outer coats, are offering a select line "Protector" coats for ladies' and men wear. The feature of the "Protecto outer coat is the patented collar, whi fits snugly around the neck producing military effect, doing away entirely wi the necessity of wearing a muffler a protecting the wearer in all sorts weather. The fabrics are careful selected cheviots, tweeds and rain-pro cloths of the best British, German a American textures. Their Model C is double-breasted auto coat, made with wi guard and wind cuffs. The material rain proofed and is furnished in light a medium weights and in colors or pla The ladies' coats are made of the sa material and in the same styles as t coats for men.

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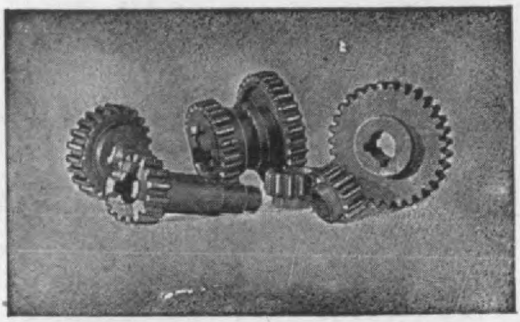
Mr. N. A. Hawkins has been appoint

Planed Bevel Gears

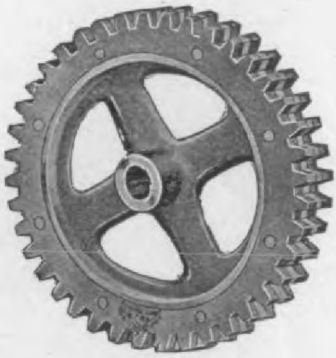


Hardened Steel Transmission Gears

New Process Noiseless Gears

Bronze Gears, Fibre Gears, Spiral Gears and Internal Gears

Our facilities are ample for turning out accurately cut gears in any quantity : : : : :



The New Process Raw Hide Co.

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N. J., patterned after its foreign ories, is now **ready with a complete**

Michelin Flat Tread Clincher Tire.

of tires and rims for the automobile e. This company's comprest tread is so shaped that when mounted on rim with the **inner** tube inflated the

The Michelin Clincher Type Comprest Tread

er on the tread of the shoe is com- t instead of being distended as is l. This compression is said to add erially to the wearing qualities and ral durability of the tire. A cut in shoe, we are informed, is held closed he compression **of the** rubber on the

Michelin Anti-Skid Type Clincher Tire.

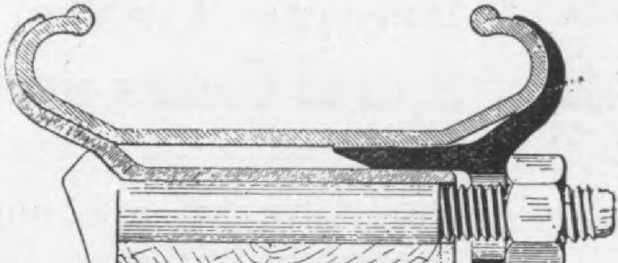
ing tread, tending to reject instead

skid tread, the tread being provided wit an additional leather tread having stee rivets. As this leather strip only cover the tread and does not extend over th side walls, the makers claim that littl resiliency is lost by **this construction.** Th

Michelin Quick Demountable Round Tread Tire.

leather is applied not to increase th wearing quality, but solely as an anti-ski and as soon as the rivets are worn down a new tread should be applied.

The Michelin Company also has a roun tread quick detachable tire. This tire i made with a stiff wire bead and is easil fitted to any of the well-known detachabl



Michelin Demountable Rim.

rims. The quality and general construc tion of the tire is the same as in all th other Clincher types, and this quick de tachable tire is also made with an anti skid tread similar to the tread of th Michelin Clincher Anti-Skid type. Th Michelin line also includes a Demountabl Rim constructed as here illustrated.

Paragon Auto Oils

Paragon Auto Oils are manufacture specially for the automobile trade by Loo & Dilworth, of Philadelphia, Pa.

By a special process of double filtratio thru selected materials, all of the fre

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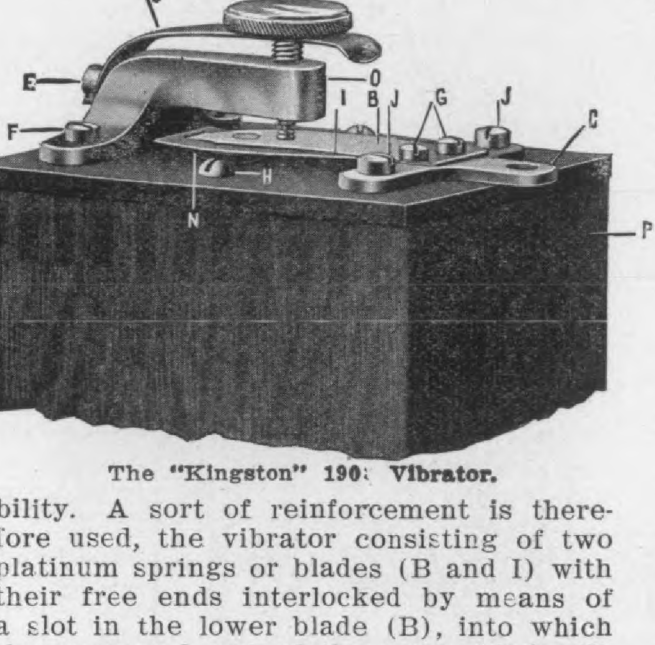
made some important minor improvements, one of which is an improved form of vibrator used on the 1908 Kingston coil. This vibrator has been designed to obtain light construction and quick vibration, while obtaining strength and dura-



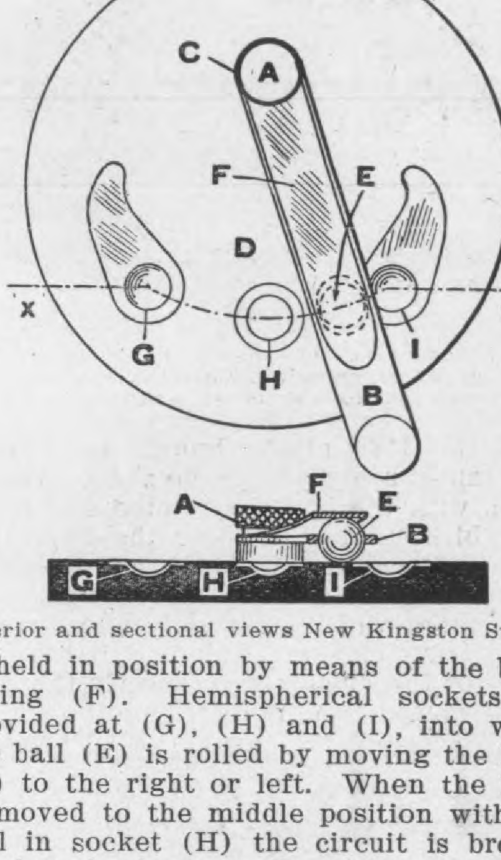
The "Kingston" 190: Vibrator.

bility. A sort of reinforcement is therefore used, the vibrator consisting of two platinum springs or blades (B and I) with their free ends interlocked by means of a slot in the lower blade (B), into which the narrowed end of the upper blade (I) slips. The screws (G) pass thru both blades at the other end. The adjusting screw (A) has a platinum rivet, and is prevented from loosening by vibration by the lock spring (D), which is in turn held by a ¼-inch platinum screw (E). The covering (P) of the individual units in the 1908 coils is of fibre.

The "Kingston" 1908 **Switch**, Exterior View.

The 1908 Kokomo line also includes a new switch in which is employed a ball contact. This switch is of the combina-

The plug (A) when removed breaks the circuit and prevents the of the car, and the lever (B) can connect the battery, magneto or dy when the plug is in. The drawing with clearly illustrates the features o switch. The lever (B) is fulcrume (C) and at (D) is slotted to allow th sertion of a small steel ball (E), w



Interior and sectional views New Kingston S

is held in position by means of the spring (F). Hemispherical sockets provided at (G), (H) and (I), into w the ball (E) is rolled by moving the (B) to the right or left. When the is moved to the middle position with ball in socket (H) the circuit is br Moving the lever to the right carrie ball into socket (I), and connects up set of batteries or one source of cu such as magneto or dynamo, while ing it to the left carries the ball socket (G), and connects up the source of current. The cover of the s is held on by two screws.

Alundum is the name of a new gri material recently developed and br out by the Norton Co., of Worcester, M the well-known abrasive wheel ma This material is made into gri wheels, rubbing and sharpening st It is manufactured by taking the p amorphous oxide of aluminum, othe known as mineral Bauxite, and me it in immense electric furnaces. cooled ingots are then crushed and gr

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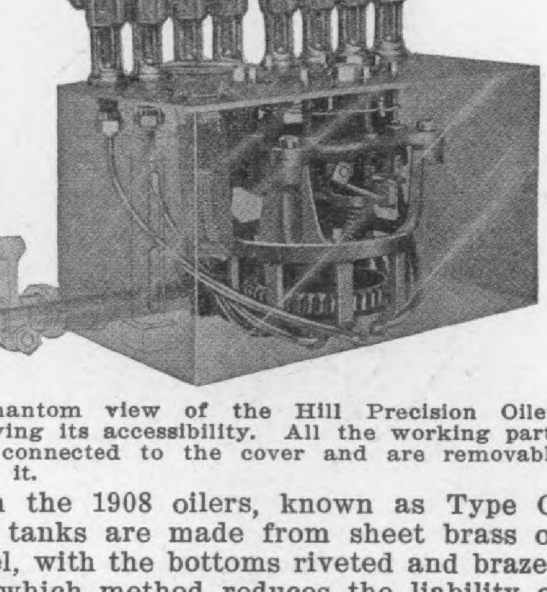
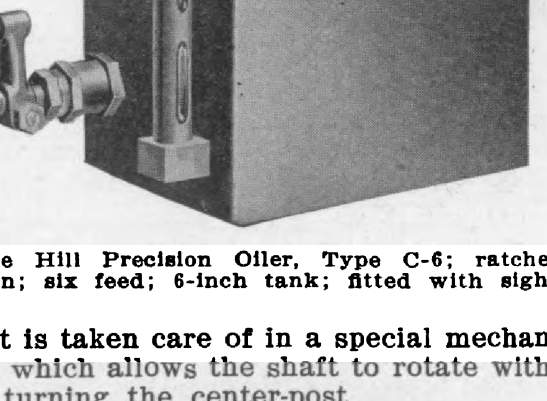
ed by the Precision Appliance Co., 832- Austin avenue, Chicago, Ill. The rs are made with from one to eight ds, and any number of units can be d. Attention will here be given to features only.



antom view of the Hill Precision Oiler, ing its accessibility. All the working parts connected to the cover and are removable it.

the 1908 oilers, known as Type C, tanks are made from sheet brass or l, with the bottoms riveted and brazed which method reduces the liability of kage from the tanks to a minimum.

n account of the cam action, these icators will feed in only one direction otation of shaft, and it will be neces- for the customer to specify the direc- wanted. A reverse motion of the

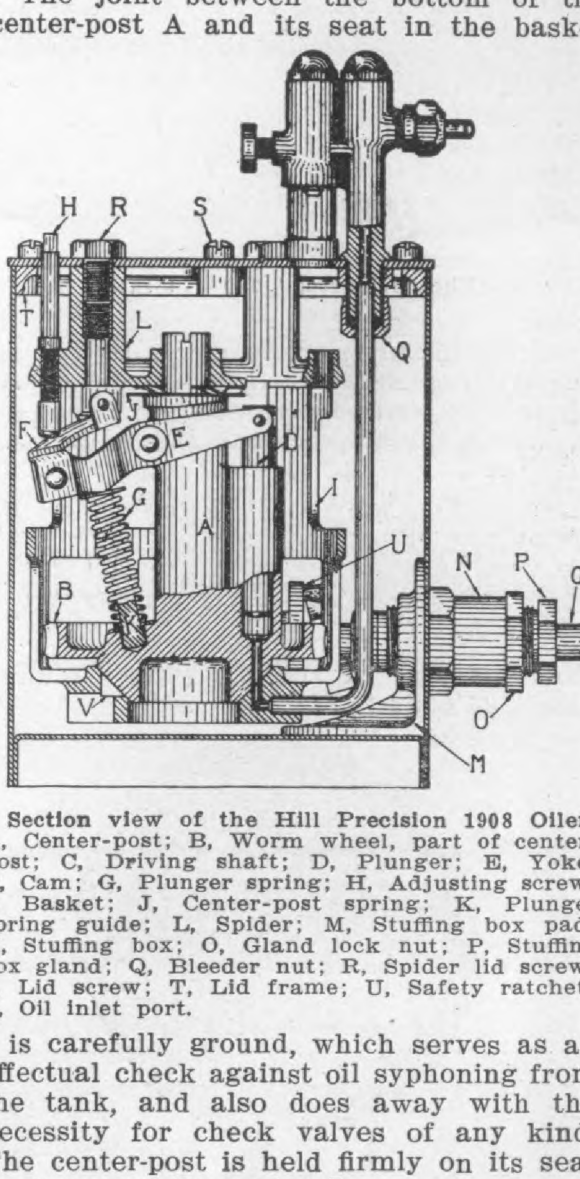


e Hill Precision Oiler, Type C-6; ratchet n; six feed; 6-inch tank; fitted with sight

t is taken care of in a special mechan- which allows the shaft to rotate with- turning the center-post.

of the outer end of the yoke E, coming contact with one of the cams F. Oil thus drawn into the plunger chamber th port V. When the outlet to the chamb is in line with the delivery port, the yo E disengages with the cam F and t spring G drives the plunger down, th shooting the oil thru the delivery pipe i to the bearing. The amount of oil tak into the plunger chamber for any beari is accurately proportioned by means of t adjusting screws H, each delivery tu having its own cam and adjusting scre

The joint between the bottom of t center-post A and its seat in the bask



Section view of the Hill Precision 1908 Oile A, Center-post; B, Worm wheel, part of cente post; C, Driving shaft; D, Plunger; E, Yok F, Cam; G, Plunger spring; H, Adjusting screw I, Basket; J, Center-post spring; K, Plung spring guide; L, Spider; M, Stuffing box pa N, Stuffing box; O, Gland lock nut; P, Stuffi box gland; Q, Bleeder nut; R, Spider lid screw S, Lid screw; T, Lid frame; U, Safety ratche V, Oil inlet port.

I is carefully ground, which serves as a effectual check against oil syphoning fro the tank, and also does away with th necessity for check valves of any kin The center-post is held firmly on its sea by means of the spring J.

The oilers list from $15.00 for a 4 pi 1 feed oiler, to $52.00 for a 10 pint 1 feed size. These prices are for oilers wit steel tanks, belt driven, fitted with pla bleeders, without pulleys and wit standard pad connections.

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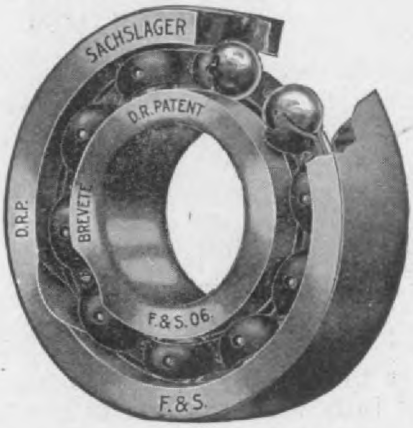
F. & S.

Annular Ball Bearings

The dependable kind



Furnished in both "Silent" and "Full" type for various loads and speeds.

STEEL BALLS

We are importing Steel Balls of superior quality and extreme accuracy such as employed in F.&S. ANNULAR BALL BEARINGS.

Correspondence is invited.

J. S. BRETZ COMPANY

Sole Importers

TIMES BUILDING .·. NEW YORK

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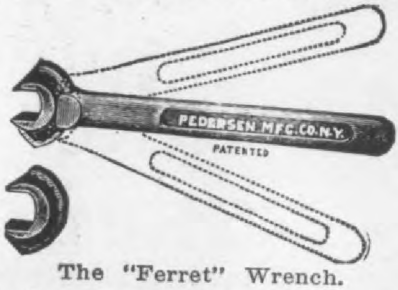
t is now sold to the United States e thru a branch located at 116 Broad et, New York City, established recently the manufacturers, S. Smith & Sons, , London, England. This indicator rates by centrifugal force and springs ch actuate the indicator hand. The ernor is mounted horizontally and en by a flexible cable thru gearing. gearing is used to allow a slow turn- of the flexible shaft, and the shaft tes at a very low speed. The drive the wheel is by friction, a rubber being prest against a disc to give tive drive. This construction is very ble and adjustment is easily made for rent sizes of wheels. Three springs used to govern the movement of the cator, a weak spring for low speed, a

1908 Smith Speed Indicator.

um spring for higher speed, and a g spring for top speed. These springs into use successively as the speed e car varies and the variation of the er is practicaly uniform. The pointer ost sensitive on the low speed and a hair spring is used to keep it steady revent back lash. The unique feature is instrument is the marking of the on each indicator by hand according e results shown at known speeds in factory. In each instrument, there- compensation is made for the est variation in the strength of the gs, and absolute accuracy thus at- d. The scale on the dial is almost a lete circle being 8½ inches long, and dicator is therefore easily read from art of the car. The case of this in- ent is of solid brass of water-proof ruction, and highly ornamental. This

size set screws, nuts and bolts.

The handle and heads are made of high grade drop forgings, and the wrench is as strong as a solid S or straight wrench. It uses the various heads on one handle and it takes the place of several wrenches



The "Ferret" Wrench.

such as S and off set wrenches. It can be used as a ratchet thru about 90 degrees working equally well in both directions without any change. There being no springs or pawls, the wrench is indestructible and the use of solid heads prevents the turning off of corners when used on nice work.

These wrenches will be made in special sizes and shapes when ordered in sufficient quantities.

Gray & Davis Lamp Piping System

Gray & Davis, the well known lamp makers of Amesbury, Mass., make a practice of fully investigating every lamp complaint that comes to their notice, and they advise us that they have found that fully half of the troubles with gas lamps have been traced to defective piping. They have, therefore, prepared a diagram of a correct system of piping for gas lamps which they believe all users of gas lamps

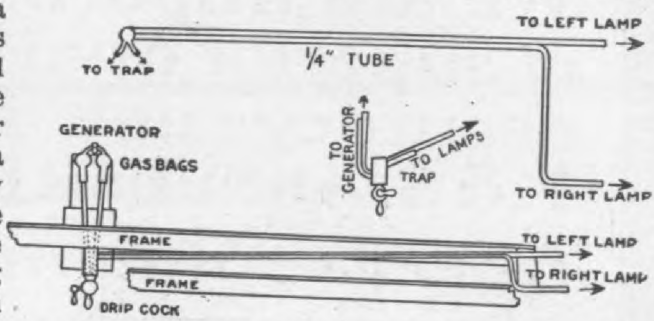


Diagram Piping System for Gas Lamps recommended by Gray and Davis.

would find profitable to use. In this system, which is illustrated by the drawing herewith, all pipe pitch downward to the drip cock, and each lamp is piped independently, all the piping coming together at a trap. Gas from the generator or gas tanks enters the trap below the piping to the lamps. The drip cock should be

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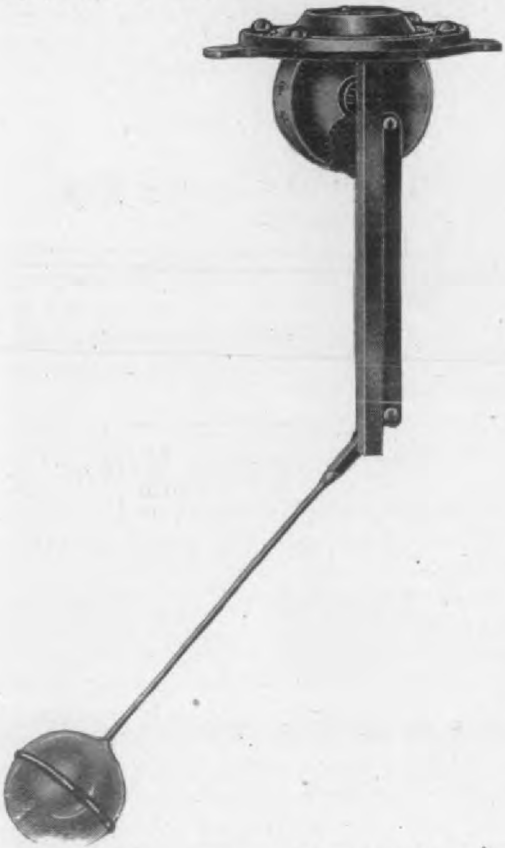
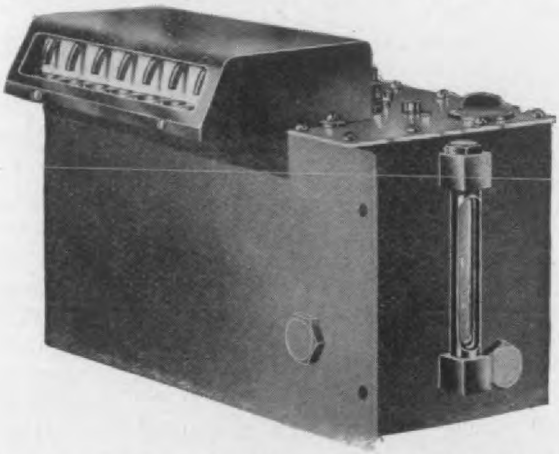
inimum price consistent with high grade onstruction and accuracy. In this gage nly one figure can be seen at one time, hereby eliminating the **chance of reading**



Side View of the "Hancock" Tank Gage, showing its method of operation.

it incorrectly. The accompanying cut clearly shows its method of operation, also its simplicity of construction. The gage is almost entirely machine made, therefore all parts fit and are interchangeable. It is made of brass and will not rust.

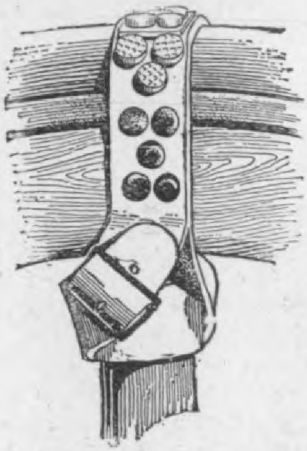
The manufacturers carry in stock for quick shipment all sizes from 6 to 13-inch depth of tanks, but can furnish upon short



car so as to protrude from the dash, w the oiler itself is fastened to the other of the dash under the hood.

Woodworth Single Kant-Skid Ban

In addition to the complete sets of K Skid Bands for applying to the tires Leather Tire Goods Company, of Nev Upper Falls, Mass., is putting out si Kant-Skid Bands, which instead of b fastened to chains which go around wheel, are buckled around the spoke o



Woodworth Single Kant-Skid Band.

wheel. One or more of these may be on each wheel, as desired. The b have additional round protection rive the sides, as well as anti-skid rivet the tread portion. These Kant-Skid gle bands are especially suited for tires. The price is 50 cents each.

"Valgrinok" Valve Grinding Pa

The National Valgrinok Compound 200 Summer street, Room 82, Bo Mass., has recently brought out a valve grinding compound known "Valgrinok."

It is made of a special kind of chemically combined, and is free emery. It is used by mixing wit gasoline or kerosene to a thin Valgrinok is put up in tin boxes conta about 9 ounces each, three cakes, c medium and fine, in each box. Th price is 50 cents per box.

The Supplementary Spiral Spring of St. Louis, has issued its 1908 book Supplementary Spiral Springs, shows that its device can be fitted to tically every model and type of ca on the market. Mr. J. G. Stadelman,

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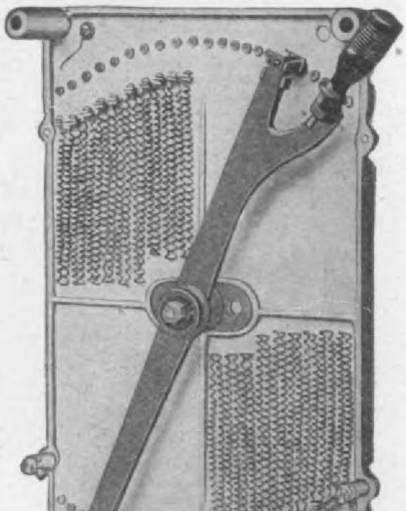
ed upon the market battery-charging stats which give an extremely wide e of control.



View of the "Universal" Battery Charging Rheostat.

e particular rheostat which is called "Universal Rheostat" can be used to ol the charge of any ordinary sized nobile battery with any number of

-Leonard Charging Panel for Private Garages.

the potential between consecutive step being reduced to a point below that a which arcing could occur.

They are also furnishing complete bat tery charging panels for private plants mounting rheostats above described, o the back of the switchboard. On the fac is mounted a line switch, fuses, overloa and underload circuit-breakers and rheo stat controlling handle. With this pri vate plant switchboard a charge can b started at any desired rate, and then left for when the cells are fully charged th circuit will be automatically opened. A a result, it is possible for an owner t start a charge at night, and when the cell are fully charged the circuit is opened au tomatically.

Lumen Bearing Metals

The Lumen Bearing Co., of Buffalo, N Y., is manufacturing an extensive line o bearing alloys, suitable fo. all conditions and in various degrees of strength, elasticity, etc. One of its main products is a composition known as Lumen, which combines in a marked degree the excellent wearing qualities of genuine babbitt with the strength and rigidity of phosphor bronze. It is claimed to be from 20 to 25 per cent. lighter in weight than ordinary bronze, and is also considerably lower in price. It is non-magnetic, and a metallurgical test of it shows the following: Weight, 4 ounces to the cubic inch; specific gravity, 6.93; tensile strength, 33,000 pounds per square inch; torsional strength, 35,000 pounds; compressive strength, 80,000 pounds; fusing point, 725° F.; shrinkage in sand moulds, 7-64 inch to the foot; coefficient of expansion in the solid state, .000015 of an inch per degree Fahrenheit. This metal is especially desirable for thrust collars and for bearings designed to carry unusually heavy loads.

For withstanding repeated shocks, and to meet the requirements where only a metal of high residue, plasticity and anti-friction qualities can be used, the manufacturers offer their Electric Bronze, which is a phosphor-bronze composition which is perfectly deoxidized by a special process. This metal machines readily; has a fine texture and is designed for bearings on gas engines, automobiles locomotive main rods, and wherever it is necessary to withstand high speed and severe pounding. The manufacturers furnish finished castings made of this metal, and also sell it in ingot form.

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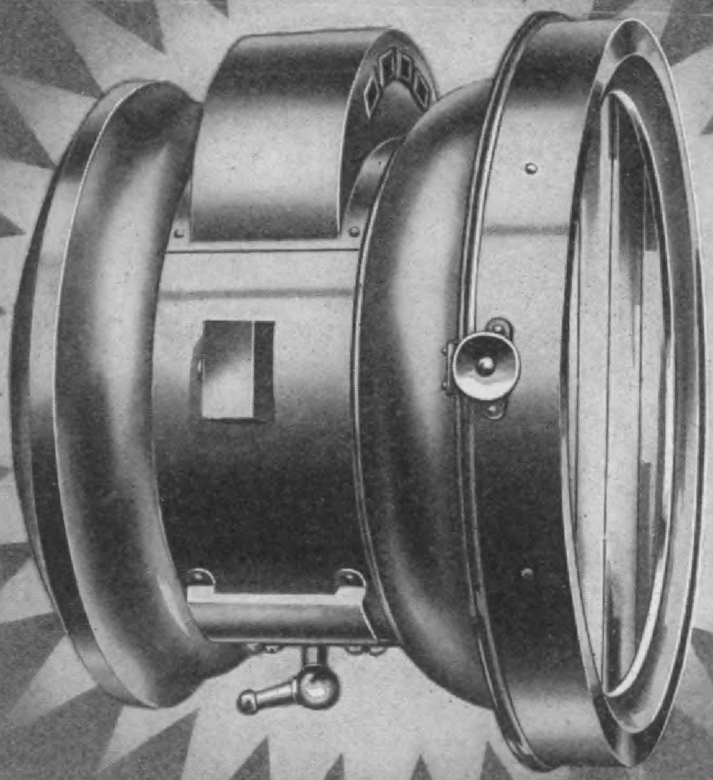
GRAY & DAVIS

1908

LENS MIRROR SEARCHLIGHT



GRAY & DAVIS LAMPS

will be used as the regular 1908 equipment of the following high-grade cars:

Pierce, Stoddard-Dayton, Reo, Peerless, Jackson, Pennsylvania, Rainier, Winton, Pope-Hartford, Premier, Elmore, Dorris, Garford, Royal.

Write for style book and prices. Lamp illustrated, design patent allowed September, 1907.

GRAY & DAVIS AMESBURY, MASS

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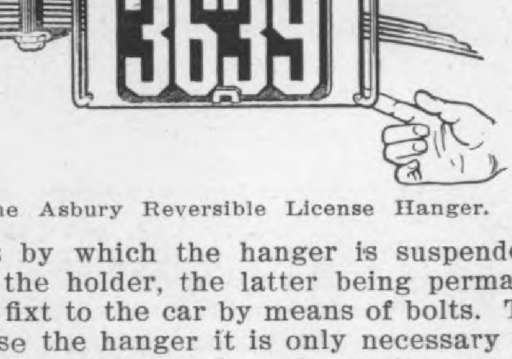
re of which is the fact that it can be sed immediately, and thus two State e numbers can be carried, either of can be brought into use in a few ds. This is accomplished without nechanical contrivance whatever, and mplicity is perhaps one of the most ctive features of the Asbury hanger. hanger is of brass, and at each end tached stout brass rods which form



he Asbury Reversible License Hanger.

by which the hanger is suspended the holder, the latter being permanfixt to the car by means of bolts. To se the hanger it is only necessary to it up full length, and turn it over, so the other ends of the brass rods are ht into use as hooks. The weight of anger, of course, naturally keeps it ing with the right side out, and there possibility of its being reversed unthe user lifts it up full length and it over. At the same time the reng process is so simple that it res only a second to perform it. If the t travels thru more than two States an easily substitute another hanger two more license tags, and be prefor passing thru two more States ut further trouble. The substitution new hanger is the work of but a few es, the attaching device being spedesigned with this in view.

"New Britain" Portable Vise Stand

e New Britain Machinery Co., New in, Conn., realizing the necessity for table work bench or vise stand, has ntly brought out the New Britain ble Vise Stand which will be found ially useful in automobile garages.

e body of the stand is of circular rigidity being attained by means circular column of rolled boiler plate, held between the base and the top. e top, of cast iron, is so shaped that or work may be laid upon it, and in ng from place to place they will not

vise side is far enough back from the working line so that in standing at the vise nothing is in the way of the workman's feet. Provision is made for transporting the bench from place to place by simply raising the self-locking handle to the position shown in the cut, to bring the stand off the floor and to bear upon its three wheels, two of which are dead and one on a swivel. The stand can then be

The "New Britain" Portable Vise Stand.

easily pushed over rough or smooth floors, the swivel behind, and when the desired point is reached, a depression of the lever drops it upon its base, and it is ready for use. Should occasion require, the stand may be worked up into a corner.

The stand is built in two sizes, one in which the top tray is 20x26 inches, carrying a 3½-inch vise, and another in which the top tray is 24x32, carrying a 5-inch vise. In each case, the vise is just the right height for filing, 41 inches. The manufacturers furnish these stands equipt with a standard make of vise, but any make will be fitted where desired. The stand can also be furnished without vise, where the same is to be used as an inspector's cabinet.

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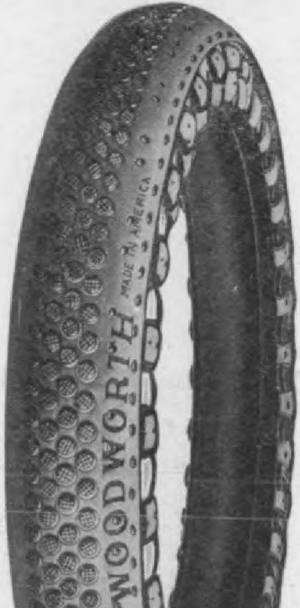
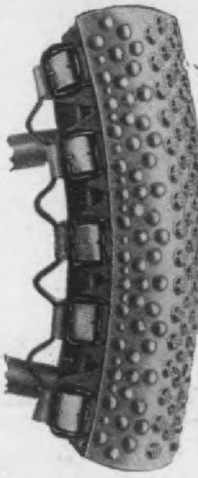
F. Matt & Company, 290 Halsey street, Newark, N. J., are manufacturing auto



The New Woodworth Tread is a continous three-ply chrome leather band around the tire, studded with closely set steel burrs. On each side of this band is a self-adjusting steel wire secured by strong buckles and straps to hold it firmly in position and to make the Tread conform to the tire. New hat-shaped steel rivets with broad shoulders and strong heads and a new steel buckle and strap are other improved features of the Woodworth Tread for 1908.


Special Tread

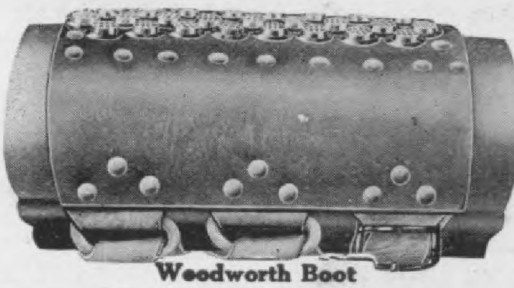
SPECIAL—A Special Tread with oval-headed steel rivets set along the sides for rocky and rutty roads are also important improvements in the 1908 Woodworth Tread.

A set of Woodworth Treads makes the car instantly co trollable, protects it against injury, prolongs its life and mak the tire last three to six times longer. Sizes from 26x2½ 36x 5. Prices $8.00 to $25.00 each.

Prices for Special Woodworth Treads 20 per cent. high than the above.

WOODWORTH BOOT

made of three-ply chrome leather with outside strip reenforced with steel burrs. Protects the cut and worn parts of the tire. Can be adjusted in three minutes. Fastened by heavy strap lacing through strong rings. Take up but little room. A good thing to have with you on a trip.

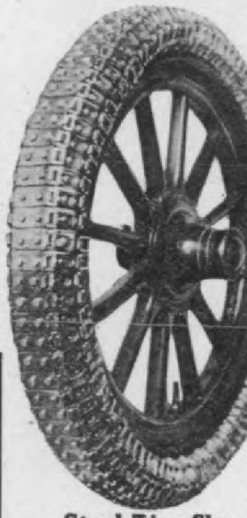

Woodworth Boot

Kant-Skid

FOR PNEUMATIC OR SOLID TIRES

Woodworth Steel Tire Shoe

Made of steel plates over chrome leather. They are flat on the wearing surface with closely set steel burrs to prevent skidding. Fastened to the tire by hooks on each side. They protect the tire against puncture, skidding and blowouts. You can use up the old tires with safety with Woodworth Steel Tire Shoes.


Steel Tire Shoe

"Kant-Skid" consists of strips of chrome leather across the tire about four i ches apart. Each cross strip has a steel plate and steel studs on its outer surface to take the wear of the road. Safe, Soft, Noiseless, cannot possibly injure the tire. Will outwear any o her anti-skid device. Barred by no road laws, Local, State or National. Every pair guaranteed. Sizes 26x2½ or 3 to 36x4½ or 5 Prices $9 to $13 per pair.

Write for handsome new booklets, "Safe and Sane Automobiling" and "Trail of the Woodworth Tread" FREE on request.

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254 Michigan avenue, Chicago, is put-
out full elliptic springs, using the
principle. In these the scroll is on
back end of the main leaf with a coil
een the end of the scroll and the low-
ain leaf. To stop side motion they
a separated plate coming from the
r of the upper spring and fastened
the head of the lower leaf in the or-
y way. This company is also put-
out a coil rebound check, which they
not only checks rebounding, but does
retard the downward motion of the
g. This same coil is also used in a
se position to strengthen springs that
little weak. These coils are easy to
, and are selling at a very reasonable
.

"Lennox" Tire Gas Tanks

e "Lennox" Chemical Company, 1201-
East Fifty-fifth street, Cleveland, O.,
anufacturing a line of tire gas tanks,
styles of which are shown herewith.
e valve used on these tanks can be
ed and closed with a small hand
ch, included with the outfit. The
s are tested to over three times their
ing pressure before being shipt from
actory, and are fitted with safety de-
which permit the gas to escape in
they are subjected to extraordinary
itions of heat.
e prices, specifications, etc., of the
ent outfits made by the Lennox peo-
re as follows: No. 1 outfit is for car
hose, is $15.00.

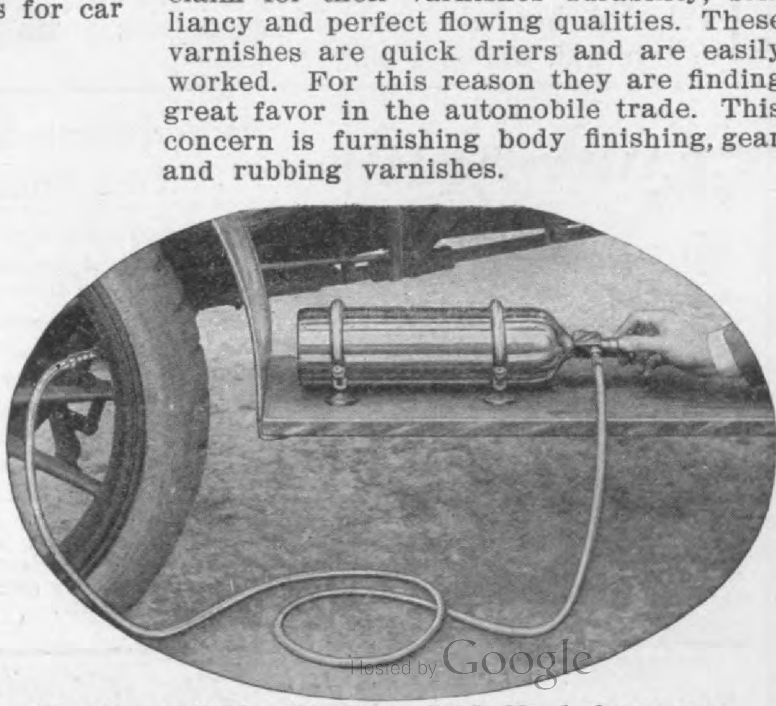
No. 2 outfit, also for car use, is 25 in
ches long by 4 inches in diameter, and
weighs 28 pounds full and 21 pounds
empty. It will fill 25 to 45 tires. The
price is $18.00, including 10 feet of hose
Clamps for attaching these tanks to the
footboard or other parts of the car in
brass finish are furnished for $1.50 per
pair. A gage for registering the tire
pressure is furnished at $5.00.

An important feature of these tanks is
their flat bases, which permits them to
stand alone top end up.

No. 3 outfit for garage use stands 4 feet
high, and includes a regulator, gage, 10
feet of hose and a truck. This tank will
fill from 75 to 150 tires. It lists at $40.00.

Outfit No. 4 stands 4 feet high, and in
cludes a regulator, gage, 10 feet of hose
and a truck. This type will fill about 200
to 300 tires. The list price is $50.00
Prices for refilling these tanks are as fol
lows: No. 1, $1.75; No. 2, $2.00; No. 3
$2.50, and No. 4, $5.00.

Wm. Harland & Son, 168 Center street
New York, is a concern which has been
established in the manufacture of var
nishes for the coach, carriage and railway
trade for 120 years. Since the advent of
the automobile, they have made a special
study of the requirements of this trade
and are supplying varnishes specially
adapted to automobile finishing. They
claim for their varnishes durability, bril
liancy and perfect flowing qualities. These
varnishes are quick driers and are easily
worked. For this reason they are finding
great favor in the automobile trade. This
concern is furnishing body finishing, gear
and rubbing varnishes.



The "Lennox" Tire Gas Tank, Outfit No. 1, for car use.

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SPEED

Patent 1897
TRADE MARK REGISTERED 55,364

NON SKID
RUBBER TREAD

BAILEY'S "WON'T SLIP" TREAD TIRES

Made and Sold by

The B. F. Goodrich Co.
Factories, Akron, Ohio

The Fisk Rubber Co.
Factories, Chicopee Falls, Mass.

The Diamond Rubber Co.
Factories, Akron, Ohio

Goodyear Tire & Rubber Co.
Factories, Akron, Ohio

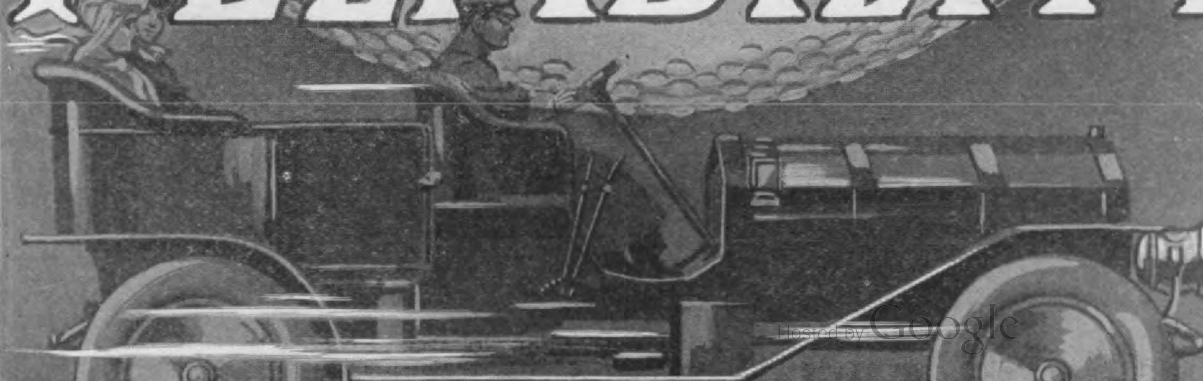
Hartford Rubber Works Co.
Factories, Hartford, Conn.
HARTFORD and DUNLOP TIRES

G & J Tire Co.
Factories, Indianapolis, Ind.

Morgan & Wright
Factories, Detroit, Mich.

International Rubber Co.
Factories, Milltown, N. J.

RELIABILITY



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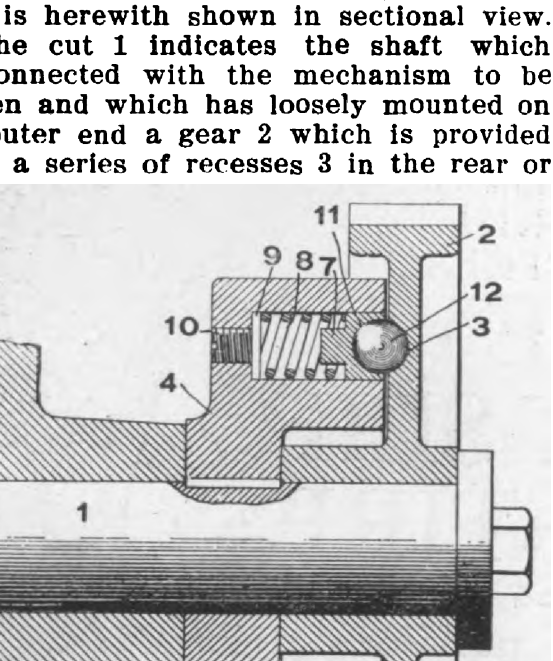
ed to the driven member by a rotatable ing part adapted to positively lock members together and cause them to te in unison under normal conditions, to yield and permit the driving mem- to rotate continuously independently he driven member when the latter is ected to abnormal strain, thus pre- ing gear stripping.

is gearing is manufactured by the dable Gear Co., of Springfield, Ohio, is herewith shown in sectional view. he cut 1 indicates the shaft which onnected with the mechanism to be en and which has loosely mounted on outer end a gear 2 which is provided a series of recesses 3 in the rear or



ional view of the "Gannon" Yieldable g.

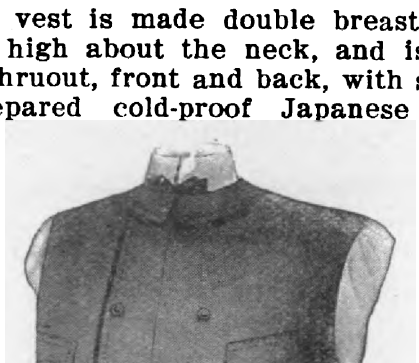
face thereof. These recesses are rical in shape and may be of any per and should be of a depth equal mewhat less than one-half the diame- f the sphere. The recesses are ar- ed concentric with the shaft and are d but a short distance apart and ex- entirely around the shaft. A driven utch member 4 is rigidly secured to haft 1 in the rear of the gear 2 and ovided with a recess adapted to re- the hub of the gear. This clutch ber is provided with four recesses 5 ding parallel with the shaft 1 and ged at a distance therefrom corres- ng to the arrangement of the ses 3. Slidably mounted in each of

block 6 to adjust the tension of the sprin 8. The bearing block is provided in it outer face with a recess 11 which is of depth slightly greater than the diamete of the sphere. Loosely mounted in th recess 11 is a hard steel ball 12 of a diame ter corresponding to the diameter of th recess, and, as the recess 11 is of a deptl greater than half the diameter of th sphere, the greater portion of the ball 1 is incased within the bearing block 6 while that portion which extends beyon the recess 11 is adapted to engage one o the recesses 3 formed in the gear 2, an at some distance below the center thereof The tension of the spring 8 is such as t retain the balls 12 in engagament with th several recesses 3 of the gear 2 and t cause the gear 2 and the clutch membe 4 to rotate in unison under normal condi tions, but the tension of the spring is s regulated that in case the driven part o mechanism is subjected to an abnorma strain, the spring will compress and allov the balls to escape from the severa recesses 3, thus allowing the gear 2 t rotate independently of the clutch mem ber.

"Protector" Auto Vests

The Leon Mann Co., 699 Broadway, New York City, has recently added to its wel known line of automobile garments a new style of automobile vest known as the Protector vest.

This vest is made double breasted and is cut high about the neck, and is inter lined thruout, front and back, with special ly prepared cold-proof Japanese tissue



The Polar "Protector" Auto Vest.

fibre. The vest is claimed to absolutely protect the wearer from cold and damp-

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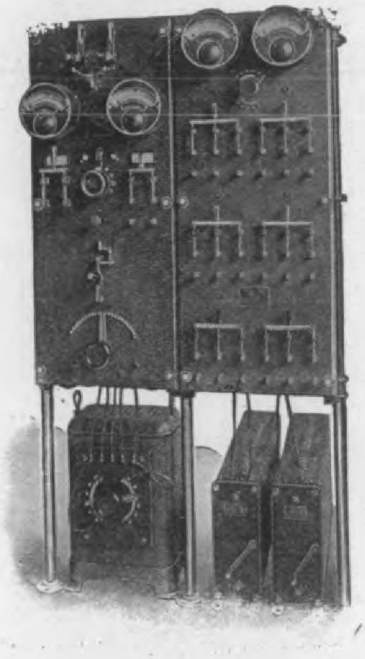
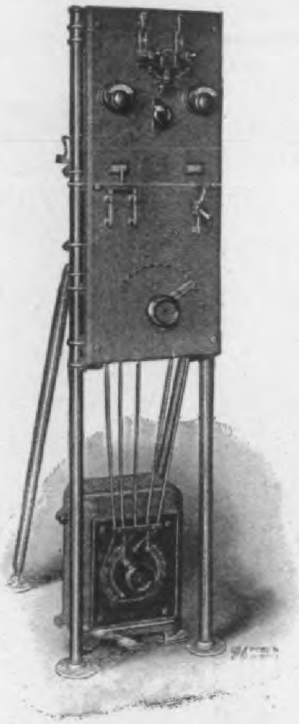
Mercury Arc Rectifiers
for Charging Storage Batteries



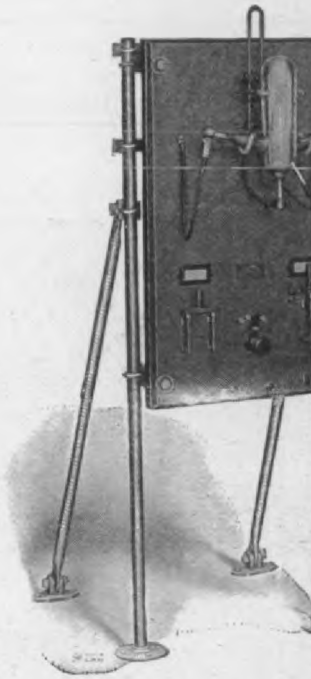
RECTIFIER PANELS FOR GARAGE OUTFIT

For garage service panels are made with charging capacity of from 1 to 6 batteries at one time.



PANEL FOR PRIVATE GARAGE

For private garage operation the rectifier forms a compact, inexpensive and efficient equipment.



PANEL FOR CHARGI IGNITION BATTERII

For ignition batt charging the rectifier a capacity of from 2 cells at a normal rate amperes continuously.

The Mercury Arc Rectifier is the most efficie device known for charging batteries from an alte nating current circuit.

More economical. Simpler in operation. Occupies less floor spa
In every way preferable to any other battery charging outfit.

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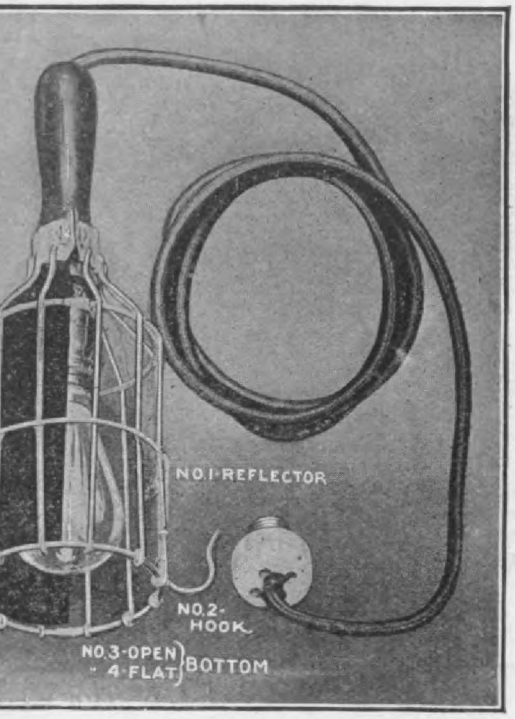
of portable hand guard lamps for use arages and around automobiles, etc., n can be attached to any wall recep- or hanging socket.

le No. 29 here illustrated is so ar- d that the reflector not only diffuses ight rays, but also shades the light the person using it. The guard is ded with a hook for hanging up the The outfit includes a 10 candle r lamp, reflector, socket, guard, han- 2 feet of cord, and a detachable plug. ist price of this outfit is $3.50.

fit No. 25, is practically the same the exception of the reflector, which ranged so as to focus the light into all space, the light being thrown out e open end. The list price of No. 25 00.



se" Portable Hand Guard Lamp, No. 29.

fit No. 27 consists of a miniature le 4 candle power, 6 volt, hand lamp, , guard, handle, 10 feet of cord snap catches. This lamp can be in connection with either batteries gneto, in which case the light is con- by Hubbell Pull Chain Switch, or vith keyless socket and snap clips, can be attached or detached from ies in a second. The list price is

Electric Valve Seating Tool

of a handle at the side of the tool. Instead of a screw driver, other types of tools can be inserted in the socket of fit any type of valve.

Type A, Portable Electric Valve Seating Tool.

This device is also made as Type B, which is the same in construction as Type A, with the exception that it is a smaller tool and the depending tool socket is central in Type B, whereas it is eccentrically located in Type A. The tools are equipt with cord and plug to fit any lamp socket either direct or alternating current.

This concern also makes a drill press attachment having the same motion as the electric type of tool.

The Morgan Spring Co., of Worcester, Mass., manufactures a complete line of wire springs, rods, etc., for use in automobile manufacture and for all other purposes. The wire rods are rolled from steel and best iron, possessing a high degree of ductility and tensile strength.

The Norton Grinding Co., Worcester, Mass., is making a specialty of manufacturing machines for crank shaft and cylindrical grinding. This concern makes

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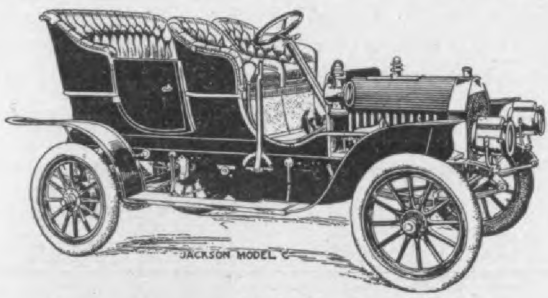
No Hill Too Steep.

For 1908—A Line o
Cars of Unparallele
Excellence. :: :



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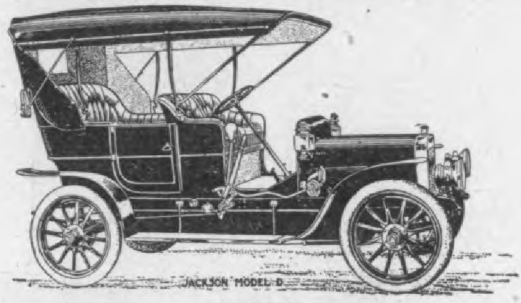

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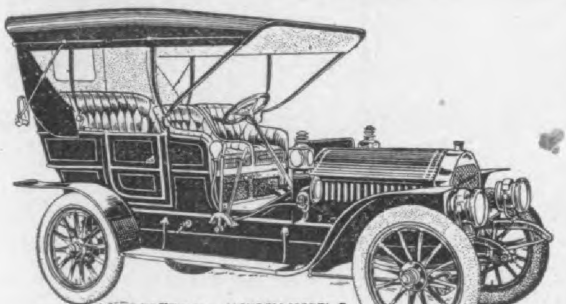

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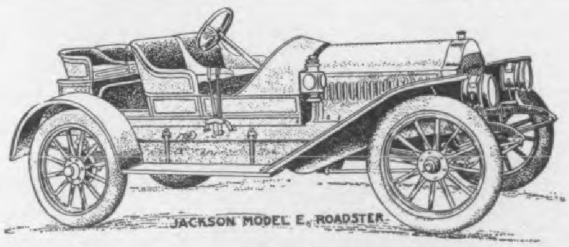

$2000

We do not like to advise anyo to move along the "line of least r sistance"—it is violating the ethi of social energy—but that is real what we are compelled to do wh we encourage a dealer to s Jackson cars: their merits are apparent and so easily demonstra ed that the cars literally *sell the selves!* But these same merits, w find, attract a selling organizati of the highest efficiency—men intelligence who are quick to a preciate correct mechanical pri ciples, and a good, staunc thorough-built car throughout—a for a few more of such we can fi room in unoccupied territor Write at once for catalogue a terms.

Jackson Model F Runabout

2-Cylinder Under Hood, 15-18 H. P.,

Jackson Automobile Co

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"Petre" Automatic Carburetor

In designing the Petre automatic carburetor the particular object kept in view was to produce an instrument which will deliver a uniform mixture at all times, regardless of the variations in the speed or load. This has been accomplished by the maker, the Petre Carburetor Co., St. Clair and Ontario streets, Cleveland, O., by taking advantage of the natural law governing the flow of fluids—i.e., under a given pressure (or suction) the flow will be in direct proportion to the area of the port.

The operation and construction of this carburetor will be seen by referring to the accompanying cut in which A is the air valve, which completely closes the air port when not in operation, and J is the gasoline valve (or needle) which completely closes the gasoline port at the same time. The action of the air valve is resisted by a long spring B, which is comprest to such an extent that the increased tension due to the slight lift of the air valve is practically negligible. The air valve will not open until a sufficient suction is produced in the mixing chamber to overcome the tension of the spring, plus the weight of the air valve.

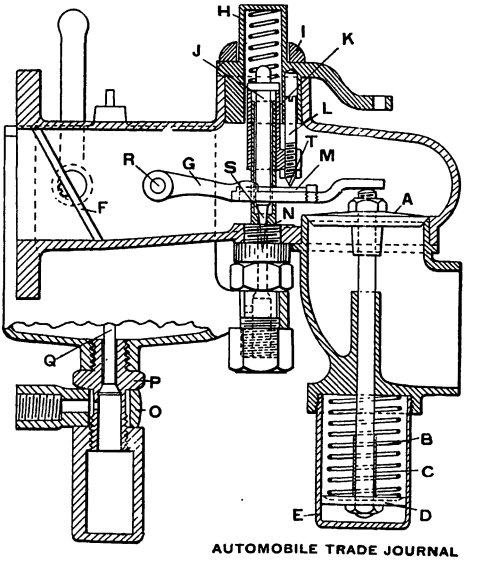
The suction, the manufacturers state, can never increase perceptibly beyond this amount, as no engine when fitted with the proper sized carburetor can maintain a greater suction than with the air valve wide open. Thus it is seen that the suction is fixt by the tension on the air valve spring regardless of any other condition. No matter how fast or how slow the engine may run or what load it may have the suction in the mixing chamber cannot vary, and the flow of gasoline or air will be in proportion to the areas of the ports.

The gasoline valve is lifted from its seat by the action of the air valve thru the lever G and the lifter K. It will be noticed that the fulcrum R of the lever G, the point at which the lever G rests upon the air valve A, and the point T, at which the lifter K rests on the lever G, are in a straight line, giving a lift to the gasoline valve J exactly in proportion to the lift of the air valve.

The tapered portion of the gasoline valve J is of such shape as to make the opening between it and the port S always in the same proportion to the area of the air valve corresponding to a proportionate lift. To change the proportion between the areas of the gasoline and air ports a regulating cap H is provided, by means of which the position of the point T, at which the lifter K rests upon the lever G may be varied at will, thus varying the lift of the gasoline valve. The air valve is provided with a glycering dash pot E, which makes the operation noiseless. The float is direct acting.

When the engine is started the throttle is of course slightly open, allowing the engine to create a suction in the mixing chamber; as soon as the suction has reached the required degree the air valve will open slightly, causing a proportionate opening of the gasoline valve.

By opening the throttle more the suction in the mixing chamber is momentarily increased, causing the air valve to lift until the opening is sufficient for the demand of the engine, when the suction will become normal, and the air valve will stop. Should a heavy load be suddenly thrown upon the engine its speed would be reduced, and consequently the suction would be reduced, and the air valve and gasoline valve would partially close, until the normal suction would be reached when



Section of the "Petre" Automobile Carburetor. A, air valve; B, air valve spring; C, brass tube; D, dash pot piston; E, dash pot; F, throttle; G, lever; H, regulating cap; I, regulating cap clamp; J, gasoline valve; K, gasoline valve lifter; L, adjusting pin; M, hardened steel washer; N, gasoline valve seat; O, gasoline connection; P, float valve seat; Q, float valve; R, fulcrum; S, port; T, resting point of lifter K. As will be seen from the cut the float chamber is situated in back of the gas outlet pipe. The gasoline inlet valve is also sectioned to show its interior construction.

they would stop. The suction then remains normal, and the proportion between the areas of the ports cannot change owing to the construction.

The only variation is then in the quantity which is according to the demand. When the throttle is opened the suction in the mixing chamber will tend to increase if the engine speed increases, but if the engine is so loaded that its speed cannot increase, then no harm has been done by opening the throttle, as neither of the ports has been altered by the operation of the throttle. Four sizes of this carburetor are offered, viz.: 2-inch, 1¾-inch, 1½-inch and 1¼-inch, listing at $75, $60, $50 and $45.

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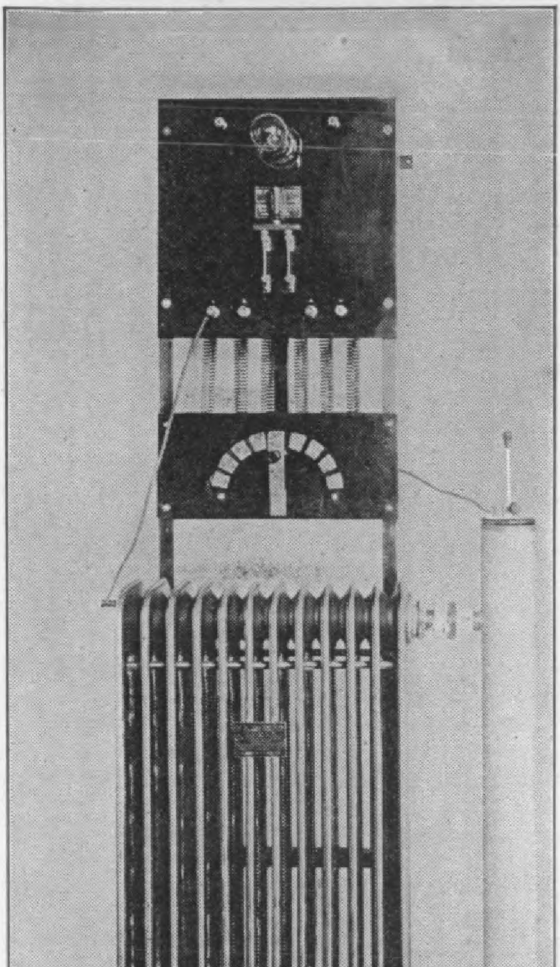
The HICKLEY

Patent Alternating Current Rectifier



For transforming alternating current int direct current at a minimum loss.

Operates satisfactorily on alternatin currents of any frequency and voltage.

No mechanism to get out of orde requires no attention, simple to operate inexpensive to maintain, no noise o fumes, highest efficiency.

A complete, reliable and practicall indestructible instrument, for chargin Electric cars and storage batteries, ope ating direct current motors and electro plating, etc.

If you use Electric Motors or Dynamo you need

HICKLEY'S "Hiko" Commutato Compound

for carbon and copper Dynamo and Mot Brushes.

Ten per cent. greater output with less heatin when HIKO is used. Increases the life of com mutator and brushes many times. Put up tin boxes. Fifty cents the box.

"Hiko" Carbon Brushe

reduce friction, insure a better contact, a smooth and polished commutator, less heating an therefore less wasted power. Prices on application. State size of brush and number wante Discount to the trade.

Hickley's Armored "Hiko" Soldering Sticks

are more economical than the ordinary sticks now on the market. The compound, which non-corrosive, is put into cardboard cases, preventing waste and breakage. Price 25 cent Liberal discounts. Write for Catalog.

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fans on automobiles.

e Kello belt is put on under tension requires no tightening or adjustment once being placed on its pulleys. particular features of this belt are couplings which are fastened in such

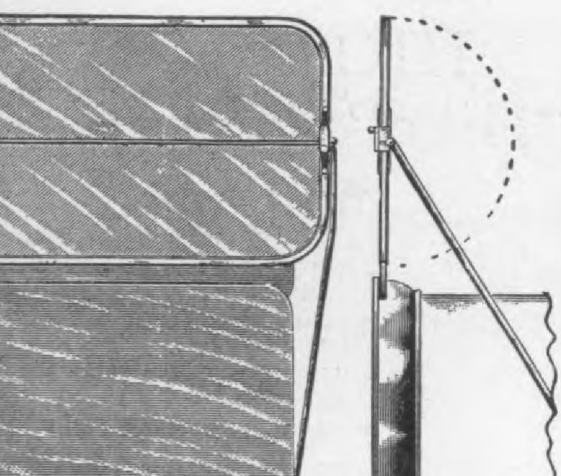
hens of the "Kello" Wire Automobile Belt.

nner that they cannot pull out, the with which the belt can be taken off ut on and the quality of both the ings and the wire from which it is .

The 1908 "Breeze" Windshield

e show herewith Model F, the latest eze" windshield manufactured by Car- Chapman & Co., Ludington, Mich. er models of these wind shields were ibed in our July, 1905 issue, page and in July, 1906, page 146, and were e solid type, while Model F is a fold- hield.

e frame of Model F is made from tubing, highly polished. A 3-16-inch is fitted. The shield is made in two s, the upper half of which can be



he "Breeze" Model F Wind Shield.

to fold either forward or backward. satisfy the wants of those wishing mewhat cheaper wind shield, but g the same constructional features as F, this concern is offering their E. which is made with a wood instead of brass.

The "Duplex" Folding Auto Trunk

The Duplex Folding Pail Co., 420 and 422 West Fourteenth street, New York City, has recently placed on the market a

The "Duplex" Folding Automobile Trunk.

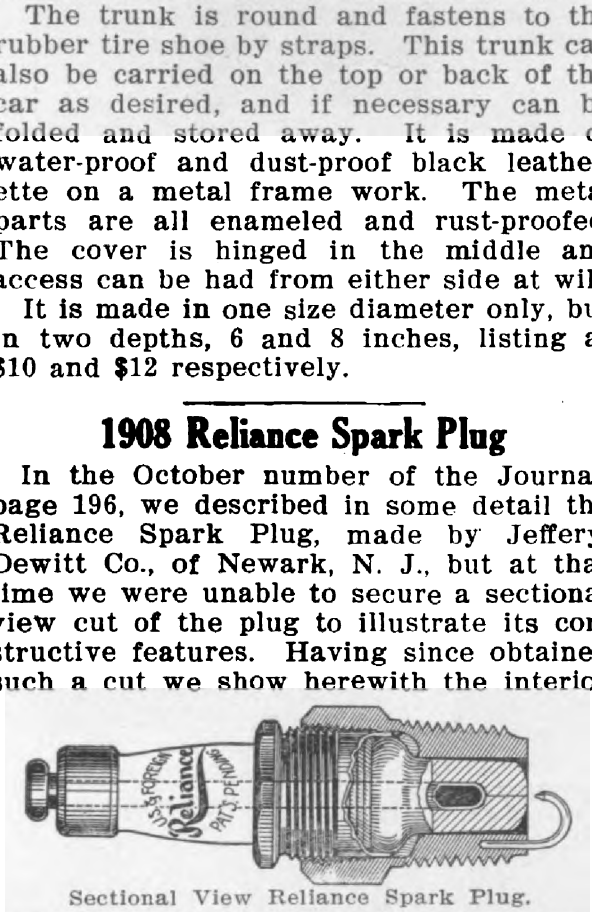
folding automobile trunk adapted to be placed in the center of the extra tire usually carried on the side of the car.

The trunk is round and fastens to the rubber tire shoe by straps. This trunk can also be carried on the top or back of the car as desired, and if necessary can be folded and stored away. It is made of water-proof and dust-proof black leatherette on a metal frame work. The metal parts are all enameled and rust-proofed. The cover is hinged in the middle and access can be had from either side at will.

It is made in one size diameter only, but in two depths, 6 and 8 inches, listing at $10 and $12 respectively.

1908 Reliance Spark Plug

In the October number of the Journal, page 196, we described in some detail the Reliance Spark Plug, made by Jeffery-Dewitt Co., of Newark, N. J., but at that time we were unable to secure a sectional view cut of the plug to illustrate its constructive features. Having since obtained such a cut we show herewith the interior

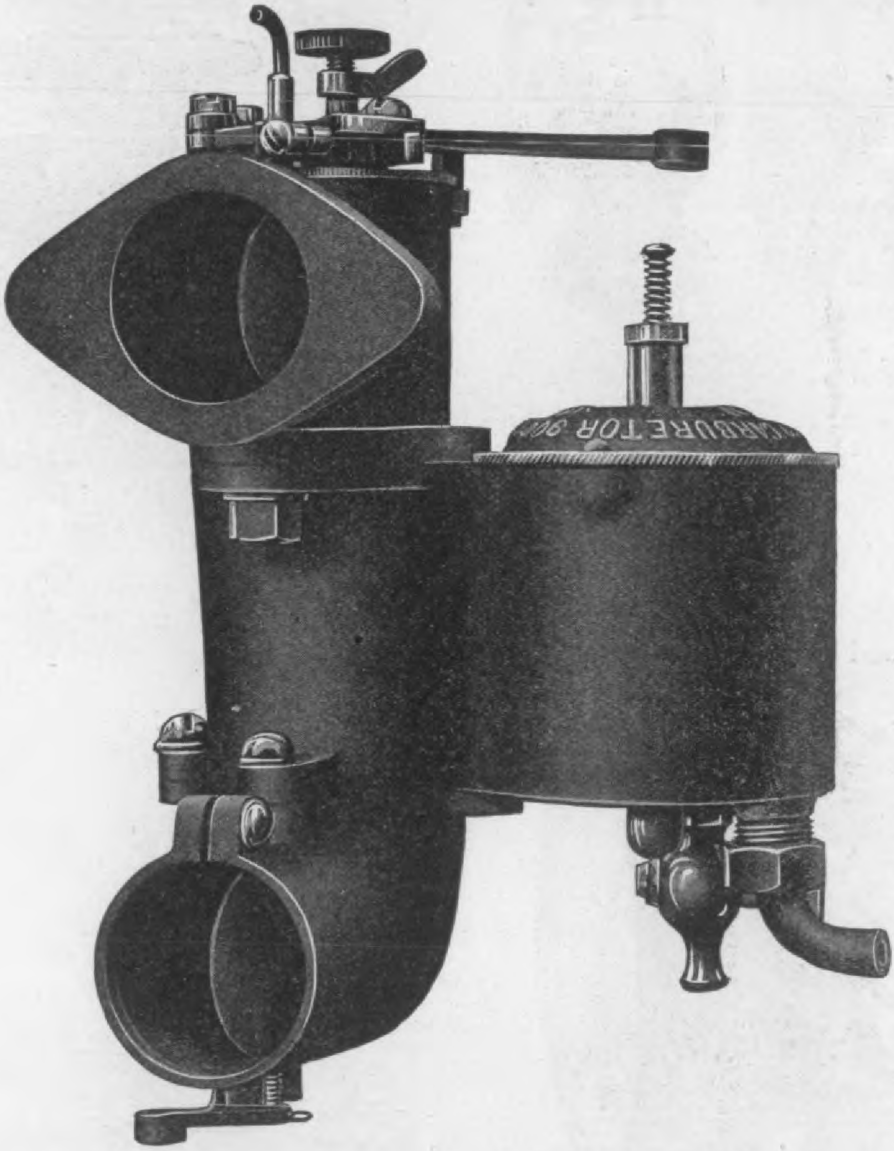


Sectional View Reliance Spark Plug.

construction of this plug, which shows such exceptional efficiency as to spark under water. As before explained, the central

THE BUFFALO CARBURETOR

The Best of All the Carburetors



It saves gasoline; therefore money. It is durable, easily adjusted, and gives the maximum of horse-power per gallon of fuel

BUFFALO CARBURETOR COMPANY
887-889 MAIN STREET BUFFALO, N. Y.

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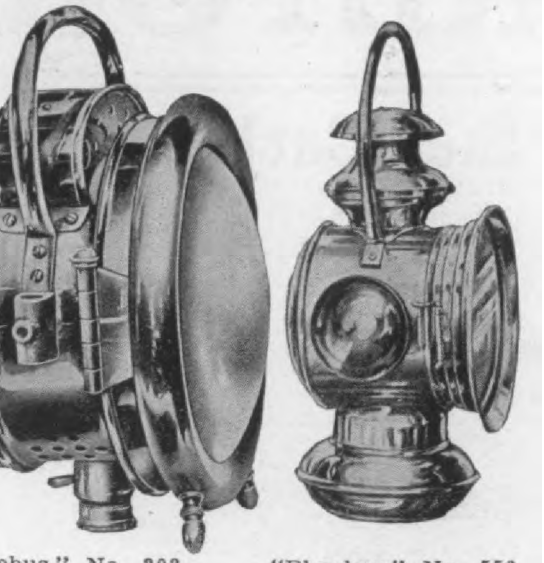
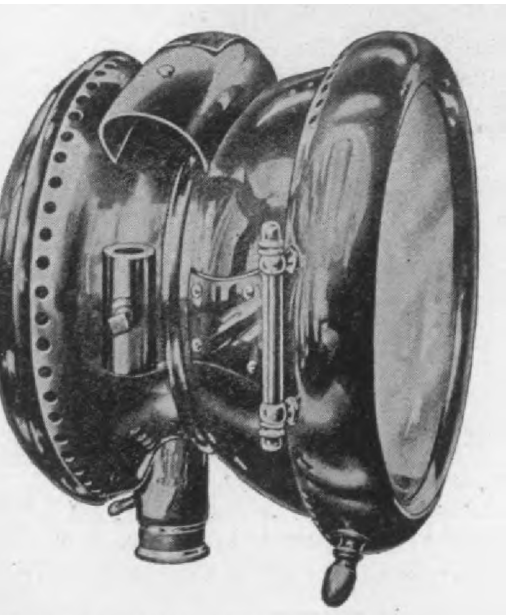
Manhattan Screw & Stamping Works his year in a position to handle a greater amount of business, and for reason have also increased the num- f styles of lamps offered and added other specialties to their line.



ebus," No. 303, Headlight. "Phoebus," No. 556, Round Tail Light.

ir lamps are trade-marked "Phoe- and several of the 1908 styles are llustrated. No. 303 is the leader of Phoebus" line. It is called the "light fier," and is fitted with a powerful, lly ground 8-inch condensing lens, not only magnifies the intensity of ght, but projects the rays a long dis- ahead, and an efficient, high grade



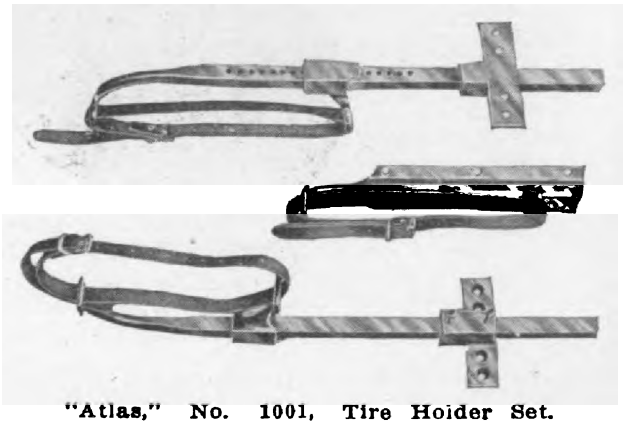
"Phoebus," No. 750, Projector.

or is fitted. A feature of the lamp compactness, its depth being only

furnished in two styles, one with and one without back door. Like No. 303, heavy gage brass and brass castings are used in its construction. Either parabolens or ground mangin mirror reflector is used. Dimensions are 10½ inches diameter of front, 8½ inches diameter of back, and 11 inches deep. List price is $15 with closed back, and $16.50 with door in back.

"Phoebus," Square Side Oil Lamp, No. 554.

In accordance with the trend of fashion this company offers an attractive square oil side lamp. This is listed as Style No. 554, is 14 inches high, and the sides are 5 inches square. The body is of brass or



"Atlas," No. 1001, Tire Holder Set.

gun metal, as desired, and the reflector is silver plated. The side glass is crystal, green or red, as wanted. Price is $8.25

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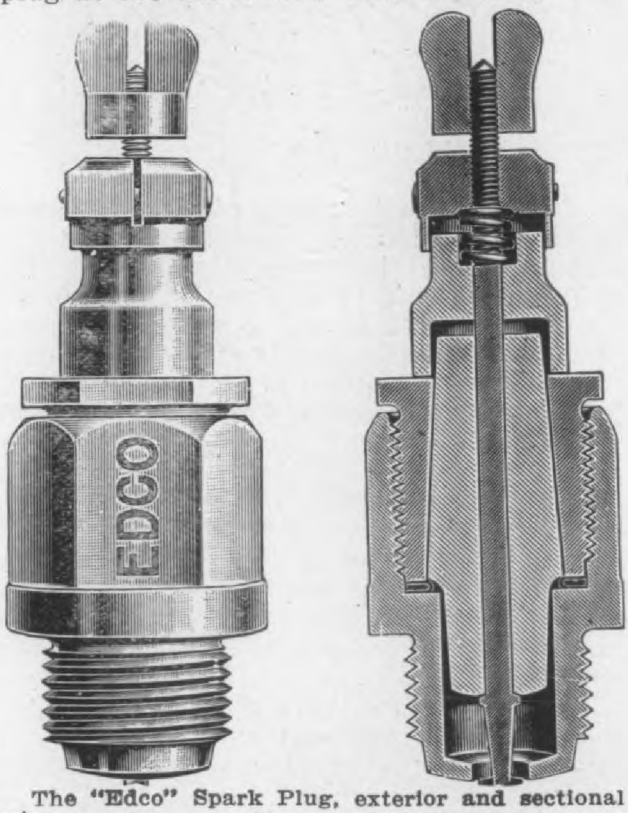
lamp brackets, adjustable tire holders in two different styles, tire pumps, and horn screws.

The "Atlas" adjustable tire holders are furnished in sets of three. These sets are adaptable to any make or shape of car. They are also easily removable for cleaning. They hold two or three tires, and list at $7.50 per set, complete with straps.

"Edco" Spark Plugs, Tire Valves and Tire Lugs

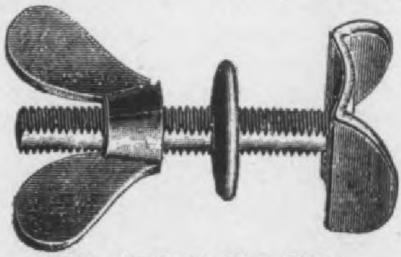
Ch. Dien, 43 West Thirty-fourth street, New York City, is marketing several automobile specialties manufactured in Switzerland. One of these is the "Edco" spark plug here shown. In this plug steatite insulation is used. The insulation does not touch the metal parts of the plug at the inner end, room being allowed



The "Edco" Spark Plug, exterior and sectional views.

for expansion under heat and to prevent breakage from shocks. The insulator is machined to fit into the cone-shaped bore of the bushing, and this provides a perfectly tight fit. The central electrode is made of pure nickel, and carries a conical-shaped flange near its inner end, by which the insulation is held, and a tight joint provided at this point. At its outer end the electrode is fitted with a helical spring, so that the insulation is not held

valve self-locking. The closing o



The "Edco" Tire Lug.

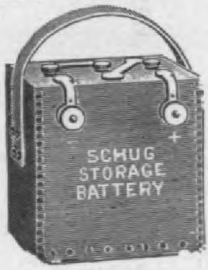
valve commences with the introduct air whether at maximum pressure o

Mr. Dien is also offering tire lu here shown, and racing lock nuts f tomobile and motorcycle tires.

The "Schug" Storage Batter

The Schug Electric Manufacturin Detroit, Mich., maker of ignition atus for motor car use, has recently to its line a storage ignition battery. Schug battery possesses several features claimed to overcome the objections to storage batteries.

A feature of the Schug battery way the case is put together. Th tom of the case is fastened with



The "Schug" Storage Battery.

pins, which cannot be affected b acid, thereby preventing all danger case coming apart.

The battery is made up of separat made of rubber, each cell being by itself, and three of these cell placed in an oak case, making a 6-vo tery. The terminals of the differen are then brought out and burned to and the tops of the cells are neatl ered with a sealing compound. Th of separate jars instead of one larg partment jar is intended as a saf against breakage.

The cells are joined together wit connectors burned together, and th minals are brought over the side box; the only metal parts used th not made of lead are the screw washers, which fasten the extra brass thumb screws used for fasteni wires to the battery. The top of th

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The "Watts-Detroit" Carburetor

Another new carburetor recently placed on the market is the Watt's-Detroit" carburetor manufactured by the Watt's-Detroit Carburetor Co., 58 Griswold street, Detroit, Mich. In designing this carburetor special care has been taken to overcome the trouble incidental to the varying of the fuel level, due to jar and bouncing over rough roads, etc. This carburetor was designed by Mr. F. J. Watt, vice-president of the R. E. Hardy

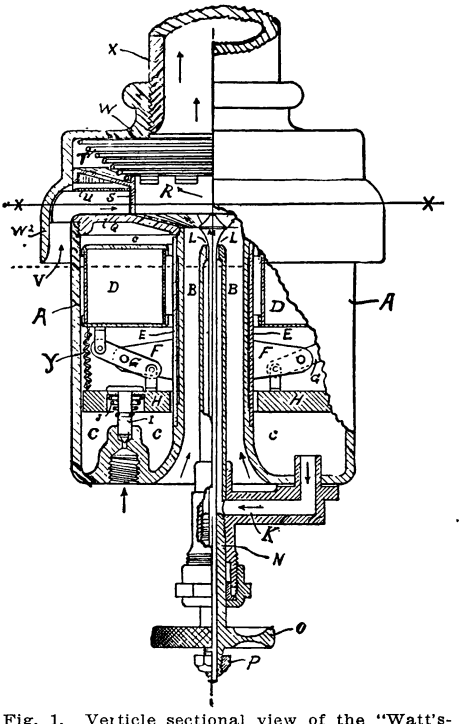

Fig. 1. Verticle sectional view of the "Watt's-Detroit" Carburetor. A A, cast brass shell; B B, central air passage; C C C C, reservoir and float chamber; D D, annular hollow float, surrounding central air passage; E E, tube carrying brackets F F; F F, brackets integral with E E adapted to support middle of equalizing levers G G; G G, equalizing levers pivoted at middle and attached at their ends to float D and disc H H; H H, counterbalance weight and steadying disc; I, inlet valve; J, spiral spring; K, fuel passage from reservoir to jet nozzle; L, jet nozzle; M, regulating valve; N, adjusting screw; Q, cover above fuel reservoir, upper surface formed with diagonal passages leading towards periphery of mixing chamber; R, mixing chamber; S, automatic air valve; T, spiral spring normally holding air valve closed; U, cover over air passage; V, auxiliary air passage extending completely around shell; W W, cap, closing top of mixing chamber, and guiding valve S; X, outlet pipe; Y, spring, resisting lifting effect of liquid in reservoir. The dotted line indicates the normal fuel level.

Co., of New York, for whom he designed the original "Sta-Rite" spark plug. It is of the float feed type, with the gasoline jet nozzle and the air intake located centrally.

Referring to the sectional cut, H H is a flat disc, which exactly counterbalances the float D D, and acts also as a dashpot to prevent chattering of the supply valve. This construction makes it impossible for any manner of outside movement to affect the position of the float, which is kept partly submerged by a pair of light springs.

The initial air supply is drawn thru the annular passage B B, and additional supply is drawn thru the large annular passage V, and admitted in varying quantities to meet certain requirements, under the circular edge of the large auxiliary valve S, which opens, more or less, according to speed of motor or position of throttle.

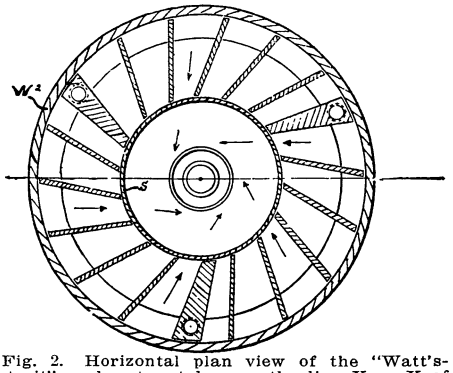

Fig. 2. Horizontal plan view of the "Watt's-Detroit" carburetor, taken on the line X — X of Fig. 1.

The mixture is produced in a distinctly novel manner by rapid rotation of the contents of the mixing chamber, this movement being produced by a peculiar arrangement of fixt guides which confine the air within gradually narrowing channels, so that its speed is easily accelerated to the rate naturally due to the amount of suction, which can be remarkably light in consequence of the freedom of its passage, and the peculiar rotating effect. A suction of only one pound per square inch normally produces a flow at the rate of 332 feet per second, which is fast enough to rotate the contents of the mixing chamber some 500 revolutions per second.

This rotation creates a powerful centrifugal force which carries all particles of liquid to the outer edge of circles where they come in contact with the hurrying air jets, and are instantly vaporized.

Means are provided for regulating the fuel jet, which is made to assume the form of a thin film, shaped like an inverted cone, which crosses the path of both the initial and auxiliary air supplies. The outlet is furnished in any required style, and with throttle valve when needed.

The George N. Pierce Co., of Buffalo, has removed the treasurer's department from 752 Main street to the new offices in the administration building of the Pierce factory. The company will maintain the retail store at 752-754 Main street.

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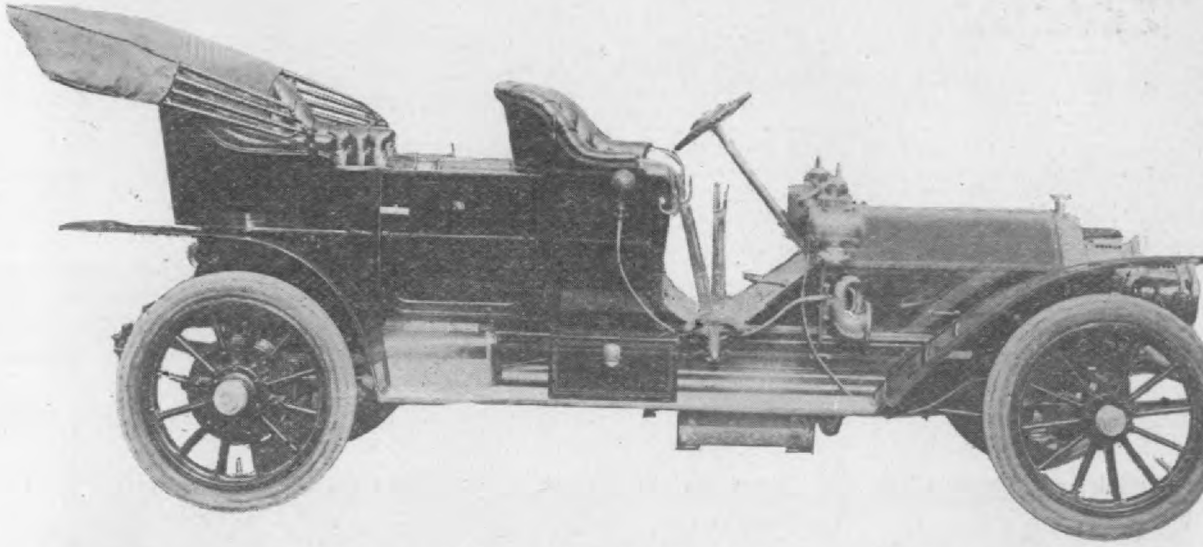
Falls, Mass., U. S. A., well known as the rst American motor-car builders to offer six-cylinder pleasure car for sale, in anuary 1905, and as having been since hat time strong advocates of the superority of the six-cylinder motor for highlass touring cars and limousines, offered -cylinder cars only for 1907.

For the season of 1908, however, the tevens-Duryea Company adds to its 1906 nd 1907 line of two 6-cylinder cars, known s the "Big-Six," cylinders 4¾x5¼ inches, 0 H. P., and the "Light-Six," cylinders 7/8x4¾ inches, 35 H. P., a new four-cylnder chassis, cylinders 4¾x4½ inches, 24 I. P. All the Stevens-Duryea motors have vater-cooled cylinders, working on the 4-troke cycle.



The New Stevens-Duryea 1908 Model X. 5-passenger touring car. Wheel base, inches. Gage 56 inches. Tires all 34x4 inches. Motor 4-cycle water-cooled, four cylind 4¾x4½ inches, 24 H. P. Multiple disc clutch, sliding gear, 3 forward speeds and reverse, be gear to divided rear axles. Brakes, rear hub exterior and interior. No line-shaft brake. Jun spark plugs with dry cells and storage battery. Weight 2600 pounds. Price $2750, including lamps, mats, horn and tools, ready for the road. Cape Top $150 extra. Magneto ignition fit complete $200 extra.

The advent of this Stevens-Duryea, 1908, -cylinder model marks a change in the usiness policy of this large builder of merican cars, altho this 4-cylinder car oes not announce any change of engieering estimates of the relative values of our and six-cylinder motors to be used in igh-class cars priced at $2750 and over. or cars of this size and price, the manageent is fully convinced that the closer pproximation of the six-cylinder motor o constant torque makes it the prime reuisite of touring car durability, comfort, xury and elegance.

There are yet many cars built and sold hich are driven by a single cylinder, than the two-cylinder, and is much costly than the six-cylinder motor, hence must always meet the requirem of those buyers who want something ter than the opposed cylinders motor yet are not prepared to purchase six-inder cars. Fully realizing the prefere of this large class of prospective buy the Stevens-Duryea has made this 4-inder Model X, in addition to its prev line of exclusively 6-cylinder models, ply because the 4-cylinder can be sol a lower price than the six-cylinder mo For all purchasers who desire the car in points of excellence of drive, ability, elegance and luxury, the comp confidently recommends the six-cylin motor as greatly superior to the very four-cylinder that can be produced.

THE NEW 4-CYLINDER MODEL.

The 1908 four-cylinder Model X, is no sense a cheap production. The m is along the latest and best lines of m cylinder gas-engine production, and workmanship is the very best that Stevens-Duryea factory can produce. cylinder bore is ample, and the strok short, giving power, both on maximum partial changes and smooth running at speeds.

The 4-cylinder chassis, construct wheels, axles, speed change, brakes in all details is fully equal to that of

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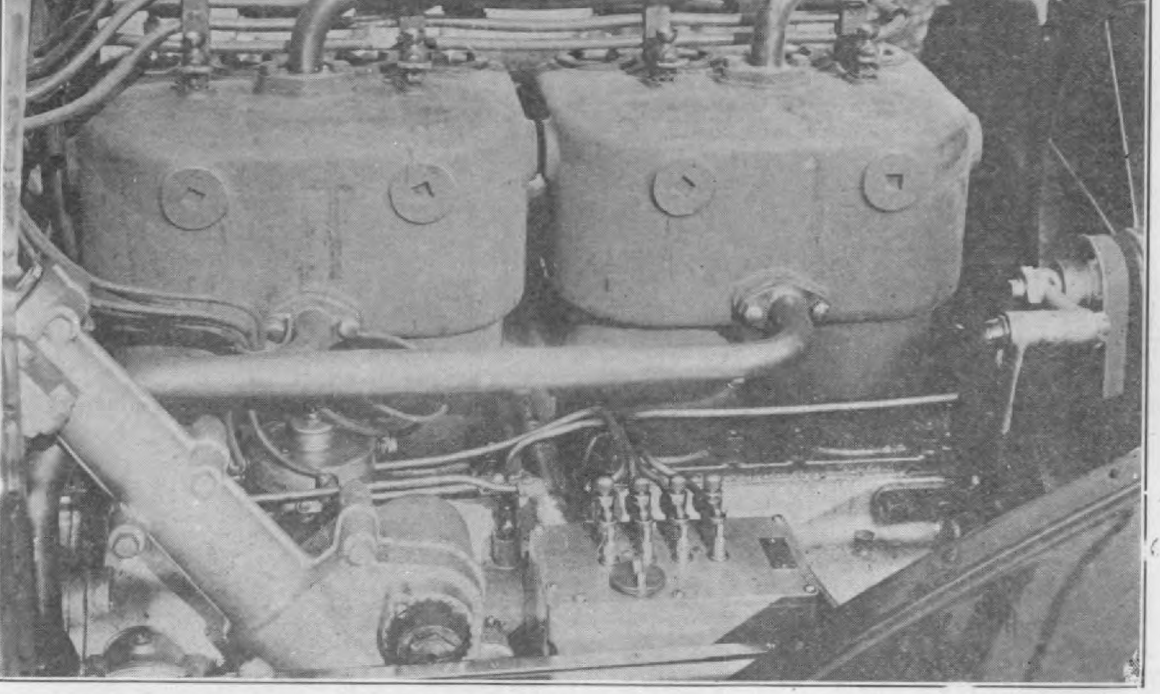


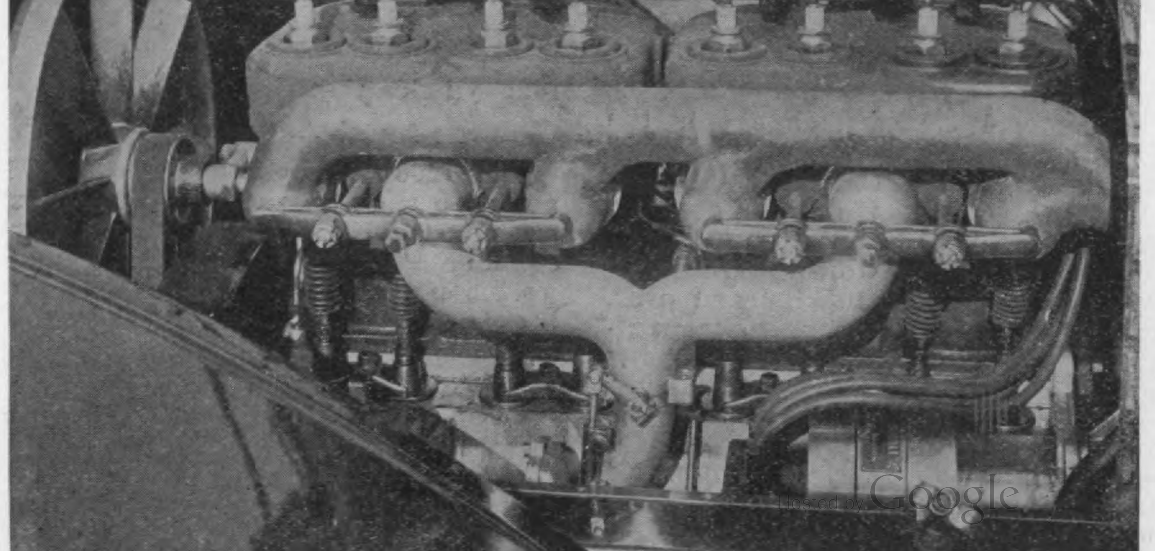
Stevens-Duryea 1908 Model X motor, right side. Fly-wheel in front. Dual unit cylinders, -lead mechanical oiler, fan belt-driven, with idler belt-tightener.

hanical particulars which the Stevens-yea Company desires to publish.

ON THE ROAD.

hursday, November 14, a Stevens-yea "Light"Six" touring car left the ens-Duryea factory at Chicopee Falls, 45 P. M., and was driven thru Spring- and Westfield to Huntington, about 30 miles, at 2.30 P. M.

The day opened with a little snowfall enough to whiten the ground, but the weather cleared as the sun rose, and this "Light-Six" run was made under a blue sky diversified with white clouds, giving an overhead June effect which did not harmonize with the cold November wind



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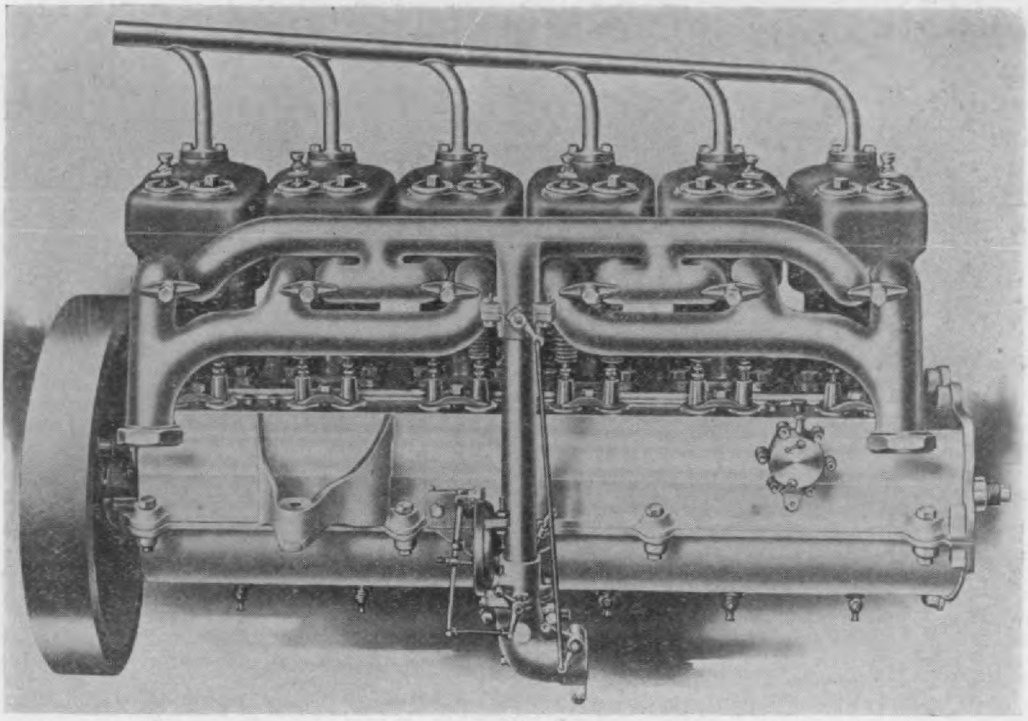
something fine all thru this 30 miles, with only one short bit of slightly rough going a little west of the turn under the railway track leaving west of Springfield, and the "Light-Six" made a steady 45-miles pace of it with down-hill glides of better than 50, so that the ride was really enjoyable in spite of the head wind blowing, to which we added our own fast rate going out.

the 30 miles between Huntington an Stevens-Duryea factory in Chicopee.

The Stevens-Duryea "Light Six" h the smoothness of running that c terizes six-cylinder propulsion, and dition to this is on delightfully springs, so that even with our light passenger load the good road and a perfect springs made this swift rush



Stevens-Duryea 1908 Model U 6-cylinder motor, left side, fly-wheel in front, showing piping and Stevens-Duryea own carburetor.

This road is the Springfield-Albany route, and we passed or met several large cars carrying parties of masked tourists, more women than men in furs and goggles, showing the advance in every day motor car use.

At Huntington, in the Berkshire Hills, on the west bank of Westfield river, we warmed ourselves for 15 minutes and made the return start at 2.45 P. M. The smooth road is very crooked, winding among the bleak hills and following the west bank of the river closely to Westfield, where the whips are made.

We were making fast time, averaging nearly 50, as the country is lonely and we had the road free before us most of the

wintry air really delightful. We had wind there was in our faces goin and at our backs returning, which it seem like springtime weather. Th was really not cold, but a 50-mile makes a cooling breeze.

Mr. Taylor is perfectly at home i Stevens Duryea "Light-Six," and int to cover the 30 miles return run minutes when we left Huntington, an well up to his schedule when we ha oiler-shaft stop.

This 60 miles run justified the St Duryea preference for the six-cy motors, as the movement of the "Light-Six" was the smoothest withi writer's motoring experience.

Amphibious Auto

The long-talked-of French invention, which is as much at home in the water as it is on land, recently put in its appearance in New York City, together with

River near Fort Washington, wh plunged into the water, and after i been driven up and down the river score or more times it left the wate headed for Broadway. The machin

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gston, New York, U. S. A., began the ufacture of motor cars in 1907 and offer a 1908 line of three different mobiles; a seven-passenger touring a limousine to seat seven passengers a tourabout to seat either two, three our passengers. A landaulet body is fitted to the seven-passenger touring chassis when desired. All four of these models are on the same chassis, h is made in two wheel-base lengths, and 121 inches, respectively.

In all essential particulars these Allen Kingston cars have the same general ar rangement as the best foreign cars. The axles are I-section forward and tubula steel in the rear, the springs are all half elliptics, and the chassis frame is pres steel.

The motor is four-cylinder, 4-cycle water-cooled, 5x5¾ inches, 45 H. P nominal. Selective sliding gear transmis sion, four forward speeds and a reverse

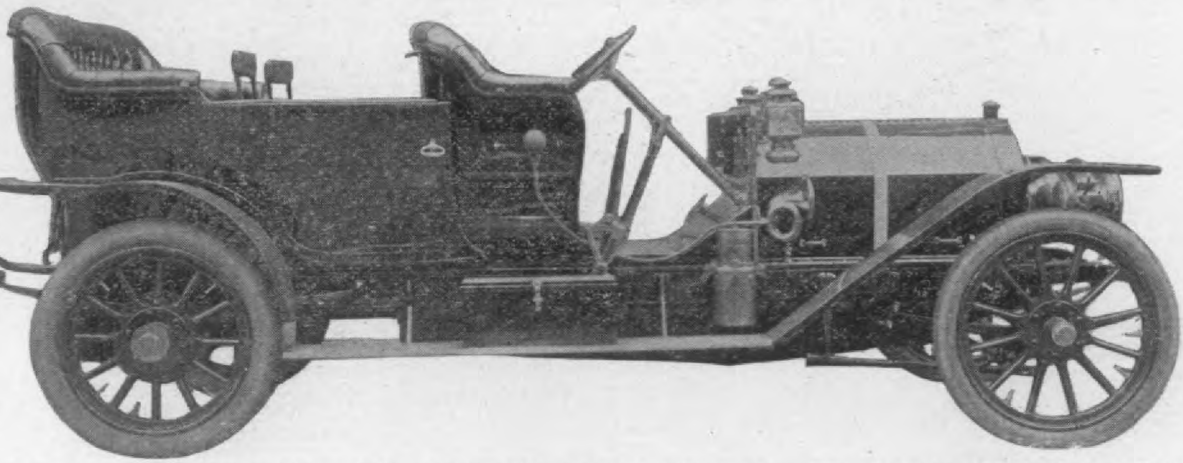

Fig. 1. Allen-Kingston, 1908, seven-passenger touring car. Wheel base 125 inches. Gage inches. Tires, 34x3½ inches front, 34x4½inches rear. Motor, 4 cylinders, 4-cycle, water-ed, 5x5¾ inches, 45 H. P. Four speeds for ward and a reverse selective, sliding gear, direct high speed. Bevel-gear to full-floating, divided rear-axles, with large diameter bevel-balance r. Wheels, line-shaft, side-shaft, bevel-pinion shaft and balance gears, all on annular ball rings. Full double ignition system, with two sets of spark-plugs, storage battery and Bosch gneto. Convex body lines, 3 passengers in rear seat, two revoluble, folding and detachable s on the tonneau floor, which has ample foot-space for 5 passengers. Two seats forward, screw ring gear. Weight 3100 pounds. Price $4000, including 5 lamps, mats, horn, tools and luggage ier in the rear, ready for the road. Cape top, $100 extra.

e entire motor-car output of the New Car and Truck Company is taken by Mr. Walter C. Allen, No. 3, West y-fourth street, New York City, who handle this line of large high-powered rican automobiles under the general gnation of the "Allen-Kingston" cars.

direct on the fourth speed is used wit bevel gear to full-floating rear axles. A wheels and axles and the line and sid shafts, are on annular ball bearings. Th steering action is by right and left screw threads, powerful, absolutely locked an so constructed as to take up all lost motion

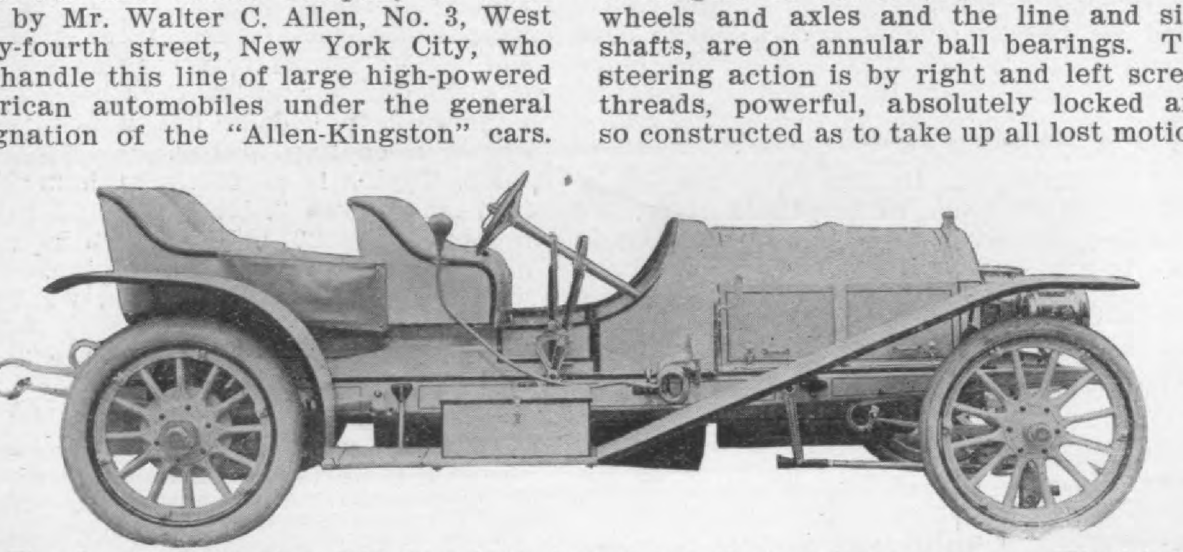

Fig. 2. Allen-Kingston 1908 Tourabout, to seat two, three or four passengers. Wheel base inches. Specifications of chassis construction otherwise the same as Fig. 1. Weight, 2400 nds. Price $3900, including 5 lamps, mats, horn and tools, all ready for the road.

ese cars were designed with a view the production of high-class, high-

The ignition is a complete double equip ment, storage battery reserve and Bosc

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crew thread steering action used in the Allen-Kingston has full-faced surface-engagements in place of the line and point contacts inseparable from the worm and

as equal in every way to the best for cars, while the home production, free import duty, enables these cars to placed in the hands of purchasers for a

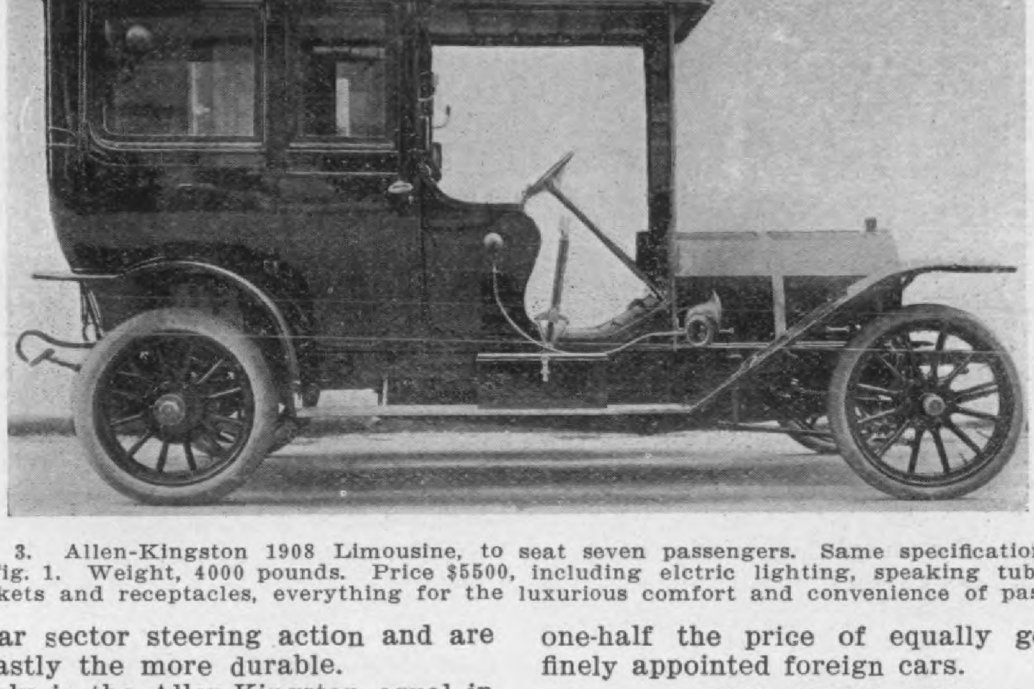

Fig. 3. Allen-Kingston 1908 Limousine, to seat seven passengers. Same specifications th out as Fig. 1. Weight, 4000 pounds. Price $5500, including elctric lighting, speaking tube, cl and pockets and receptacles, everything for the luxurious comfort and convenience of passeng

worm-gear sector steering action and are hence vastly the more durable.

Not only is the Allen-Kingston equal in design to any foreign built car, but it may be expected to show more durability and convenience than any foreign car, as the

one-half the price of equally good finely appointed foreign cars.

THE FRONT AXLE.

This is I-section, steel drop-forg spring-pads integral, no welds, yoke o ings, 7 inches; stub-axle pins ⅞ diam

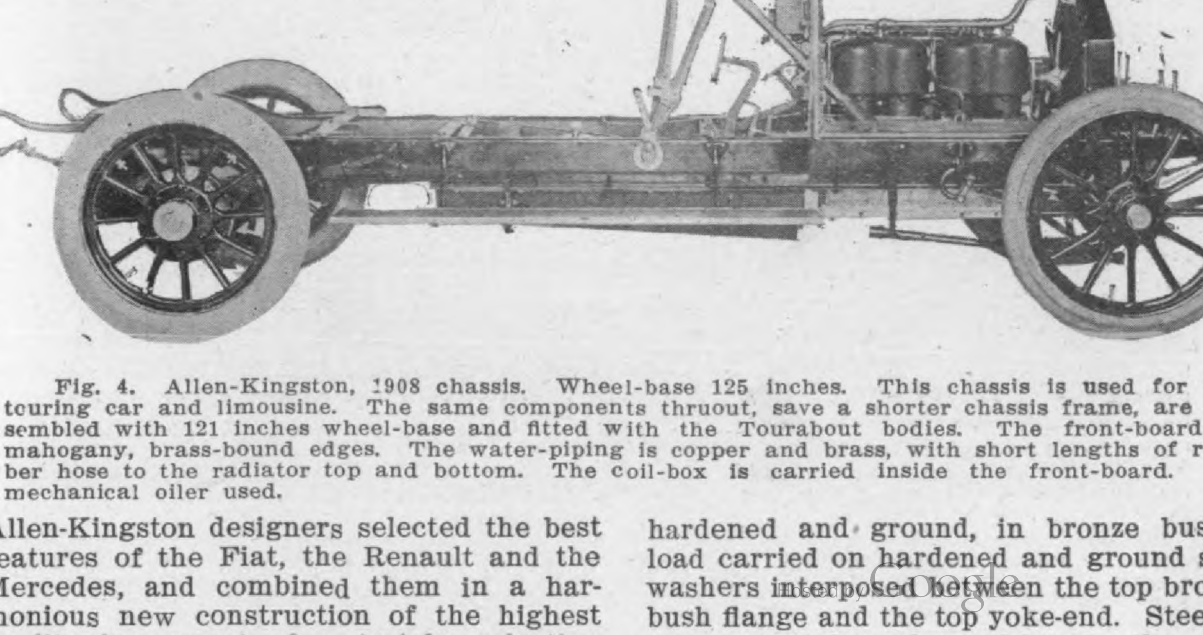

Fig. 4. Allen-Kingston, 1908 chassis. Wheel-base 125 inches. This chassis is used for touring car and limousine. The same components thruout, save a shorter chassis frame, are sembled with 121 inches wheel-base and fitted with the Tourabout bodies. The front-board mahogany, brass-bound edges. The water-piping is copper and brass, with short lengths of r ber hose to the radiator top and bottom. The coil-box is carried inside the front-board. mechanical oiler used.

Allen-Kingston designers selected the best features of the Fiat, the Renault and the Mercedes, and combined them in a harmonious new construction of the highest

hardened and ground, in bronze bus load carried on hardened and ground washers interposed between the top bro bush flange and the top yoke-end. Stee

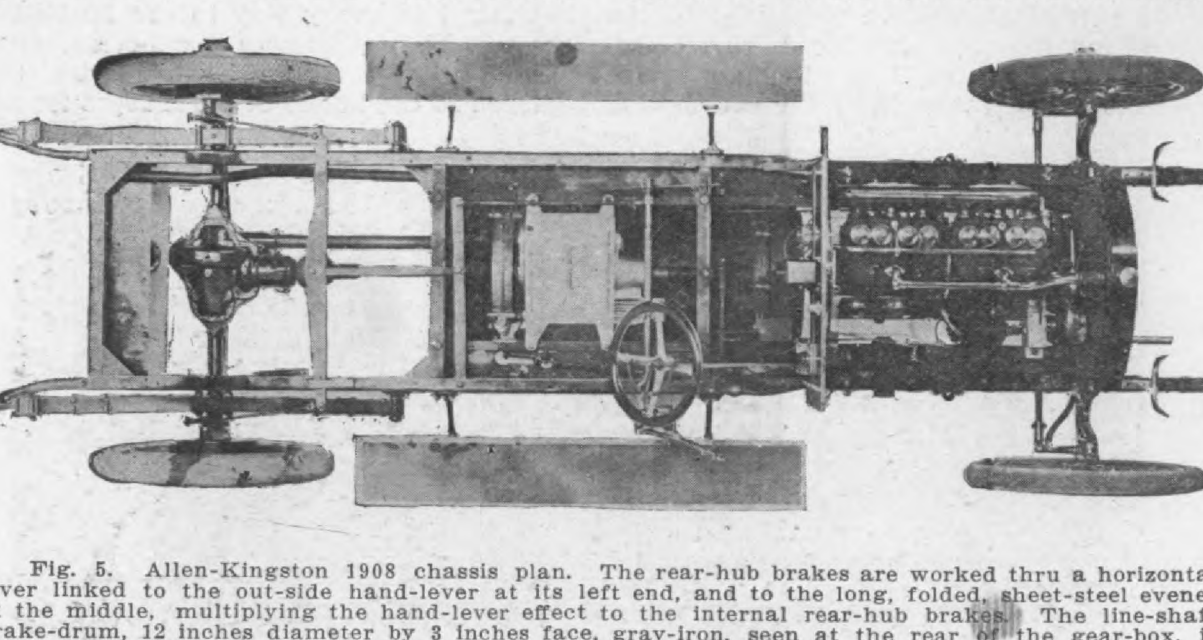

Fig. 5. Allen-Kingston 1908 chassis plan. The rear-hub brakes are worked thru a horizonta ver linked to the out-side hand-lever at its left end, and to the long, folded, sheet-steel evene the middle, multiplying the hand-lever effect to the internal rear-hub brakes. The line-shaf ake-drum, 12 inches diameter by 3 inches face, gray-iron, seen at the rear of the gear-box, nbraced by bronze external shoes jointed, metal to metal, without lubrication, the larg ameter and face giving sufficient friction with only a light pressure. This line-shaft brake ghly effective and is said not to heat, chatter nor wear, altho not lubricated.

aring. The bevel gear is a hardened el, 12 inches large diameter, 5 d. p.; pinion is hardened steel. The bevel ar thrust is taken on adjustably secured frame cross-girt by a rigid link, globed both ends.

THE SPRINGS.

The springs are all half-elliptics; t

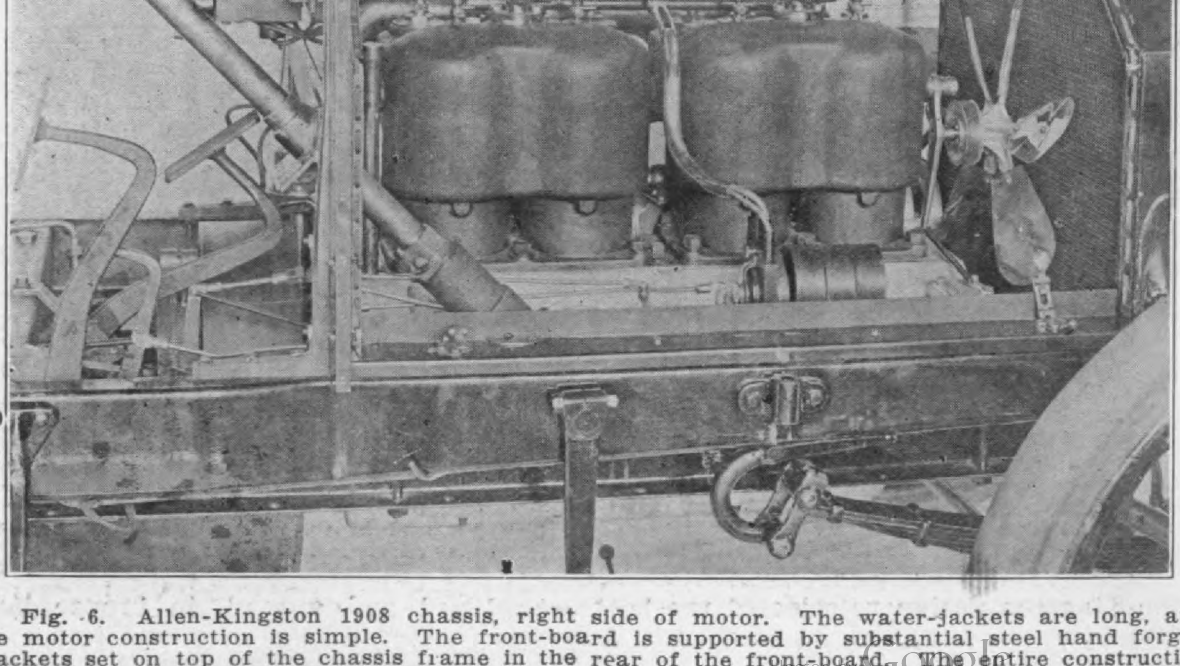

Fig. 6. Allen-Kingston 1908 chassis, right side of motor. The water-jackets are long, an e motor construction is simple. The front-board is supported by substantial steel hand forge ackets set on top of the chassis frame in the rear of the front-board. The entire constructio heavy and substantial.

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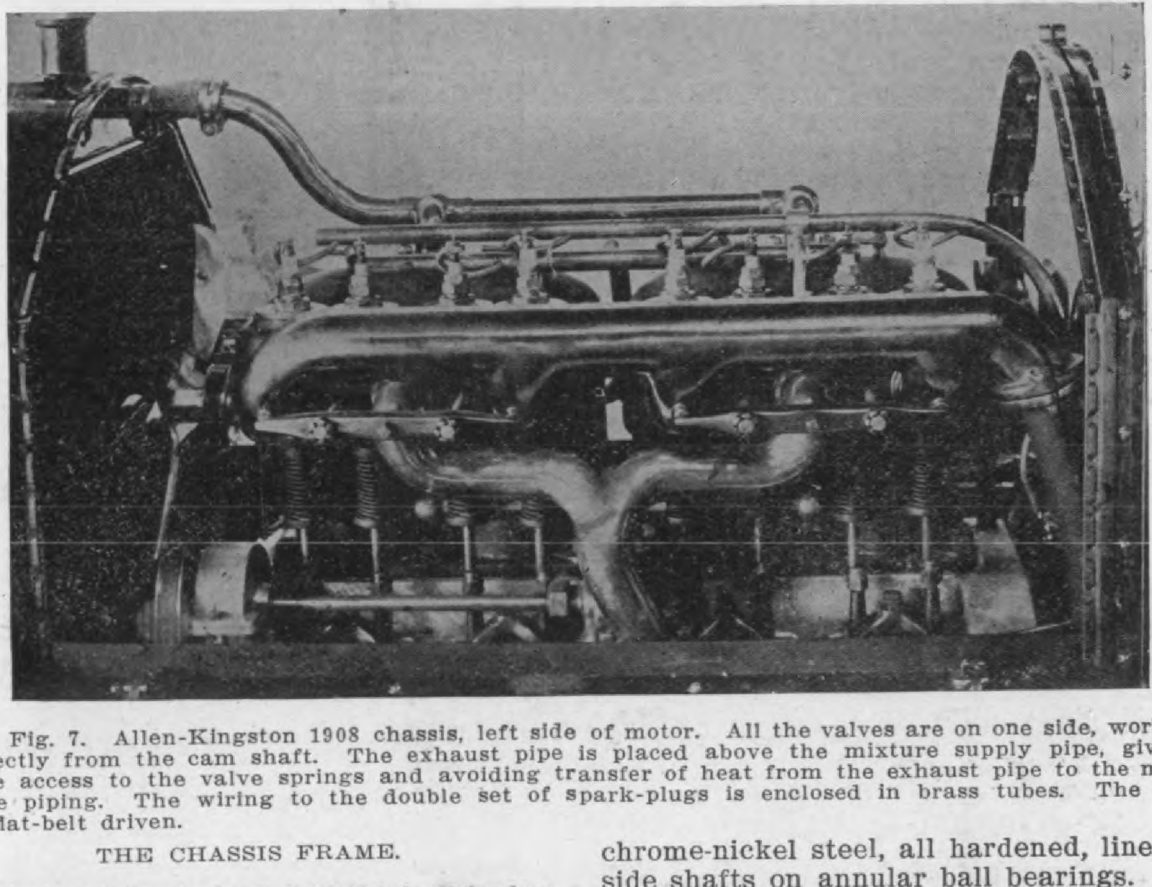

Fig. 7. Allen-Kingston 1908 chassis, left side of motor. All the valves are on one side, wor directly from the cam shaft. The exhaust pipe is placed above the mixture supply pipe, giv free access to the valve springs and avoiding transfer of heat from the exhaust pipe to the m ture piping. The wiring to the double set of spark-plugs is enclosed in brass tubes. The is flat-belt driven.

THE CHASSIS FRAME.

This is of prest steel, 5-32 thick, 5 inches greatest depth, in two widths, 34 inches n rear and 32 inches front. The rear of

chrome-nickel steel, all hardened, line side shafts on annular ball bearings. change selection bars are each matically locked when disengaged the shifting rocker arm. The gear bo

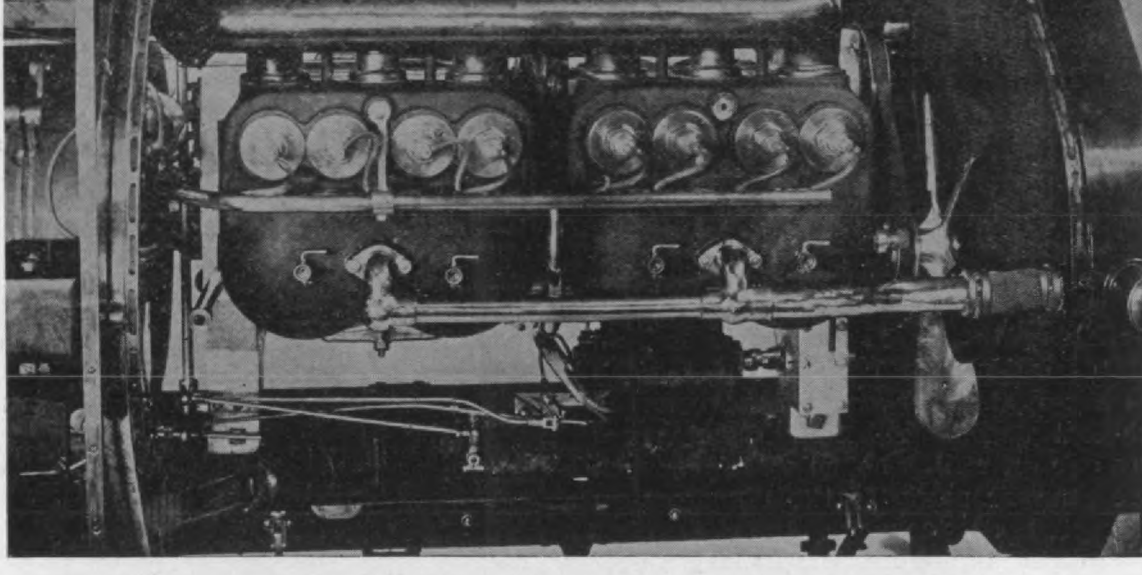

Fig. 8. Allen-Kingston 1908 chassis, plan of motor. The cylinders are cast in dual-u valves all on one side, with screw caps over each, spark plugs in the middle of the eight c complete double ignition system, storage-battery and magneto current supply.

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s hardened, is placed between the
ch hub and the line shaft.

he propeller shaft is 12 inches diameter,
l, with "Hartford" universal joints, dust
of and self-lubricating.

THE MOTOR.

he cylinders are ground. The pistons
ground to a taper, and are packed
3 eccentric rings all above the piston
. The piston pins are solid, 1⅛ inches
meter, fixt in the rod top end and turn-
in bronze bushes in the piston hubs.

drum, gray-iron, 12 inches diameter by
inches face, is fixed to the line-shaft at th
rear of the gear box, and is fitted with
jointed bronze shoe, external, 3-hole leve
and pedal applied, run dry.

CONTROL.

The steering is by right and left scre
threads, hand wheel 16 inches diamete
1½ turns to full sweep of front wheel
The spark and throttle levers are on to
of the hand wheel and are ratchet retaine

There are two hand levers at the driver

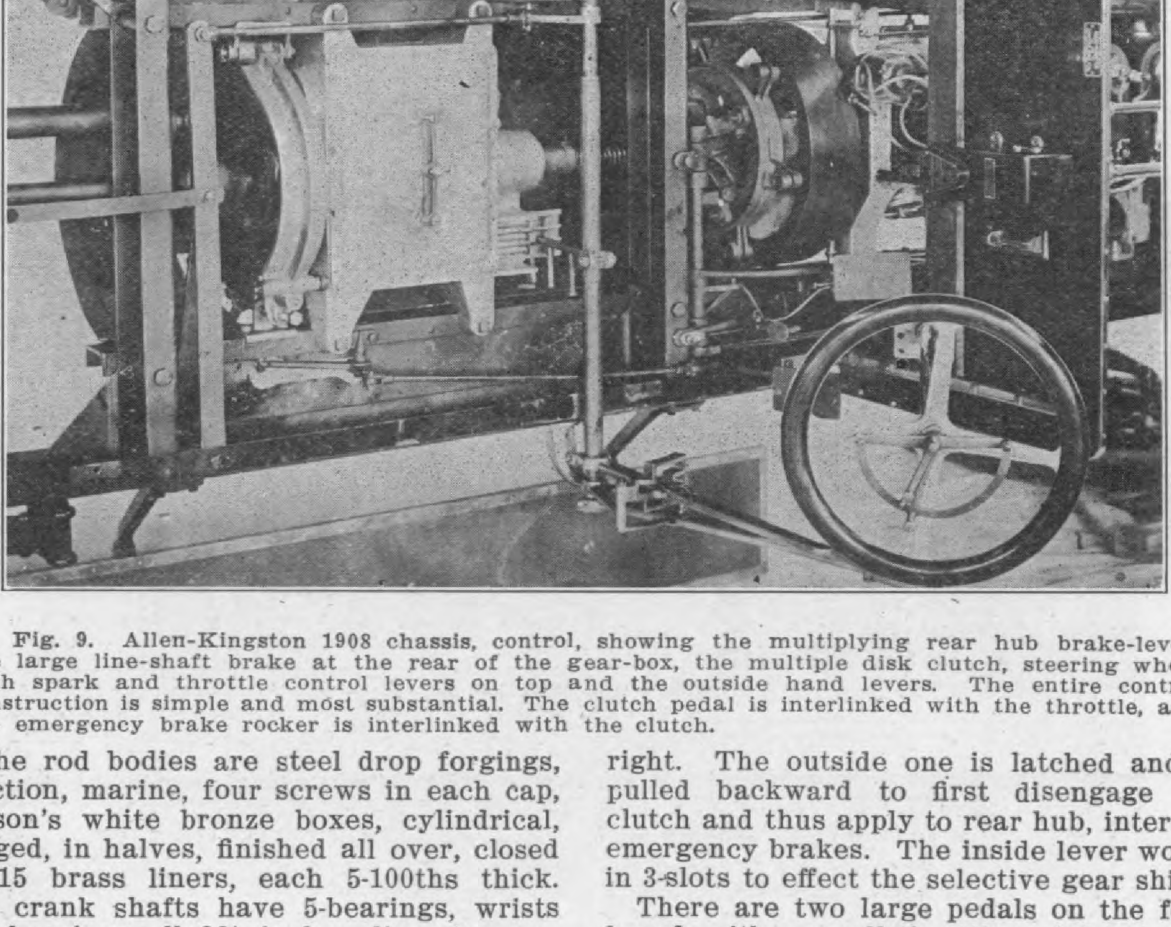

Fig. 9. Allen-Kingston 1908 chassis, control, showing the multiplying rear hub brake-lever, large line-shaft brake at the rear of the gear-box, the multiple disk clutch, steering wheel h spark and throttle control levers on top and the outside hand levers. The entire control struction is simple and most substantial. The clutch pedal is interlinked with the throttle, and emergency brake rocker is interlinked with the clutch.

he rod bodies are steel drop forgings,
tion, marine, four screws in each cap,
son's white bronze boxes, cylindrical,
ged, in halves, finished all over, closed
15 brass liners, each 5-100ths thick.
crank shafts have 5-bearings, wrists
bearings all 2⅜ inches diameter.

he motor-base and oil-basin are alumi-
alloy castings. The oil-basin has an
vidual oil pit for each cylinder, each
it has a stand-pipe which governs the
sh-pool depth. All four stand pipes
to one oil well, whence oil is returned
one plunger pump to the oil pits thru
ostructed oil passages.

he ignition is double, jump spark plugs,
in each cylinder, storage battery or
neto.

right. The outside one is latched and i
pulled backward to first disengage th
clutch and thus apply to rear hub, interna
emergency brakes. The inside lever work
in 3-slots to effect the selective gear shift

There are two large pedals on the foo
board, with a small throttle pedal betwee
them. The left pedal when pushed fo
ward disengages the clutch, and at th
same time closes the throttle. The righ
pedal is pushed forward to apply the lin
shaft brake only.

The control is most simple, and th
great diameter and face of the line-sha
brakes, together with the selection o
coacting materials, gray iron and bronz
make it highly effective under small pre
sure, and permit its use without lubric
tion.

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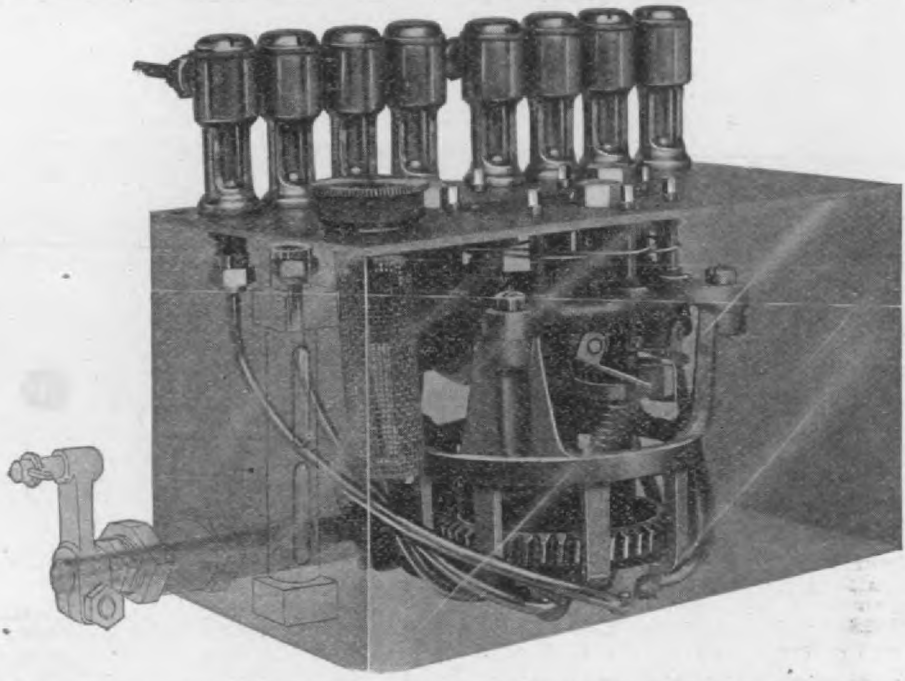
GET ON THE INSIDE



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, Mass., U. S. A., was formed in 1899 exploit the patented Knox system of engine cylinder direct air-cooling, and since that time, evolved a very diver-d line of highly successful motor cars

cooling are forced to assert that a give volume of air in motion will cool one meta surface more readily, rapidly and effectiv ly than it will cool another metal surfac equally well disposed for cooling effec

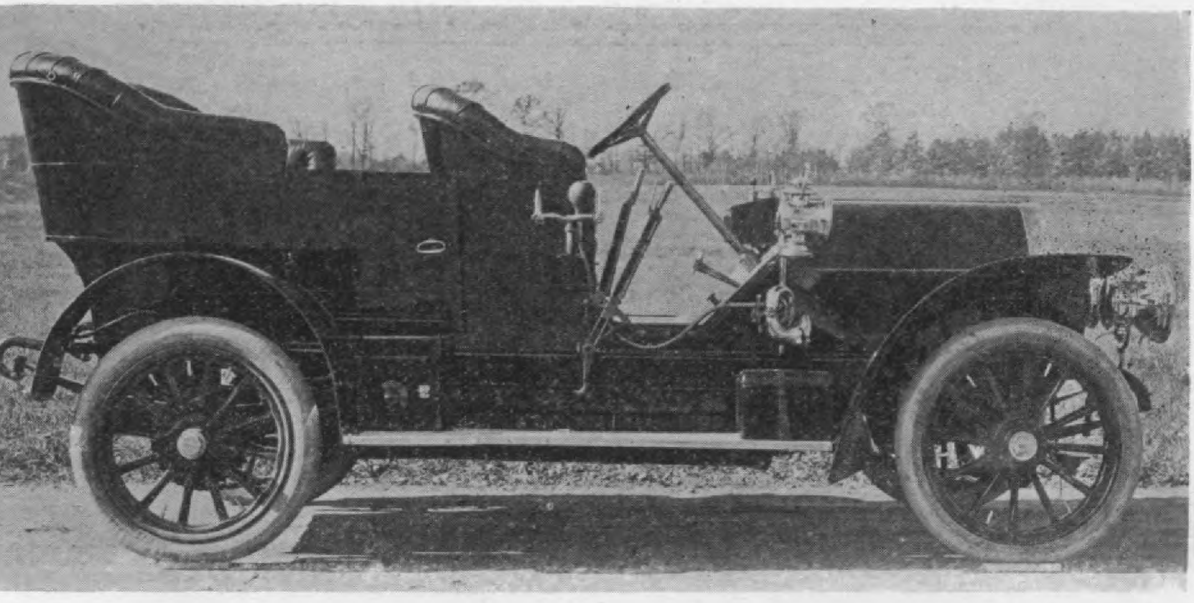

Fig. 1. Knox 1908 Model G waterless, 7-passenger touring car. Wheel base 112 inches. Gage inches. Tires 34x4 inches front, 34x4½ rear. Motor, four, vertical, air-cooled, 4¾x5½ inches, H. P. Cone-clutch, selective sliding gear, 3 forward speeds and a reverse with side chains the rear wheels. Weight about 2800 pounds. Price $4,000, including 5 lamps, mats, horn and ls, ready for the road. Cape top, $200 extra.

driven by motors directly air-cooled, oting "The Knox Waterless" as its an and battle cry.

peaking strictly, all car motors are, always must be, air-cooled, as the

which is absurd.

But in spite of this perfectly fair an truthful statement of actual motor cy inder cooling conditions, and of the al solutely satisfactory performance of som thousands of Knox Waterless motors i

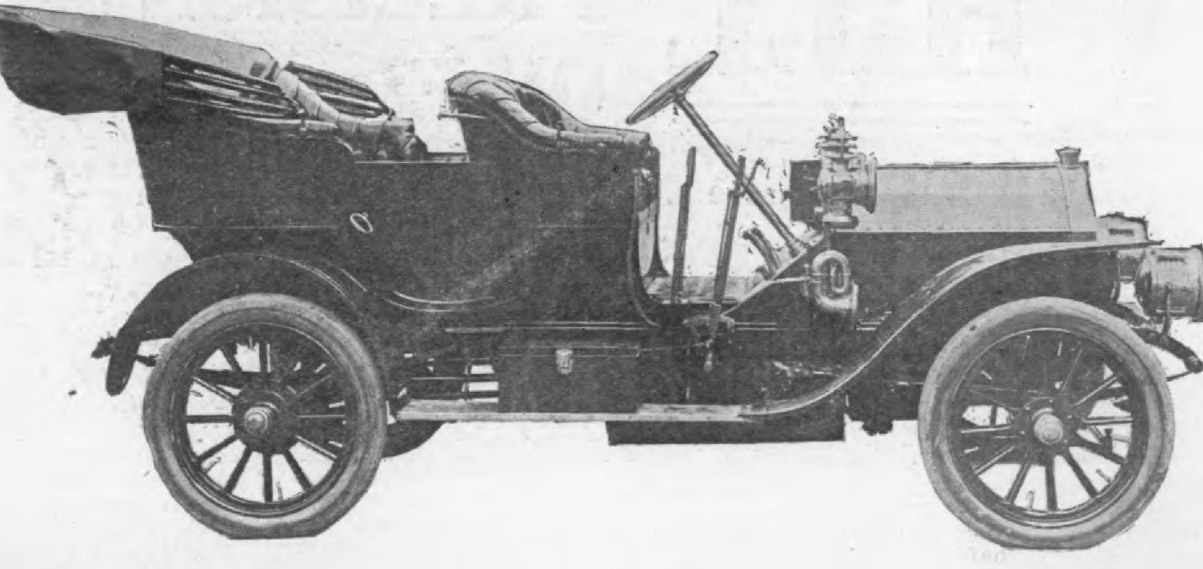

Fig. 2. Knox 1908 Model L, water-cooled, 5-passenger touring car. Wheel base 102 inches. e 56 inches. Motor, water-cooled, four cylinders, 4-cycle, 4⅜x4¾ inches, 30.6 H. P. Cone ch, selective, 3 forward speeds and a reverse sliding gear to bevel gear and divided rear s. Weight 2400 lbs. Price $2700, including 5 lamps, mats, horn and tools, ready for the d. Cape top $150 extra, water proof, folding and extension.

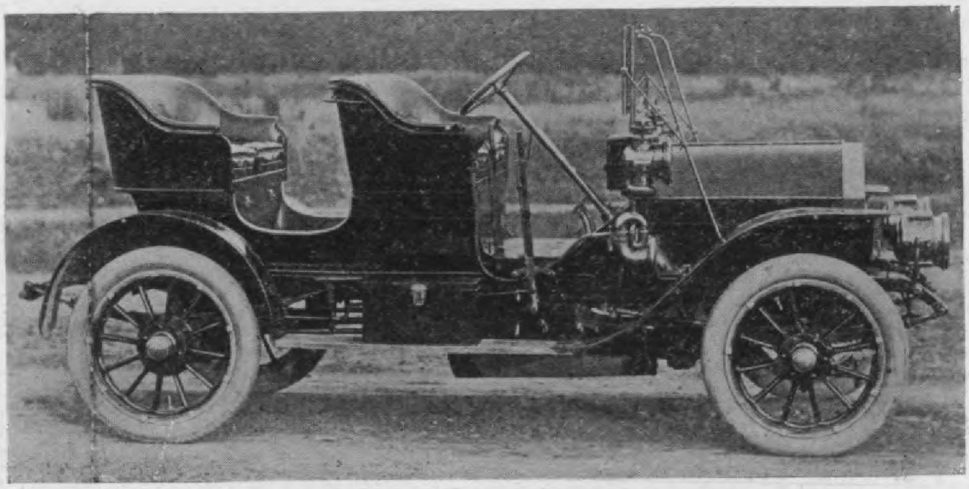

Fig. 3. Knox 1908 Tourabout, air-cooled or water-cooled, Model H or Model L chass
Weight, as shown, 2250 pounds. Price $2600, including 5 lamps, mats, horn and tools, ready
the road. With detachable tonneau the weight is about 2350 pounds, price $2700, same equ
ment.

endent conclusions as to the real values of ater cooling and direct air-cooling com- ared with each other. The car buyer does ot yet feel competent to judge for him- elf, and is therefore influenced by the

Present indications point to a 1908 duction of more cars in number driven direct air-cooling motors than by mo which have water jacketed cylinders, the Knox engineers and managers are

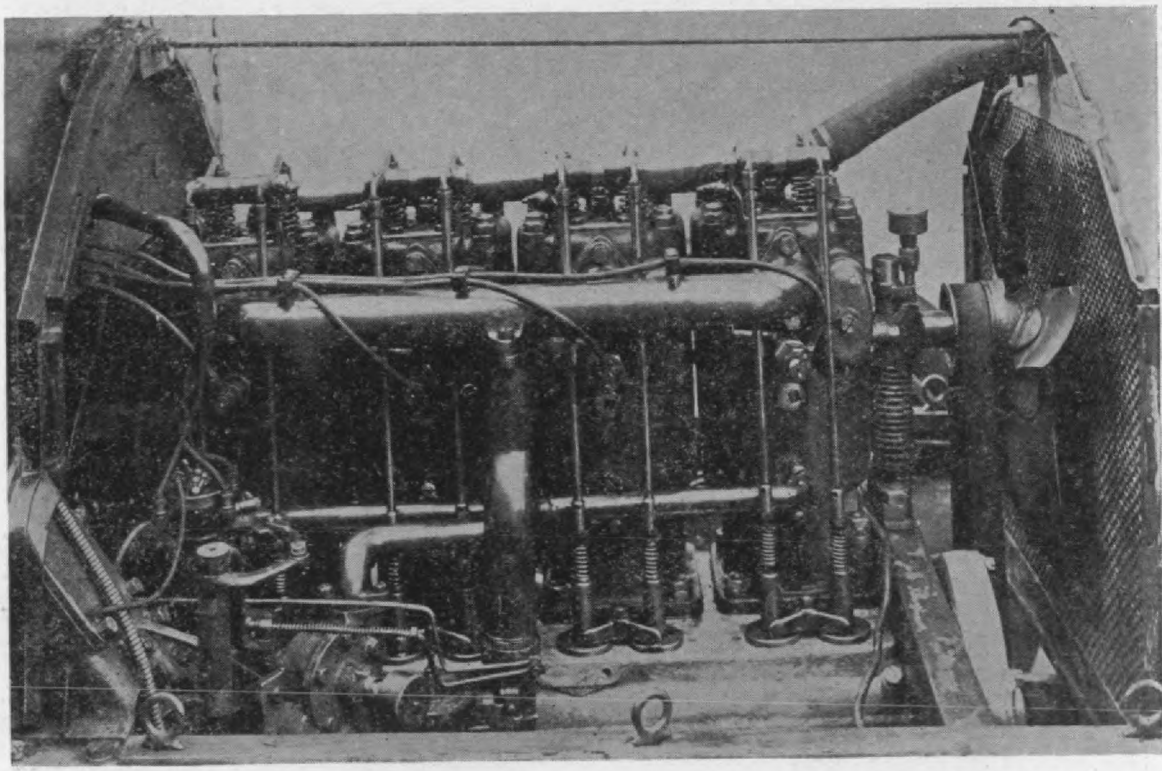

Fig. 4. Knox 1908 Model L, water-cooled, four-cylinder motor, right side. The valves are the applied cylinder heads, no valve cages, and are worked with push rods and overhead bea from one cam-shaft located in the motor base. The single-unit cylinders are 4⅜x4¾ inches. H. P. The motor base and oil basin are aluminum alloy castings. The ignition is one jum spark plug in each cylinder, with dry cells, storage battery and box of four coils on the fr board. The lubrication is by one force pump which forces the oil from a well in the oil through unobstructed oil leads to the crank-shaft journals, whence the oil drains to the oil and is then returned by the rotary oil pump to the crank-shaft journals.

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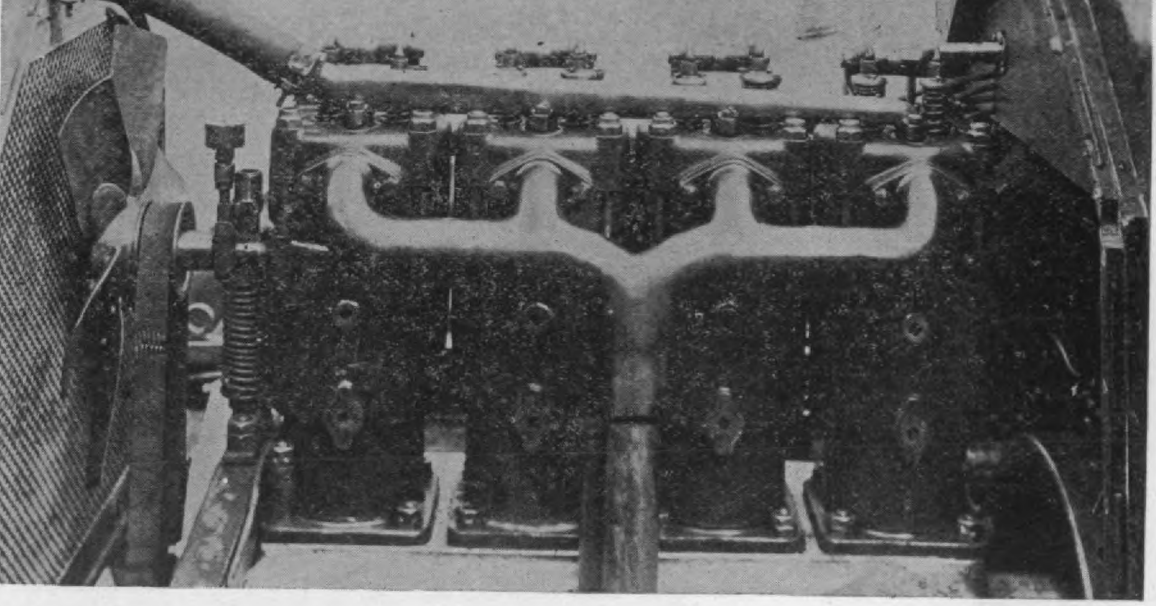

Fig. 5. Knox 1908 Model L, four-cylinder motor, water-cooled. Left side, showing exhaust and belt-driven fan. The fan is hung on a swinging arm, fitted with a coiled spring which ntains a constant fan-belt tension. The cylinders are single-unit castings.

to public demands, right and wrong. is first Knox water-cooled motor is sim- he Knox 1907 Model H motor, water ted, and given very large water es around the valves which are placed pplied cylinder heads, all up to the latest and best water-cooled practice, at those who buy the Knox 1908 cars water-jacketed motor cylinders may ct the best result which can be ob- d with water cooling. Direct air- ng includes no circulating pump, tor leakage nor freezing troubles, and Knox company continues to offer its oled motors for 1908.

e Knox 1907 Model H chassis con- tion, fully described in the November, issue of the Journal, gave most ying results thruout the season of and is continued for 1908 unchanged direct air-cooling and changed only cylinder water jacketing and the ad- of the water piping, circulating pump radiator in the Knox 1908 Model L is.

ON THE ROAD.

dnesday, November 13, a Knox 1908, nder, water-cooled Model L touring eft the Hotel Worthy, Springfield, , at 2.15 P. M., Thomas E. Crane g and the writer tonneau passenger nce, because the Knox folks had so to say about the Model L springs.

day was fine and not so very cold sidewalk, but there was no suffering heat when the Model L struck a e clip on the clear road to Chicopee

to Easthampton, with the writer now as front-seat passenger. The road from Springfield to Chicopee Falls is fairly smooth, not very smooth, and tho the Model L springs are excellent, one-pas-

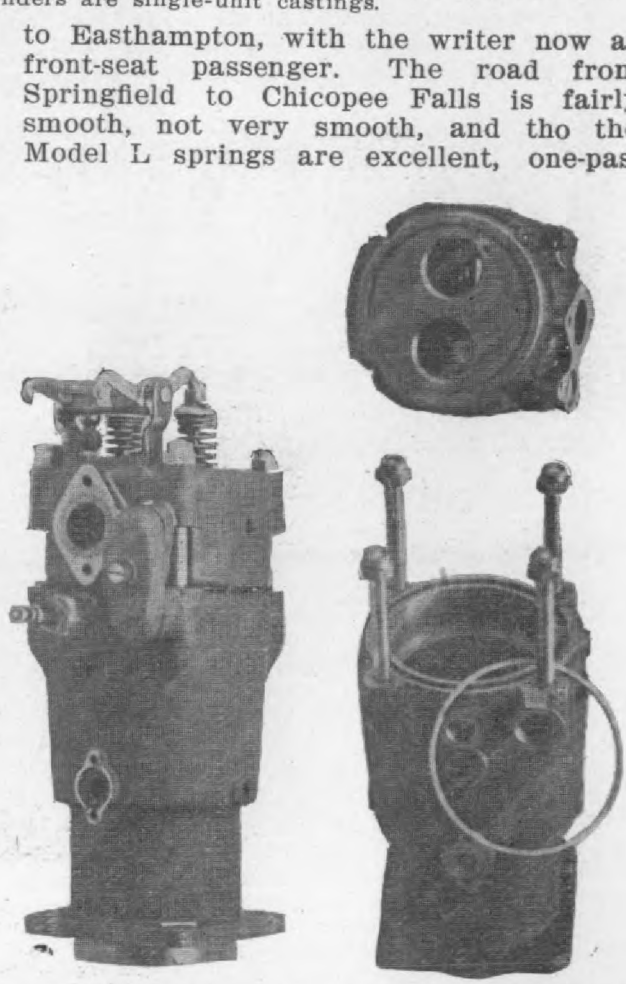

Fig. 6. Knox 1908 Model L. motor cylinder and applied cylinder head. The valves are seated in the head itself, no valve cages used. The water passages in the cylinder head are large, and the water cooling of the exhaust valve is effective.

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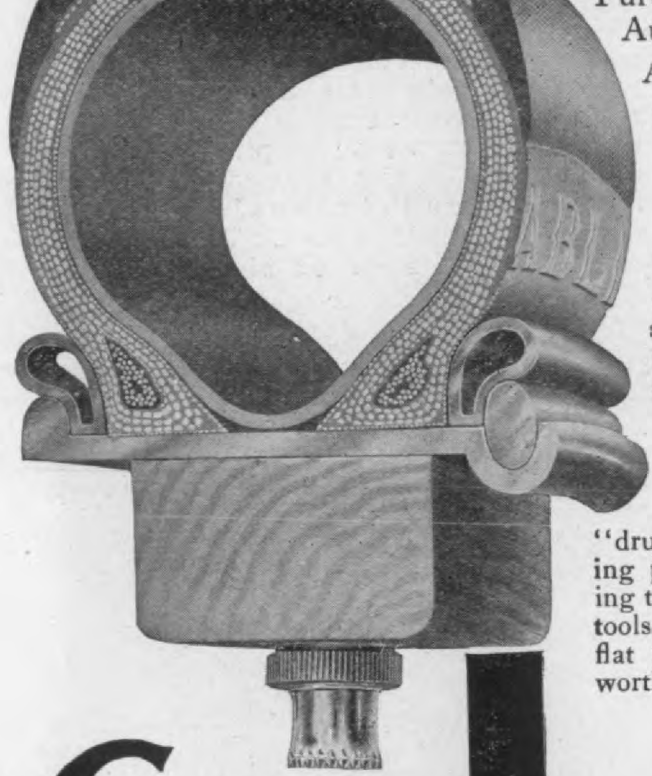

Further, the Goodyear Auto-Tire is **90% puncture proof.**

And to make motoring **absolutely** trouble free—to **eliminate tire trouble** and make any **possible** tire accident **insignificant,** the Goodyear Detachable Auto-Tire on Goodyear Universal Rim **can** be—if ever **need** be—taken off or put on in less than a minute by the watch, by simply loosening one nut with a common wrench and using the fingers for the rest of the simple operation. It is the only rim made **not** requiring **a special** tool, which if lost or mislaid makes it impossible to remove tires owing to all detachable tires now being made with inextensible bases.

Do these things mean much to you, Mr. Motorist, who have probably spent "drudging" hours, or have been delayed, fixing punctures, or failing to fix them, and failing to get the tire off through lack of "required tools"—spent dollars for new tires because flat riding had "rim cut" the old ones to worthlessness?

GOODYEAR

You can't rim cut Goodyear Detachable Auto-Tires on Goodyear Universal Rims.

Nor will they "creep"—"blister"—develop "mud boils"—come off—or do **anything** that good tires **shouldn't** do.

No "ifs"—"unlesses"—"providings" — "exceptings" or "perhapses." Goodyear Detachable Auto-Tires on Universal Rims absolutely **won't** do **any** of these things.

If we could prove each statement in this advertisement, wouldn't you order Goodyear Detachable Auto-Tires on Goodyear Universal Rims right away?

We **can** prove **all**—in this or any other advertisement—any **agent** can and **will** gladly—or **we** will if you'll drop a line to our home office.

We will also show you our extra heavy Clincher Tire, the superior of which does not exist in Clincher style.

We'll show you, also, the 1908 Goodyear Red Seal Brand Inner Tube which is guaranteed for a full year, insuring maximum tire service from Goodyear Tires on Goodyear Rims.

Call and give us the **chance** to prove Goodyear wheel equipment superiority, or write for the free book, "How to Select an Auto-Tire."

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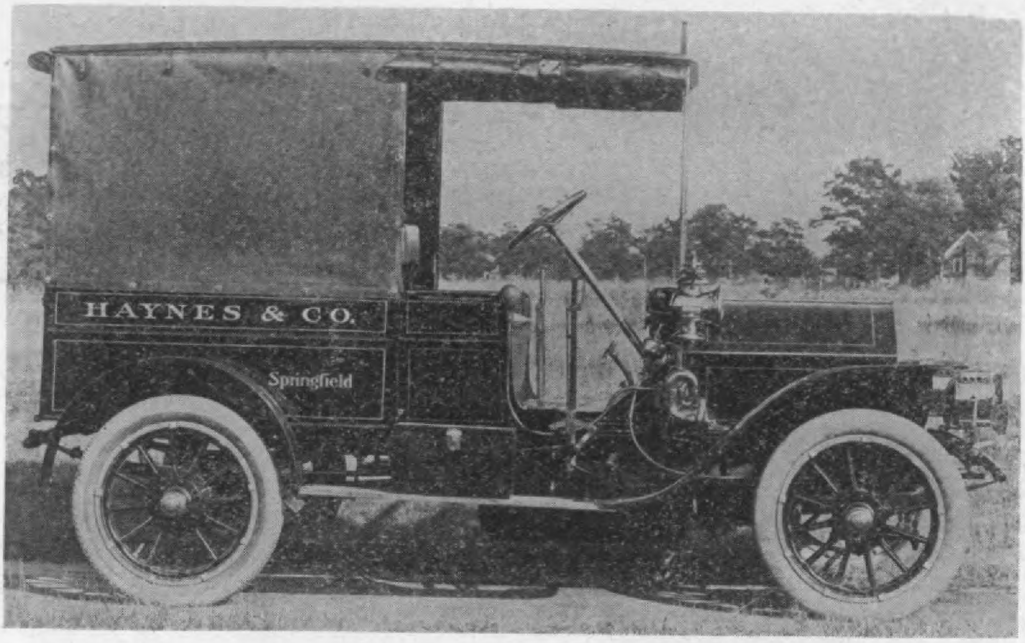
of five into the tonneau, making passengers up. The road is very rooked and rough clay with big breakers every rod or two, winding the north side of Mount Tom, and irls made plenty of noise as we over the bumps, but even with assengers, all well grown, in the u and two in front, the springs did

Model L up to 50 or so which gave us a wintry wind in our faces as we flew over the smooth, winding road. We did the 21 miles from Northampton Court House to the Knox Factory in Springfield in 43 minutes, which was very fast as we had to go slow thru Holyoke and Chicopee and in the Springfield streets. The whole run of 42 miles was made on high gear and



. 7. Knox 1908 600 lbs. paying load, 4-cylinder motor, air-cooled Model H chassis, com- car. Wheel base 102 inches. Gage 56 inches. Tires all 32x4 inches, pneumatic. Motor, linders, air-cooled, 4⅜x4¾ inches, 30 H. P. Cone clutch, metal to metal with cork inserts. gear, 3 forward speeds and a reverse, with bevel gear to divided rear axles. Weight 2600 Price $2700, including 3 oil lamps, mat, horn and tools.

e at all, and the front seat riding tremly good. From the foot of Tom to Easthampton the road is and straight for two or three miles took it at 45 or 50 miles. We left ent passengers somewhere between npton and Northampton and passed

the Model L did not slacken speed on any hill in the route, doing much more in the way of climbing when we had seven passengers aboard than the cylinder diameter seemed to promise, while the springs deserve all that the Knox folks say in praise of them.

Buick 4-Cylinder Runabout

Buick Motor Company, of Flint, as added an entirely new 4-cylin- bout of light weight and compara- w price to its 1908 line. This lit- has a 4-cylinder, vertical motor of , the bore and stroke each being es. The frame is of prest steel, motor is suspended on a sub- of similar material. The wheel 8 inches, and the gage standard. n is by jump spark from a single distributor, current by storage The motor is water-cooled and

slow speed ahead and reverse are by pedals, and the clutch is operated by a side lever. The drive is by shaft and bevel gear to the divided rear axle. Internal expanding hubs are used on the rear wheel drums, and an external contracting band brake is provided in the rear of the change speed gear. The wheels are all fitted with 30x3-inch tires.

The springs are semi-elliptic in front and full elliptic in the rear. A neat runabout body with detachable rumble seat is fitted. The car sells for $850 f. o. b. the factory, Flint, Mich., including oil side lamps, tail lamp, generator, gas head-

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was organized in 1903, to exploit certain patented inventions in gas engine cylinder-cooling as applied to motor-car driving, and sold the first car driven by an air-cooled motor made under these patents in 1904.

The Corbin Corporation made and sold a considerable number of cars driven by

cooled motor at the 1907, November son Square Garden exhibition, New City.

For 1908 the Corbin Corporation offer three models of cars, a 5-pass touring car, a 4-passenger runabout 2-passenger roadster. All of these

Fig. 1. The Corbin, 30 H. P., 6-passenger touring cars. Wheel base 108 inches. Ga inches. Tires 34x3½ inches front, 34x4 inches rear. Motor four vertical cylinders, 4-cycle, w cooled or air-cooled as preferred, 4½x4¼ inches, 32.4 H. P., A. L. A. M. rating. Cone c selective sliding gear, 3 forward speeds and a reverse, with bevel gear to divided rear Weight 2200 pounds. Prices, air-cooled, $2650, water-cooled, $2500, including 5 lamps, horn and tools, ready for the road. Cape top, $150 extra. All motors are fitted to take tw of jump-spark plugs with dry cells and storage battery and a 4-coil box on the front Bosch magneto and complete double ignition system fitted, $200 extra.

this particular type of air-cooled motor in 1904, 1905, 1906 and 1907, never applying motors of any other type previously to 1907. These Corbin patented air-cooled motors ran perfectly well, never in any

Corbin car models will use the sam sis fitted with either an air-cooled or cooled motor as the purchaser may

The prices for the air-cooled driven models will be $150 more th

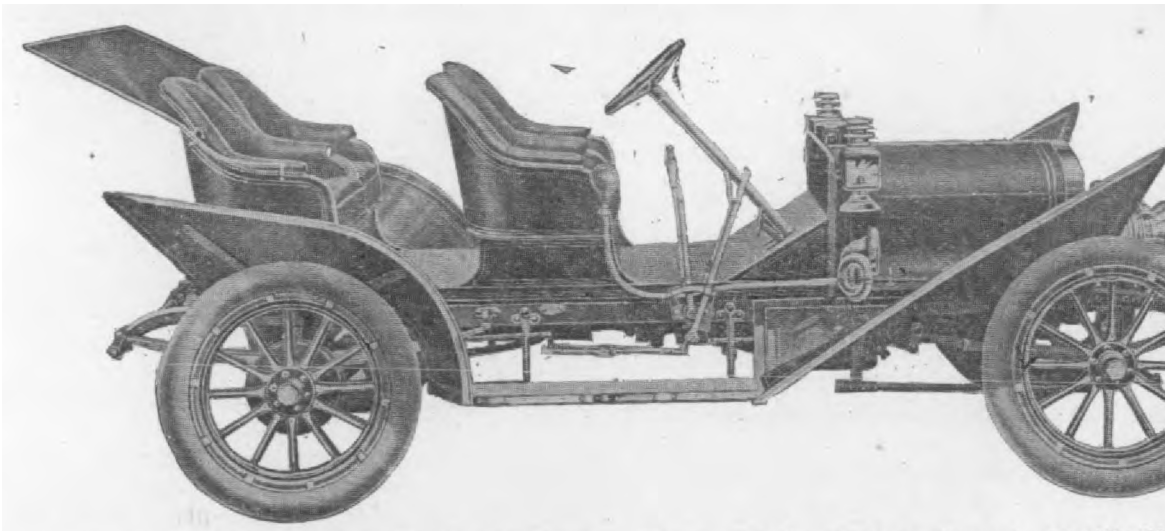

Fig. 2. Corbin 1908, 30 H. P. Runabout. Same chassis and equipment specificati Fig. 1. Price, air-cooled, $2650; water-cooled, $2500. Complete double ignition systen teries and Bosch magneto, $200 extra.

single instance failing to work because of

the same cars driven by wate motors, everything but the motor t

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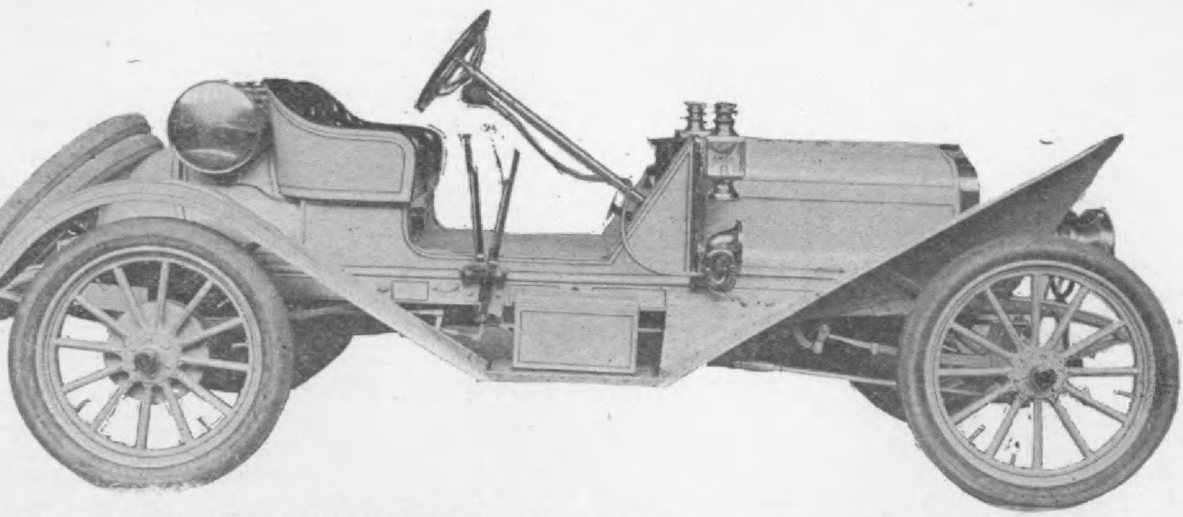
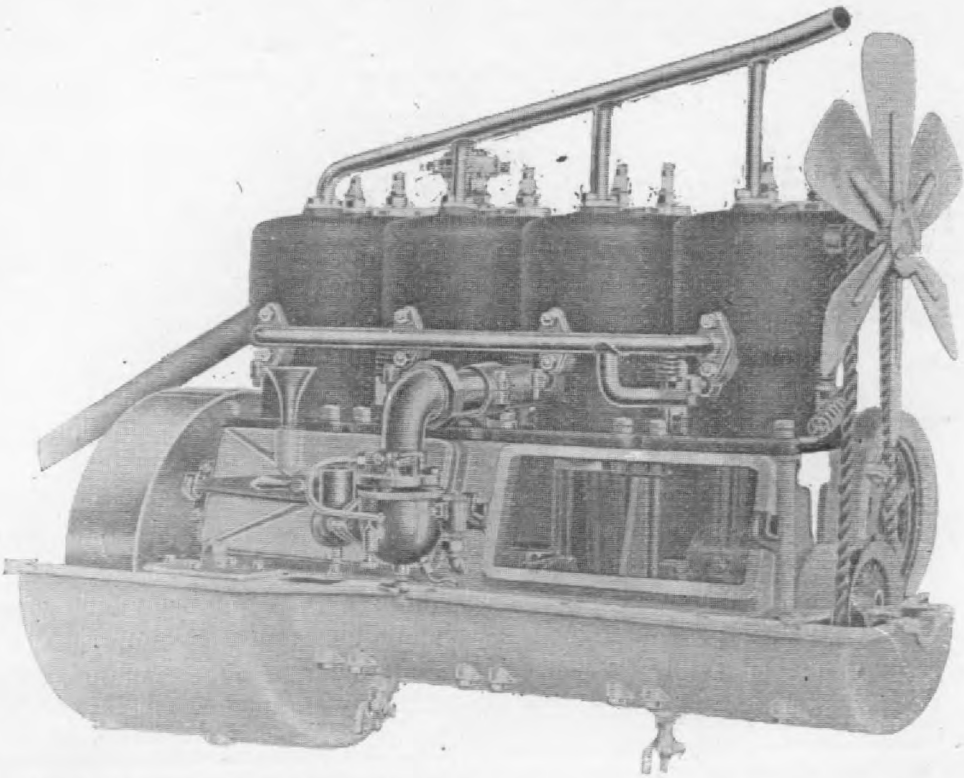


Fig. 3. Corbin, 1908, 30 H. P. Roadster, to seat two passengers only. Same chassis and pment specifications as Fig. 1. Price, air-cooled, $2650; water-cooled, $2500. Complete le ignition system, batteries and Bosch magneto $200 extra.

, with an air-cooled engine, and $2500 ter-cooled. The cape top is $150 ex-

motors are fitted to take two sets mp-spark plugs with dry cells and 4¼x4¼ inches. The 1908 cylinders are 4½x4¼ inches, same dimensions for both air-cooling and water-cooling. The power of the air-cooled motors is rated the same as that of the water-cooled. Fig. 4 shows



ig. 4. Right side of the 1908 water-cooled Corbin motor. The crank case, lubrication and on systems are the same for both the air and water-cooled motors. A feature of this is the steel-tube exhaust pipe, branch pipes molded to the main pipe. The intake pipe per which is below the exhaust pipe, and therefore charge is not unduly heated and ex- d before entering the cylinder. The cylinders are 4½x4¼, rated at 32.4 H. P. by the A. L. . formula.

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e battery, using a 4-coil box on the the right side of the 1908 water-cooled

the exhaust valve is worked thru a push rod and overhead beam. The air-cooled ports are 1 7-16 diameter. In the water-cooled motor, shown in Fig. 4 and 5, the ports are 1 9-16 diameter.

LUBRICATION.

The lubrication for both motors is the same, two splash-pools, separated by one, narrow, splash-fed oil-pool which is constantly filled by the splash and gives flooded lubrication to the middle one of the five crank shaft bearings thru underneath oil holes. Of the five crank shaft bearings, the two end bearings are on annular ball bearings, while the three intermediate bearings are in plain boxes, oiled by independent leads from the three sight feed box placed on the inside of the front board. The lubricating oil is poured

groove in each cylinder, this oil gr being always covered by the piston. splash pits are supplied by drippings the crank shaft journals.

Access to the crank-box is had large hand-holes, with oil-tight co which are secured with a long bar he slots at the ends and fitted with one h screw in the middle.

The valve action, see Fig. 5, is fro single cam shaft, cams applied, pin key retention, with pivoted horizo levers, no rollers, rounded lever-e hardened, resting directly on the c and the valve lifters resting directly top of the lever ends over the cams. top ends of these lifters are fitted spring-plungers, flanged on top to about 1-64th gap before the plunger fl

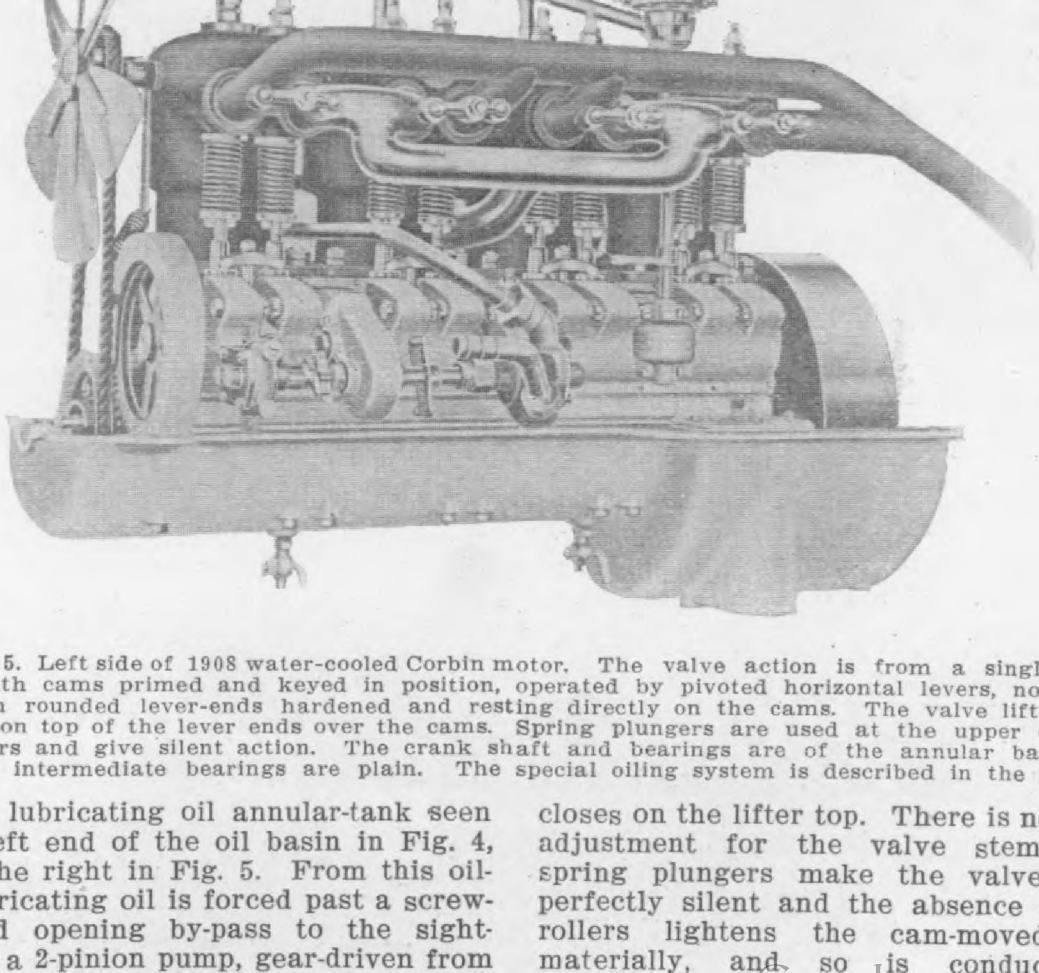

Fig. 5. Left side of 1908 water-cooled Corbin motor. The valve action is from a single ca shaft with cams primed and keyed in position, operated by pivoted horizontal levers, no rol but with rounded lever-ends hardened and resting directly on the cams. The valve lifters directly on top of the lever ends over the cams. Spring plungers are used at the upper ends the lifters and give silent action. The crank shaft and bearings are of the annular ball ty and the intermediate bearings are plain. The special oiling system is described in the text

into the lubricating oil annular-tank seen at the left end of the oil basin in Fig. 4, and at the right in Fig. 5. From this oil-tank lubricating oil is forced past a screw-regulated opening by-pass to the sight-feeds by a 2-pinion pump, gear-driven from the cam shaft thru light flat-spring drivers, which will yield if the pump offers undue

closes on the lifter top. There is no le adjustment for the valve stems. spring plungers make the valve a perfectly silent and the absence of rollers lightens the cam-moved materially, and so is conducive durability.

A notable feature of this motor is

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he fan is rope driven, and has its ring on a spring-pulled bell-crank, so to give a constant belt-tension auto-ically maintained; this wholly obviates belt troubles.

ON THE ROAD.

short ride, four miles, from New ain to Berlin Junction, Friday, Novem- is a strong hill-climber and picks up spee promptly. The springs are easy, and thi short rush in a new car, just ready fo shipment, was a real pleasure. The valv motion, owing to the action of the sprin plungers in the top ends of the valv lifters, is perfectly silent and the car mad no noise at all that the observer coul detect.

1908 Toledo Models

he Pope Motor Car Co., of Toledo, o, announces its models for 1908 and that the factory is able to make y deliveries. Two models, Type XVI XVII, are offered. These have the e general chassis specifications with exception of wheel-base. Type XVI

1908 IMPROVEMENTS.

One of the special features is the us of two separate systems of ignitio using two sets of spark-plugs, the wirin being such that practically every chanc for short circuiting has been avoided. A increased motor capacity has been a

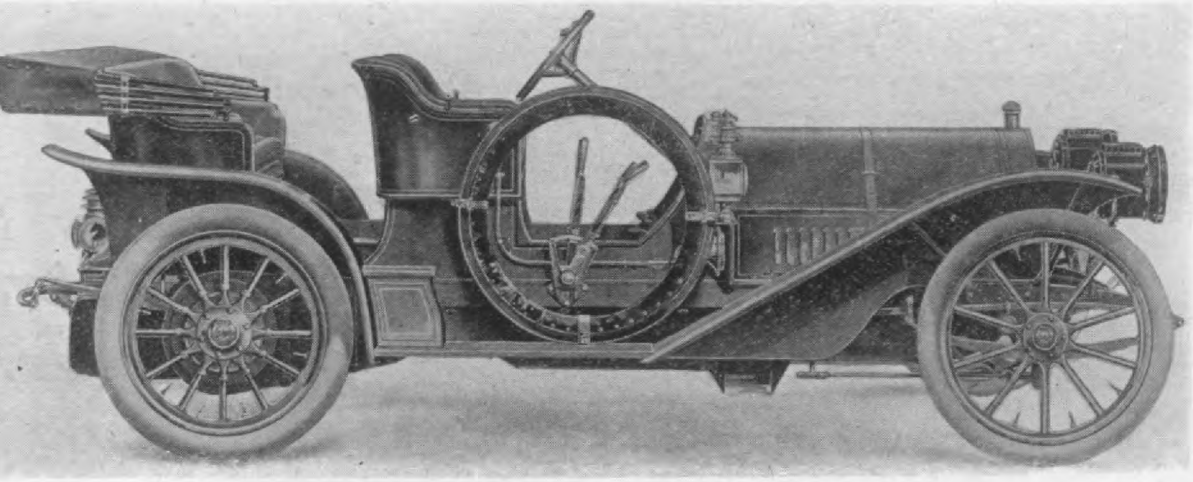
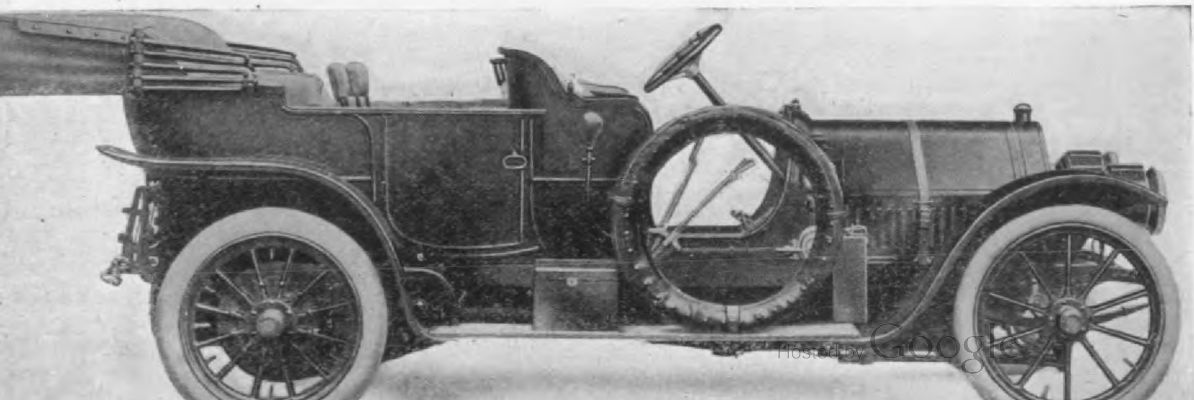


Fig. 1. 1908 Type XVIII Pope Toledo Touring Runabout. 50 H. P., 36-inch wheels, double ition system with separate spark plugs. Double side chain drive, pan under entire car.

g 115 inches, while XVII is 126 inches. smaller car continues the Pope-Toledo e of symmetrical body curves while XVII is of the straight line type of . Type XVIII, a 50 H. P. touring run-ut, is also offered on the same chassis. ranged and all the bearings and wearin parts have been increased in size. Ther are also improvements in the clutch an transmission. The use of all steel fram the liberal use of chrome nickel an other alloy steels, the overhead engin



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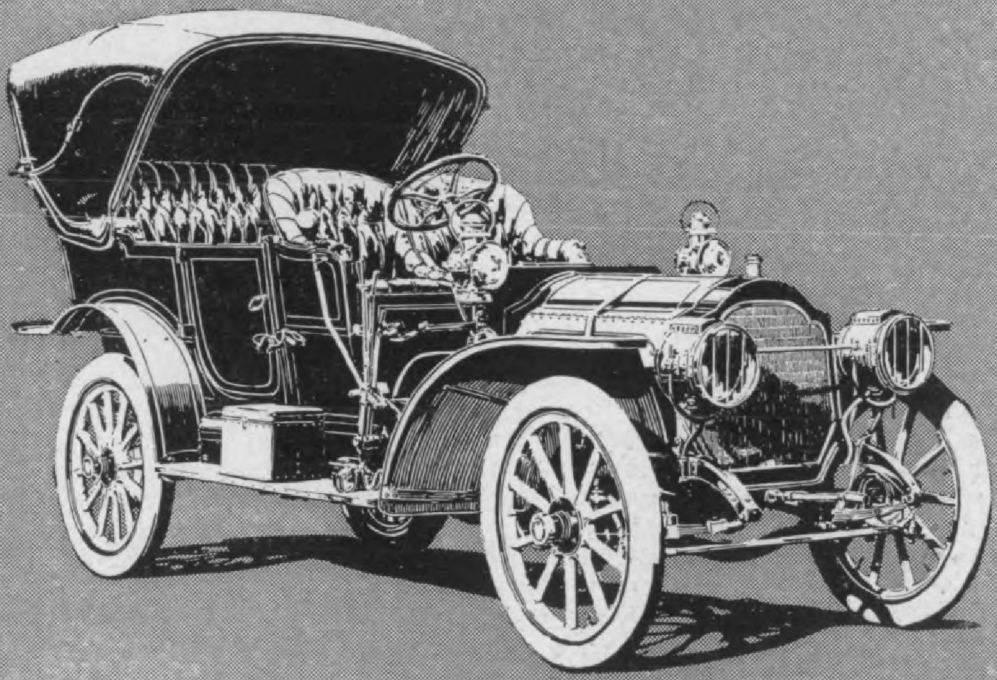
Packard

"THIRTY"
1908



"Ask the man who owns one"

PACKARD MOTOR CAR COMPANY
DETROIT, MICHIGAN

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ufacture are Pope-Toledo features that e been retained.

ball bearings of generous size.

The motors of all Pope-Toledo cars ar

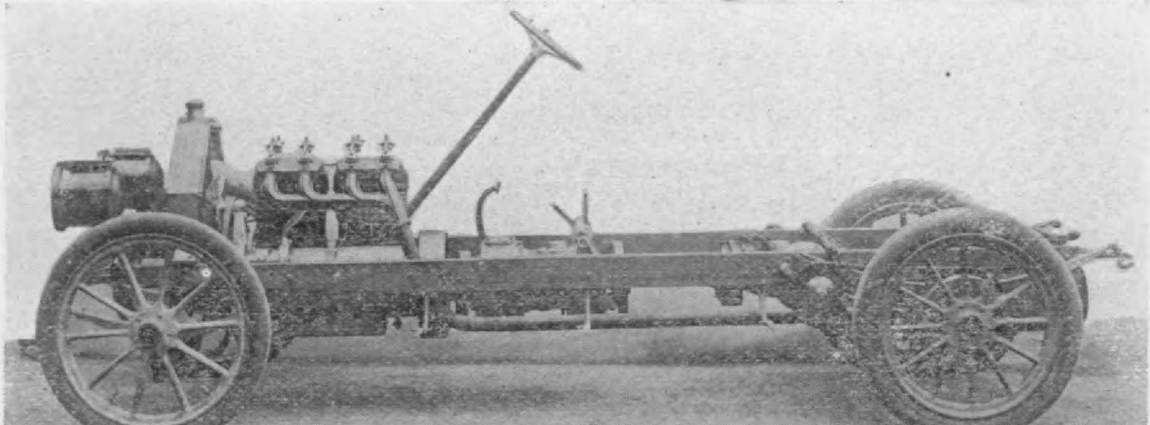
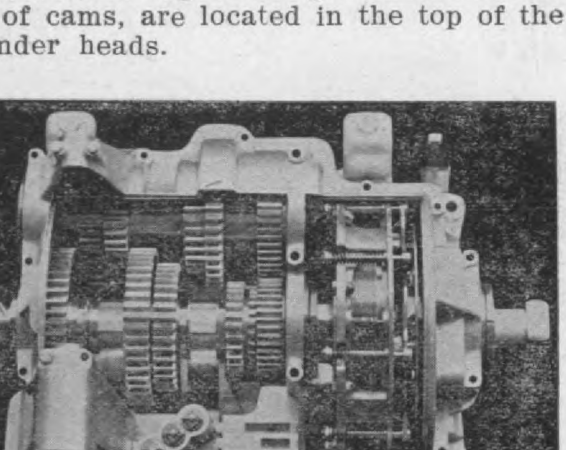


Fig. 3. Left side of 1908 Pope Toledo Chassis special sprockets which can readily be anged are used. The Pope Toledo engine features such as the overhead valves, copper water ckets and special radiator of the company's make are retained. Alloyed steels are used freely. e wheels are large and D. W. F. imported ball bearings are used thruout the construction.

TYPES XVII AND XVIII MOTOR.

he engine is of the four cylinder, four le type with twin cylinders cast in rs, copper water jacketed, heads inte-. Large mechanical valves operated double acting walking beams and one of cams, are located in the top of the nder heads.

water-cooled and the radiators are man factured by the Pope Company. Thes are spoken of as "Planetic." A high fillin thimble with a vulcanized cap lined wit brass is used. The water pump is centrif gal and gear driven. All water conne tions are of pure moulded rubber to secu flexibility.



g. 4. 1908 Pope Toledo Change Speed Gear, improved lubricating device for 1908. A e hand hole gives easy access to the interior. ratio of the gears have been improved. e is an oil tight partition between the clutch gear case and the multiple disc clutch which in oil is said to be very velvety in its action, to operate and gives no jar in starting. For the clutch has been lightened as well as gthened and a strong and positive clutch e is provided. The clutch yoke is ball bear-

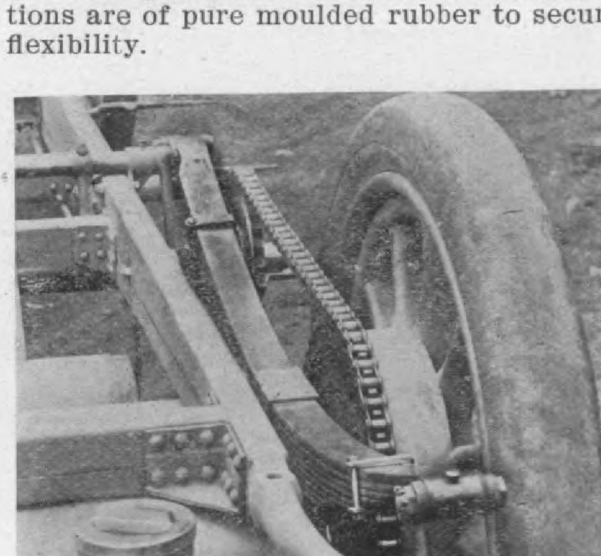


Fig. 5. Rear corner of 1908 Pope Toledo show ing the gasoline tank with large and convenie filler, inverted "U" section chrome nickel ste frame, gusseted corners, chrome nickel ste spring hanger, and one inch pitch, silent roll chains encased and running in oil.

he exhaust valves are operated by in-dual springs. The relief cocks for ting are provided with manifolds and

Two complete sets of ignition are su plied, operating on two separate sets spark plugs on opposite sides of the e gine cylinders, one being the 1908 Eis

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edo" construction, rearranged so that the loat chamber surrounds the aspirator or nixing chamber, thus assuring a regular

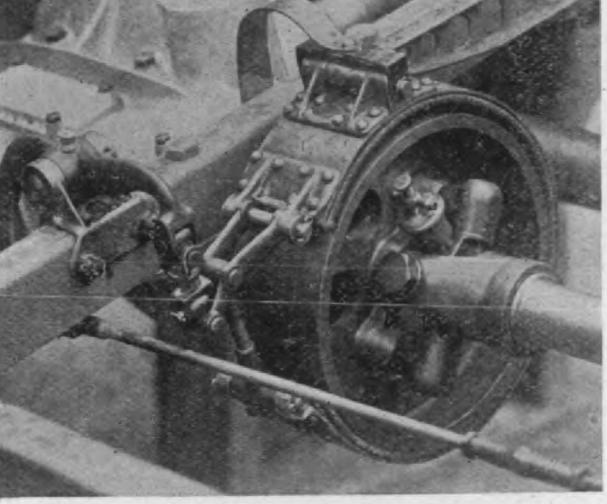

Fig. 6. Pope Toledo line shaft brake of the contracting type showing the special linkage arangement and method of mounting on the cross rame member, also the lightened brake brace vhich is fastened to the side frame member.

supply of gasoline, as the angle of the car on the road does not affect the gasoline evel. A drain cock is provided for re-

joints.

The gasoline system consists of a gallon copper tank carried on the rea the chassis and provided with a l funnel shaped filler. On the dash small tank carrying one gallon of g line. An automatic pump operated by haust pressure keeps this small dash supplied with gasoline at a constant l

A multiple metallic disc clutch enc with the transmission and running i oil bath is used. Packing joints prov with glandnuts are placed between transmission chamber and the clutch between the clutch and the outer en the shaft. The number of discs has reduced and the shape of them char which permits a quicker engagemen the clutch while still retaining the lightfully smooth, velvety action. I holes have also been provided for c and examination.

The change speed gear is of the s tive type, four speeds forward and on verse, direct drive on the third sp Ball bearings of large dimensions are and the gears have six pitch teeth. gear ratios have been changed some for 1908.

The lubricating system has not bee tered and consists of forcing oil by a pump from an overflow reservoir belo

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the bearings. The pistons are lubricated by means of small ledges on the inner edge which catch the oil mist and feed it thru small oil holes to the inner walls of the cylinders.

BRAKES AND CONTROL.

The driving brakes are in dust proof drums attached to the rear wheels, operated by a pedal which interlocks with the clutch and also with the emergency hand lever on the side of the car. In addition, there is an emergency brake on the drive shaft, operated by another pedal independently of the clutch.

Steering is by an irreversible, worm and sector, provided with adjustable stops so as to prevent the tires from scraping the guards or springs. The steering wheel has an aluminum spider fitted with wood grips. The wheels are 36 inches in diameter; 4-inch tires front and 4½-inch tires on the rear.

The axles are one-piece chrome nickel steel I-beam section forgings of generous size; pivots and steering knuckles mounted on D. W. F. ball bearings, with hardened steel bushings, and provided with compression grease cups. The spark and throttle control levers operate as usual on a stationary sector on top of the steering wheel and are finished in dark gun metal, and tipped with horn handles. An accelerator foot pedal is also provided.

BODIES AND EQUIPMENT.

The touring car body is made of prest steel, with roomy double side entrance tonneau, fitted with individual folding seats. The edges of the tonneau are trimmed with hand-polished "Cuban Sabique." Under the driver's seat and opening into the tonneau is locker room for two dress suit cases. A folding foot rail is also provided and also a fine thick cocoa mat. The space under the rear seat is available for luggage. The top door handles are trimmed with horn, and the side handles covered with seal leather. A double folding robe rail covered with seal leather is also provided.

The touring runabout body is of new type, and is fitted with a double detachable rear seat. The engine and body are well back on the chassis, and the steering post extends backward in a very comfortable position. The rear seats may be detached and an artillery box can be substituted. The tools are carried in drawers under the driver's seat owing to the shorter running board.

The hood and guards are both made of aluminum with reinforced steel edges.

The equipment consists of two large acetylene searchlights, two side oil lights, a rear signal light, acetylene generator, complete equipment of tools, an extra set of spark plugs, all carried in a large steel tool box attached to the left running board. On the right running board is another steel box which carries the storage battery and clutch and engine oil and bearing grease. The pump, jack and repair kit are all in the tool box. An extra large French horn is also supplied.

For Uniform Motor Car Laws

The proposed uniform State act which was drafted and submitted by Chairman Terry at a meeting of the Legislative Board early in the present year has been redrafted and will be in its final form prest for passage in those States where at present the laws are undesirable and oppressive.

In preparation for the campaign in behalf of the Federal bill, literature in the form of letters has been prepared, to be distributed by the automobile clubs and their members thruout the country and by individual automobilists not connected with any club, not only among other automobilists, but among all classes of citizens, urging them to communicate directly with their Congressmen in support of the bill and to secure the favorable action of the committee and of Congress upon the measure.

Meeting of the A. A. A. Racing Board

At the meeting of the Executive Committee of the Racing Board of A. A. A., held in New York City, November 27, the following resolution was adopted:

"Resolved, That it is the sense of this meeting that the Racing Board approve the sportsmanlike action of the Automobile Club of America and the Florida East Coast Automobile Association, in their endeavor to resuscitate high class racing on the Ormond-Daytona Beach, and further, we assure both clubs of our hearty and earnest support."

After the other routine business was considered, the meeting adjourned, and then reconvened as the Vanderbilt Cup Commission, and adopted a resolution to the effect that the William K. Vanderbilt, Jr., Cup Commission promote a race for the William K. Vanderbilt, Jr., cup during 1908. The date of competition, the rules governing the competition, the entry blank, the form of declaration and the course will be announced by the Commission by July 1, 1908.

George H. Day Dies Suddenly

Mr. George H. Day, one of the founders and for many years the moving spirit of the Executive Committee of the Association of Licensed Automobile Manufacturers, died suddenly of heart disease at Daytona, Fla., on Tuesday, November 21. The death of Mr. Day came as a shock to the entire motoring world, which mourns the loss of one of its greatest benefactors.

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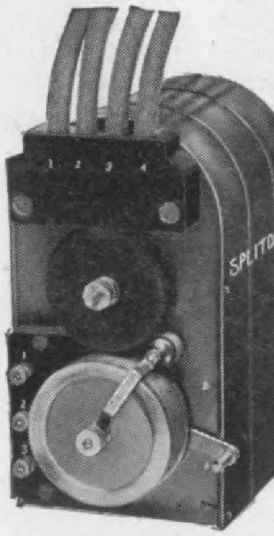
Now for 1908

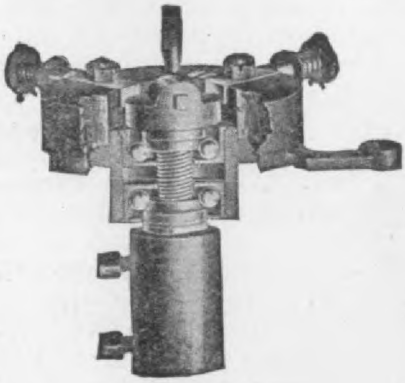
The past year has been a very busy one for us, and we take this occasion to thank our many patrons for their recognition of the superior quality of

Splitdorf Ignition

and to promise that, with our greatly increased facilities, we shall endeavor to sustain the golden opinions of the thousands of motorists who look to SPLITDORF for the best.

The new SPLITDORF Synchronized Distributing Coil successfully solves the problem of firing a multi-cylinder engine with a single coil and vibrator, firing each cylinder at the proper time. Overcomes all possibility of misfiring by reason of our patented auxiliary condenser, which also gives the Timer much longer life. ¶ Can be used in conjunction with any make of non-vibrating or vibrating coil by simply screwing down the adjusting screws on the vibrators so as to short-circuit same.





The time of the spark by the SPLITDORF Ball Bearing Timer is absolutely true in every revolution. ¶ These Timers are of exceedingly high grade material and workmanship and are being used very largely.

The SPLITDOR High-Tension Magneto

is a worthy addition our well known li Less complicated a more efficient than a other. ¶ Already o large number of the b cars and making go

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C. F. SPLITDORF

e F. A. Brownell Motor Co., Roches-
N. Y., U. S. A., successors to Brown-
rebert Company, Rochester, showed
ie New York Palace Exposition four
rs, from 4-cylinders, 34 H. P., to 6-
ders, 80 H. P.

e F. A. Brownell Motor Company,
alized at $400,000, took over the busi-
of Brownell-Trebert Company in Oc-
, 1907. Brownell-Trebert Company
formed in February, 1906, to exploit
e of motors previously developed, and
successive organizations mark ma-
changes and improvements which
brought the 1908 Brownell motors up
e very latest practice in gas engine
ruction up to 160 B. H. P.

The Brownell 1907 Palace exhibit included 3 models of 6-cylinder motors, cylinder respectively, 4x5, 4½x5, and 5½x6½ inches. Of these three 6-cylinder motors the intermediate and largest are the latter designs with valves in the cylinder head, overhead beams and cam shaft in the motor base. The smallest size 6-cylinder model has an overhead cam shaft with the valve operating bell cranks all hung on a common stationary shaft directly above the cam shaft, one cam for each valve. This form of all overhead valve motion has advantages, and is largely used, and will be continued for some time, altho certainty of lubrication, protection from dust and ready accessi-

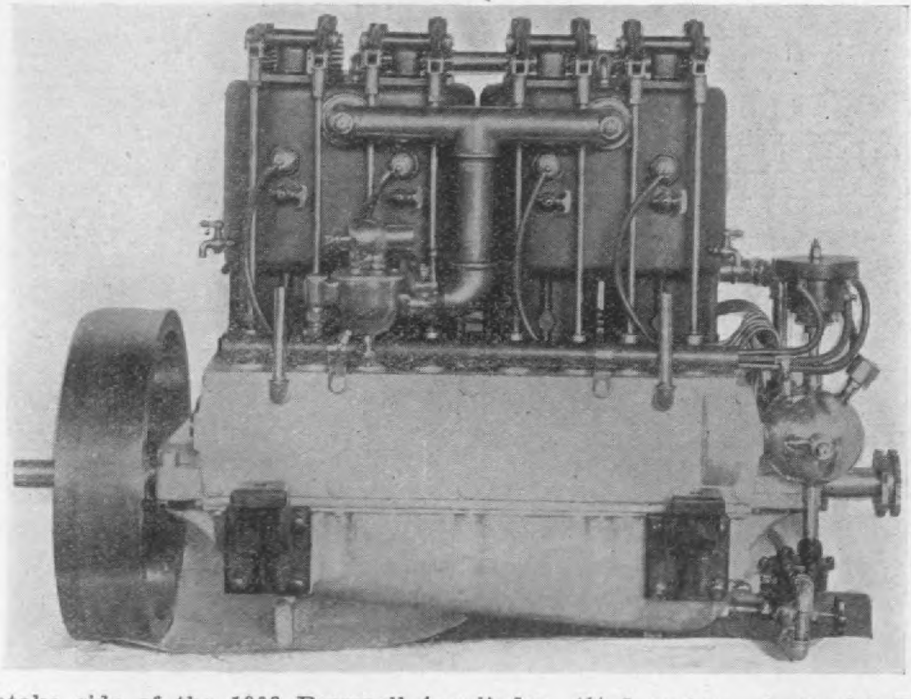

Fig. 1. Intake side of the 1908 Brownell 4-cylinder, 4½x5 motor. A special Brownell car-
tor is used as described in the text but is not here shown. The small gear pump at the
m which pumps oil from the overflow tank up thru a strainer into a closed tank containing
s shown. A double ignition system is supplied.

e F. A. Brownell Motor Company has
llowing list of officers: F. A. Brown-
resident; William B. Deininger, vice-
lent; Robert C. Kershner, vice-
lent; F. A. Brownell, treasurer;
e C. Whipple, secretary.

THE BROWNELL MOTORS.

of the Brownell motors are 4-
water-cooled, with a 3 sliding pis-
rotary, water circulating pump, the
nell carburetor and jump spark ig-
, with either battery or magneto cur-
supply, ignition either double or sin-

of the motors has single unit cylin-
all the others have the cylinders

bility lead the Brownell engineers to prefer placing the cam shaft in the crank box, covered by a full length hand plate which perfectly encloses it, but can be quickly removed, giving free access to the cams and cam rollers. The cam rollers are in forked horizontal levers, all hung on a common rod, placed opposite the cam shaft inside the motor base. This horizontal roller lever relieves the cams of the work of moving the valve lifters, and greatly increases the valve action durability. The lever lifter rods have a screw length adjustment at the top, check nut retained, making it easy to adjust the valve action clearance so as to pre-

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lengthwise port bridges, about ¼-inch thick, which equalize the valve and valve seat wear on the port and entire wall sides. This port bridge is an unusual feature, and is regarded as highly valuable by the engineers of the company.

All crank boxes are aluminum castings, divided horizontally in the plane of the crank shaft axis, and are capt underneath, all free from the oil basin underneath, which has no oil pits.

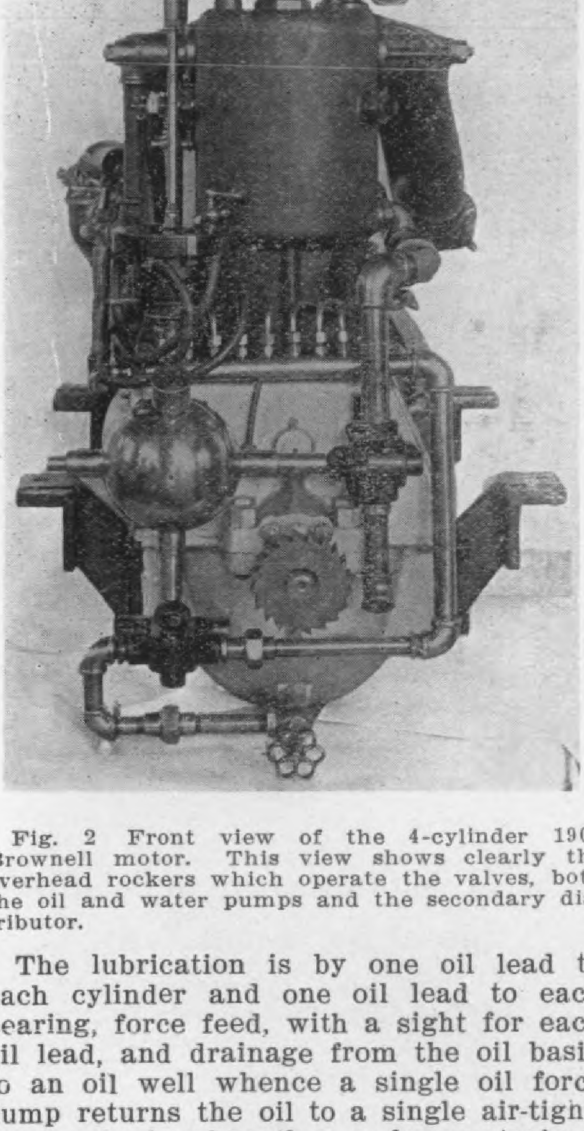

Fig. 2 Front view of the 4-cylinder 1908 Brownell motor. This view shows clearly the overhead rockers which operate the valves, both the oil and water pumps and the secondary distributor.

The lubrication is by one oil lead to each cylinder and one oil lead to each bearing, force feed, with a sight for each oil lead, and drainage from the oil basin to an oil well whence a single oil force pump returns the oil to a single air-tight, overhead chamber thru a large strainer, giving a strong air pressure on the oil reservoir. The feed sights are placed at the oil lead terminations, making the oil supply everywhere visible.

The connecting rods are all steel drop forgings. The piston pins are hollow, very

inside and out, rods symmetrical, bodies in middle of wrist bearings, al boxes closed on thin liners, to take u removing one or more liners, without ing to depend on accurate workman in removing metal to preserve the rod parallelism.

The pistons are packed with three rings each, all above the piston pins. crank shafts are high carbon steel, a ample diameter and are finished by g ing.

THE GEARING.

The half time gears consist of a pinion applied to the crank shaft wi bronze pinion on the cam shaft. A c in bevel gear at the cam shaft front outside the crank box, drives a ver shaft carrying the commutator on its end and driving the two pinion oil pump at its lower end. The cam mitre gear meshes with four pinions, ing two horizontal and two vertical drives; one of the horizontal shafts d the rotary water circulating pum slotted eccentric disk with 3 radially ing pistons. The other horizontal s on the cam shaft side, may take the mutator if desired.

THE WATER COOLING.

This rotary pump displaces a large ume of water per revolution, and a the water jackets are unusually long. cylinders and entire water jackets ar tegral castings, which ensure perman water-tight construction by avoidin water-jacket packing.

EXHAUST COOLING.

The Brownell dual cylinder units the two intake valves in the middle, the two exhaust valves outside of t This gives water jacketed exhaust sages long enough to be effective in ing the exhaust before it reaches th terior exhaust piping. The rapid circulation and ample water jacket make this exhaust cooling in the cyl head jacket practicable.

THE CARBURETOR.

This is a new design for multiple der motors, a single float regulatin gasoline level for two stand-pipes o diameter and form throats, with a rate automatic auxiliary air intake each stand-pipe, for 4-cylinder motors three stand-pipes, same adjuncts for for 6-cylinder motors. This gives a tually independent carburetor for pair of cylinders employed, a carbu arrangement before tried and disc

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ts own individual adjustment in its threaded sleeve, so that the fuel supcan be independently regulated for pair of cylinders at first, and this ate adjustment can be retained. , by moving all the externally ded needle valve carrying sleeves to-

num casting gear cases, unless otherwise ordered. The sliding gears, all Brownell designs, are made by the Brownell factory.

THE MARINE REVERSE.

This reversing clutch consists of an internal expanding bronze ring in a slightly

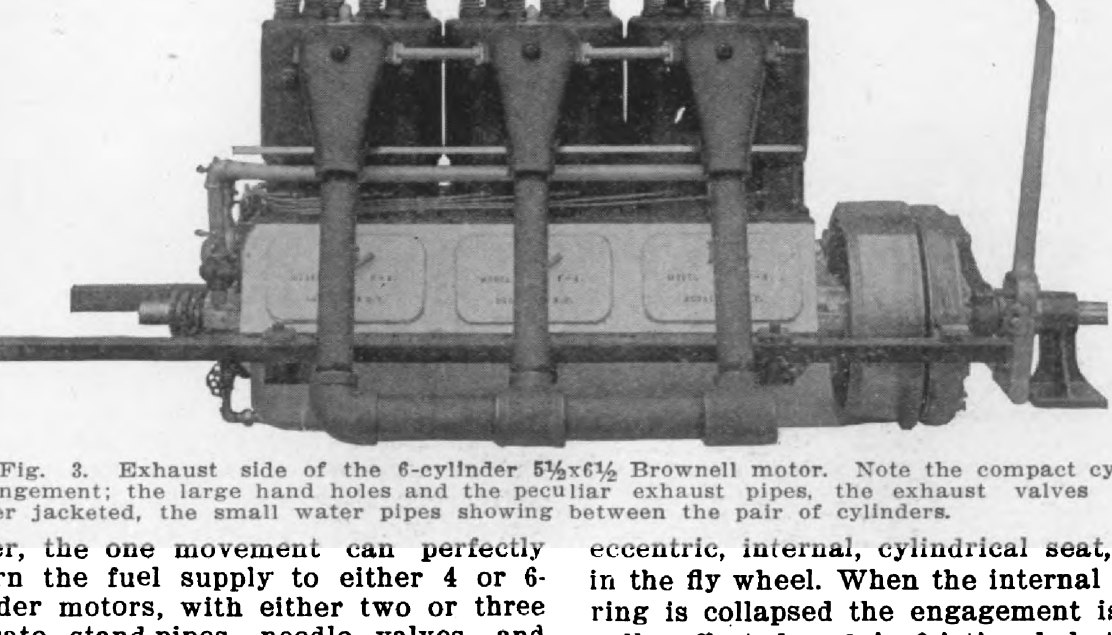

Fig. 3. Exhaust side of the 6-cylinder 5½x6½ Brownell motor. Note the compact cylinder ngement; the large hand holes and the peculiar exhaust pipes, the exhaust valves being r jacketed, the small water pipes showing between the pair of cylinders.

r, the one movement can perfectly rn the fuel supply to either 4 or 6-der motors, with either two or three ate stand-pipes, needle valves and iary air intake valves, all as perfect-if only a single stand-pipe and needle were used.

e motors are fitted with either cone ultiple disk clutches, or special types utches to purchasers' own drawings

eccentric, internal, cylindrical seat, bored in the fly wheel. When the internal bronze ring is collapsed the engagement is gradually effected and is frictional, but when the bronze ring is fully expanded it must be sheared by the fly-wheel before the clutch can let go, thus obtaining all the advantages of both the friction and solid jaw clutch.

The Dietz "Sentinel" Tail Lamp

e Dietz Sentinel tail lamp is a late ion to the Dietz line of lamps, manured by the R. E. Dietz Co., 60 Laight t, New York City, and is made for use

volt electric bulb, as ordered; 2½-inch reflectors, 3-inch white and ruby lenses, and a combination socket. The price of this lamp is $3.25, for acetylene type, and $3.75 with electric attachment.

Michigan Auto Company to Build Only Special Automobile Parts

It is probably not universally known in the trade that the Michigan Automobile Co., of Kalamazoo, Mich., has given up the manufacture of complete automobiles, believing it to be more to its advantage to specialize on the manufacture of parts. To this end it has been for the last two years or so shaping its business toward doing special work, and is now prepared to make, from special designs or samples to be furnished, any style of gas engine from one to six cylinder, and any type of

Conn., U. S. A., was established in 1853, and began a general foundry and machine business which developed two specialties, mining machinery and steam fire engines. The business was incorporated in 1903, $200,000 capital stock, a close corporation, with William E. Burnham, formerly of the long-established hardware firm of Eaton, Cole & Burnham, as president. The Pacific Iron Works took up the gas engine car motor in 1907, and is now offering a wide range of 4 and 6-cylinder motors, both air and water-cooled.

The smallest, lightest and lowest cost Pacific motor has four cylinders, air-cooled, rated at 26 H. P. The cylinders are 4¼x4½ inches, with rods 10 inches center to center, with crank shaft wrists

motion is vertical lifting rods, scre
justed for length, to long and short
overhead. The beam connections all
tapered pin, hardened joints, adjustab
wear. The cam shaft gear, interme
and crank shaft pinion are all hard
run in oil, and make no noise.

LUBRICATION.

Two distinct oiling systems are op
with any of these Pacific motors, on
tem a force feed to each cylinder, th
supplying the crank pits, no ov
stand-pipes and no return. The oth
ing system is a separate oil pit and
pipe for each cylinder, all overflow
oil well, which is sucked by a force
delivering oil thru unobstructed lea
each crank shaft journal, the drip

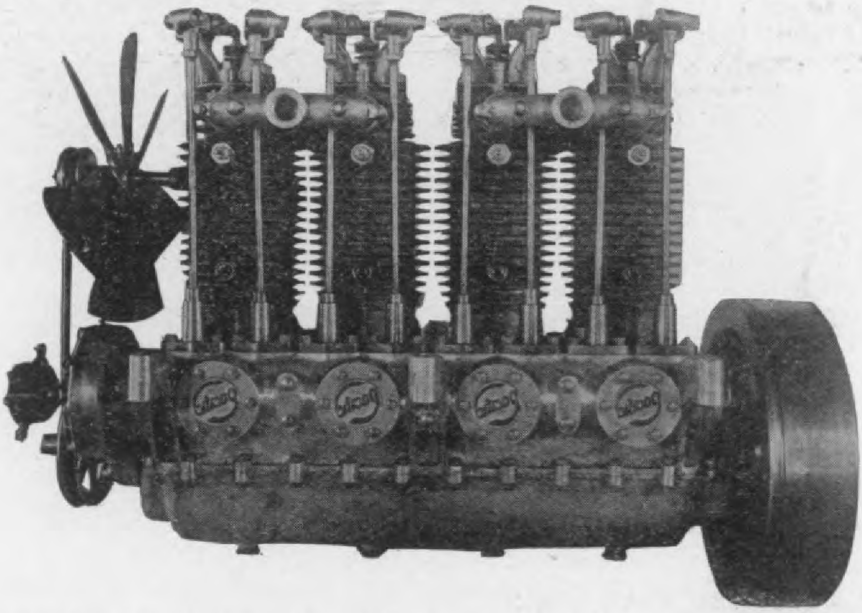

Fig. 1. Pacific Iron Works 1908 air-cooled motor, four, single-unit, vertical, 4-cycle cylin
The motor-base and oil-basin are aluminum alloy castings, joined in the crank-shaft axis horiz
plane. The connecting rods are unusually long, nearly 2½ piston strokes center to center.
valves are caged in the cylinder heads, valve stems vertical. The valve action is push-rod
overhead, long and short beams. See Fig 2. The cylinders are 4¼x4½ inches, and this mot
rated at 26 H. P., 1000 R. P. M.

and journals all 1⅝ inches diameter, and a 45 pound fly-wheel 16 inches diameter. The compression of this 44-cycle motor is 550 pounds. The valves are all caged, all alike, steel drop forgings, heads and stems integral, ports all 1½ inches diameter, valves 45 degrees angle faces. Each valve cage is retained by two screws, and either cage and valve may be removed in assembly. The valves are vertical, in the cylinder head, and the valve action is a single cam shaft located in the crank box, cams supplied to cam shaft and retained with one taper pin in each. The cam shaft is driven from the crank shaft thru an intermediate gear, to reduce the gear diameters, and the whole cam shaft may

to the crank pits and oil well again.
two lubrication systems require di
oil basins, which are supplied as
by the purchaser. The Pacific eng
prefer the overflow and pump oilin
tem, tho the force feed, with no
works well and is preferred by man
ers.

The timer is carried on the forwa
of the cam shaft, or thru miter ge
two other positions, one of which
the timer at the top end of a v
shaft.

The cooling ribs are circumfer
with one 6-vane fan belt-driven, in

The crank box and oil pan are alu
alloy castings. The crank shaft ha

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rson's bronze or steel drop forged rod es are supplied as desired. The rod ends are uncut and bronze bushed. rod caps are each held with one bolt side, with two nuts, one castelated a split pin. The wrist boxes are Par- white bronze, finished all over, split closed on 2, 5 and 10 thousandths liners, same as the crank shaft s.

PISTONS.

e Pacific pistons are all same general truction, four eccentric snap rings, lap, all above the pins. The piston are cylindrical, hollow, hardened and nd, retained with tilt screws which

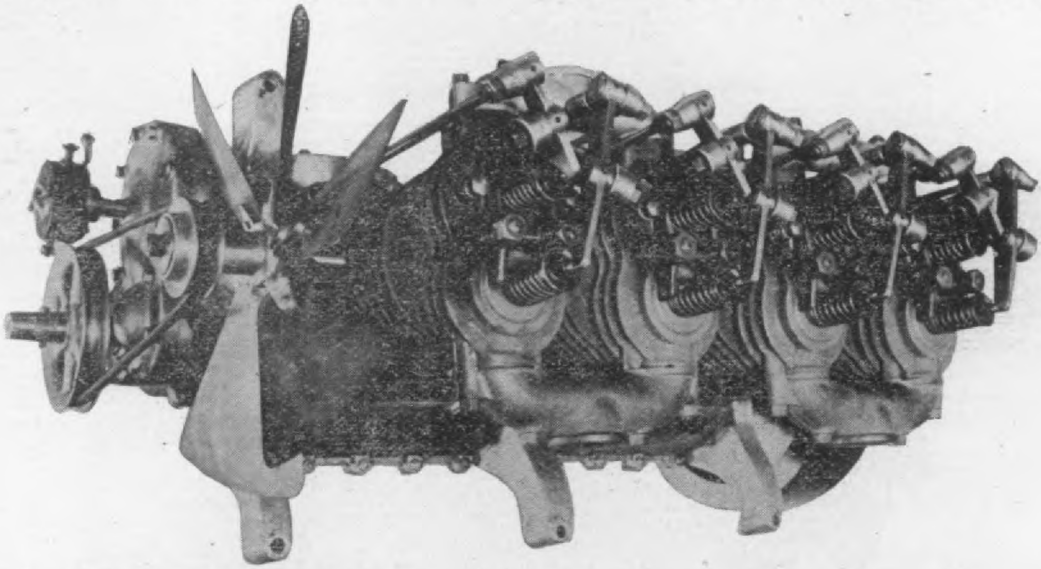

Fig. 2. Pacific Iron Works 1908 air-cooled motor, oblique view from above, showing the ar disposition of the long and short, valve-actuating, over-head beams. All the valve lever rod joints are taper pins or studs in taper seats, with screw adjustment to take up lost ion.

retained with 3-16 diameter split pins the screw heads, the pins being long gh to keep the screws from slacking The pistons are 3 cylinders in form, head above the rings is 5 thousandths l, then three thousandths small to bottom of the rings, and finally 1 sandth small to the piston bottom

e total weight of this 26 H. P., air- ed motor, is 390 pounds, including pip- carburetor and fly-wheel.

e small water-cooled motor is 4 cyl- rs, same bore and stroke and general r construction as the air-cooled de- ed. The water circulation is by a ro- pump, eccentric, with one sliding pis- This small water-cooled motor has ounds compression, and is rated at 28 P., 1000 R. P. M., standard Pacific e test velocity. The weight is 390 ds; price on application; same price

liner assembly. All crank box bolts g clear thru the motor base, bolt heads o top of base, between the cylinders, cas telated check nuts and split pins below.

The Pacific larger sizes of motors, ger eral construction as here indicated, ar as follows: Four cylinders, water-cooled 5x6 inches, 40 H. P., weight 520 pound everything on, including the cone clutch Six cylinders, 4¼x4½ inches, water-cooled 40 H. P., weight about 550 pounds, wit cone clutch. Six cylinders, 5x6 inches water-cooled, 60 H. P., weight, without th clutch, 600 pounds.

It is the intention of the Pacific Com pany to produce a line of well built ca motors at as low a price as good design material and workmanship will permit, i large numbers, to meet the requirement of motor car manufacturers.

The cylinders are bored and reame cold, and then finished by grinding whil heated by gas burners to working tem perature.

The pistons, piston rings, crank shaft and valve action parts are finished b grinding, and nothing is spared in pro ducing these Pacific motors in form t stand up under hard work and satisfy pur chasers.

The Pacific Iron Works has its ow foundry and chemist, and analyzes every heat, keeping its cylinders to very nearl a constant mixture, running one cupol on cylinders only.

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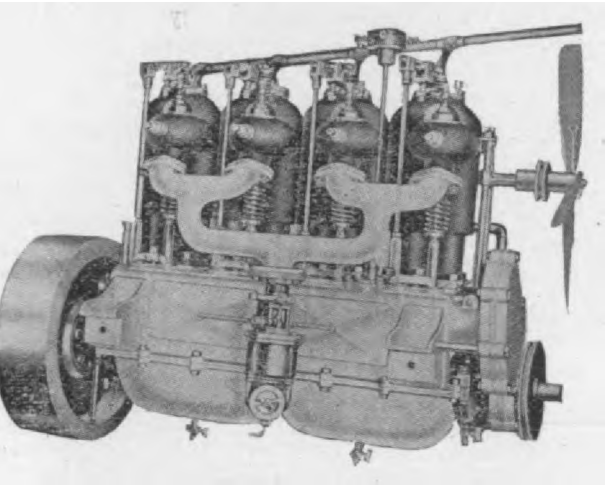
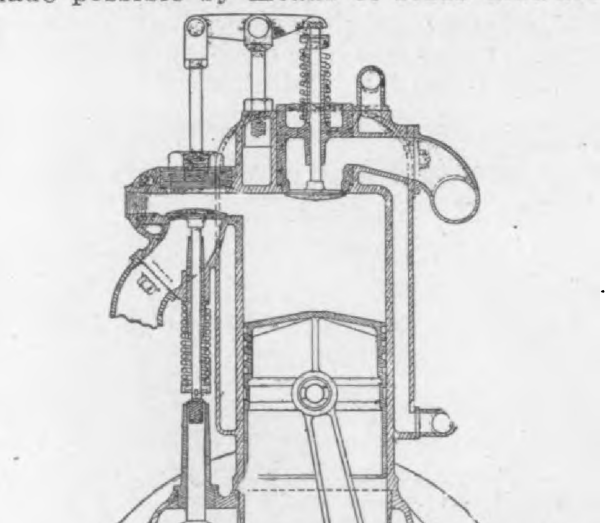
In our November number, page 184, i

75 pounds, and 4¼x5, 35 H. P., weight 00 pounds.



The "Model" 4-cylinder automobile motor; take side.

One of the most important features of hese motors is the method by which eight has been reduced. This has been nade possible by means of studs that are

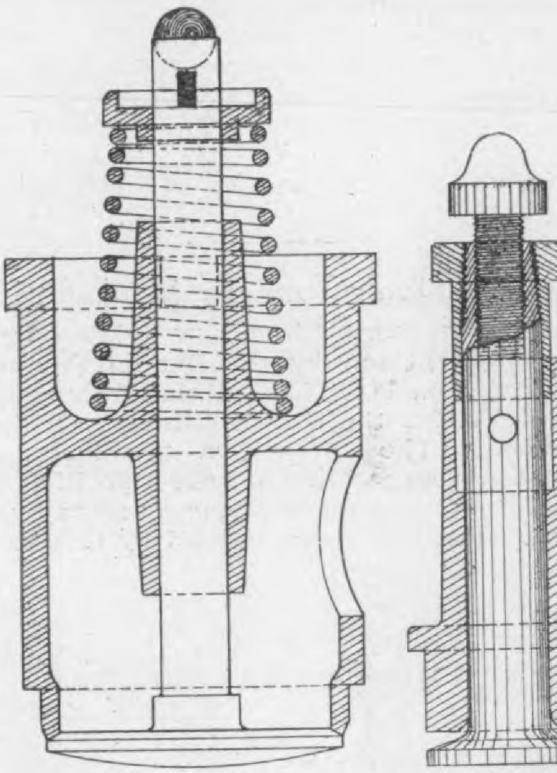


Transverse sectional view of the Model Auto-nobile Motor.

nade to hold both cylinders and the bear-ng caps to the frame, the bottom part of the studs being provided with collars,

necessary weight without sacrifi strength or decreasing diameter or len of bearings.

The engine is of the separate cast inder type, with five main bearings, end ones of which are provided with oilers. The diameter of the shaft crank pins is 1¾ inches, and all beari are made of ample length to insure l life and tight bearings. The cylind are made of the best grade of close g cast iron. The crank shaft, cams, v



Details of the "Model" motor; cut on the shows a sectional view of the valve cage, s ing steel ball contact; the other cut shows a tional view of the valve lifter, guide and ad ment for receiving valve.

lifters, valve stems, cylinders, piston ri piston pins and pistons are all ground latter being annealed after turning before grinding. By this method the ufacturers claim to get a 3-1000 cl working fit than is possible where the ton is not annealed before grinding. exhaust valve stem is turned and l ened to receive a steel ball. This red the contact and eliminates noise, and prevents side wear on the exhaust v guide.

Lubrication is by the splash system also force feed to main parts. The c shaft is turned with a collar, which into a groove of the case, preventin

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tment. The exhaust manifold gradu-
y increases in size from 1½ to 3 in-
es. All bearings, both connecting rod
d journal bearings, are of nickel metal
de in steel moulds under a 150 pound
pressure. The piston pin is held in
ce with a steel snap ring, thus guard-
against any possibility of the piston
working out and cutting the cylin-
r. The pistons are also turned on the
ide in order to guarantee pistons
ighing the same in every case for a per-
ct balance. The manufacturers guar-
tee not only the bearings but every part
the engine, including pistons, piston
gs and cylinders to be absolutely inter-
angeable. In other words, any piston
ll work as well in one cylinder as in
other; the cylinders may be changed
m one place to another without filing
fitting.

yton Folding Tonneau for Cadillacs

We show herewith a new folding ton-
au brought out by the Dayton Folding
nneau Co., 1143 North Main street, Day-
, Ohio, for the Cadillac single cylinder
nabout. The cut shows the body in
en position, while in folded position it
esents the same neat appearance as seen
other models manufactured by this con-
rn.

The Dayton Folding Tonneau Body for the Cadillac Single Cylinder Runabout, shown i
pen position.

This body fits the chassis without any
eration whatever, and all fastenings are
nished with it, so that there is no ex-
expense. The tonneau latches tightly
en closed, so that there can be no clat-
when going over rough roads, but it
be easily opened in a few seconds to
at the engine or to provide extra seats.
e body is painted and upholstered to
tch the chassis. The leather used is
the highest grade, and extra care is
en with the painting. At first these

intosh & Co., of Grinnell, Iowa. Instead
of a plain clasp or a plain buckle a
strap at the wrist, they now use a co
bination of buckle and clasp which p
mits the user to draw up the glove snu
about the wrist and then to snap the cla
The strap will remain as adjusted a
thus every user of these gloves can adj
the fit of the wrist exactly and make th
"rist fit" more truly than heretofore. T
new fastening device includes a long str
fastened at one end to the glove and
shorter strap formed into a loop a
having both ends sewn down to the glo
together. The looped strap carries
square link thru which the free end of t
long strap passes. The long strap pass
back and forth thru another square li
and carries at a point near its attach
end a snap button and also a clasp
admit this snap button, the clasp be
movable along the strap by a meth
similar to fastening and unfastening
buckle. When the clasp is once adjust
to suit the wrist of the user, no furth
adjustment is necessary, but the glo
can at any time thereafter be instan
snapt snugly around the wrist.

The 20th Century Chamois Rubs

The Twentieth Century Mfg. Co.,
Warren street, New York City, has rece

ly placed on the market what it terms t
Twentieth Century Chamois Rub, made
from the clippings of the best oil tann
chamois, every piece of which is warrant
washable and not to get hard or crack
water. It is made specially for use
motor boats for polishing hard wo
cabins, glass and polished brass par
and in fact takes the place of the regul
chamois skin with the advantage that
costs much less than the latter arti

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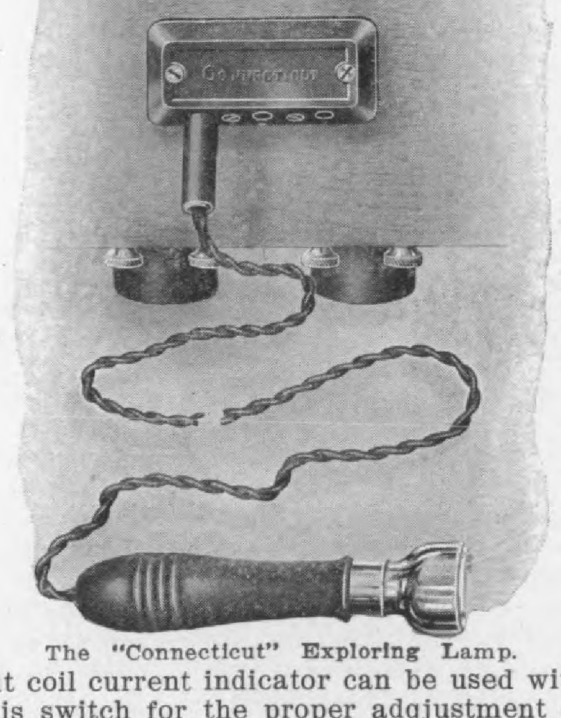
gnition specialties in the shape of a new
witch and an electrical exploring lamp.
The switch is designed for use with a
ouble ignition system when a vibrator
oil and battery are used as one system,

The "Connecticut" Magneto Switch.

nd a high tension magneto as the other.
t is so arranged that with the running
lug removed from the top of the switch
t is impossible to start the engine,
s the battery circuit is opened and
he magneto circuit closed. The Connecti-



The "Connecticut" Exploring Lamp.

ut coil current indicator can be used with
his switch for the proper adjustment of

circuit will be furnished. The price
the switch is $2.50. The Connecticut
ploring Lamp can be operated by sim
placing the plug attached to the cord
the receptacle of the type "P" Plug Sw
attached to any Connecticut Coil, and t
advancing or retarding the spark lever
that the timer is in contact. The la
will then glow. This will allow the
rent for operating the lamp to pass t
the coil, but on account of the high
sistance of the lamp, the coil does
vibrate, and absolutely no harm can
done to the coil while the current is p
ing thru it. It can also be used with
the plug, it being then used by simply
necting the wires direct to the spark
battery. The lamp is put up in a
leather case with snap lock, so that it
be thrown into the tool box without do
any damage to the lamp. The price c
plete with plug is $3.50; without p
$3.00. The price includes leather cas

"Sta-Rite" Spark Plug Protecto

The R. E. Hardy Co., 86 Watts str
New York City, well known manufact
of the Sta-Rite Spark Plugs has adde
its line the Sta-Rite spark plug prote
here shown.

The "Sta-Rite" Spark Plug Protector

This protector is spun out of br
and will fit any spark plug that has
thumb nut on the top of the bolt, as
protector has a hole thru the center c
so that it will fit right over the bolt,
the wire goes on top of the protector
the thumb nut on top of the wire. T
the plug is thoroly protected from wa
flying mud, etc.

Owing to the large proportions assu
by the spark coil and plug departmen
the Fischer Special Manufacturing Co

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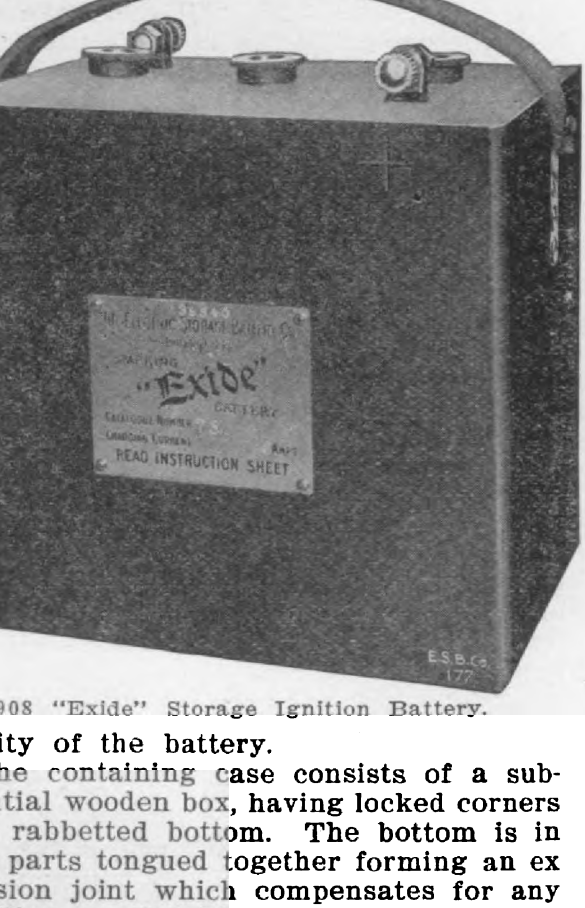
known to the trade, is of the storage e, and the manufacturer, Electric rage Battery Co., Nineteenth street and gheny avenue, Philadelphia, has given eful attention to designing constructive ures that would add to the service-



908 "Exide" Storage Ignition Battery.

ity of the battery.

he containing case consists of a sub-tial wooden box, having locked corners rabbetted bottom. The bottom is in parts tongued together forming an ex sion joint which compensates for any lling, or shrinking of the wood caused moisture. Before the cells are assem- in this case it is given two coats of acid-resisting paint, and a third coat he same paint is given the completed ery.

he jars in which the elements are as-bled are composed of hard rubber, and set into the box with sufficient clear-e to allow for a special compound to oured between them and the case, al-ng no space for acid to creep down in- and destroy the wooden case. This pound also materially strengthens the and in case of a cracked jar reduces liability of leakage.

he elements used are the Standard ide" plates, assembled with specially ted wood diaphragm separators.

he connectors between cells consist of ubstantial pillar strap, of a tough, tic and thoroly acid-resisting metal,

model has been superseded on the 19 model, by a handle composed of rubbe webbing, which has proved to be mo durable.

The "Add-Wear" Steel Belt

The Add-Wear steel belt is adapte specially for fans or oil pumps. It manufactured by the Adwear Auto Ti Sleeve Co., North Attleboro, Mass. It ca be instantly put on or removed. On a

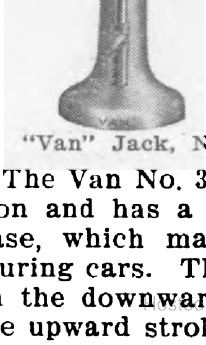
The "Add-Wear" Steel Belt.

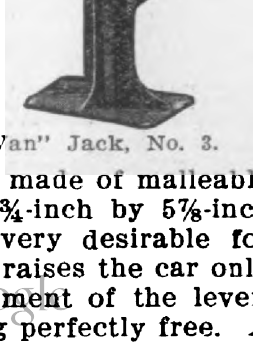
count of its peculiar construction it has tendency while in use to cling firm against the pulley and yet may be instan ly removed. The couplings are guarantee against breakage. The list price of th belt is $1.50.

New 1908 "Van" Jacks

Two of the latest types of automobil jacks offered by the Vanderpool Bros Springfield, Ohio, are their models No 1 and 3, here shown.

The Van No. 1, is made of malleabl iron and its raising screw is cut from ¾ inch round cold rolled steel. A pocket cast inside of the stand to hold the turnin lever which is made of cold rolled stee This model weighs 4¼ pounds and wi raise any car with 28 to 34-inch wheel It lists at $1.75.

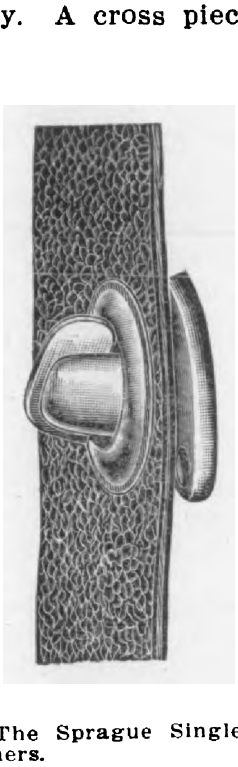


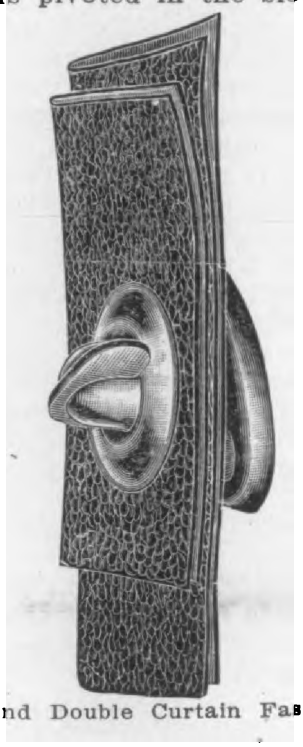


"Van" Jack, No. 1. "Van" Jack, No. 3.

The Van No. 3 is also made of malleabl iron and has a large 3¾-inch by 5⅞-inc base, which makes it very desirable fo touring cars. The jack raises the car onl on the downward movement of the leve the upward stroke being perfectly free.

ne of the principal merits of this type f fastener is its simplicity, and that it is ire to work. Another advantage is the act that it can be worked with a gloved and, or even if the hand is covered with mitten, so that it is not necessary for he car user to remove his gloves or mitens and get his hands cold on a wintry ay. A cross piece is pivoted in the slot





The Sprague Single and Double Curtain Fasners.

the end of the main portion of the fasener, and this cross piece can be swung a position in a line with the main part the fastener, so that the grommet will ide over the whole thing, and the cross iece is then swung into a position perendicular to the main part of the fasten-, and in this position prevents the curin from becoming loose, as shown in the lustration. To unfasten the curtain it is nly necessary to push back the grommet nd reverse this operation.

Trade Printed Matter

The Imperial Brass Manufacturing Co., 241-9 South Jefferson street, Chicago, have issued r 1908 a much more elaborate catalog than ny heretofore sent out by them. It contains pages in a rich purple and orange cover. A erusal of the book shows that many additions ave been made to the Imperial line for 1908.

Charles H. Besly & Co., 15-21 South Clinton reet, Chicago, are distributing an attractive lite booklet on their "Helmet" oils for motor r and other uses. Its pages are livened up the use of small illustrations of out-door enes having special reference to the particular urpose to which the various lubricants are put.

Two booklets have just been issued by Zoar attery Co., of Zoar, O., one a catalog of prices, ecifications, etc., of the various types of Zoar

and the decorative illustrations, and the general tone of the book is one of ext elegance and refinement. Four distinct ch are described on each of which various typ bodies are fitted, making in all a line o models.

The 1908 catalog of A. N. Parry & Co Amesbury, Mass., shows that they have larged their line of automobile specialtie quite an extent. The catalog, which con 80 pages and cover, is devoted to both car and automobile fittings, such as canopy standards, bow separators, curtain fasteners terior lights, hardware, and similar goods

Standard Welding Co., Cleveland, O., ha sued a little booklet illustrating several of many types of seamless steel rims which it ufactures. This company has made over 20 ferent styles, but owing to certain trade c tions has not been permitted to catalog majority of them. The booklet just is shows that the Standard Company has the ity and proper equipment to produce all and shapes of rims for all kinds of ve wheels.

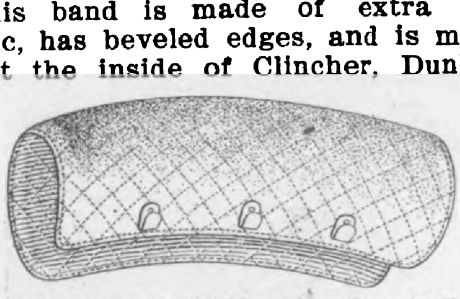
A treatise on carburetion and the 2-motor has been published in pamphlet forn E W. Stevens, M. E., East New Market, designer of the Stevens carburetor. It is a cital of the author's experience and the de tions therefrom in perfecting the Stevens buretor and making it suitable for use in co tion with two-cycle motors. A sectional half-tone and a line cut are used to illus the explanatory matter.

"As they Come to Us," is the title of a lately issued by Woods Motor Vehicle Co Chicago, Ill., and containing a number of monials selected at random from the many ceived from pleased users of Woods electric gasoline cars. The letters are reproduced in act fac simile, and they indicate that W cars have been giving perfect satisfaction many years.

"Mesinger" Inside Tire Repair Ba

The H. & F. Mesinger Manufactu Co., 1801-1807 First avenue, New Y City, well-known manufacturers of shoe repair bands, saddles, etc., have cently added to their line the new in tire repair band, here shown.

This band is made of extra str fabric, has beveled edges, and is mou to fit the inside of Clincher, Dunlop



The "Mesinger" Inside Tire Repair Ban

Fisk tires. The hooks can be bent to the different styles of casings to prev creeping. This band is made exactly the same principle as the inside of a ular tire, and will repair blow-outs, cuts and other defects of the casing. sizes and prices are as follows: 3 and inches, $2.00; 4 and 4½ inches, $2.50, 5 and 5½ inches, $3.00.

In the advertisement of E. S. Yo

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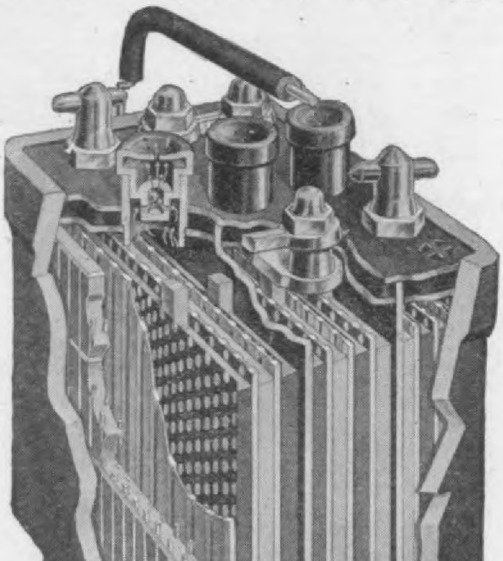
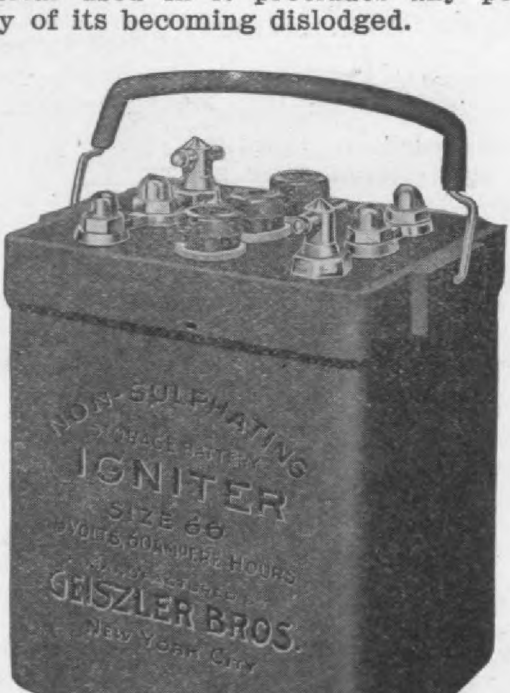


ctional View of the "Geiszler" Storage Igni- Battery, Size 66.

main claims of superiority made for it that it will positively not sulphate, and the chemical treatment of the active erial used in it precludes any possi- y of its becoming dislodged.



rior View Geiszler Storage Ignition Battery.

of perforated hard rubber and ribbe wood, which also precludes any possibi ity of short-circuiting by direct contac The sealing of the separate compartment is made, first by an inner hard rubbe cover; second, a thick layer of sealin compound, and third a master cover o hard rubber over all compartments, whic insures both acid and water-tight cor struction. The vents are so constructe as to allow the free escape of the gases and by means of the indirect openings ef fectively prevent both evaporation an spilling of the acid.

All the screws in the terminal bindin posts are heavily silver plated to preven corrosion. The nuts and cell connector are made of a special composition of an timonious lead, which is unaffected by aci and sufficiently hard to properly perforn its function. The handle is made of Ger man silver wire, and is covered with rub ber tubing. It is sprung into place i cavities drilled into the sides of the carry ing case, and may be readily removed i occasion requires.

Size 66 is 5⅝ inches long, 7¼ inche wide, and 8 inches high, and weighs 2 pounds. It lists at $15.00. Other sizes ar made from 20 ampere hours, 6-volts, listin at $11.00 to 80 ampere hours, 6-volts, lis ing at $22.00.

"Non-Freeze" Radiator Solution

"Non-Freeze," for automobile radiator is manufactured by the Pierson Moto Supply Co., 43 Cortlandt street, New Yor City. It is said that it will not freeze a 20° below zero, and will not evaporat It is sold in powder form in 10-poun cans, this quantity being dissolved in 1 quarts of warm water. The can lists a $2.00.

The New Departure Mfg. Co., of Bristo Conn., demonstrated the efficiency an strength of New Departure Two in On annular ball bearings at the shows by run ning 1000 pounds wheels on both radia and end thrust types of these bearing One wheel was placed horizontally for de monstration of the end thrust type, an the other vertically to show the efficienc of the radial type.

The Warner Instrument Co., of Beloi Wis., has moved into its new factory i that city. The buildings are of reinforce concrete construction. The main buildin is 100x200 feet in dimension with the roo

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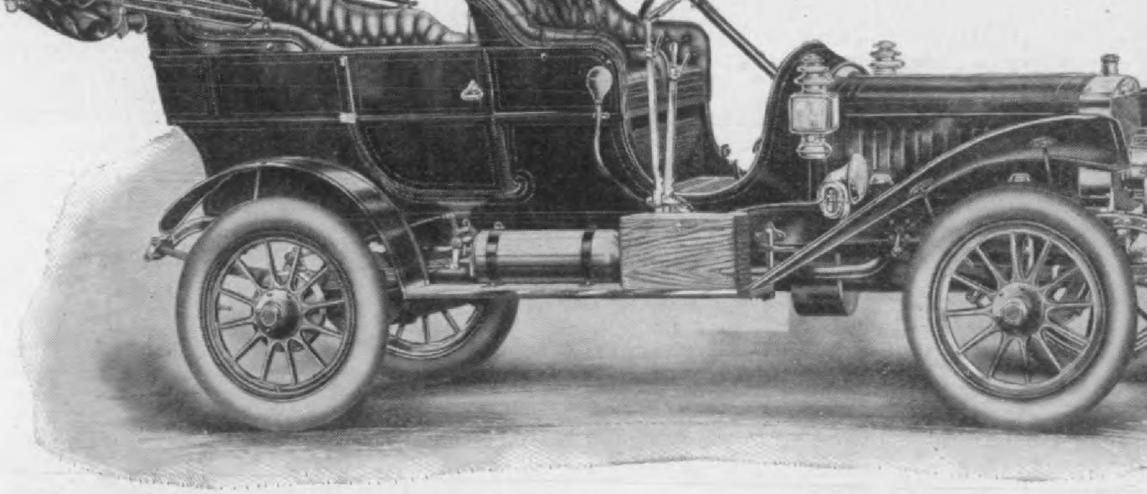

THE $2000

THE STANDARD OF AMERICAN AUTOMOBILE VALUE

Mitchell

Perhaps you've noticed that most cars cost more than the Mitchell.
Did you ever notice that they were any better in finish or in material—or any better in **performance**—on the road?
Ride in a $2000 Mitchell and **see.**
Have any Mitchell agent "show you" a Mitchell.

Look it over—go out into the country and test it on the toughest hill you know of—through some particularly bad stretch of sandy or muddy road. Notice your power—notice speed—notice the sweet running motor—the tranquil action of all moving parts—ease of control—notice general efficiency, Mr. Prospective Owner.

Then if you can see how you'll get two or three thousand dollars more automobile value out of any other car—**buy** the other car, we won't say a word.

But you won't **find** more value in any other car.

Present day automobile value is **standardized in** the **Mitchell** at **$2000.**

A demonstration will prove this to **you.**

You are under no **obligation** to buy when you ask for a demonstration.

If you are considering the purchase of a car we want you to **know** the Mitchell, and we want **to show** you what you get in a Mitchell at $2000 and that you can't get any **more** in **any other** car, **regardless** of the price.

Call up the Mitchell agent.

The Right Price for the Right Car

$2000

WRITE US FOR CATALOGUE No. 18

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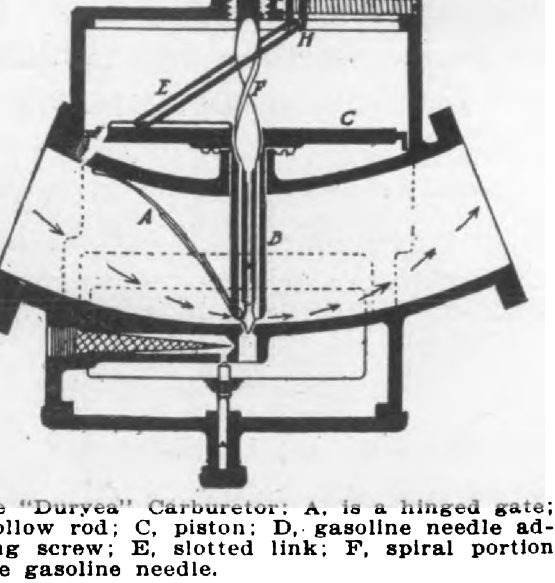
MITCHELL MOTOR CAR CO.

c, float feed type with the gasoline located in the center of the car-tor.

he accompanying cut illustrates the cipal of operation employed in this uretor. In the full sized air passage gate A hinged to the hollow rod B of piston C. The suction of the engine the piston C and opens the gate A, eby varying the air supply as needed. ve the piston or diaphram C is a radius E, thru which the spiral portion of gasoline needle F passes. As the pis-C rises this link E turns the spiral F s threads in D and adjusts the gaso-in proportion to the air then passing. action of the radial link E can be



e "Duryea" Carburetor: A, is a hinged gate; ollow rod; C, piston; D, gasoline needle ad-g screw; E, slotted link; F, spiral portion e gasoline needle.

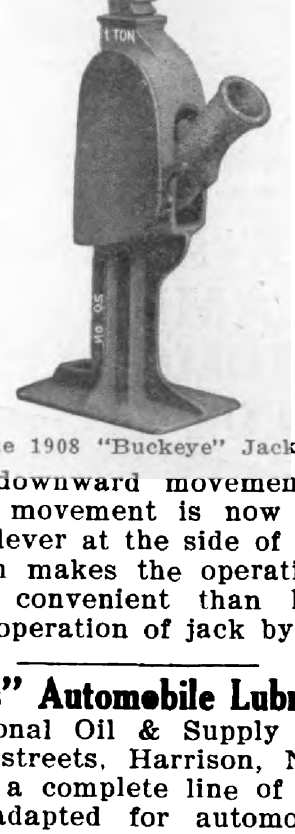
sted and made exactly right by ad-ng the position of the pivoted end of arried by the holder H so that the ing point of E makes either a long arc much needle movement or a short with little needle movement as the n C rises. The original adjustment starting is secured by turning B till ect mixture, slowest speeds and easiest s are obtained. The forward end of carburetor is provided with a gage en to exclude dirt, and at the oppo-end the throttle (not shown) is fitted. account of the carburetor depending suction for its automatic operation,

the carburetor is $75.

The Latest "Buckeye" Jack

The Buckeye Jack Manufacturing Co Louisville, O., has recently placed on th market a new model of the Buckeye au tomobile jack, shown herewith.

The main improvement made in th new model is the elimination of the eccen tric on the side which controls the up



The 1908 "Buckeye" Jack.

ward and downward movement of th jack. This movement is now controlle by a small lever at the side of the socke lever, which makes the operation of th jack more convenient than heretofore and allows operation of jack by the foot.

"Viscos" Automobile Lubricants

The National Oil & Supply Co., Firs and Essex streets, Harrison, N. J., ar putting out a complete line of lubricant especially adapted for automobiles an hydrocarbon engines.

For all places where grease can be use this concern offers its Viscos grease whic is made in three consistencies, ligh medium and heavy. It is put up in barrels half barrels, 100 pound kegs, 50, 25, 10 an 1 pound cans. They also manufacture graphite grease which is put up in th same size packages as the Viscos grease For transmission gears this concern i putting up a Transmission Gear Compoun which is sold in the same size package as their other greases.

Viscos oil is especially adapted for cyl inder lubrication. It is made in five grades Extra light, light, medium, heavy and ex tra heavy, and is guaranteed not to car bonize. It is put up in barrels, half bar rels, 10, 5, and 1 gallons cans.

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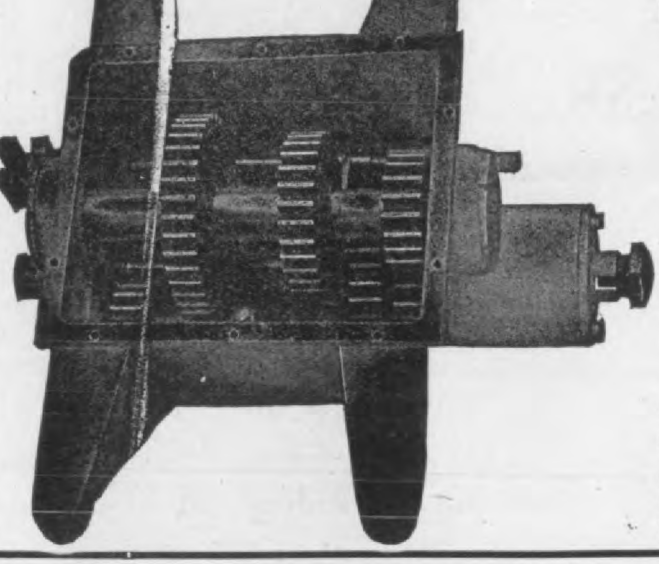


LIGHT OR HEAVY.

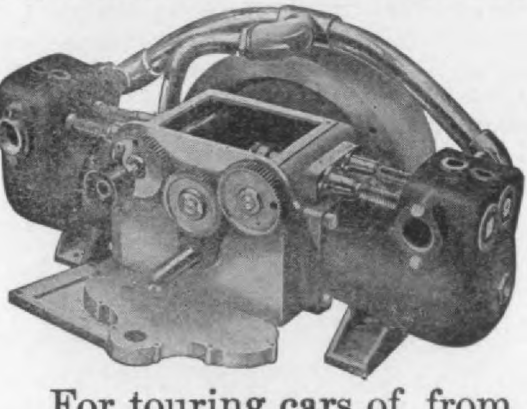
SELECTIVE TYPE, plain or ball bearing made in sizes as follows:

No. 3 for cars up to 2,000 lbs. Shaft Drive.
No. 3½ for any size motor up to and including cylinder 5x5.
No. 4 shaft drive and double chain drive, built for largest types of pleasure and commercial cars and trucks.
PLANETARY GEARS. Made in two sizes: No. 3, for up to 1850 lbs. No. 4, for the heaviest types of pleasure commercial cars. Let us quote you prices.

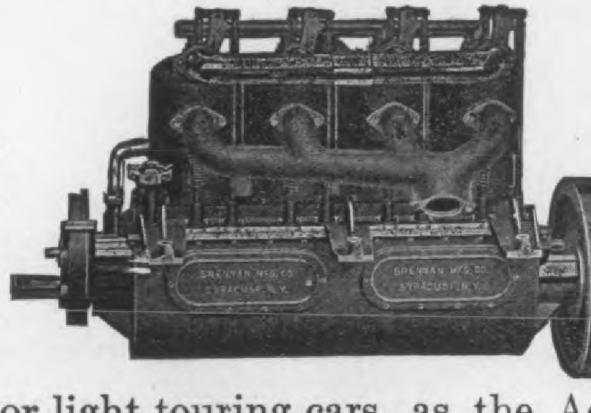
SYRACUSE GEAR CO., - Syracuse, N.

BRENNAN STANDARD
Motors and Transmission

vill solve the power problem for you. We have models to suit equirements of the automobile builder.



Our horizontal ball-bearing mo two cylinder, 5½x5, 20-24 H. P. is pecially adapted for shaft drive or ch drive. The two cylinder 5x5 engin an ideal equipment for runabouts.



For touring cars of from five o seven passengers, the standard ype is our four cylinder, 5x5, 40 H. P. motor. This is a triumph n motor building, being powerul, silent-running and reliable.

For high-powered runabouts or light touring cars, as the A ar, Pope Hartford, Etc., our four cylinder, $4\frac{9}{16}$ in. bore x 4 troke is unsurpassed.

Ve furnish Motors and Transmission Gears complete on steel frame or pres teel frame. Four and six-cylinder chasses, from 28 to 80 H. P. built to or

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. Murray Automobiles & Bicycles, Bloomington, Ill.

L. Murray, 215 Main street, Blooming-Ill., agent for the Cadillac cars in that tory believes that individual efforts responsible for the majority of sales e. No special advertising or stunts resorted to, but prospective customers aught by demonstration the operation e car and all the details of construc- are fully explained. A regularly ot garage with light lathe grinders and ng apparatus, etc., for repair work is ated. Second hand cars are not traded nless in exceptionally good condition the company can figure on a fair profit oing so. Salesmen are employed on y and must be strictly honest in all ngs.

garding the question of the better- of the agents' condition, Mr. Murray s that a great deal of worry could be d the dealer if the factories would up their gigs and tools, so parts ed from time to time would require lutely no fitting. All parts should be to limit gages and thoroly inspected ee that they do not exceed the per- ble variation.

Keep in Touch with Customers

e Smith Auto Company, of 1420-22 t Place, Denver, Colo., with Arda k, president and manager, is repre- ng the Great Smith roadster and ng car. Daily newspapers, theatrical rams, making record runs, getting paper notoriety, making the cars lar and showing the people what the vill do are the methods of advertising oyed. The company states that most s customers come from individual ef- altho advertising helps a great deal. sales have been made the company s up a friendly correspondence with customer to cultivate his acquaintance, watches his car and keeps it in ad- nent believing that it will keep the haser in a better frame of mind to mmend the local firm as well as the them after business hours at which time their minds are free from business cares The company thinks that it is the best time to interest a man in an automobile A well equipt garage and repair shop is operated, but very little trading in or second hand cars is done, as it is a poor business for dealers.

Cuts Out Joy Riding and Liquors

Fred S. Smith, of 38 Columbus avenue Boston, Mass., agent for the Autocar and Apperson cars in that city makes some terse statemnts in regard to his method of conducting business. Altho he does not conduct a garage he has a good shop equipt with a full line of machinery for taking care of repair work. Very little business is done in trading in second handed cars.

Mr. Smith states that his success in the automobile business is due mostly to individual efforts. It is his opinion that in order to better the trade conditions for the dealer, it is necessary for them to cut out Sunday and night work, joy riding and liquors.

Salesmen should be employed entirely on a salary, as it will save dispute and jealousies and all he believes will be more likely to work for the common good. Mr Smith's requirements for a salesman are honesty, politeness, sobriety and the devoting of business hours to business.

Grafting chauffeurs are cut out entirely

A Dealer's Unique Method

Julian F. Denison, of New Haven, Conn. local agent for the Atlas motor car has adopted a unique method, showing the comparative action of the four and two cycle engine. He has installed in the window a model showing a sectional view of the 2 and 4-cycle types of cylinders with spark plugs connected and the space where the explosions usually occur covered with a ground glass plate behind which incandescent lamps flash at the proper intervals, giving the appearance of an explosion in the cylinders. The model is run by an electric motor.

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vithout the model necessitated in many ases much time and repeated explanaions.

The Lemont Motor Car Co., Worcester, Mass.

Mr. B. A. Lemont, manager of The Lemont Motor Car Company, 6 Tirrel Street, Worcester, Mass., writes us that ltho the company acts as agent, its prinipal business for the past four years has een the renting of automobiles. With eadquarters in Worcester the company onducts a rental business at Ormond Beach, Florida, during the winter, January o April, and at Bretton Woods, N. H., uring the summer, July to October.

In the past, five makes of cars have been sed in the service, but in the future the Elmore cars will be used exclusively, the ompany now having the agency for this ar in Worcester Co., Mass., Volusia Co., Fla., and Britton Woods. N. H. The garage at Worcester is maintained all the ear round and at the season resorts the ompany sell and operated the large garages of the Hotel Ormond at Ormond Beach and Mt. Washington and Mt. Pleasant Hotels at Bretton Woods, N. H.

E. P. Moriarty & Co.'s Garage, Kansas City

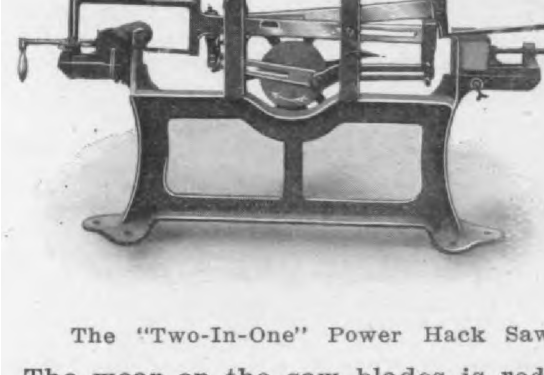
The E. P. Moriarty & Company, of Kansas City, Mo., under the management f E. P. & J. T. Moriarty, is conducting the agency for Packard, Stevens-Duryea & Woods Electric, at 1610 Grand avenue. The company does not do any storage busiess but has a well equipt repair shop where it repairs only the cars that it andles. The company's success in selling ars is attributed both to individual efforts nd newspaper advertising. The company nakes a specialty of frequently placing pecial want ads in the papers.

The card system of follow up is employed and after purchases have been nade the owners are supplied with written nstructions on all special points in care f cars, winter use, etc. Demonstrations nd visits are made by the salesmen who re employed on a salary only and who are equired to give every one a square deal. Grafting chauffeurs are an annoyance which the company has been fighting for he past two years.

Hotel Walton, December 3. Reports that the association is in a first class f cial condition. The membership has increased. Altho the show was held n earlier this year than ever before the s committee's report indicates that it a success and this year yielded la profits than ever before. The electio sulted as follows President, J. W. Wi of the firm Gawthrop & Wister, El Agents; vice-president, George H. Sn White steamer agent; secretary and surer, L. D. Berger, of the Motor Sho

The "Two-in-One" Power Opera Hack Saw

Buffalo Specialty Manufacturing Buffalo, N. Y., recently placed on market a new power operated hack called the "Two-In-One." This hack has been designed to perform the wor two ordinary single blade outfits, b provided with two blades, one at end; but as both are driven from one and operated by one set of moving p space and installation cost are econom and other advantages obtained not curable were it necessary to install single machines. The saws can be ated separately or simultaneously.



The "Two-In-One" Power Hack Saw

The wear on the saw blades is red to a minimum, as the pressure on san only applied while they are making cutting strokes; while on the re stroke when no work is being perfo the blades run free of pressure. I therefore claimed that the life of blade is doubled.

When the saw has cut thru the being sawed an automatic shut-off de instantly stops the saw and prevents necessary wear.

The vises for holding material t sawed are fitted with swivel jaws, w adjust themselves to hold pieces of

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Retail Notes

Aubel & Wood, Akron, O., are erecting a new brick and concrete garage on East Buchtel avenue, near Main street.

B. & H. Motor Car Company has recently opened a garage 147-151 W. Forty-ninth street, New York City.

Botterill, Tom, of Salt Lake City, Utah, agent for the Babcock electric car, has been given the agency for the Babcock car in Denver, Col.

Battle, Edwin A., has opened a new garage and repair shop at Third and Scott streets, Little Rock, Ark.

Brock Automobile Garage, on Canal street, north of East State street, Trenton, N. J., has recently opened for business.

Corn Belt Auto Company, Waterloo, Ia., will move into its new quarters on East Fifth street, where it will conduct an up-to-date garage and repair shop.

Electrical Garage Company, 128 Columbia St., Utica, N. Y., incorporated early in September, has removed to 7 Court street, where it has more commodious quarters. This company makes a specialty of the storing, charging and repairing of electric carriages only.

Felker's, W. B., garage business in Denver, Col., is being continued by Delia W. Felker. Mr. Felker was killed in a racing accident on Labor Day.

Flynn, Walter, has disposed of his Wick avenue garage at Youngstown, O., to Kleese & Wick.

Hosterman, A., South Bend, has moved his garage and repair shop from 309 North Main street to 205 North Main street.

Joo, Raymond S., has closed his garage at 79 Orange street, Newark, N. J., and become identified with the Roseville Motor Car Company.

Koch, William, will erect a two-story garage 30x120 feet at 223-225 North Sixteenth street, Philadelphia, Pa., to cost $7,500.

Kohlhuss Motor & Parts Company is the style of the new concern recently opened up in Cleveland, Ohio, as manufacturers agents at 1918 Euclid avenue.

Monte Cristo Garage is the name of the new $12,000 building now in course of construction in New London, Conn., and will be operated by James O'Neil and James F. Sullivan.

Maltby, W. S., of Plainfield, N. J., has taken the Essex county for the Corbin cars, and will open salesrooms in Newark.

Mack & Brooks, of Lima, O., have purchased the $12,000 Ashton lot on W. Market street, and will erect a large garage thereon.

Mosehart & Keller Automobile Company is the style of a new company recently formed in Houston, Texas.

Newby Automobile Company, of New Castle, Ind., has been organized and incorporated in the sum of $15,000, and will shortly take over the retail business of J. A. Newby.

Nock Automobile Co., E. L., Providence, R. I., will build a new garage on Broad street, near Potter avenue.

Olson & Johnson have opened a garage and repair establishment at 1722 West Superior street, Duluth, Minn.

Owens & Co., Allen W., Baltimore, Md., is enlarging its garage on Preston street, near Charles, which when completed will contain three times its present floor space.

Palethorpe, J. E., will erect an addition 30x80 feet, to his garage at Kokomo, Ind.

Powell Automobile Company, of Omaha, Neb., has sold its automobile business to H. E. Frederickson, and increased its jobbing business. The Powell Company's new address will be 2010 Farnam street.

Pratt, C. B., has opened a large garage in Weymouth, Mass. It is located on Water street.

Park, John A., of Raleigh, N. C., has secured the agency for the Ford car in that place.

Ranger & Barrett Co., is the style of the new concern which has taken over the garage business of W. C. Thornhill, 310 Tenth street, Minneapolis, Minn.

Schaefer, W. E., Ripon, Wis., will open a garage in his building on Jackson street, where he will carry a full line of auto supplies.

Smith & Euwer will construct a garage on West Rayen avenue, Youngstown, Ohio.

Smith Bros., of Los Angeles, Cal., have been appointed agents for the Rainier cars for southern California.

Agency Notes

Northern Motor Car Company, of Detroit, Mich., maker of the Silent Northern, has assigned the following 1908 agencies: Copeland & Taylor, Pontiac, Ill.; C. W. Evans, Dixon, Ill.; Noah Keeler, Wallace, N. Y.; A. H. Ritter, Iola, Kan.; Enid Auto Company, Enid, Okla.; Wilson Auto Company, Wichita, Kan.; Huron Auto & Electric Company, Port Huron, Mich.

The Corbin Motor Vehicle Corporation has recently established the following agencies: Reese Motor Car Co., Cleveland, O.; Corey & Wallace Motor Co., Portland, Ore.; Pacific Coast Automobile Co., Seattle, Wash.; Inland Auto Co., Walla, Walla, Wash.; B. C. Bernard, Troy, N. Y.; Carlton Garage and Repair Co., Brooklyn, N. Y.; Clark & Davis, Syracuse, N. Y.; Wierick Bennett Auto Co., Sioux City, Iowa; Bell Bros., Stanford, Conn.; Bridgeport Auto Co., Bridgeport, Conn.; New Haven Auto Corporation, New Haven, Conn.; the E. H. Towle Co., Waterbury, Conn., and Pyramid Motor Car Co., Danbury, Conn.

The Dragon Automobile Company, of Philadelphia, has signed agency contracts with the following: W. F. Rabenold, Allentown, Pa.; Gate City Motor Car Company, Atlanta, Ga.; Mohler & DeGress, Mexico City; Carrington Auto Company, Carrington, N. Dak.; L. W. Pipher, Stroudsburg, Pa.; Indianapolis Motor Company, Indianapolis, Ind.; Crescent City Auto Company, New Orleans, La.; Dragon Automobile Company, Boston, Mass.; American Garage Company, St. Louis, Mo.; Dragon Auto Garage, of Hudson County, Hoboken, N. J.; United Motor Car Company, Cleveland, Ohio; W. B. Brown, Pittsburg, Pa.; Louis Erickson, Seattle, Wash.; Eby Manufacturing Company, Lincoln, Nebr.; Wm. H. Franklin, Hightstown, N. J.; Branstetter Motor Company, Chicago, Ill.

The Forest City Motor Car Company, manufacturers of the Jewel cars, at Masillon, O., has established the following agencies:

M. L. Robertson, Cullman, Ala.; Freeman-McCabe Co., 455 Golden Gate avenue, San Francisco, Cal.; J. B. McIntosh Auto Co., 199 Jefferson avenue, Detroit, Mich.; O. E. Goodenough, 280 State street, Rochester, N. Y.; Jewel Automobile Co., 487 Sterling place, Brooklyn; D. B. Smith & Co., Utica, N. Y.; Shelby Machine & Supply Co., Shelby, N. C.; F. L. Manning, Merna, Neb.; A. L. Hoover, 1720 South Seventeenth street, Lincoln, Neb.; York & Spenny, 1305 North Broadway, Oklahoma City, Okla.; W. H. Wolfe, Del Rio, Texas; R. H. Magoon Motor Car Co., Cleveland, O.; D. S. Hoover, Crestline, O.; N. W. Neptune, Londonville, O.; G. L. Wirick, Pemberton, O.; Archer & Clark, Farmers Station, O.; F. Roosa, Conneaut, O.; W. D. Hoge, Rayland, O.; E. V. Hall, Convoy, O.; Frank Geis, Warwick, O.; Andrews & Fite, Georgetown, O.; W. A. Robinson, Steubenville, O.; Malcolm Newstetter, Reading, Pa.; G. A. Wynn, New Florence, Pa.; J. C. Moore, Saltsburg, Pa.; R. J. Goodell, Putney, Vt.; Porter-Cowper & Co., Norfolk, Va.; Branson & Janda, corner Nineteenth and Ferguson streets, Cheyenne, Wyo.

Mr. F. B. Cole, for three years past foreman of the repair shop of the H. H. Franklin Mfg. Co., Syracuse, N. Y., has accepted a position with the Boyer Motor Car Co., San Francisco, Cal.

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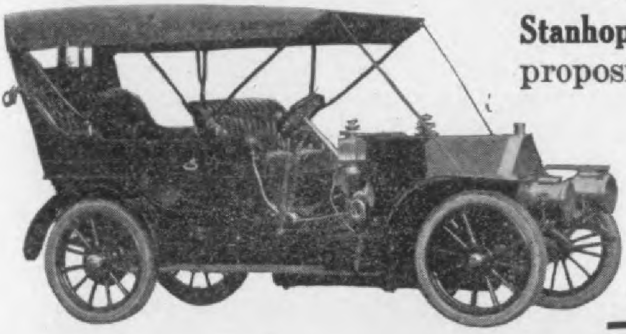
The "Jewel 40"—4 cyl. 40 H. P.—$300

The **"JEWEL 40"** is our large touring car model for 1908, and wonderful value for the price. It is equipped with the famous Rutenb motor, has a pressed steel frame, with special, one-piece drop forged fro axle, I-beam section. Has 36" wheels with 4" quick detachable or clinch type tires; 117" wheel base and 56" tread. Improved steering gear. Doul ignition system,—Bosch magneto and four unit coil and storage batter The costliest and most valuable ignition system on any car selling $3,000. Seats 7 passengers comfortably.



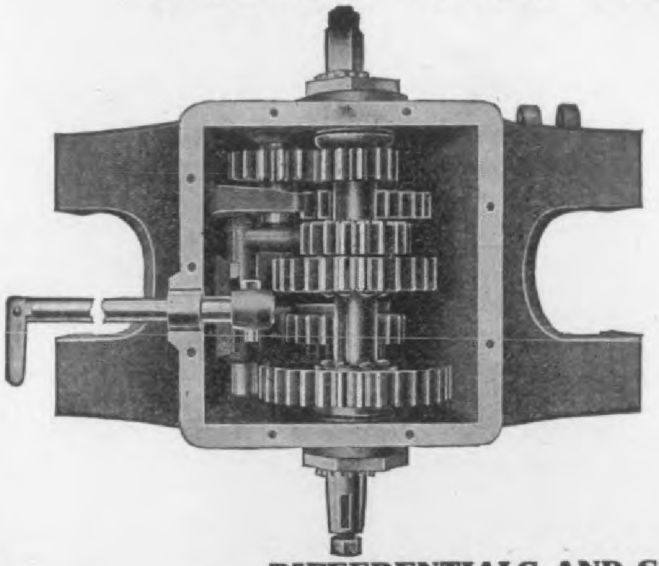
The **"Jewel 40," Jewel Runabout** a **Stanhope** offer the dealer an exceptionally f proposition. Write for particulars.

Forest City Motor Car C

111 Walnut St.,
MASSILLON, OHIO

BROWN-LIPE GEARS

SELECTIVE AND PROGRESSIVE SLIDING GEAR TRANSMISSIONS



DIFFERENTIALS AND STEERING GEARS

Direct Factory Salesmen:—K. FRANKLIN PETERSON, 166 Lake St., Chicago. THOMAS J. WETZ
29 West 42nd St., New York City.

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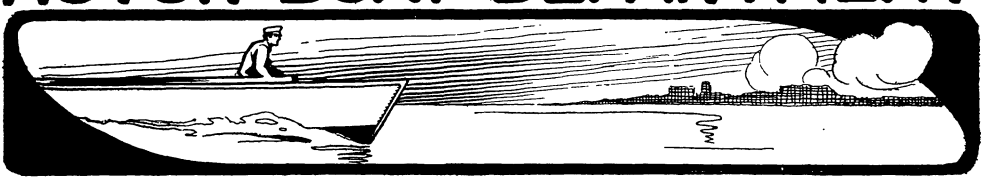
MOTOR BOAT DEPARTMENT



Marine Coming Events

January 1-8—Chicago Motor Boat Show, Coliseum, American Association of Engine and Boat Manufacturers. Chester I. Campbell, Mgr., 5 Park Square, Boston.

January 14-18—Hartford Automobile Dealers' Show, Foot Guard Hall.

January 25-February 1—Boston Motor Boat Show, Mechanics' Hall. New England Engine and Boat Manufacturers' Associations. Chester I. Campbell, Mgr.

February 3-8—Power Boat and Sportsman's Show, Convention Hall, Buffalo, N. Y.

February 20-March 7—New York City, Madison Square Garden, Fourteenth Annual Motor Boat and Sportsmen's Show.

March 16—The Fourth Annual Motor Boat Carnival at Palm Beach, Fla.

April 6-11—Buffalo, Convention Hall, Motor Boat and Sportsmen's Show. D. H. Lewis, Mgr.

Motorboat and Sportsman's Show

The 14th annual Motorboat and Sportsman's Show is to be held this winter in the Madison Square Garden, February 20 to March 7. Arrangements have been made on an elaborate scale and will be under the management of Captain J. H. Dressel. The exhibits will be, as usual, large in number and varied in character. Several changes will be made in the arrangement, notably the lake will be shaped like the letter C, with turns at each end, providing a long waterway, 15 feet in width.

The New York Motor Boat Show

The first exclusively motor boat show ever held in this country opened its doors to the public in Grand Central Palace, New York City, on Saturday, December 7, under the auspices of National Boat and Engine Builders. A survey of the exhibits showed that great progress has been made during the past year.

The various sections of the building in which the exhibits were placed were handsomely decorated with flags and streamers, and the stands were well lighted and decorated. The exhibitors numbered one hundred and four, ranging from the large forty-foot cruisers, smaller power boats, down to canoes and internal fittings, which latter were so caried as to suggest that there could be no limit to them.

The straight knife-like bow which allows the water to fall on board, drenching the occupants, has given way to the flaring bow which throws the spray from the hull.

Great interest was shown in the exhibits of the big cabin cruising power boats, shown by the Racine Boat Manufacturing Co., Matthews Boat Co., and the Truscott Boat Manufacturing Co.

The staunch little sea-going power dcries shown by the Atlantic Company and the Toppan Boat Manufacturing Co., attracted much attention.

This year there was a noticeable scarcity in racing creations. The Den was the only one shown which could claim honors for speed.

Probably the motor that received the most attention was the 60 H. P. engine exhibited by James Craig, being the motor which drove the Ailsa Craig when she won the New York-Bermuda race.

News Items

During the construction of a new bridge over the Chicago river at Eighteenth street, Chicago, the city authorities are operating a motor ferry boat which is driven by a 3-cylinder, 5x6-inch Anderson Marine motor, made by Anderson Engine Co., Shelbyville, Ill.

Defoe Boat & Motor Works, Bay City, Mich., offer, in addition to a line of complete launches, knock down frames, marine motors and accessories, boat patterns for the use of amateur boat builders. Prices of patterns range from $1.75 to $12 per set, and knock down frames from $4 to $120 according to size and grade of material used. The lumber required runs from 20 to 200 feet for the frame, and from 30 to 200 feet for the planking.

The fourth annual motor boat carnival at Palm Beach, Florida, will be held the week commencing March 16, when as usual Lake Worth will be brilliantly illuminated by original fireworks, consisting of a naval battle, fireboat racing, etc. In addition to the lake carnival this year, Managers Fred Sterry and H. E. Bemis will include in the fireworks programme an illumination of the Royal Poinciana Gardens and grounds and this is to be made one of the attractive features of the week.

Gies Gear Co., Detroit, Mich., recently sent out a postal containing an illustration in colors of an under water scene, showing the propeller of a motor boat being broken by striking a rigid log standing up in the water with its top below the surface. Attention is called to the fact that such an accident would have been impossible with a "Gies" reversible propeller.

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THE SIMPLEST CONTROL IS SAFEST

IF YOU HAVE MORE THAN ONE THIN
TO DO TO GET THE SPEED CONTROL O
YOUR BOAT, YOU ARE LIABLE SOMETIM
TO GET CONFUSED, AND MAKE A MISTAKE

MISTAKES ARE DANGEROUS

THE SIMPLE, POSITIVE, PERFECT CONTROL GIVEN B

THE ROPER PROPELLER

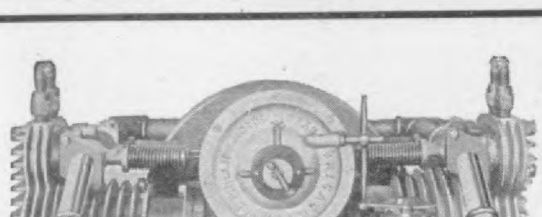
PAT. DEC., 19, '05

MAKES MISTAKES
IMPOSSIBLE, BECAUSE

ONE LEVER DOES IT ALL

SEND FOR OUR BOOKLET

C. F. ROPER & CO., Hopedale, Ma



Ask for Circular No. 31.

PHILLIPS DUPLEX
GOVERNED MOTORS 190

New Works. Enlarged Capacity

Air Cooled 4½ x 4 in. Length Over All 29 i

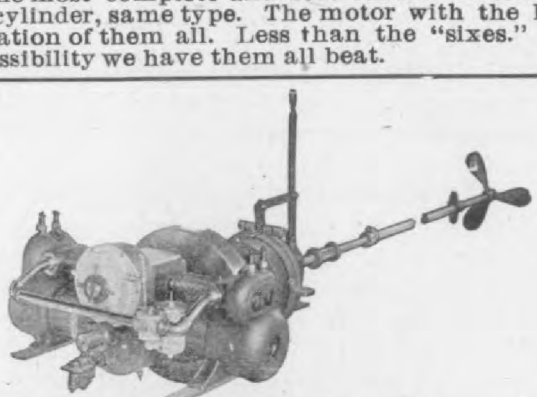
Removable Valve Chambers, with entire val
Exhaust does not pass over inlet valve, incom
gasses pass over exhaust in each cylinder. Dup
Sparking System. Duplex Carbureter. French I
Mixture in cylinders. High grade throughout.
sold on price only.

Water Cooled 4½ x 4. Length Over All 29 ins.

The smoothest running 2 cylinder motor on the market.

The most complete and serviceable. Also made in 4 cylinder, same type. The motor with the least vibration of them all. Less than the "sixes." For accessibility we have them all beat.

Ask for Circular No. 21.



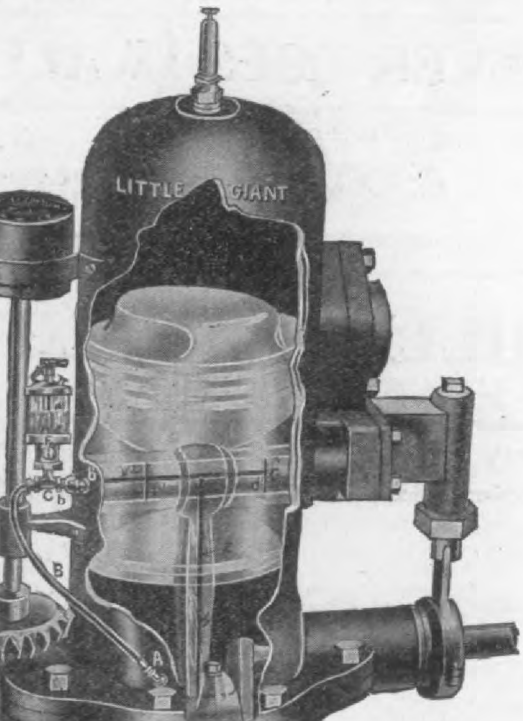
Phillips Duplex Governed Marine Mo
the surest, safest and steadiest Marine M
—4 Sparks—2 Gasolene Feeds No racing w
reversing, non-vibrating. Low center
gravity. A fine auxiliary. Special atten

ine marine motors, has recently de-
d and is equipping its motors with
rce feed oiling device, which it is
ed does away with the accumulation
l in the crank case which happens
the splash system is used.

this system the pressure in the
case produced by the down stroke
e piston is utilized.

s pressure is carried thru copper
g B, past the tee C, in which is
ed a sight feed lubricator. This lu-
tor is regulated to feed about 10 to
ops of oil per minute into the tee,
whence it is blown or forced thru
assage thru the cylinder wall b'.

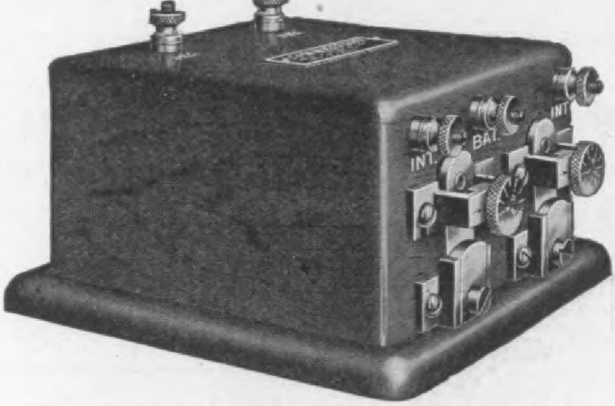
e piston is provided with oil grooves
which oil is forced during its up-
and downward travel, depositing this
oroly around the cylinder walls and
rings.



le Giant" Postive Force Feed Lubricating
" A, union check valve; B, copper
e pipe; C, T, in which sight feed lubrica-
crewed; b, continuation of copper pressure
onnecting with and thru cylinder; D,
passage in cross-head pin G; d' and d",
passage in cross-head pin G, to lubricate
rings; E, drilled passage in connecting
communicating to passage D; b', hole
linder; F, sight feed lubricator; G, cross-
n; H, connecting rod.

n the opening or passage D is pre-
to the opening b, an accumulation
is forced thru the hollowed cross-
in G to the cross-head pin bearings

The Connecticut marine spark coil is manufactured by the Connecticut Telephone & Electric Co., Meriden, Conn., a feature of this coil being its low battery consumption, the manufacturers claiming that the coil will fire the highest compression boat engine on as low a battery consumption as 3-10ths of an ampere, by that, they mean the current drawn from the battery to operate the coil when the engine is not running; but when in operation the consumption is but one-half of this amount.



The "Connecticut" Single Cylinder Marine Spark Coil.

The cases are made of hard wood with spar varnish finish and all metal parts are nickeled except the vibrator and armature which are treated with a rust proof finish which will prevent the rusting of these parts altho they should become wet.

Both the vibrator and the contact adjusting screws are self-locking and stay in any position without any possibility of their jarring loose. The contact screw is fitted with a patented dial adjustment with which it is possible to adjust the coil to draw a given amount of current.

Altho this coil is designed especially for Marine use it will be found most satisfactory for any kind of stationary or automobile engine work. This coil is made in 1, 2, 3 and 4 cylinder types, listing at $10, 20, 30, and $40 each.

"Putnam" 1908 Marine Motors

In addition to cycle and car motors, described in our December issue, the Putnam Motor Manufacturing Co., Inc., 57 Lebanon street, Springfield, Mass., also includes in its line for 1908 several sizes of marine motors, all of the 4-cycle type, and adapted to use either gasoline or kerosene.

The 1908 marine motors are built in 1½, 2½ and 5 H. P., single cylinder, and 5 and 10 H. P., double cylinder sizes. A 4-cyl-

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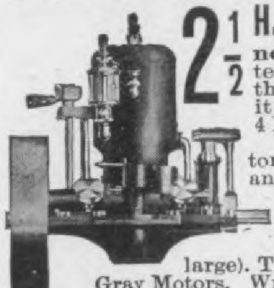
The intake on these motors is auto-
atic, and the exhaust valves are operated
means of push rods and rocker arms.
e pistons are of the trunk pattern, fitted
th three rings at the top end. The cyl-
ders are finished by lapping. The con-
cting rods are of bronze with large bear-
gs. The prices are as follows: 1½ H.
, $50; 2½ H. P., $65; 5 H. P., single cyl-
der, $90; 5 H. P., double cylinder, $100,
d 10 H. P., double cylinder, $200.



2½ H.P. Complete Outfit $

not bare—and guaranteed to develop more than 3 1-2 H.P.—in fact, it is as powerful as most 4 H.P. engines.

We built and equipped a
tory last winter—the most
and up-to-date plant in the
voted exclusively to
marine engines. We
moving into another
larger plant—5 stories (3
large). This shows the enormous de
Gray Motors. Write today for the story o
mile long distance race on Lake Erie, also

Engines 2½ to 40 H.P. GRAY MOTOR CO., 28 Leib St., De

The Cushman Motor

Has surmounted the difficulties of the past in the manufacture of two cycle engines.

It establishes a new standard of excellence in marine motor construction.

Its new features are striking and their practicability is at once apparent to one who is looking for a superior machine.

Address Cushman Motor Co., 2018 N St., Lincoln, Neb.

JOE'S REVERSING GEAR
and
ONE WA
Clutche

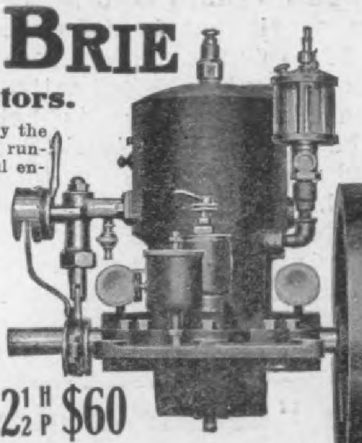
Send f
CA
LO
of
MARINE
SPECIALTI

SNOW & PETRELLI MFG. CO., New Haven, C

ANTI-CORROSIVE
REGISTERED IN PATENT OFFICES UNITED STATES, CANADA AND GREAT BRITAIN.
GAS ENGINE LUBRICANT
MANUFACTURED ONLY BY
E. H. KELLOGG & CO.
Nos. 242 & 244 SOUTH ST. NEW YORK, U.S.A.

IS THE BEST FOR
AUTOMOBILES AND MOTOR BOATS

DU BRIE
Marine Motors.



Here is positively the simplest, smoothest running, most powerful engine on earth.

Quality considered, it's the lowest priced. We guarantee absolute satisfaction and

IMMEDIATE SHIPMENT

Write at once for new catalogue showing Ten sizes, 2½ to 27 H. P., at prices that will surely interest you.

2½ H P $60
(With complete equipment.)

DU BRIE MOTOR CO., 432 GUOIN ST., DETROIT, MICH.

Putnam Motors for 1908

Air and Water Cooled Types. For Auto., Launch and Motorcycle. Also Full Sets of Castings. 1½ to 40 H. P. One to Eight Cylinders. Putnam Carburetors, 4 sizes.

PUTNAM MOTOR MFG. CO.
57 Lebanon Street Springfield, Mass.

Perfection

MARINE MOTOR

For real service, for looks, finish and power the Perfection beats any motor ever sold at anywhere near its price—can't be beaten at any price.

2 H P $45

Simple, speedy, reliable and reversible. No cranking. Price is for engine complete with full boat equipment—NOT BARE

High Grade Marine and Auto Engines, 2 and 4 Cycle, 2 to 20 H. P. Best material and FULLY GUARANTEED also sells

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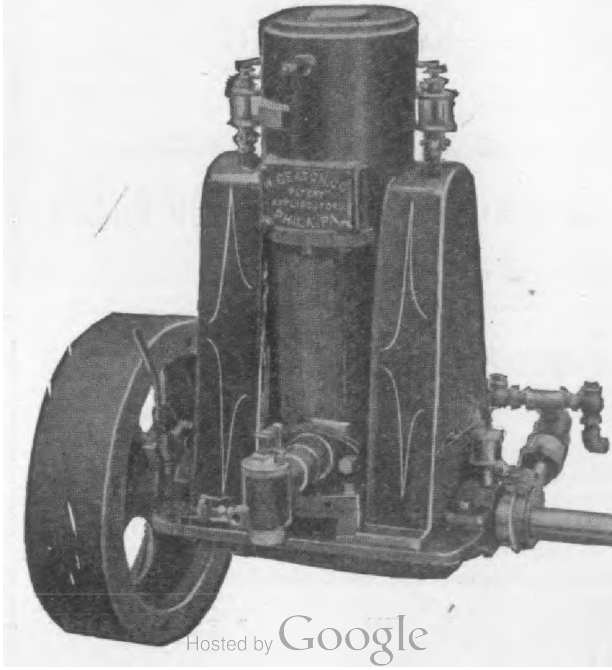
"Idlewild," an 8½ H. P. craft, built by M. J. H. Johnson and powered with a Lathrop Motor.

"Johnson" Motor Craft

J. H. Johnson, Seattle, Wash., manu-
ıres motor craft of various styles for
rent requirements. The illustration
with is of the "Idlewild," a 35-foot
ch of a type which he has found to
: with great favor. The "Idlewild"
ın by an 8½ H. P. Lathrop motor and
pable of a speed of 9½ miles per hour.
reat many of this type are built at
Johnson shops both for private use and
y service at boat houses. Launches
20 to 60 feet in length are turned out
at present a 50-foot miter stern launch
passenger service is being built. It
be fitted with a 40 H. P. Lamb engine.
Johnson launches are built on order.
e beam is 7 feet 4 inches. The motor
aced aft, giving 17 feet of open cock-
for passenger accommodation. The
s are full length on each side of the
pit and accommodate twenty-four per-

The "Beaton" Marine Engine

new type of 2-cycle marine engine has
ıtly been brought out by Wm. F.
on & Co., 5109 Melrose street, Frank-
Philadelphia, Pa., the feature of this
r being that no crank case is used.
motor consists of a cylinder having
heads and slots are provided in the
der for the passage of the wrist pin,
h is in the center of the piston, ex-
s thru these slots, and is connected on
outside to the connecting rods, one on
side, which are in turn connected at
lower end to the crank shaft, which
nds under the lower head of the cylin-
ing rods which reduces side thrust on th
walls of the cylinder. The cylinders an
pistons are cast of close grain grey iron
The shaft bearings are of best babbit
metal, and the crank pin boxes and wris
pin boxes are of phosphor-bronze. Jum
spark ignition is used. All end thrust i
taken up by balls nested in bronze rings
The prices of these motors are as follows
3 H. P., single cylinder, $140; 4 H. P., sin
gle cylinder, $165; 5 H. P., single cylinder
$185; 6 H. P., 2-cylinder, $300; 8 H. P
2-cylinder, $350; 10 H. P., 2-cylinder, $400
These prices include ball thrust, coupling
muffler, two sets of batteries, jump spar
coil, switch, inboard water connections
bronze shaft and solid propeller.



The "Beaton" Two-cycle Marine Gasoline En

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For Cleaning Auto Bodies

It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO
Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

Combination Ladder Company
Jobbers of Automobile Supplies
366 Fountain Street
PROVIDENCE, R. I.

and at all good automobile supply stores in all leading cities.

Send for our Mobo booklet —"*How to Clean Well Varnish and Paint on an Automobile*" It's free.

The exclusive Micrometer feature of

THE Wico Spark Plu

permits accurate and minute adjustme the spark gap—to 1-1000th of an in assuring rhythmic running of the en at all times. All plugs can be set a

EXCELS EVERY OTH PLUG ON THE MARK

The Wico is practically self-clear will not foul, and heat will not brea After severe tests it is now adopted endorsed by leading manufacturers. I WICO Plug is guaranteed for one Made in standard or special sizes to fi motor car.

Write department 23 for catalogue, also request Witherbee Battery Litera

Wico Spark Plugs are for Sale b dealers, or will be sent direct from $1.00 each, prepaid, to any address. Plugs in solid mission oak case, $5.0

Manufactured by
WITHERBEE IGNITER COMPA
541 West 43d St., New Yor

CHICAGO
1429 Michigan Ave

DETROIT
220 Jefferson Ave.

BALTIMORE OFFICE, 510 Continental Trust Building

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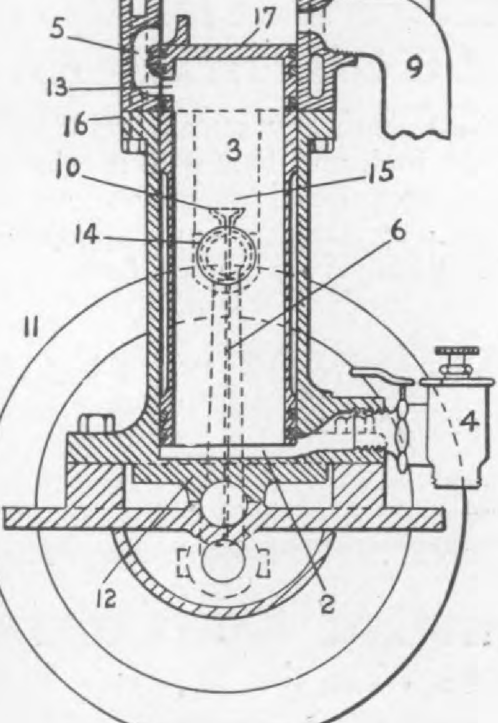
own stroke of the piston, which has closed end 17, and is therefore filled gas on this down stroke. The piston ovided with an opening 13, which at ottom of the stroke registers with sage 5 leading into combustion cham-. The comprest charge therefore is ferred to the combustion chamber at nd of the down stroke and during rocess of compression and transferal nes warmed by contact with the hot and head of the piston, this tending ke the charge more combustible. As harge is drawn into chamber 2 in l state, a larger charge is obtained



AUTOMOBILE TRADE JOURNAL

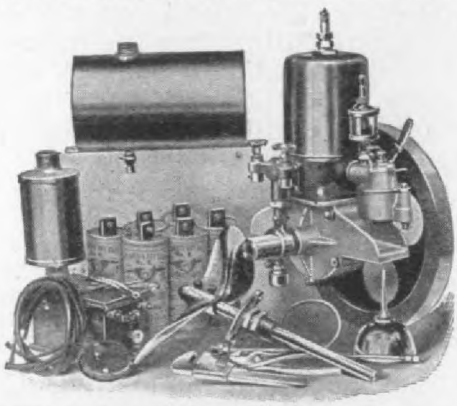
onal View of the Beaton Marine Motor.

f it were warmed outside the motor. head 12 closes up the lower end of ylinder and thus enables the piston ck in a charge and to perfectly com- it. This head is also used as a cap e center bearing of the crank shaft. nnecting rod 11 is placed on each f the cylinder and connected at the after lubricating the wrist pin, passes down the rod and lubricates the crank pin. The shaft is lubricated from grease cups and an oil cup on the side of the cylinder lubricates the piston.

An overflow pipe 8 is run from the top of the water jacket to the exhaust pipe 9, thus utilizing the water to cool the exhaust. The cylinder is bolted together at 16, but no joint is required as the top of the piston is above the line of division. To remove piston it is only necessary to take out the bolts. To take up lost motion the cap screws in the connecting rods are tightened, and as they are outside the cylinder this is a simple and easy matter.

"Waterman" Canoe Power Outfit

Waterman Marine Motor Co., 1500 Fort street, West, Detroit, Mich., made an auspicious entry into the marine field early in 1906 by introducing a self-contained out-board power outfit for converting row boats into motor boats, which was described in our April, 1906, number, page 262. This company is now offering a complete power outfit of an entirely different character, and intended for installation in canoes. From the illustration it will be observed that this consists of elements of



The "Waterman" Power Outfit for Canoes.

regulation type, but it possesses several distinctive detail features. The motor is of the 2-cycle type and is rated at 2 H. P. The cylinder is of grey iron, cast without jacket and a polished, spun copper water jacket is applied. The crank case is of aluminum and bearings are bronze bushed. Crank shaft and connecting rod are of steel and the water pump and all fittings are of polished brass. The motor is 14 inches high and weighs 35 pounds. The outfit is shipt complete, including foundation pieces, all ready for installation.

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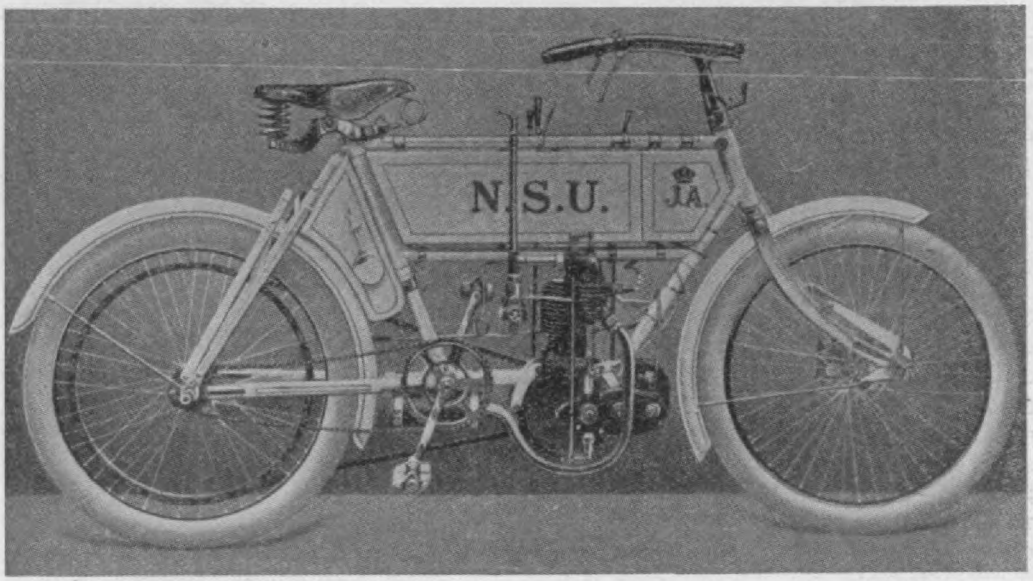
1908 N. S. U. Motorcycles

For the 1908 season the N. S. U. Cycle and Motor Co., are offering the following models: 1¼ H. P., $210; 3 H. P., $230; 3½ H. P., $242; 3¾ H. P., $255; 4 H. P., twin cylinder $300; 6 H. P., twin cylinder $320, and 6 H. P. twin cylinder with fore

means of an oil pump conveniently loc
The drive is by a belt made of a com
tion of rubber and canvas. The
models are all fitted with a new
spring fork. The wheel rims as we
the fork ends are nickel plated. The s
cylinder machine is made with a sh
wheel base than the regular model



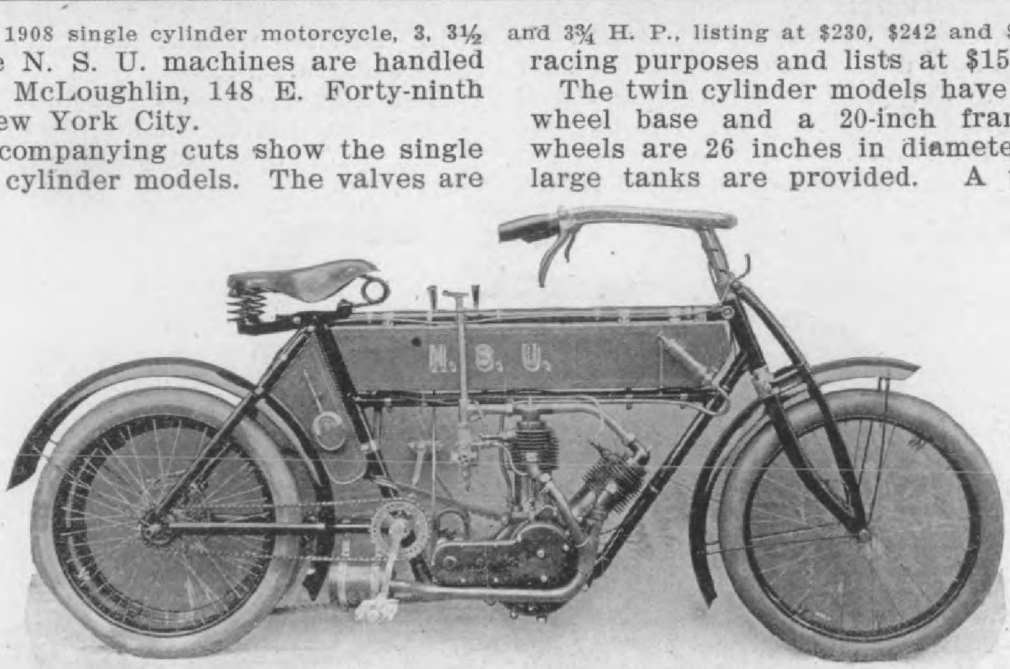
N. S. U. 1908 single cylinder motorcycle, 3, 3½ and 3¾ H. P., listing at $230, $242 and $255.

ear. The N. S. U. machines are handled by J. F. McLoughlin, 148 E. Forty-ninth street, New York City.

The accompanying cuts show the single and twin cylinder models. The valves are

racing purposes and lists at $15.00 e

The twin cylinder models have a 59
wheel base and a 20-inch frame.
wheels are 26 inches in diameter. F
large tanks are provided. A two-s



N. S. U. 1908 twin cylinder motorcycle, 4 and 6 H. P., listing at $300 and $320, respectivel

mechanically operated. The ignition is by

gear and free engine pulley are furni

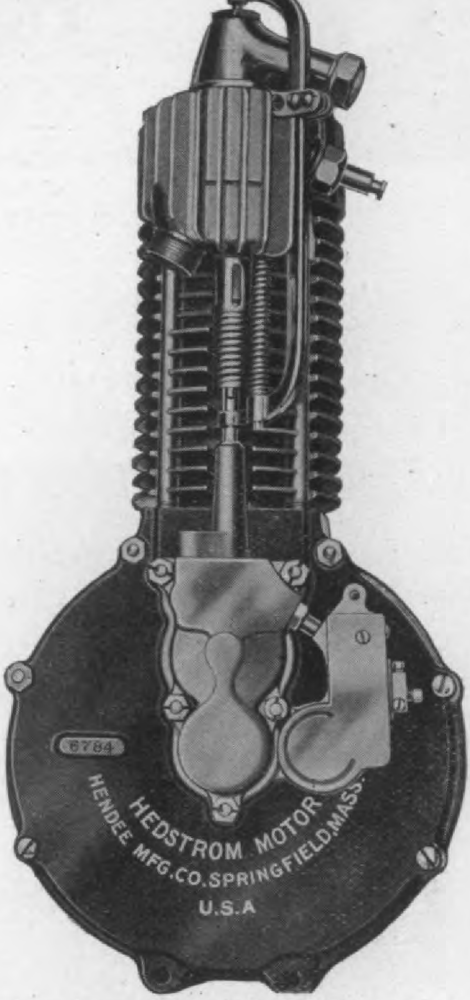
Digitized by Google

cket, the saddle over the seat mast and muffler behind the crank bracket. The S. U. Company will establish a branch his country at an early date.

1908 Indian Motorcycles

he 1908 Indian line of motorcycles ıufactured by the Hendee Mfg. Co., ingfield, Mass., consists of a 2¾ H. P. gle cylinder; 3½ H. P. single cylinder; . P. twin cylinder, and tri car or dery van on the single cylinder or twonder.

ome features not mentioned in the cription published in our December, , issue, page 308, are here enumerated. twin cylinder Indian here shown, has ¼-inch bore by a 3¼ inches stroke and be furnished with automatically or hanically operated inlet valves accordto the purchaser's option. The caretor is the Hedstrom improved autoic compensating carburetor. The trol is by the Indian patented, leverdouble grip. The right grip cons the electric spark and the left controls the throttle. This model capable of making speeds up to 60 es per hour according to gear. The ne is made of seamless tubing, 1⅛-inch 16 gage, 1¼-inch bottom, 14 gage. All ts are internally reinforced. Its height 2 inches. The wheel base is 51 inches. transmission is by roller gear drive n the engine to the countershaft. A bin-Indian duplex motorcycle coaster ke is fitted. The tires are 2¼-inch G mounted on hollow steel rims finished natch the frame. The machine weighs pounds, and is finished in Royal Indian



Exterior view of the Hedstrom motor, showin the new mechanical valve action.

with handle-bar, but without saddle, $15.00 extra.

The single cylinder machine is simila in construction to the double cylinder m chine with the exception of the pow plant.

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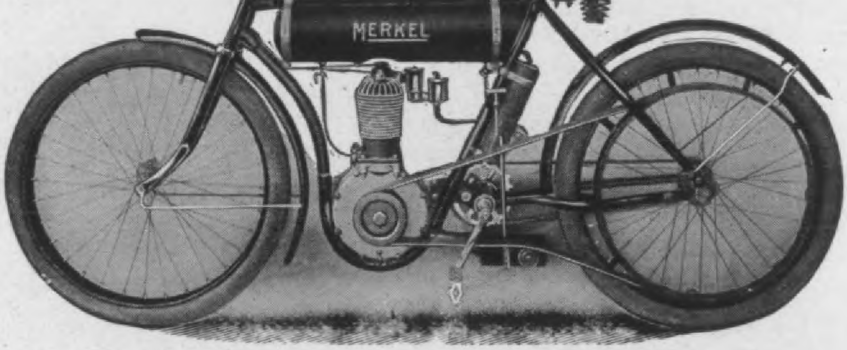

At the Recent Chicago Motor-cycle 414 Mile Endurance Run

30 MACHINES STARTED
8 MACHINES FINISHED.

4 MERKELS STARTED
3 MERKELS FINISHED.

One-Fourth of the TOTAL ENTRIES FINISHED.

Three-Fourths of the MERKEL ENTRIES FINISHED.

AT THE START, ONE out of every eight of the machines were Merkels.

AT THE FINISH, THREE out of eight of the machines were Merkels.

Isn't that convincing?

You can depend upon it,—the Merkel is always there at the finish.

The 1908 MERKEL has the same dependable qualities and many more.

The universal acceptance and recognition accorded it at the recent New York show, places it as one embodying more new, original and exclusive features than any other exhibited.

The live dealers must give their customers the latest and the best they can produce, for the buyers of motorcycles today demand it. You can supply their wants with the 1908 Spring Frame Merkel.

It possesses COMFORT, SPEED, Perfect CONTROL, DEPENDABILITY (Magneto Ignition), SMOOTHNESS of OPERATION, (BALL BEARING MOTOR) and the many other requisites to complete a perfect Motor-cycle.

Mr. "Dealer," are you a live one? If so, you had better write.

MERKEL MOTOR COMPANY

1098 26th AVENUE :: :: :: MILWAUKEE, WI

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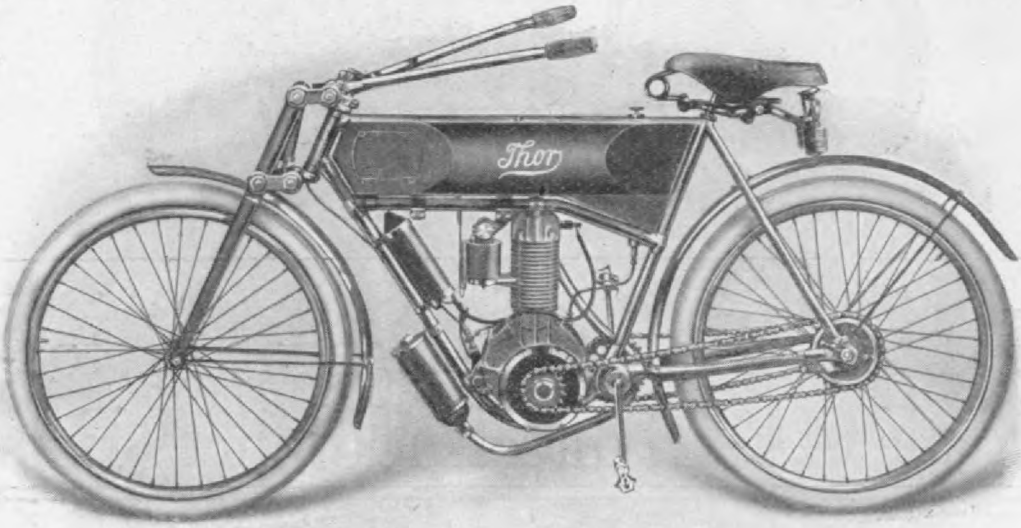
inery Co., Aurora, Ill., has been im-
ed in several details, and represents
dded experience of an extra season's
of this well known outfit.

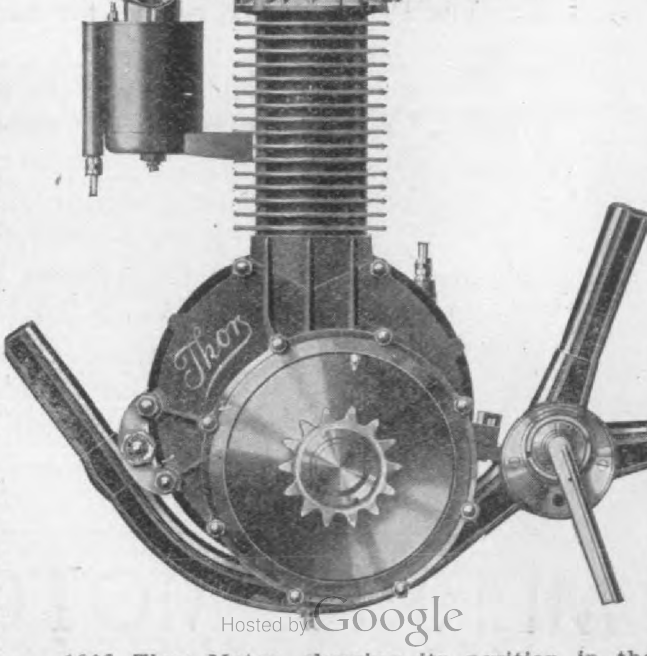
is supported at three points, and is there
by amply secured to resist the strain o
driving. The carburetor is lowered, and
this leaves the head and upper part of the



The "Thor" Motorcycle. The Aurora Automatic Machinery Co., is now furnishing this com-
e machine as a regular stock model, as well as the well known "Thor" unassembled outfits
parts. Three other models are also offered.

e 1908 Thor motor and transmission
nstructed so that the base and trans-
on are one mechanical unit; the lat-
part of the motor itself, the same as
am shaft or any other essential part.
transmission is practically one piece
h includes in itself the ball bearing
ces, the reducing gear, and means
attaching sprockets. The internal
mechanism reduces the friction about
er cent. Particular attention is given
ardening the gears, and ball races
balls are of such size as to reduce the
and make it practically imperceptibl
fter long and hard usage. It follows
rally that where there is slight fric-
and no wear the noise is decreased.
sides the complete unassembled outfits
Thor people are this year marketing
plete machines direct, and include in
908 line four distinct models. Model
a single cylinder, 2¼ H. P., chain
n machine, listing at $200. Model 8
a 3 H. P., single cylinder machine
gear transmission and lists at $225.
el 8 B, is the same as 8 A, excepting
it has a spring fork. Price is $250.
el 8 C is a twin cylinder machine of 5
e power, has gear transmission and
g fork and lists at $300. A magneto
be fitted to any of these models on
al order at extra cost. The equipment
the best and includes a full complete-

cylinder more exposed to the cooling air
current, as well as making the gasoline
pressure more even, whether the tank be
full or empty. The position of the motor
does away with a number of obstructions
that formerly retarded cooling. Improve



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1908 Thor Motor, showing its position in the

1908 AUTO-BI

THE CHICAGO SHOW

Proved valuable to the buyer by showing the difference between the Auto-Bi, a machine of well defined and tried out features, and the numerous experimental features shown on our machines.

How Does This Strike You?

A belt that **WON'T STRETCH** and can be run slack.

2½" clincher tires and hollow steel rims.

A full 3 H P. motor. Speed regulated with **ONE** grip which will stay where you put it.

Oil-feed adjusted while riding. Auxiliary exhaust port to keep motor cool and increase power.

The original and only spring truss fork. Three ordinary No. 6 dry cells. Fewest parts of any motorcycle built.

Responsible agents wanted in unoccupied territory.

Send for Catalogue.

The Auto-Bi Company

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ecting rod; 10 per cent. in short end rank pin; increased oil space in base; e absolutely dust proof and self-lubri-ng; transmission and driving sprocket be removed without effecting adjust-ts of the motor; by use of the Thor ger the power chain and pedalling n can be adjusted independently.

Thor Spring Fork.

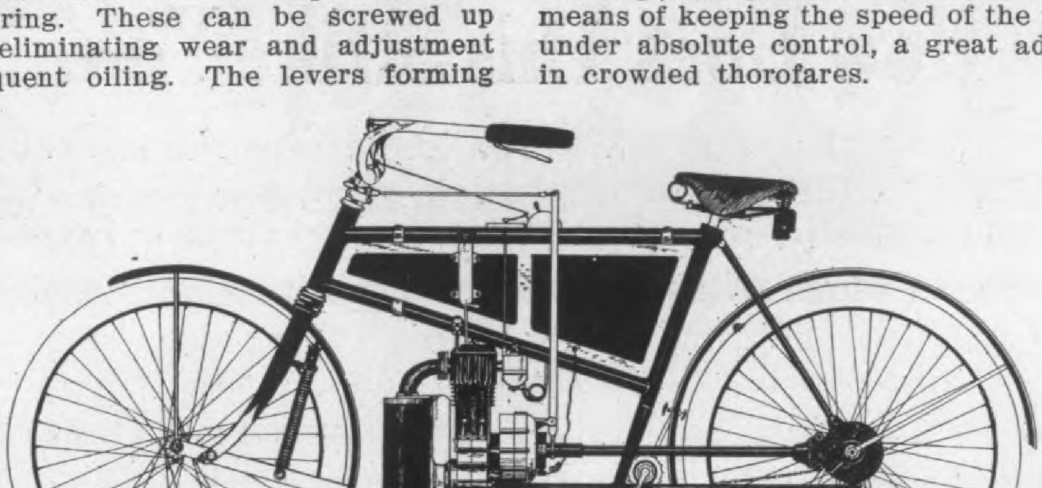
ne Thor spring fork is not an attach-t to a fork but a complete fork in it-It consists of a one-piece stem and r connection with triple keyed top ection. Four levers connect the fork of the frame with the parallel ex-ing fork sides, making eight connect-points which are of ample size and bearing. These can be screwed up lly, eliminating wear and adjustment frequent oiling. The levers forming

safety device in particularly severe re coils. This cylinder, arranged for absorb ing the shock, is hinged diagonally on th head and fork bearings and can be de tached without taking the work apart This construction of the fork being for ward from the head allows the controllin mechanism to be carried from the cente of the head.

"Delaware" Shaft Driven Motorcycl

W. J. Grube, a mechanical engineer, wh has been connected with the motor ca trade in various capacities for some years and has designed and marketed both en gines and complete cars, has lately turne his attention to motor cycles, and for year past has been thoroly trying out hi finally adopted design. This motor cycl is called the "Delaware," and is made b Grube Motor Co., of Delaware, Ohio, o which Mr. Grube is general manager, A. J Willey is president and S. S. Blair, secre tary-treasurer.

Some of the unusual features of thi machine are noticeable at a glance, suc as the shaft drive and the peculiar moto suspension. Drive from the motor to th shaft is thru a multiple disk clutch whic is controlled from the right handle ba by means of a lever similar to the brak levers on the early types of pedal cycles The clutch allows a free motor for eas starting and gives a ready and efficien means of keeping the speed of the machin under absolute control, a great advantag in crowded thorofares.



Cross section view The Delaware Motorcycle engine showing multiple disk clutch which is en-sed within gear case on engine. Note F & S Annular bearings and clutch arrangement.

ffset from the fork, the fork sides can nade straight which in itself reduces

The motor, which is of 3 H. P., i mounted fore and aft and the drive

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THE LIGHT

MOTOCYCLES

Critics Say we Have the Best—Quality, Up-to-date Features and Prices are the Great Factors.

$185.00 to $300.00. Magneto Extra.

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THE LIGHT MFG. & FOUNDRY CO.

Motorcycle Department

4th AND HANOVER STREETS, :: POTTSTOWN, PENNA.

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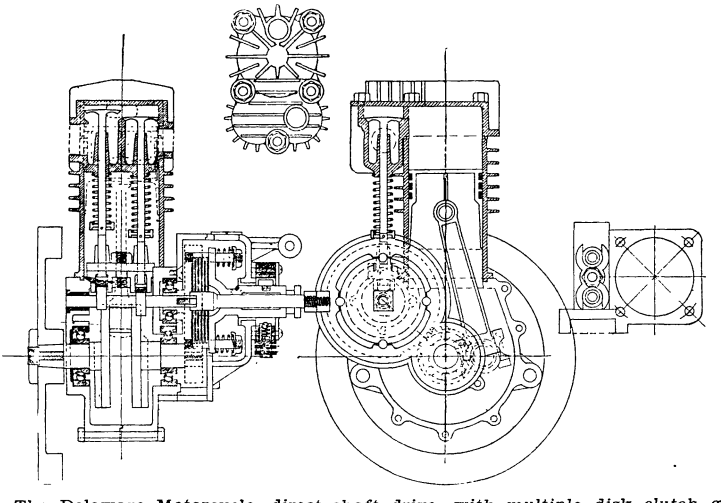
steel 1-16-inch thick (alternate disks hardened) assembled inside of the large half-time gear which is cupped out for the purpose. Six of the plates are driven from four studs set in the gear wheel, the alternate disks have square central holes fitting squared clutch shaft. The small bevel gear drive pinion is cut integral with the drive shaft, which is driven at its forward end with right and left-hand threaded square nuts which connect with a squared hole sleeve to the clutch shaft. This arrangement absolutely prevents the nuts from working loose and allows of a little give and take in the drive shaft mechanism. It also allows of the motor and accessories, which are entirely self-contained, to be removed, which can be done in a few minutes without in any way disturbing the drive shaft. The clutch is held in engagement with a brass follower plate and four coiled springs which fit the previously mentioned studs that drive the discs. The drive mechanism throughout is by squared shafts and integral cut gears, rendering derangement of these parts practically impossible. This arrangement makes the drive exceedingly simple, as all the mechanism necessary in addition to the regular engine is the shaft and pair of bevel gears. End thrust both of clutch and gears is taken by ball thrust bearings of improved type. The motor is 3 H. P. and of the 4-cycle type; bore and stroke each 3 inches. The crank shaft is of forged steel with counterweights integral. The crank shaft is mounted on F. S. annular ball bearings. The cylinder is turned inside and out, giving a uniform cylinder wall. Cylinder and piston are ground and lapt. Both valves are mechanically operated. Carburetor is of the usual spray type, but is not fitted with float feed chamber. Instead it has a very simple pump and overflow system which keeps the gasoline at a constant level. This is an important improvement, for by eliminating flooding of the carburetor overheating of the motor is avoided. This arrangement is also economical, as no fuel is ever wasted. The frame is made of 14-gage tubing strongly reinforced at frame connections. The wheel base is 56-inch; wheels are 28-inch, fitted with G & J two-piece rims, any make of tire being supplied. The front fork is of the suspension type. The lower fork reaches entirely around the wheel from one axle tip to the other, to prevent the wheel from wobbling when rounding corners. A rubber-damped rod passes thru the spring and spring support, and serves to make fork safe in case the supporting springs should break. The crank hanger and pedals, which are used only for starting, are clamped to the lower rear stays and can be readily removed and comfortable running boards fitted for the feet, as the motor can be easily started before mounting. The oil, gasoline batteries and coil are all carried in one neat case. The case also encloses all wiring with the exception of one wire to the timer. The long wheel base and exceedingly easy front fork, together with long handle bar and large soft rubber grips, give very easy riding, and when running boards are fitted the effect is practically that of a car on two wheels as far as comfort is concerned, but a bicycle as regards up-keep expense. The price is $215.00 with battery ignition or $250.00 with magneto.



1908 Model, The Delaware Motorcycle, direct shaft drive, with multiple disk clutch giving a free engine. Note sensible exhaust pipe and large muffler which effectually silences the exhaust.

If you send us $2 before February 1, you can save $2 by doing so. That is we will credit you with two year's subscription for the price of one.

The Thomas Auto Bi Company, of 1573-1575 Niagara street, Buffalo, New York, was recently incorporated under the New York state laws as the The Auto Bi Company, with $50,000 capital.

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Automobile Supplies

We don't buy every freak that is offered to us. That's the reason we sell only standard reliable supplies. This discretion is directly of benefit to you, because our familiarity with the business enables us to correctly judge the difference between good and bad supplies. Our line is complete, minus undesirable articles. It is up-to-date and the best that can be secured. If you buy from us you buy right.

Send for our catalog and quotations.

Thiems Motorcycle

We are sole distributors for this wonderful motorcycle for Pennsylvania, New Jersey, Delaware, Maryland, Virginia and the South.

To know the THIEM MOTORCYCLE is to appreciate its good points. Write us and we will give you details. It is a much better motorcycle to sell than to sell against. If you want the agency, be quick.

Manufacturers Supplies Co.

418 ARCH STREET, PHILADELPHIA

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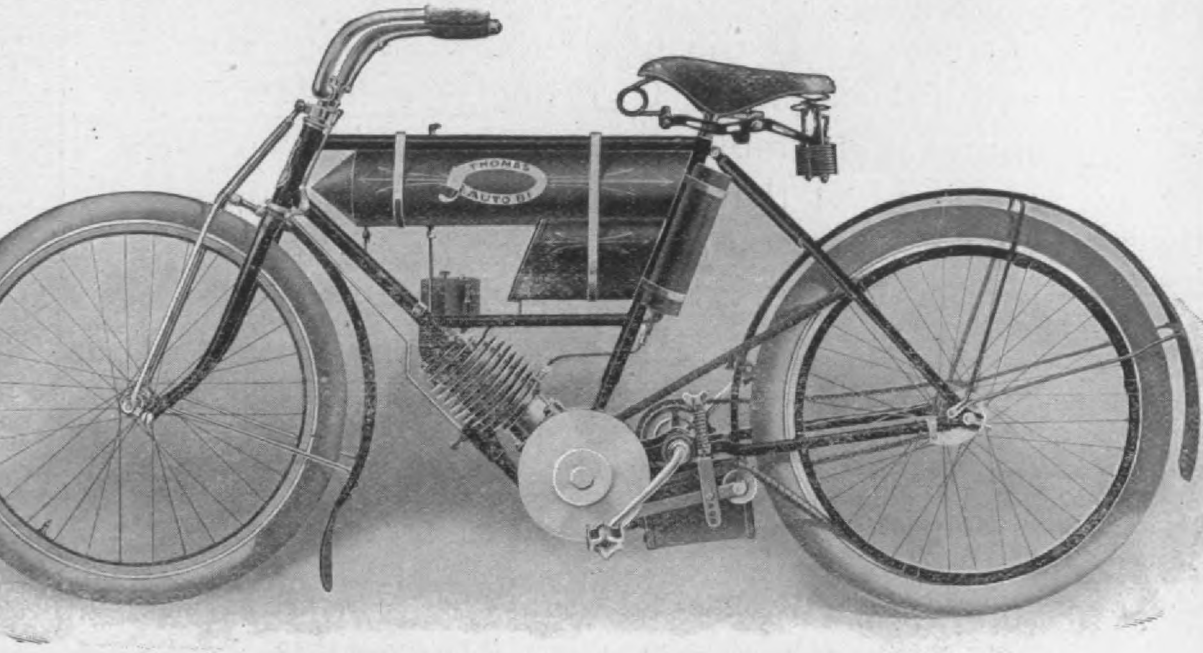
as Auto-Bi Company which formerly the machine has been succeeded by Auto-Bi Co., and the new factory is ed at 1573-1575 Niagara street, Buffalo,

o models are offered for 1908, both ame mechanically but having different ments to meet the requirements of ifferent classes of customers. Some mers want the very best tires, saddles, and for this class the Auto-Bi Co., Model 47, which has 2½-inch G & J er tires, hollow, nickeled steel rims, ns double coil spring motor seat, or s motor saddle, extra high handle corrugated extra wide mud guards

The Ovington Motor Co., 2208 Broadway, New York City, N. Y., agent for the four-cylinder F. N. motorcycle of Holland, are now prepared to fit fore cars to these machines. The fore car is a device by means of which the motorcycle may be transferred into a three-wheel two-passenger vehicle, one passenger being placed in front of the other. It is different from a side car in that the extra passenger attachment is placed in front of the driver who sits on the motorcycle seat instead of beside him as in the case of the side car. The fore car is not new in this country, but the type of fore car illustrated has several distinctive features. The bracing



The 1908 "Auto-Bi," Model 47. Price, $210.

heavy braces, spring cushion front chain-belt drive, Corbin front hub and r brake and either a Breeze car- r or a new carburetor made by the Bi Company. The 1908 improvements e a new spring on the idler which the tension on the belt auto- lly adjustable to varying conditions. erfly nut is provided for compressing pring and thus increasing the ten- nd the rod carrying the idler arm is ed with three holes at its lower end w further adjustment. The finished of the motor are nickeled, which not dds to its appearance but gives a surface easily kept clean and not ly to gather and retain dirt. A foot- ed muffler cut-out is fitted, and a g cock is provided to give easy g with a cold motor. The timer is ed on the new model. The cushion

is different than that of any American machine, the frame work running from the extreme rear to the front. In the matter of brakes this fore car is not depdendent on a small motorcyle brake in the rear hub of the motorcycle itself, but is fitted with a powerful expanding drum brake in place of the hub brake, and in addition with two band brakes, one being on each wheel of the fore car. In other words, every wheel on the vehicle is fitted with a powerful brake, any one of which would be sufficient to stop it under all ordinary circumstances. The rear brake is applied as is customary by a back pedaling action, and the band brakes on the fore car by means of a special pedal placed on the fore carriage frame work in proximity to the feet of the rider. The machine is also fitted with liberal sized automobile type mud guards instead of bicycle guards, as

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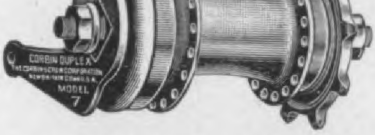
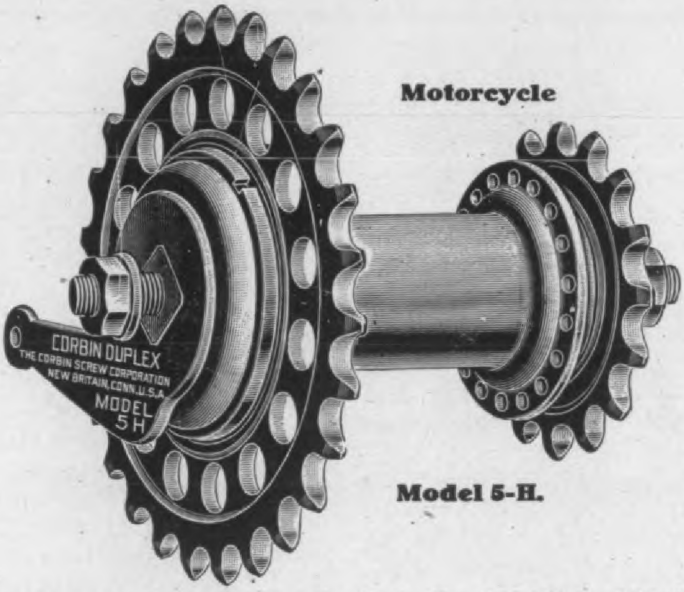


1908

Corbin's Duplex Brake.

Corbin's Two-Speed Brake

CORBIN HUBS



Motorcycle

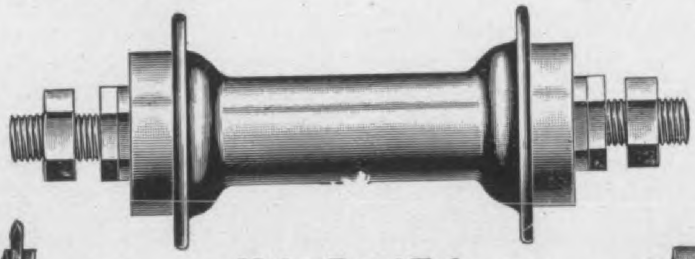
Model 5-H.

Any size Driving Sprocket ⅝ or 1 inch pitch Spoke Holes, button-holed on dr side allowing the replacement of spokes without taking wheel from frame removing driving sprocket.

Driving Sprocket is fastened by six lugs that fit corresponding slots in hub sh

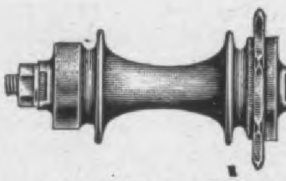
NO STRIPPING OF THREADS

Made in Three Widths for either Belt or Chain Drive Motorcycles.
Heavy Front Hubs to match.



Motor Front Hub.

Front Hub.



Plain Rear Hub.

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A side car is also made by the F. N. Company which overcomes the usual difficulty experienced in steering this type of vehicle owing to the third wheel rotating in one place only, as the F. N. third wheel is of the castor type, and supported on ball bearings, being free to swing into any plane in a vertical axis.

THE NEW SINGLE CYLINDER F. N. MOTOR CYCLE.

A new single cylinder machine has been placed on the market this year. One of its novel features is the transmission, which is a combination of a gear and belt drive. It is usually necessary to make the driving pulley on the engine as small as possible, and the pulley on the rear wheel as large as the construction will allow in order to obtain the required gear reduction. The small engine pulley means that the driving belt has very little surface or grip, and the large pulley is liable to strike road obstructions. The F. N. Company has mastered this difficulty by employing a geared pulley. This is an enlarged type of the ordinary pulley, but in the interior, gear teeth are cut, and a pinion on the engine meshes with this gear. As the gear reduction is made in the geared pulley itself, this construction allows the use of a very large engine pulley and a comparatively small rear pulley, and it is claimed belt slipping is entirely overcome. This device also forms a ready means of tightening the belt. This little machine weighs complete only 100 pounds, which, when it is considered that this includes a Simms-Bosch high tension magneto and a spring fork, is remarkably light; in fact, the machine is one of the lightest in the country.

THE F. N. BIG FOUR MOTOR CYCLE.

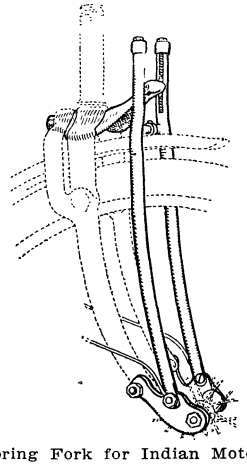
The four-cylinder F. N. motorcycle remains practically unchanged. However, a heavier type of Simms-Bosch magneto is employed, a different design of muffler is used, and the rear mud guard has been made more readily removable.

The price of the F. N. single cylinder motorcycle has just been reduced from $250 to $215, and this includes a Simms-Bosch magneto, which sells alone for $42.50, the spring forks, combined gear and belt drive, and other valuable 1908 features. The Ovington Motor Company also now handle the Nala Hub, a two-speed gear and free engine device, the price of which is $68.50. It is especially adaptable to use with twin cylinders or large single cylinder motors, and for tricar use. Another new feature of the F. N. line is a 6 H. P., 4-cylinder motorcycle for racing purposes. The engine has mechanical valves, and is fitted on a light weight racing frame.

Imperial Motorcycle Mfg. Co., of Brazil, Ind., has under way a two-cylinder motorcycle which will be equipt with magneto and two-speed gear and will employ shaft drive.

Sager Spring Fork for Indian Motorcycles

J. Harry Sager, Rochester, N. Y., has put out for 1908 a new type of the Sager spring fork, especially designed for use on Indian motorcycles which was given marked attention at the New York and Chicago shows. The difference between this model and the standard Sager fork is

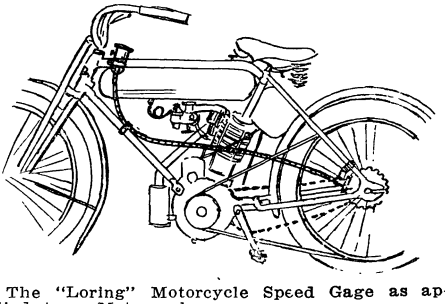


Sager Spring Fork for Indian Motorcycles.

chiefly in the new attaching device made necessary by the fact that the Indian fork is swiveled at a point near the crown. As the drawing herewith tells the whole story, extended description is not necessary. A number of motorcycle manufacturers are using Sager spring forks as regular equipment on their 1908 machines.

The "Loring" Motorcycle Speed Gage

The Loring Speed Gage, marketed by the Loring Auto Appliance Co., 49 W. 63d street, corner Broadway, New York City, and described in our November, 1907, issue, page 205, and in the December, 1907, issue, page 164, is now made in a smaller size for motorcycle use.



The "Loring" Motorcycle Speed Gage as applied to a Motorcycle.

The accompanying cut suggests the manner in which the gage is applied to a motorcycle. The drive is by bevel gears. The internal construction of the motorcycle gage is exactly the same as the regular automobile size, except that its parts are proportionately smaller.

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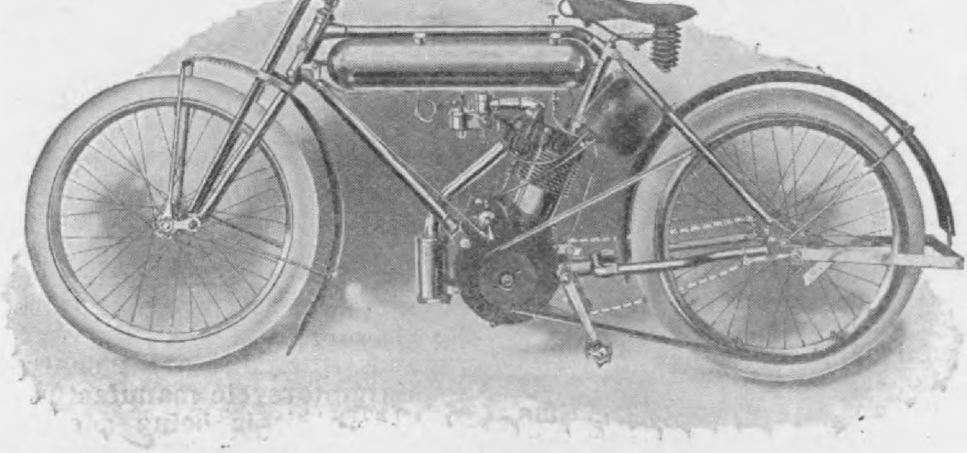

M. M. FOR 1908

THE BEST MOTOR CYCLE BUILT. Not what we say, but what the Riders say. YOU WOULD SAY SO, TOO, if you could only ride the M. M. Special for 1908, with its 3½ H. P. smooth running engine, equipped with 26" wheels, nickeled rims, special constructed frame dropped at seat post joint to admit of a perfect seat position, at the same time giving you a longer wheel base, thereby a better balanced Machine. Add to this an ideal Motor Cycle front spring fork, so perfectly constructed and adjusted as to absorb all road jars, while the engine is so placed in frame as to get the best possible results with the least possible vibration, and you get some idea of the splendid M. M. for 1908.

Also equipped with the new M. M. Motor Cycle Stand, newly designed cylinder and cylinder head. Also new priming device, new chain idler device, together with long rear adjusting jaws admitting of the taking up of any and all slack that might appear in the belt, thereby adding efficiency to the belt transmission.

These are only a few of the new features on the M. M. for 1908.

Write for details and our interesting proposition.

"Agents Get Busy."

AMERICAN MOTOR CO.

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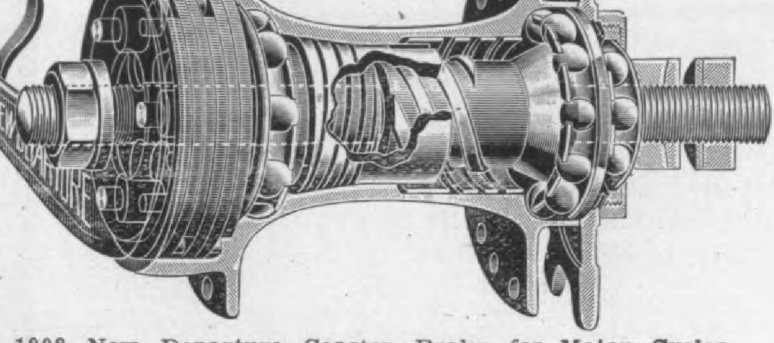
e December number. In the "R. S." g fork one larger spring has sup- ed the two formerly used. The fork has been strengthened and the head gs also. A direct drive machine is of the features of the "R. S." 1908

e of the points to which attention is d is the fact that the motor can be d centrally in the frame and not to side and yet the proper chain line is ned as well as perfect balance. The are placed separately from the r base in an oil proof case, thus d breakage occur, no damage will one to the motor parts themselves. oil proof case is not only of neat and eful appearance, but the construc- makes this machine such a clean one it is said that protection such as leg- is not necessary to keep the rider's es clean. The frame of this machine so specially designed with a view to netry.

1908 New Departure Motorcycle Coaster Brake

refining the New Departure Motor- Coaster Brake for 1908, the maker, Departure Manufacturing Co., New ol, Conn., has incorporated in it such ovements as are calculated to make ronger and more certain in action ut sacrificing its well known charac- ics and simplicity.



1908 New Departure Coaster Brake for Motor Cycles.

e new model is made in two lengths all for belt drive, namely, 5⅝ inches ⅛ inches (from outside to outside of washers), and 5⅛ inches over all for drive. These measurements adapt rake for use in the new 1908 motor- . For the chain drive a very import-

improvement is that of making it un necessary to remove the wheel from the frame to change or repair spokes. No special tools are required to remove the lock ring or sprocket. Another advantage is the avoidance of stripping threads.

The keyed sprocket becomes practically a part of the hub itself, and is rigid, strong and reliable.

At the recent Madison Square Garden Show, the New Departure Annular Two-in-One Ball Bearing was a feature which attracted a great deal of attention among motorcycle manufacturers, with the result that it is being adopted by many of the largest manufacturers for their 1908 models.

Construction, Management and Care of Motor Cycles

E. W. Keller has written a practical little book under the above title, which is published by Advance Sales Co., American National Bank Building, St. Paul Minn. The book is of convenient size to fit the coat pocket, contains about 45 pages of descriptive and explanatory matter, and is illustrated by several full-page drawings which are simple and clear. The price is 25 cents. The information contained in this book is all presented in non-technical language, which can be understood by any novice.

The "Edco" Motorcycle Tire Valve

Ch. Dien, 43 W. Thirty-fourth street, New York City, is importing the "Edco" motor-

The "Edco" Motorcycle Tire Valve.

cycle tire valves made in Switzerland. A sectional view of the "Edco" valve is here shown. This valve has been very successful in European countries and is expected to meet with a big sale in this country.

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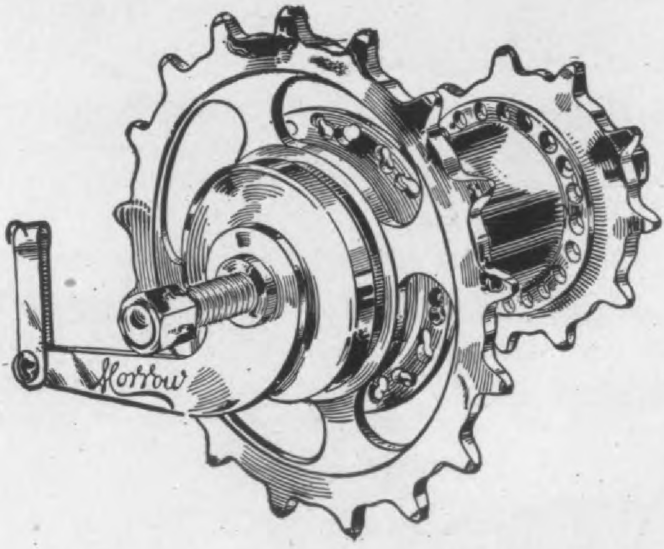
The MORROW Coaster Brake

bears the

O. K.

of time



It was first to enter the field, and ha
and always will be the first choice of man
ufacturers, dealers and riders.

Send for printed matter about our 190
models.

ECLIPSE MACHINE CO

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, of foreign make, for motorcycle use.

e "Ovico" Separate Generator Lamp for rcycles.

lamp is called the "Ovico," and sells $8.35, complete with bracket on lamp, ket for generator and connecting ng. The finish is in heavy nickel ng.

lesinger Inside Tire Repair Band

. & F. Mesinger Mfg. Co., 1801-7 First nue, New York City, are furnishing r inside tire repair band in motorcycle sizes. The band is made of extra ng fabric, has beveled edges and is lded to fit the inside of Clincher, Dun- and Fisk tires. The hooks shown near edge can be bent to fit the different

nger Inside Repair Band for Motorcycle Tires.

es of casings and prevent creeping. repair band provides a quick and ng method of overcoming defects in ngs, repairing rim cuts, blow-outs, etc. e of the 2 and 2½-inch sizes is $1.60; he 3 and 3½-inch sizes, $2.00. This l is of especial value to the motor- ist as he cannot conveniently carry e tires as can the automobilist.

deal Plating Company Growing

e Ideal Plating Co., 3 Appleton street, on, Mass., has lately increased its tory remains to be allotted to agents b the Ideal Plating Company, and it want to hear from agents who desire to repre sent such a line.

"Mattson" Sponge Rubber Handle Bar Grips

The Mattson Rubber Co., Lodi, Berge Co., New Jersey, are offering the bicycl and motorcycle trade three styles o sponge rubber handle bar grips, as follows "Perfection," made for both ⅞ and 1-inc bars; "Relief" (open both ends) made fo ⅞-inch bar only, and motorcycle size mad for both ⅞-inch and 1-inch bars.

The "Mattson" Sponge Rubber Handle Bar Grip

The latter style is a special motorcycl grip, and is made extra large being 4½ inches long, and having extra heav sponge rubber walls, to take up as muc vibration as possible. These grips ar all made of a special fine soft cushion rub ber stock.

Only Three Motorcycles in Chicago Reliability Run

There were only three entries in th Chicago Motorcycle Club's three-days' re liability run. Samuel T. Kellogg, Spring field, Mass.; Charles Van Sickle, Han mond, Ind., and J. A. Turner, Chicago, Ill each mounted on a Indian. The daily run averaged about 200 miles, and all thre finished with perfect scores. The firs day's run, November 26, was from Chicag to Rockford, Ill., and return; second da to Ottawa, Ill., and return, and Novembe 28 to South Bend, Ind., and return.

Motorcycles at Chicago

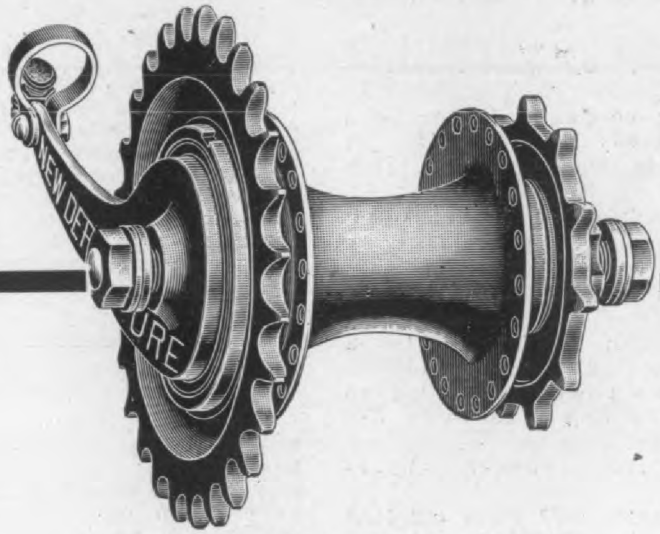
The motorcycle exhibit at the Chicago Aut mobile Show was composed of the followin exhibitors:

Aurora Automatic Machinery Co., Aurora, Ill Auto-Bi Co., Buffalo, N. Y.; American Moto Co., Brockton, Mass.; Armac Motor Co., Chicag Ill.; Consolidated Mfg. Co., Toledo, Ohio; G. H Curtiss Mfg. Co., Hammondsport, N. Y.; Exce

New Departure

Coaster Brakes

for Motorcycles



1908 *Model*

MODEL BB FOR CHAIN DRIVE

The 1908 Model New Departure Coaster Brake for Motorcycles

is the simplest, strongest, and surest.

A new feature in the New Departure Coaster Brake for chain drive machines is the keyed sprocket on the motor side. The sprocket is held rigidly and practically becomes a part of the hub.

Handle New Departures and give your patrons the very best.

WRITE FOR QUOTATIONS TODAY

NEW DEPARTURE MANUFACTURING CO.

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Answers to Motor Cycle Queries

FOREIGN Vs. AMERICAN MACHINES

15 Pierrepont St., Brooklyn, N. Y.

May I trouble you to answer the following questions:

1. How many makes of N. S. U. Motorcycles are there? In your motorcycle review you gave the N. S. U. as being made by the Leader Specialty Co., of Bradford, Pa. In the advertisement it speaks of it being "Englands best" and is imported by J. T. McLaughlin, of New York. The pictures in the advertisement and that in the review look very similar. The review gives only one-cylinder model and gives it as 3½ horse power at $205. The advertisement gives it as 2½ horse power at $225. In your March "Answers to motorcycle queries," a correspondent speaks of the N. S. U. as German.

2. Do all motorcycles that have magnetos use no coil? Why do they use a spark plug, jump spark ignition or a make and break.

3. Are foreign motorcycles considered better than American built machines?

4. What is the fastest speed made by a motorcycle? By whom? By what machine? When? Where?

5. Is a motor hung vertically better than one hung slightly inclined? If so, why?

6. How are motorcycle two speed and clutch affected?

7. What are the position of cranks on a two-cylinder motor?

8. Is not a movable Idler used as a clutch a good thing? If not, why? An example is the "Geer."

9. Is magneto ignition preferable to a battery? Is it more trouble? Is it simpler?

10. How much horse power is needed to have a motorcycle take any reasonable hill at 40 M. P. H.?

11. Are there any three-cylinder motorcycles.

12. Which is the simpler and most efficient a suction or mechanical valve?

I read your journal well each month, and I am especially interested in the queries. Hope this department may increase.—K. W. H.

The N. S. U. is made in Germany. There are several models, three single cylinder machines of 331-402-454 cubic centimeters capacity, or 3-3¼-3¾ H. P. respectively. A twin cylinder of 662 cu. centimeters capacity or 5 H. P., but as to price on the American Market I would refer you to the importers. A coil is necessary with jump spark ignition. Some magnetos have a separate coil, others have the coil in conjunction with the armature. The make and break system of wipe spark when used with magneto requires a coil.

Foreign machines are considered by some to be superior to the American made, and that claim has some merit inasmuch as the foreigners seem to have placed the industry on a more substantial basis than we. At the same time foreign machines are made to meet the demands of foreign roads and conditions, which may be very much at variance with our own.

I recall a conversation had with an Englishman in the push bicycle days, after explaining the merits of the rim brakes, the steel rim and other foreign innovations, he picked up his bike exclaiming with great pride, "eft hit, eft hit see ow solid hit is," and so it was, it tipped the scale at 45, when an American rider would not think of pushing more than 25 pounds.

In the manner of control, simplicity and neatness from an American point of view, the foreigner does not have any advantage I believe that we will be sending the American motorcycle into the European market just as we did the push bicycles, before the industry is many years older.

I understand that Wray, of your city on a Simplex has ridden a mile officially in 38 seconds, this is the fastest that I know of. A movable belt idler of a proper design may be used very successfully as a clutch. There should be a rack or other suitable means for holding the idler to the proper tension on the belt. The idler pulley should be of a generous size mounted on substantial ball bearings.

Magneto ignition is preferable to the battery when one has the price and the assurance that it will not go wrong. One cannot be absolutely stalled for the want of a battery for these are procurable almost anywhere, but when a magneto refuses to spark an expert may be many miles away. I recall a particular instance where a rider who had come several thousand miles to enter an endurance contest, was obliged to abandon the run in the first stages owing to the failure of his magneto, however, I am satisfied that the battery will have to be discarded in time, but while watching development the battery at 75c per 1000 miles is not such a bad proposition.

A machine of 3½ H. P. can be geared to travel at the rate of 40 miles per hour on good level roads, and with a 150 pound rider climb a gradient of about 12 per cent, without assistance from the pedals. I do not know of any 3-cylinder motorcycles. A suction valve is simpler, but a mechanical valve is said to give greater efficiency. I have never seen a reliable report on a comparative test, and believe that the gain in power is only slight.—C. E. D.

WHAT IS THREE HORSE POWER?

I am a motorcycle rider and a constant reader of the Journal. My machine is rated three horse power, and I can climb almost any hill in this locality (and we have some very steep ones), but there is one which sticks me, as it does every thing else propelled by motor that has ever attempted it. I admit it is a tough one, but what I cannot understand is this: The machine and my weight combined is something over 300 pounds. I have been over this same hill in a wagon pulled by a horse, the wagon alone weighed more than the combined weight of myself and motor.

How do you account for the fact that one real horse can do more than three mechanically rated horses? Does a horse power in any way mean the capacity of one horse; if so, what do you reckon as a basis for what a horse can do?—E. A. R.

The horse power is reckoned as 33,000 foot pounds, which is the product of weight in pounds lifted by velocity in feet per minute; thus, if a motor putting out its normal work can lift a weight of 100 pounds 330 feet in one minute, it would be rated one horse power delivered. This same motor could be geared to lift 10 pounds 3300 feet in one minute or 3300 pounds 10 feet in one minute. Multiply the weight in pounds by the distance raised in feet per minute, and divide the product by 33,000, and you have the horse power.

The reason a motorcycle will be stalled on a hill is because the gear is too high, for the motor must run at a certain rate of speed in order to develop its full capacity. The manufacturer usually gears the machine in such a way that it will have a fair speed on the level and still have sufficient hill-climbing capacity for overcoming most any hill. I take it the hill you refer to is a very unusual one.

There is a tendency now toward a variable speed transmission for motorcycles which will enable the rider to use a very high gear for level roads, and a low gear for hill-

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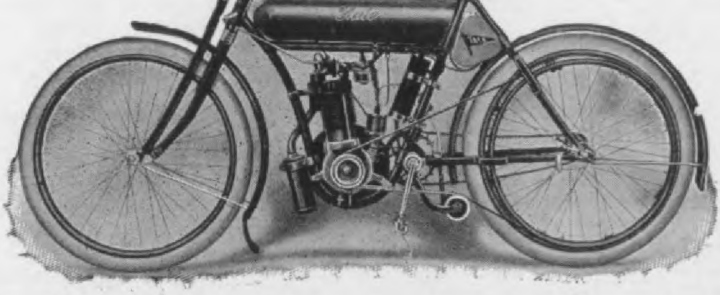
Yale-California MOTOR CYCLE



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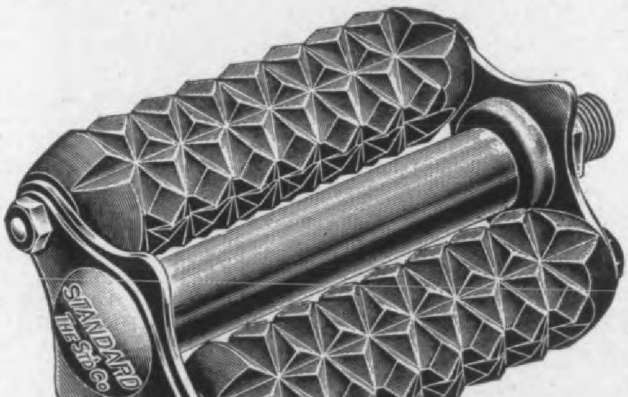

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Special Features:—Large bearings, same size on both ends, insuring perfect running qualities; balls 5/32″ diameter; axles ¾″ stock; broad rubber tread deeply corrugated, giving firm foothold—foot cannot slip.

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climbing. Such an arrangement, of course, adds to the expense and complication of the machine. Something cheap, simple and effective is what is desired.

A horse by reason of its peculiar anatomy can adapt itself to put forth its best energy at varying speeds, and this is what enables it to pull a load up a hill that would stall a motor of several times the power of the horse, but its ultimate average work is very close to the standard of 33,000 foot pounds, as this rating was based on the work of an average dray horse working steadily thru a considerable period of time. A motorcycle can travel fifty to fifty-five miles per hour and keep it up indefinitely, while the limit of a horse is not more than fifteen if kept at it steadily. This proves that the rating is somewhere near in proportion to ultima capacity with the proper gear ratio.

A man can do work with the aid of levers that would stall a horse. For instance, a horse cannot raise a building if hitched directly to it, but it is an easy task for a man with a jack screw, and that is only another way of reducing the gear. The legs of a horse act as levers, which can be applied thru a limited variable degree of pressure, and this enables it to pull a heavy load at a low rate of speed, and a light load at a high rate of speed.—C. H. M.

COMPRESSION LEAK HARD TO FIND.

Chicago, Ill.

My cyclemotor is three horse power. When you turn it over it seems like it leaks somewhere around the cylinder head. We ground both valves sufficiently, and put a gasket around the spark plug, but it leaks yet somewhere.—H. L. WOOD.

If there are no defects in the casting of the combustion chamber, such as a crack, sand hole, or blow hole, then the leak must be in some joint, or past the piston rings, as you say you have ground the valves properly, and put a gasket around spark plug. To detect a leaky joint apply soapy water around the joints, turn the motor on the compression and bubbles will develop at the leak. Cylinders will some times warp out of round, in which case it is impossible to make the rings hold the compression. The remedy for this is to have the cylinder reground.—C. H. M.

MOTORCYCLES WITH CLUTCHES.

Can you inform me thru your motorcycle department regarding any makers of motorcycles with a clutch and starting crank, or any makers of motor tricycles with package carrier in front and clutch to allow of independent starting of motor?—ARTHUR L. TABER.

The only device now of American make on the market is the Lang two speed gear which is applied to the Harley-Davidson. Quite a number of foreign made machines have two speed devices on tri-cars, both delivery and passenger. The N. S. U. has such device in both single and tri-car models. Imported by J. F. McLaughlin, 148 East Forty-ninth street, New York City, N. Y.—C. H. M.

(Note.—The "Delaware" motorcycle, just placed on the market by Grube Motor Co., Delaware, O., is fitted with a multiple disk clutch allowing a free engine, which we presume is started by turning the exposed flywheel.—Ed.)

Providence Motorcycle Club's Hill Climb

B. A. Swenson, riding a 3 h.p. Indian motorcycle, won two of the three events in which he started in the Providence Motorcycle Club's hill climbing contest on Stump Hill, Pawtucket, R. I., on Thanksgiving Day. The record of 60 3-5 seconds made over this half-mile course last year by L. F. Baldwin with a 20 h.p. steam automobile, was broken no less than fourteen times during the day.

The following is part of the summary, only showing those who covered the course in less than 60 3-5 seconds.

For motorcycles not exceeding 20 cubic inches piston displacement.

	Time.
E. L. Buffington, 1¾ h.p. Indian	0.50
F. Wilkinson, 2¼ h.p. Indian	0.52

For motorcycles not exceeding 30½ cubic inches piston displacement.

B. A. Swenson, 3 h.p. Indian	0.42
J. McLaughlin, 3 h.p. Merkel	0.51
E. L. Buffington, 1¾ h.p. Indian	0.51 1-5
F. Wilkinson, 2¼ h.p. Indian	0.53 4-5

For belt-driven machines, not exceeding 3 horse-power.

J. McLaughlin, 3 h.p. Merkel	0.55

Free-for-all, restricted to Rhode Island riders.

B. A. Swenson, 4 h.p. Indian	0.44
F. E. Domina, 3¼ h.p. Domina	0.45 2-5
F. Wilkinson, 2¼ h.p. Indian	0.51 4-5
D. V. Reiley, 2¼ h.p. Indian	0.57
E. L. Buffington, 1¾ h.p. Indian	0.58 2-5

Growing use of Motor and Pedal Cycles by Police Departments

This is an age of speed, to which the automobile adds the finishing touch, yet it is thru the bicycle and the motorcycle that speed maniacs are now controlled, and taught due respect for the law. That wheel-mounted officers furnish the solution of this problem was grasped slowly by the police authorities, but the lesson has been learned very thoroly. Wheel squads, which were dying out a few years ago, are being formed all over the country, and those already organized are held in such high favor that the tendency is to increase the size of them as rapidly as possible.

In the one hundred largest cities of the United States, more than half of the police departments have or will have wheel squads at once, and the following tabulation furnishes some interesting comparisons:

	Bicycles	Motorcycles		Bicycles*
New York, N. Y.	155	15	New Haven, Conn.	3
Philadelphia, Pa.	12	28	Cambridge, Mass.	4
St. Louis, Mo.	0	2	Atlanta, Ga.	40
Boston, Mass.	5	0	Richmond, Va.	10
Wilmington, Del.	0	2	Hartford, Conn.	7
Baltimore, Md.	1	1	Trenton, N. J.	4
Cleveland, Ohio.	13	0	Bridgeport, Conn.	4
Buffalo, N. Y.	7	4	New Bedford, Mass	10
San Francisco, Cal.	2	2	Springfield, Mass.	2
Pittsburg, Pa.	20	0	Evansfield, Ind.	6
Detroit, Mich.	0	4	Erie, Pa.	2
Milwaukee, Wis.	0	1	Elizabeth, N. J.	3
Washington, D. C.	60	0	Holyoke, Mass.	2
Newark, N. J.	14	5	Saginaw, Mich.	8
Louisville, Ky.	33	0	Lincoln, Neb.	1
Minneapolis, Minn.	5	0	Binghamton, N. Y.	1
Providence, R. I.	8	0	Augusta, Ga.	10
Rochester, N. Y.	6	4	Columbus, Ohio.	2
Toledo, Ohio.	0	6	Birmingham, Ala.	4
Worcester, Mass.	4	3	Lowell, Mass.	4

*Those in this column have no motorcycle squad.

New York City will shortly double its motorcylces squad. Chicago has neither pedal or motorcycle squad.

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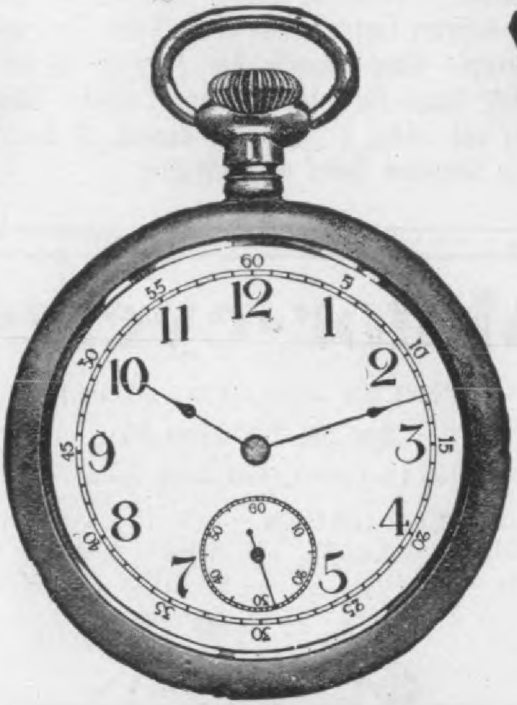

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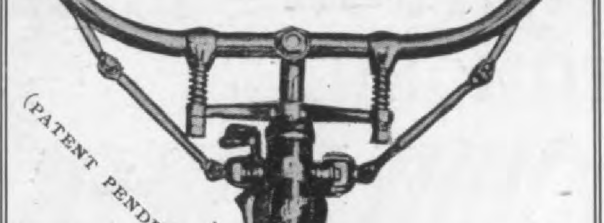

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1908 "Torpedo" Motorcycles

The Hornecker Motor Mfg. Co., Whiting, l., includes two new models in its line "Torpedo" motorcycles for 1908, one of ich has a Thor outfit, and the other imported motor called the "Antoine." Besides these models a twin cylinder or type machine listing at $275, will obably be ready in a few weeks. The cing of the motor and the disposition its accessories on the 3 H. P. Model is like the usual Thor design, the motor ng placed vertically in a low loop in frame. The muffler is placed in front the crank case and consists of two cylrical chambers; in one the exhaust is banded, and in the other is broken up that the noise is deadened. As this ffler is said to produce no back pressure the engine the maker claims that no -out is needed; hence none is provided. conspicuous feature of this model is the cing of the crank hanger above the gine driving chain. The spring fork is same that has been used for three ars past, no improvement having been nd possible. The tank contains fuel, battery and coil. The battery comses three dry cells which are strapt ether with the coil. The equipment of del C includes a "Person's Motor Seat" l 2¼-inch G & J or Goodrich tires. The ight of this machine is 125 pounds, ish, bright vermillion and list price $225. side car attachment is furnished at $75. The other new model is Model D, and ists at $225, same as Model C. The 4 P. Antoine motor, by which it is driven, s a 3⅜-inch bore and a 3¼-inch stroke, l is placed vertically in the frame, ich is not looped as on Model C, but ries attaching brackets at the ends of seat mast and front stay, these brackets ng bolted to the crank case, front and r. A compensating sprocket is fitted this model and its equipment includes Splitdorf coil, Dunlop 2¼-inch tires, to $150. It is driven by a 2¼ H. P. Th motor, has the Torpedo spring fork, Th coaster brake, compensating sprock Empire (imported) saddle and weighs 1 pounds.

A racing machine, known as Model weighing 110 pounds is also offered. general specifications are same as Model C, but it is built lower, has a wh base of only 44 inches, and is fitted w G & J 1¾-inch tires. Price is $225.

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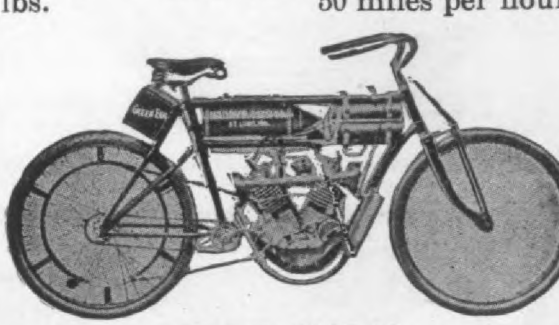

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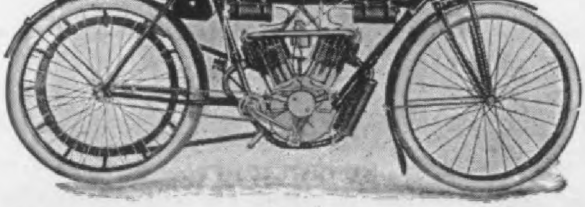

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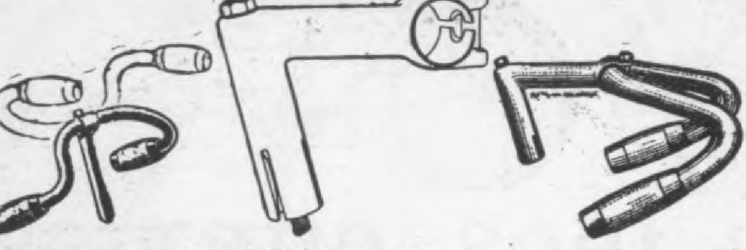

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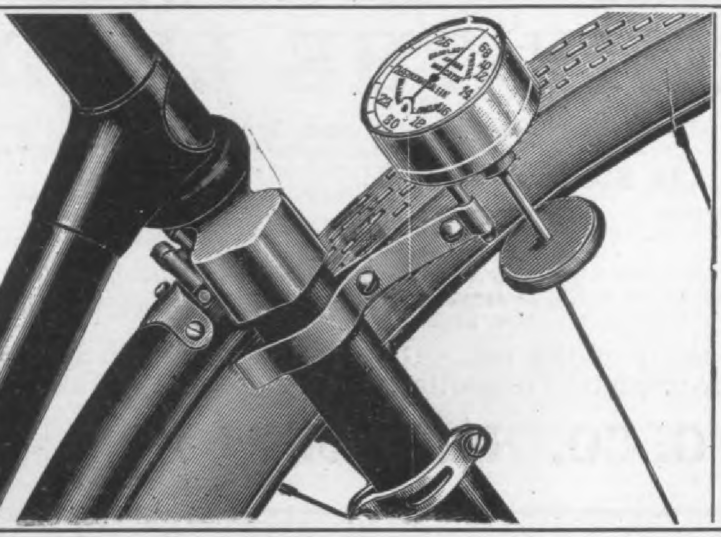

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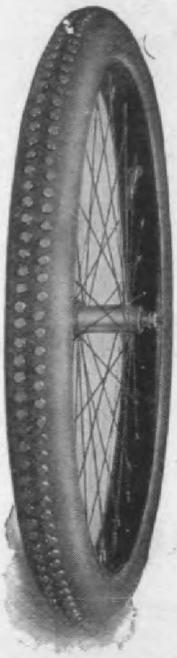

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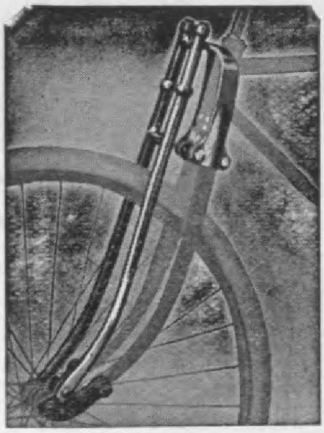

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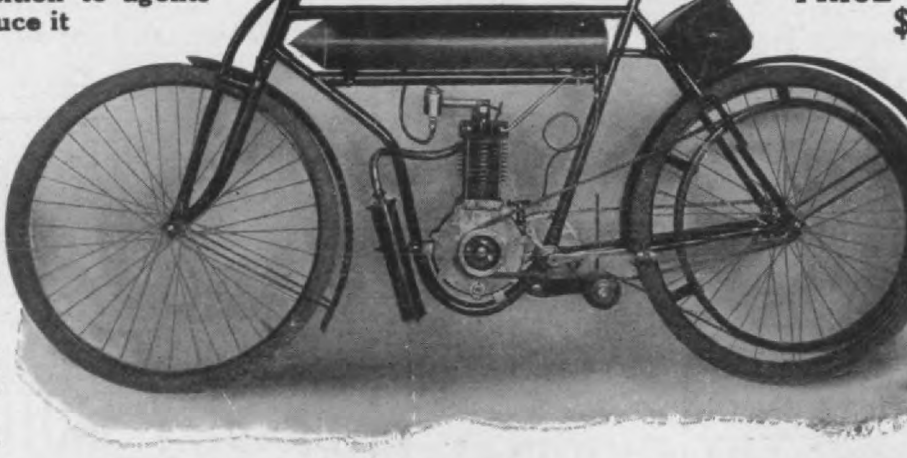

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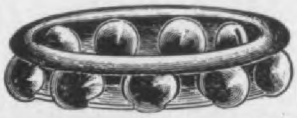

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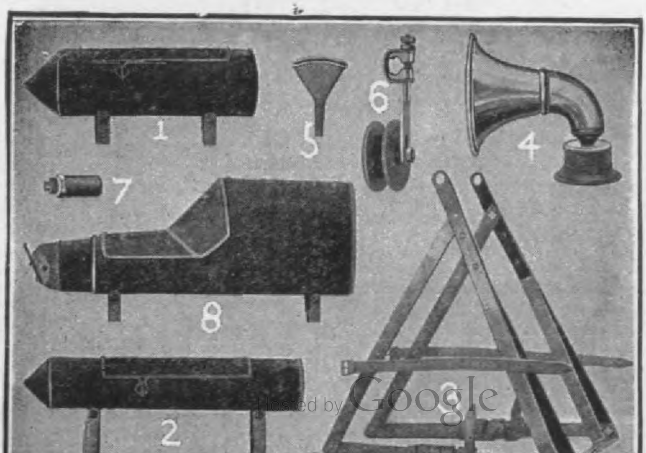

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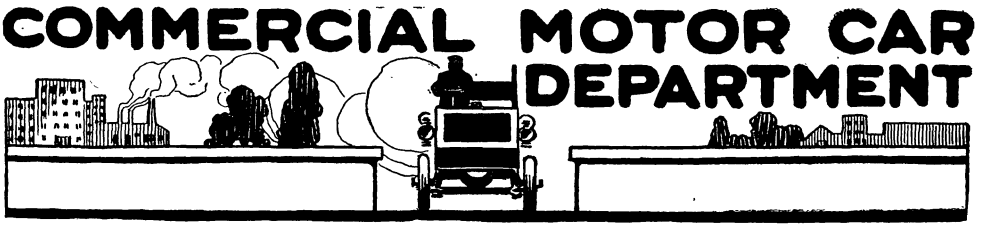

The Commercial Car Show at Chicago

Special prominence was given the commercial car exhibits at the Chicago Automobile Show, November 30 to December 7, by having them placed in a separate building, these exhibits having been displayed in the Seventh Regiment Armory. This commercial car section comprised 22 separate exhibits of complete car makers, besides the various tires, etc., shown in the same building.

There was much talk among the commercial car makers of forming a separate association for the purpose of conducting independent commercial shows in the future, the general consensus of opinion being that by such an arrangement the expense would fall much more lightly on each exhibitor as a separate commercial show could be conducted more economically so far as the commercial car makers are concerned than as an adjunct of a pleasure car show. It was also the opinion of the commercial car exhibitors that the accommodations afforded them at Chicago were not what they should be, and the makers felt that this defect could also be remedied in the future by holding a show under their own direct management. Several meetings were held during show week at which the commercial car show project was thoroly discussed.

A summary of the complete car exhibits is given below. Besides these there were commercial car tires exhibited by Hartford Rubber Works Co., Hartford, Conn.; Firestone Tire & Rubber Co., Akron, O.; Morgan & Wright, Detroit, Mich.; Diamond Rubber Co., Akron, O., and Goodyear Tire & Rubber Co., Akron, O.; roller bearings by Timken Roller Bearing Axle Co., Canton, O.; batteries by National Battery Co., Buffalo, N. Y.; universal joints by Hartford Auto Parts Co., Hartford, Conn., and a line of forgings by Atlas Manufacturing Co., Fostoria, O.

SUMMARIES OF COMMERCIAL CAR EXHIBITS.

AMERICAN MOTOR TRUCK CO., Lockport, N. Y.—"American" Motor Trucks, with various types of bodies on 3 and 5-ton chasses.

COMMERCIAL MOTOR CAR CO., Times Building, N. Y.—"Safir" 4-ton truck, made in Zurich, Switzerland.

COMMERCIAL MOTOR TRUCK CO., Plymouth, O.—"Plymouth" Motor Trucks.

COPPOCK MOTOR CAR CO., Marion, Ind.—"Coppock" 2-cycle truck.

COUPLE GEAR FREIGHT WHEEL CO., Grand Rapids, Mich.—"Couple Gear" electric trucks and delivery wagons.

GIFFORD-PETTIT MFG. CO., 1217 Devon street, Chicago, Ill.—"Gifford-Pettit" 3-ton, 4-cylinder, gasoline truck.

FRANKLIN, H. H. MFG. Co., Syracuse, N. Y.—"Franklin" air-cooled, trucks and delivery wagons.

KNOX AUTOMOBILE CO., Springfield, Mass.—"Knox" waterless commercial cars.

LAMBERT MOTOR TRUCK CO., Anderson, Ind.—"Lambert" Friction Drive Trucks.

LEAR, OSCAR AUTOMOBILE CO., Columbus, O.—"Frayer-Miller" air-cooled trucks, made in one, two, two and a half and four-ton sizes.

LOGAN CONSTRUCTION CO., Chillicothe, O.—"Logan" commercial wagons for all purposes.

MEISELBACH, A. D. MOTOR WAGON CO., North Milwaukee, Wis.—"Meiselbach' 'one, two and three-ton commercial cars.

MITCHELL MOTOR CAR CO., Racine, Wis.—"Mitchell" trucks.

PITTSBURG MOTOR VEHICLE CO., Pittsburg, Pa.—Electric delivery wagons.

POPE MOTOR CAR CO., Hartford, Conn.—"Waverly" electric deliveries and service wagons.

RAPID MOTOR VEHICLE CO., Pontiac, Mich.—"Rapid" commercial cars in all forms and sizes.

RELIANCE MOTOR CAR CO., Detroit, Mich.—"Reliance" trucks.

SAYERS & SCOVILLE, Cincinnati, O.—Air-cooled motor trucks.

STUDEBAKER AUTOMOBILE CO., South Bend, Ind.—"Studebaker" electric commercial wagons.

THOMAS, E. R. MOTOR CO., Buffalo, N. Y.—"Thomas" taxi-cabs.

WEEKS COMMERCIAL VEHICLE CO., Chicago, Ill.—"Weeks" commercial cars.

WORTH MOTOR CAR MFG. CO.—"Worth" friction drive commercial cars.

British Commercial Vehicle Trials

The recent English commercial vehicle trials organized by the Royal Automobile Club proved without doubt the most successful ever held, and fully demonstrated to the public their reliability and usefulness. Fifty-three of the sixty starters survived the test, which lasted for a period of five weeks.

The vehicles, starting on September 9, proceeded from town to town, along a route from London, embracing Bristol, Liverpool, Sheffield and the Midlands, returning to London the second week in October. The mileage per day varied from thirty to seventy, according to their class, the classification being based upon the net load. Exhibitions interrupted the tour at Bristol, Birmingham, Liverpool, Manchester, Leeds, Sheffield, Nottingham and Bedford.

The Firestone Dual Tread Tire, manufactured by the Firestone Tire & Rubber Co., Akron, Ohio, and described in our July 1907 issue, page 140, has recently been improved by corrugating the surface of the two ridges of rubber extending around the tire, thereby giving it additional traction and reducing the liability of skidding.

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Experiences of Commercial Motor Car Users

"Thinks Motor Cars Should Have More Simplicity"

Diney, Nachbaur & Co., Joilet, Ill., have been using two 10 horse power Cadillac gasoline delivery cars for delivering light packages in the city of Joilet, which has about 40,000 inhabitants.

The cars cost $950 each, and have been in use for 2 and 3 years, respectively. Each car makes 4 trips daily, with about 25 calls per trip, making an average of 50 miles per day. The average weight of load carried is 500 pounds. Gasoline and lubricating oil is figured at $15 and $5 per month per car respectively. Average monthly cost for repair work and repair parts is $50 per car. This concern stores its car at their own storage house. They pay their operator $65.00 per month and the helper $40.00. They have not experienced any trouble in securing a competent driver. They figure the car to depreciate 40 per cent. in value each year.

The most needed improvement suggested by their experience lies in the tires, which they claim to be their greatest expense. They consider speed to be the greatest advantage of the motor car over the horse vehicle.

In order to meet the requirements of their business they state the motor car should possess greater simiplicity, be geared so as to prevent excessive speeding, and be fitted with solid tires.

Government Uses Electric Vehicles

The Department of Commerce and Labor, Bureau of Standards, Washington, D. C., has at the present time in use two delivery wagons of the electric type. One of these machines has been in use for several years, and being of rather an early type it has numerous features of construction not found in a modern delivery vehicle. Among these may be mentioned pneumatic tires and the motors attached to the running gear which is considered the most serious defect, since all the vibration is transmitted directly to the motor brushes, and in consequence causes no end of commutator troubles. They are, however, using this machine, which is of 1000-pound capacity, when for any reason their larger machine is out of service. The second machine referred to, which is of 2000-pound capacity, has been in service about four months, hauling freight, express mail and general supplies between the Bureau and the city proper. The Bureau's buildings are located somewhat in the suburbs, the roads traversed being partly asphalt and partly macadam with one grade of 11 per cent. This machine has covered 46 miles, fully loaded over the average city streets on one charge of the battery. The machine is equipt with one motor, the nominal horse power of which is 2.85. The battery consists of 44-13 MV Exide cells. The average daily load is about 1500 pounds and the average mileage covered each day is approimately 15, with about 8 to 10 stops per day. They store this car at their own plant, having also their own generating equipment. Having other storage batteries to care for in connection with their plant, they find it advantageous to care for this machine themselves rather than to store it at a garage. Garage storage is ordinarily to be preferred where but a few machines are being operated, since in this case the expense of employing a competent battery man for the few machines would probably cost more than garage storage, in other words too much stress cannot be put upon the importance of the proper care of the battery of an electric machine. The neglect of this feature will determine in most cases whether the vehicle is a success or a failure. The most needed improvement in motor cars suggested by their experience, is a lighter battery. Concerning the driver, they have proceeded on the theory that to employ a man of intelligence and make him responsible for the maintenance of the machine is the best policy. The battery washing and repairs of any considerable extent are done by the regular mechanics employed at their plant.

Logan, 1908, Trucks are very excellently illustrated and described in a handsome big catalog just issued by Logan Construction Co., Chillicothe, O. As good stock, elegant taste and high-grade engravings have been used, the catalog makes a good impression at first glance, and as the descriptive matter is of a really informative and practical nature, the man who is thus induced to read it is well satisfied that the time thus spent is well spent.

A piano dealer who sells a great many instruments thruout the Middle West has placed his second order for a large Frayer-Miller truck capable of carrying four pianos and with sides which fold out, providing room for people to examine the pianos. This truck is to be sent thru the Middle West with the purpose of selling pianos to the farmers. This scheme has proved a success with a horse-drawn truck which carried only one piano. The truck not alone carries four pianos, but will travel at nearly four times the speed of the horse-drawn truck. It is the product of Oscar Lear Automobile Co., Springfield, O.

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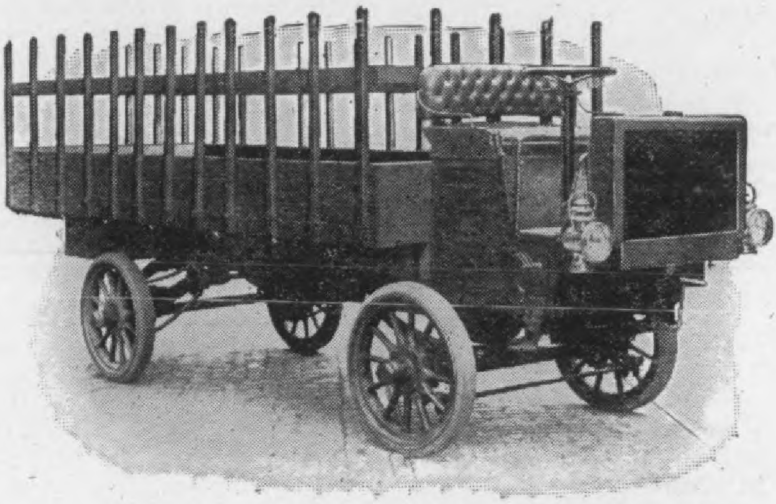
RELIANCE 1908 DETROIT



DO YOU KNOW we are today *building* and *sellin*

2 CYLINDER, 2 to 2½ ton Trucks
3 CYLINDER, 3 ton Trucks
4 CYLINDER, 4 ton Trucks

EACH CAPABLE OF A 25% OVERLOAD?

THESE THREE SIZES constitute the ONLY capacities for ECONOMICAL trucking : : :

Ask for catalogue and prices

RELIANCE MOTOR CAR CO

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"Quicker and Better Service—Perfect Satisfaction"

In enumerating his experience with the motor car in the passenger transportion business, Mr. Harry L. Briscoe, manager of the Dingman's Ferry & Bushkill Auto Co., Dingman's Ferry, Pa., expresses himself very enthusiastically in favor of motor cars as a means of transportation.

He has been using a Rapid 24 horse power gasoline car, manufactured by the Rapid Motor Vehicle Co., and which he states has been very satisfactory to him. This car employs a double opposed motor. The price of the car is $3200. With this car an average weight of 3000 pounds is carried per trip, of which two are made each day, making a total of about 50 miles per day. The operator is paid $75.00, no helper being employed. Mr. Briscoe states that with good care the depreciation of the car figures very little. The average charge per month for charging of battery is $1.50.

The car is fitted with a set of Firestone solid tires costing $280, which have been in use for 2 years, and are claimed to be as good as new. They have had considerable trouble in securing a competent driver, but have gotten over the difficulty by taking home men who are interested in the company's welfare, and training them into the work. The most needed improvement in motor cars as suggested by their experience lies not in the motor car itself, but in the driver who they state should be one who will take an interest in his car and not neglect it when out of order.

Hewitt Truck Hauls Coal Very Successfully

Herbert Brothers, of New York City, dealers in coal, during last October placed in service a 5-ton Hewitt coal carrying truck, built by the Hewitt Motor Co., 6-8-10 East Thirty-first street, New York City, which has been making regular deliveries in New York since that date.

The tentative arrangement entered into with the Herbert Brothers was that they were to pay the Hewitt Motor Company 40 cents per ton of coal delivered on their average haul, which they considered was about two miles out and two miles back. It is claimed that at this price, which was the very lowest of any haulage made, the truck can compete with horses and make money for its owners. In any haulage where feight can be had in both directions the truck will of course earn double this amount of money, even at these very low rates. The truck was originally designed for 5 tons, but has worked so satisfactorily that the load was increased to 6 tons without giving any trouble in any of the parts. The truck hauls 6 tons up a 4½ per cent. grade on the high speed with ease. When running under 6-ton load the gasoline consumption varies from 2 to 3 miles to the gallon. This can probably be reduced by more careful attention to the carburation, as other cars of the same design are running 3½ to 4 miles to the gallon with equal loads.

On short hauls with heavy loads the truck is found to compete with horse haulage in good weather, and in icy or snowy weather, or in the heat of summer, its cost is much less than horses. Beyond 2 miles the truck becomes much cheaper than horse haulage, and when the distance exceeds 10 or 12 miles the cost is less than one-half of horse delivery.

A week's record taken from November 11 to 16, inclusive, of the Herbert Brothers deliveries, shows an average of 7 1-3 loads hauled at an average of nearly 30 miles per day. The average daily weight carried for that week was 89,516 2-3 pounds.

A three months' cost sheet from the New York Telephone Company, also users of a Hewitt truck, shown herewith, illustrates how they figure their expense.

Monthly record, 5-ton gasoline truck, 1907:

	Aug.	Sept.	Oct.
Wages	$105.25	$98.07	$122.64
Garage	45.00	36.50	26.75
Gasoline	50.75	37.00	39.30
Oil	17.00	23.80	27.75
Tires	.....	.....	84.02
Repairs	.....	5.68	1.45
Monthly mileage	540	514	601

Interest at 5 per cent. is figured at $235.00; insurance, $50.00; depreciation at 10 per cent. equals $470.00, or a total of $755.00 per year.

After more than two years' experience with these cars the Hewitt Motor Company have made up the following schedule of operating cost, which has been arrived at from consultation with various customers using the cars in different lines of service. This schedule has been shown to a great many factory superintendents, and they regard it as extremely fair and reasonable. The schedule embodies the maximum of expense and will not be exceeded. The tire allowance is rather larger than is found to be necessary, but this is what the maker of the tires will guarantee on this truck. The repairs and maintenance of the car are rather less in practice than shown in the list.

Cost of operating the Hewitt 5-ton truck for one year, considering contingencies, is as follows: Price of chassis, $4500; price of body, $200; 300 working days; 40 miles of operation per day; 10,000 pounds per load; depreciation per year figured at 20 per cent. is $940.00; interest at 6 per cent. equals $282; gasoline, $450.00, counting 3.75 miles per gallon; lubricating oil, $90.00, 40 miles to the gallon; insurance, $47.00; tires, $800.00; overhauling, $200.00, and repairs, $150.00. The total figures to $3,859.00 for one year, or $12.86 per day, or 32 1-7 cents per mile or about 6½ cents per ton mile.

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7 to 1

is the preference in solid tire equipment at the two New York Shows voluntarily expressed in favor of

"Firestone"

Side-Wire Motor Tires
The World's Standard

37 cars equipped with Firestone Solid Motor Tires
5 equipped with nearest competing type and make

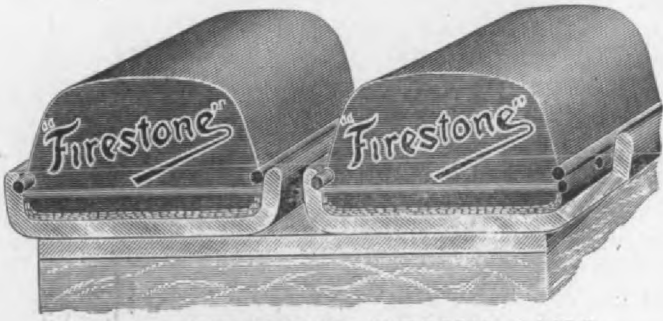
Seven other competitors divided the remaining twelve sets. Every Firestone Tire was bought and paid for at regular prices.

Firestone Tire & Rubber Co.

AKRON, OHIO

BRANCHES AND AGENCIES EVERYWHERE

SINGLE MOTOR TIRE



DUAL TIRE FOR HEAVY CARS

The Standard Tire of the World for Commercia

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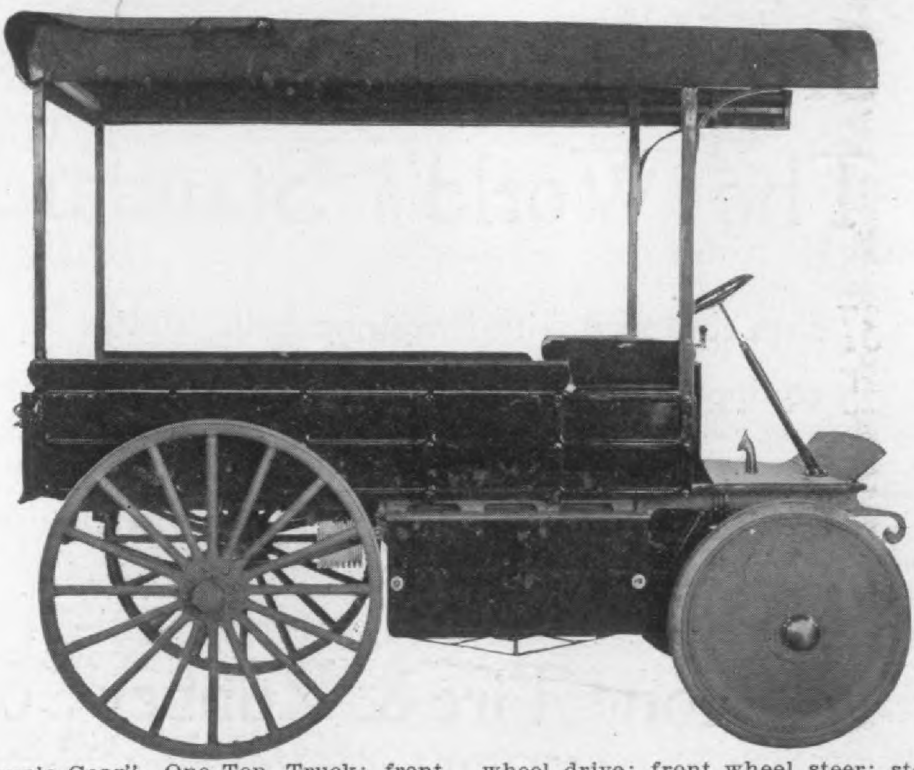
models being new this season. The
e "Couple-Gear" is evolved from
uple-Action," which is the principle in-
ed in the peculiar method of applying
power of the motors to both sides of
wheel, and to which method is at-
uted a very large increase in the ac-
amount of work which can be done
a standard battery equipment.
he first Couple-Gear truck was pro-
ed early in 1904, and was exhibited at
Chicago Show in February of that
by the Holson Motor Patents Co.
teen months later the Couple-Gear
ght Wheel Company was granted an

tremely short space, and can be drive
backward equally as well as forward a
far as steering is concerned. This a
rangement is especially advantageous i
congested traffic and in negotiating so
places, as the rear wheels will follow ex
actly in the tracks made by the forwar
wheels. Each of the wheels is fitted wit
a fibre brake band and two foot pedal
one operating the front wheel brakes an
the other the rear, are used, thus givin
two independent sets.

CONTROL AND MOTORS.

The controller is of the company's ow
manufacture, and is of the cylinder or tro



The "Couple-Gear" One-Ton Truck; front wheel drive; front wheel steer; steel tires in th
, 2¼x48 inches.

usive license to manufacture Couple-
freight carrying vehicles. The first
bit of this company will be made at
coming Chicago Show, altho several
ks are now in regular service in Chi-
, St. Louis, Buffalo and New York.
the Couple-Gear system, which was
described in our November, 1906,
e, page 231, the motors are contained
he wheels, the power being delivered
e inside of the rim of the wheel from
opposite points. In the 1908 5-ton
hine the gear reduction is 25 to 1,
h is accomplished without the aid of
tershafts. The speed of the large
k is 5 miles per hour, loaded. All
wheels are pivoted for steering, the

ley car type, giving five speeds forwar
driving motors, each delivering power a
two points, gives great flexibility, and pre
vents any sudden strains even whe
starting from rest on a steep hill with
load.

The motors are also of special desig
and manufactured by the company. The
are series wound and are geared to driv
the 5-ton car at 6 miles per hour, at 140
revolutions per minute. They are rated a
3 H. P. each, railway motor rating givin
12 H. P., but they will easily stand, it i
claimed, an overload of more than 20
per cent. for an emergency pull. Th
company states that less than six electri
cal H. P. are required to drive the ma

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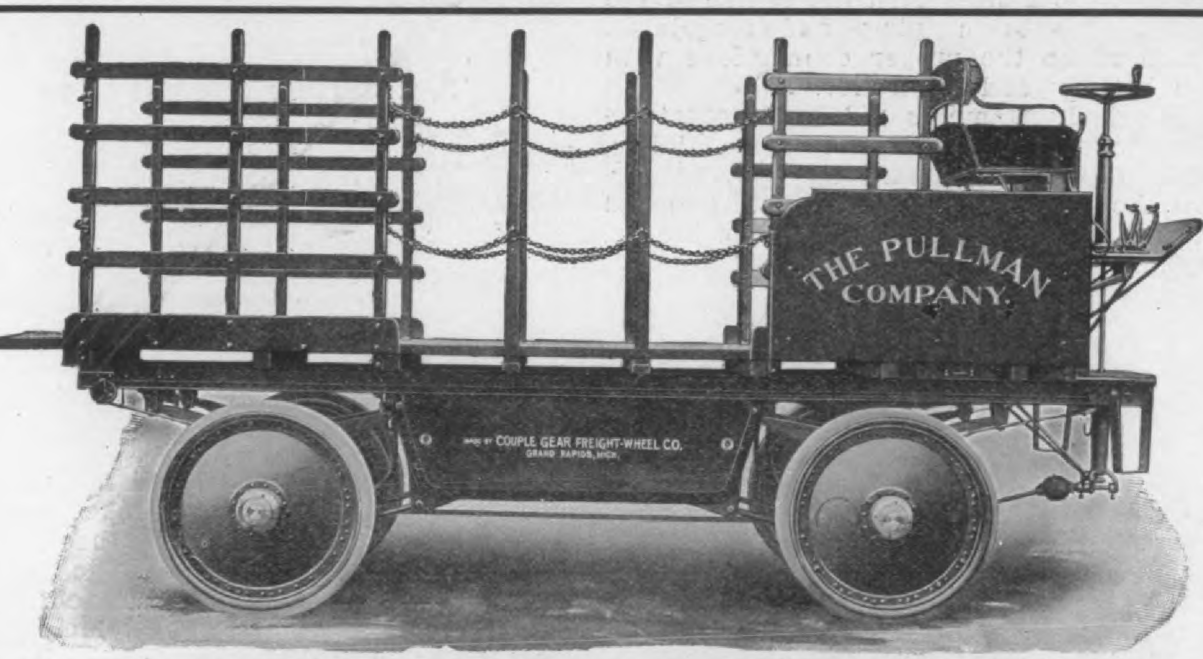
CUSTOMERS ALL SATISFIED.

1000-Pound Light Delivery. Simplest car Made. Best Record.

HEWITT MOTOR CO., 10 E. 31st St., New York City



THE "COUPLE-GEAR" ELECTRIC TRUCK

Motors Contained in the wheels. Power applied at both sides of the wheel directly to the wheel rim. Single reduction of 25 to 1. Transmission losses practically eliminated. Equipped with "Storage Battery" or with engine and generator.

FRONT-WHEEL DRIVE AND FRONT-WHEEL STEER.
FOUR-WHEEL DRIVE AND FOUR-WHEEL STEER.

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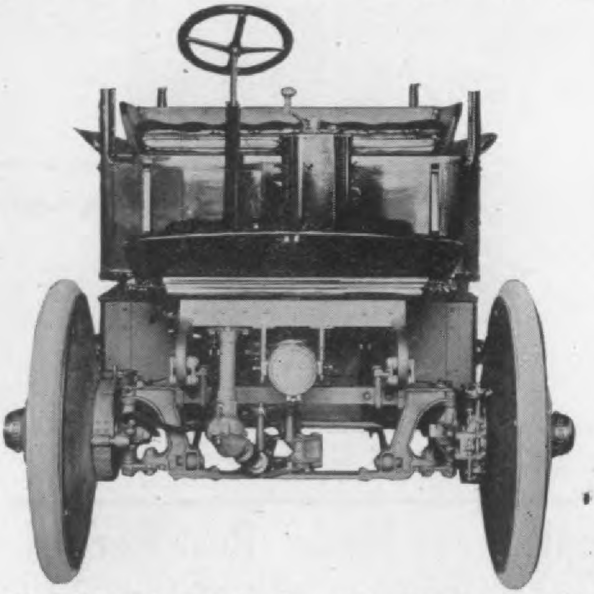
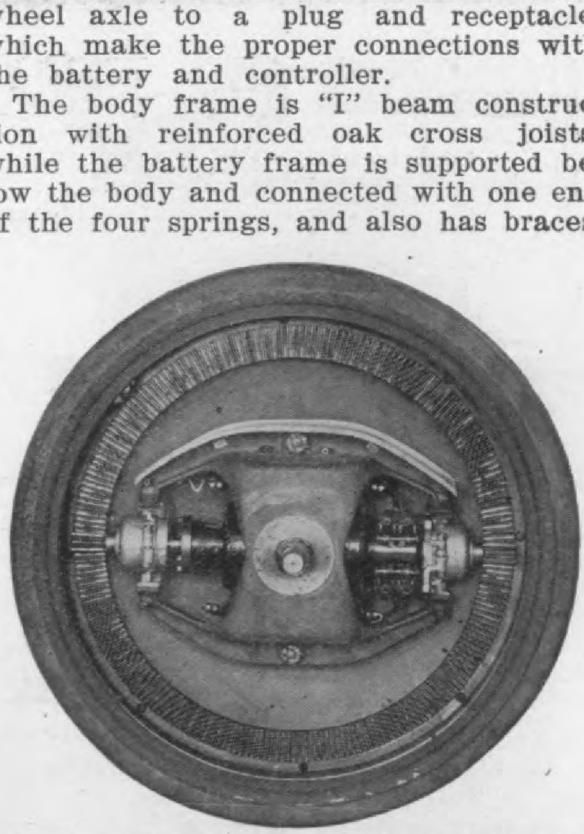
quipment on the five-ton machine consists of 4-inch twin side wire tires for oth the front and rear wheels. The xles are the same both front and rear, re of wrought steel, braced with cast steel russes, and cast steel steering knuckles



The "Couple-Gear" One-Ton Truck, showing ront axle construction, brakes and steering device; also location and style of controller.

arry the motor wheels. Flexible cables onnect the motors thru the centre of the heel axle to a plug and receptacle, hich make the proper connections with he battery and controller.

The body frame is "I" beam construction with reinforced oak cross joists, hile the battery frame is supported below the body and connected with one end f the four springs, and also has braces,



Front wheel of the "Couple-Gear" One-Ton ruck, with cover removed. The cover is bolted

THE NEW ONE AND TWO-TON MODE

The smaller models of 1 and 2-ton c city are driven and steered from the f wheels only, as it is believed that these carrying capacities four wheel ing is not necessary. The rear wheel the one-ton model are similar to thos an ordinary horse-drawn express wa being of large diameter and equipt steel tires. The front wheels are sin to the motor wheels of the five-ton tr and are fitted with 3½ inches side rubber tires. Thus it will be seen this machine has front instead of driving wheels. When specified 36- dummy wheels of the same appearanc the motor wheels in front are supplie the rear, these being equipt with the s sized rubber tires. The motor wheels the two-ton model are fitted with 5- tires and the rear wheels are supp with either rubber or steel tires at option of the purchaser. The same s of controller, giving five speeds forw and five reverse, as used on the large chine, is fitted to the smaller models. one-ton truck is capable of a speed miles per hour loaded and 11 miles hour empty, while the speed of the ton truck is 7½ miles per hour with and 9 miles per hour empty.

A Chauffeur's Moral Code

As a model code for chauffeurs, stone Tire & Rubber Co., Akron, O., compiled a set of rules printed in the f of a certificate on a hanger which l like parchment, and carries a clever tation of a very legal looking seal. code contains ten suggestive paragra each dealing with some abuse of com cial car tires to be avoided or some to be taken for the purpose of getting of tires all the "life" and service the in them.

The chauffeur is cautioned not to o load his tires, to keep the brakes wor evenly, and the axles and wheels t up, not to allow oil or grease to acc late on the tires nor expose the tire great heat, to start the vehicle straight line, to start and stop it g ually, not to run the vehicle along s car tracks in such a way as to grind d the edges of the tires, to avoid, when sible, rough pathways, to take car tr preferably at an agle, to repair tire soon as they need it.

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TIMES BUILDING - NEW YORK, N. Y.

We furnish Business Automobiles of all types and makes—machines exactly suited to any class of service.

Business houses contemplating changes or additions to their Delivery and Transportation Systems, should send for our new folder and information blank.

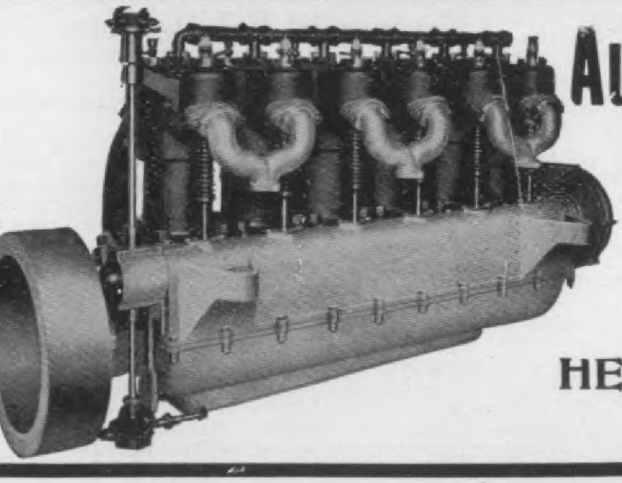
THE MEISELBACH TRUCKS

One, Two and Three Tons

Friction Drive, Perfectly Supported. All Wheels on Timken Rollers. Powerful Brakes. The Simplest and Easiest Controlled Trucks yet shown. Thirty Horse Power.

THE A. D. MEISELBACH MOTOR WAGON CO.

North Milwaukee, Wisconsin, U. S. A.



Automobile and Truck

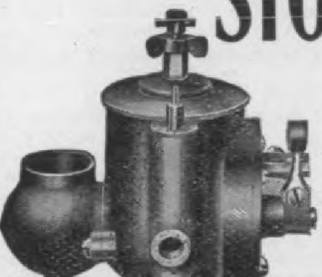
MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

HERSCHELL-SPILLMAN CO.

W. Tonawanda, N. Y.

STOP CRANKING--A SELF PRIME



When the motor stops, the condensed gasoline within the piping collects at the base of the mixing chamber. This small amount of gasoline is used as a prime and will start the motor on the first crank, even in the coldest weather.

Palmbla Carburetor

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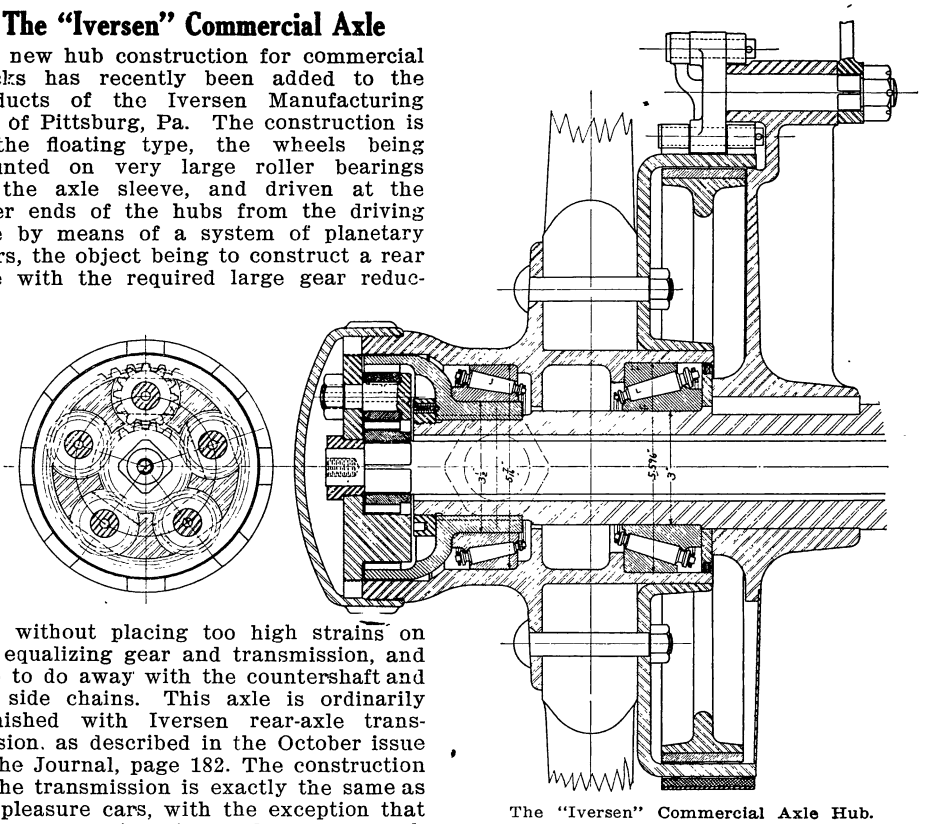
The "Iversen" Commercial Axle

A new hub construction for commercial trucks has recently been added to the products of the Iversen Manufacturing Co., of Pittsburg, Pa. The construction is of the floating type, the wheels being mounted on very large roller bearings on the axle sleeve, and driven at the outer ends of the hubs from the driving axle by means of a system of planetary gears, the object being to construct a rear axle with the required large gear reduction without placing too high strains on the equalizing gear and transmission, and also to do away with the countershaft and the side chains. This axle is ordinarily furnished with Iversen rear-axle transmission, as described in the October issue of the Journal, page 182. The construction of the transmission is exactly the same as for pleasure cars, with the exception that the gear casing is made very much stronger, as are also the axle sleeves, hubs and brakes. The axle sleeve is 3⅜-inch outside diameter and the thickness of walls as much as ⅞-inch, depending on the carrying capacity of the truck. The gear reduction in the outer end of the hub is 3 1-3 to 1. Five pinions are used to transmit the power, in order to gain maximum strength and wearing qualities in the least possible space. The gears are all case-hardened, and are mounted so that they can very readily be taken out by removing the hub cup. The torsional strain is taken care of thru the spring seats, which are clamped on a hexagon part of the sleeve, by means of a brace extending perpendicular on each side of the truck, and a link connecting this brace to the frame at either end of the springs, thereby giving the body perfect play without moving the axle to any perceptible extent. The brake construction is similar to the one used for pleasure cars, except very much larger and stronger.



The "Iversen" Commercial Axle Hub.

Firestone Tire & Rubber Co., Akron, O., exhibited at the various national automobile shows a solid tire measuring 53½ inches in diameter, said to be the largest tire at any of the shows.

Arbuckle Brothers, of Brooklyn, N. Y., have purchased a 4½-ton Frayer-Miller gasoline truck.

Commercial Vehicle Notes

The Model Transfer Company, of Hackensack, N. J., has three Knox trucks in operation between New York and Ridgewood, N. J., doing the work of four two horse teams.

The fire department of Long Beach, Cal., after using a Rambler automobile with a chemical apparatus installed in place of the tonneau for sometime, has given an order for two more Rambler cars which will be equipt with chemical apparatus.

Chief of Police Delaney, of Denver, has been provided with a Thomas Detroit runabout.

The Findlay Auto Transit Company, of Findlay, Ohio, has recently closed a contract with the Standard Oil Company, whereby the former will convey the workmen on the pipe lines between Cygnet and Lima to and from their work. At six o'clock every morning a bus leaves the courthouse at Findlay, taking the workmen out and bringing them back at six in the evening.

An ordinance which aims at the taxing of all public service motor vehicles at the rate of $100 a year, is to be introduced into Buffalo council.

The Idaho Automobile & Electric Transportation Co., has started an automobile bus service between Dubuque and East Dubuque, Iowa., making trips every hour.

The municipal authorities of Reading, Pa., have placed an order for small York Pullman touring car to be used by the chief of the fire department.

Haworth & Dewhurst, of Pittsburg, Pa., are using a large Frayer Miller truck, carrying loads of from 6,000 to 7,000 pounds over Pittsburg hills. The company reports that it does the work of two and a half teams at less than half the expense. The operating cost averages 2½ cents per mile.

The L. J. Fisher Furniture Company, of Rochester, N. Y., some time ago purchased and placed in service a large motor truck for the purpose of making retail deliveries. With the bus the company is able to make a delivery a distance of 32 miles and return in four hours, where with the horse delivery it was necessary to start at 8 o'clock in the morning, and then the wagon would not return until night.

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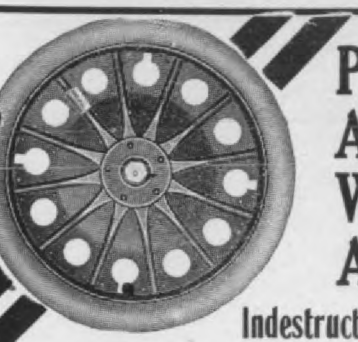

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are the only absolutely safe, always reliable wheels for your runabout, touring car, wagon, or truck. They have been proven mechanically perfect by the severest test an automobile was ever subjected to. **Indestructible Steel Wheels are the only wheels made that cannot collapse.** They stand up under the most terrific strain from heavy loads, great speed and rough roads. Are in constant increasing use on commercial vehicles of all descriptions, Fire Patrols, and pleasure cars in cross-country touring. Everywhere that wheel strength is required.

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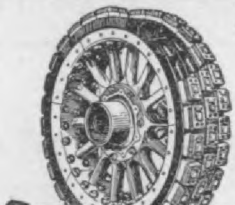

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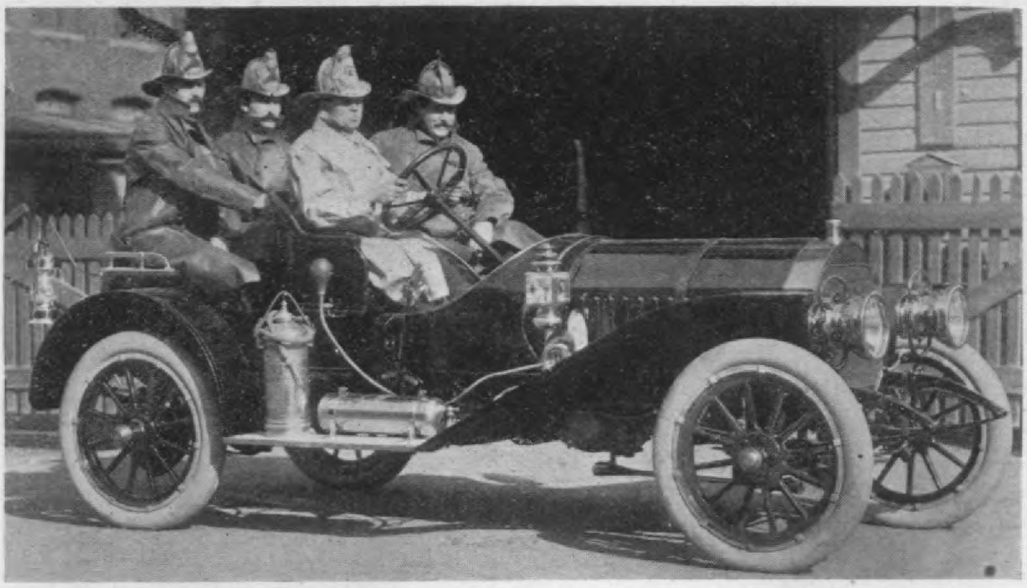
commercial purposes, is demonstrated its use in the Seattle Fire Department. 1908 roadster specially designed and is especially adapted for the sudden tu and emergency situations in the c streets.



"Autocar" Roadster specially equipt for use ofa fire chief.

uipt for the use of the chief of the fire partment of Seattle was turned out from e Autocar Co.'s factory at Ardmore, Pa., cently, and is illustrated herewith. The r is arranged to seat the chief, a driver d three firemen, and to carry in addition

The Western Rapid Transit Compa with a capital stock of $125,000, was cently incorporated for the purpose operating motor omnibuses on the pr cipal streets of San Francisco. The co pany proposes to charge a five-cent fa

The Friction Drive Plymouth Cars

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SIGHT-SEEING VEHICLES FROM 12 TO 2 PASSENGE

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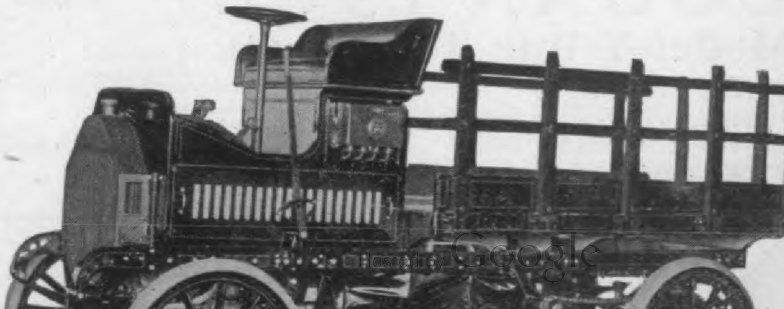

COMMERCIAL

CYCLE AND

AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 8. PHILADELPHIA FEB. 1, 1908

January Edition, 21,696

14,687	Copies mailed.
5,200	Copies Delivered to News Company.
1,009	Copies to Philadelphia and Foreign, etc., under stamps
800	Copies held in reserve.
21,696	Total copies January edition.
1,241	Back numbers sent out.
	Of these
12,558	Were paid subscriptions.
5,200	Delivered to News Company.
17,758	
1,352	Returned by News Company, to January 18, 1908.
16,406	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of the "Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the January issue was 20,455.

Of these, 24,555 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 26¾ ounces, representing 14,687 copies, and 1,241 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Automobile Coming Events

February 1-8—Providence, R. I. Automobile Show in Providence State Armory, Frank M. Prescott, Manager

February 3-8—Second Annual Motor Show, Convention Hall, Kansas City, Mo., Kansas City Automobile Dealers' Association. W. L. Walls, Secretary.

February 10-15—Detroit, Mich., Tri-State Automobile and Sportmen's Association's Show, in Light Guard Armory.

February 17-22—Cleveland Automoblie Show, Cleveland Automobile Dealers' Association. Geo. Collister, Manager.

February 21-29—Annual automobile show at Electric Park, Newark, N. J., under joint auspieces of N. J. Automoblie & Motor Club and the New Jersey Automobile Trade Association.

February 22—Passadena-Altadena hill climb, Passadena, California.

February 24-29—Auto Show and Gymkhana. Bombay, India.

March 2-7—Ormond-Daytona, (Fla.) Annual Race Meet, under management of A. C. A.

March 7-14—Sixth Annual Auto Show at Mechanics Building, Boston, Mass., Boston Automobile Dealers' Association, Chester I. Campbell, Mgr., 5 Park Square, Boston.

March 9-14—Sixth Annual Automobile Show, Convention Hall, Buffalo, N. Y., Automobile Club of Buffalo, Dai H. Lewis, Manager.

March 18-19—Savannah Race Carnival, Savannah, Georgia

March 21-28—Automobile Show. St. Lawrence Arena, Toronto, Canada. R. M. Jaffray, Manager.

March 21-28—Annual Cordingly Show, London, England.

March 22-31—Nice Annual Automobile Week, Nice Automobile Club, Nice, France.

March 26-April 24—Second Annual International Commercial Vehicle and Motor Boat Show. Olympia, London. Society Motor Manufacturers and Traders.

March 28-April 2—Opening Week Carnival by Chicago Automoblie Dealers under management of Chicago Auto Trade Association.

April 4-11—Pittsburg, Pa., Automobile Show Duquesne Garden. Automobile Dealers' Association of Pittsburg.

April 5-12—Third Annual Automoblie and Sportsmen's Show, Montreal, Canada, Arena, R. M. Jaffray, Manager.

April 6-11—Carnival opening week of New York City Automobile Dealers, General Cutting of N. Y. Auto Dealers' Asso., Chairman of committee in charge.

April 6-11—Second Annual Show of the Pittsburg (Pa). Automobile Club.

April 24—Stock car road competition for the "Briarcliff" trophy, Westchester County, N. Y., Robert L. Morrell, chairman committee in charge.

April 25-May 25—Industrial Motor Car Competition, A. C. of F., Paris, France.

May 4-5—150 Mile Endurance Run, Harrisburg to Philadelphia, and return, Motor Club of Harrisburg.

May 10—Targa Florio Contest, Sicily; Automobile Club of Italy.

May 15—Algonquin Hill Climb, up Phillips and Perry Hills, Chicago Motor Club, C. P. Root, chairman contest committee.

May 30—Hill Climbing Contest at Sport Hill, Easton, Conn., under direction of the Automobile Club of Bridgeport.

June 1-8—Pleasure Car Reliability Trials, Automobile Club of Great Britain, London, England.

June 9-17—Touring Competition for Prince Henry of Prussia, Germany. Imperial Automobile Club of Germany.

June 20-26—McClure Cup Contest in conjunction with annual run of the Albany, N. Y., Automobile Club. John Randerson, chairman of committee in charge.

June 24-27—1200-mile Reliability Run, Chicago to outlying points and return. Chicago Motor Club, C. P. Root, chairman contest committee.

July 13-17—International Race Meet, Ostend, Belgium, Automobile Club of Ostend.

August 29-30—Mont Ventoux Hill Climb, France, Vanclusion Automobile Club.

September 1-8—Voiturette Contest, L'auto, Paris, France.

September 27—Chateau Thierry Hill Climb, L'auto Paris, France.

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Licensed Association to Have January Show

At a well attended meeting of the Board of Managers of the Licensed Association held at the Association offices in New York, the morning session was given over to a regular business meeting, the Board receiving the reports of the Executive Committee and the various departments of the Association.

The afternoon session, however, was given to a discussion of the show situation. A report of the Eighth National Show was made to the Board by the Show Chairman, Col. George Pope, which was very enthusiastically received. The time for holding shows was freely discussed and whether early or late shows were the better given a thorough investigation. Col. Pope pointed out very clearly the advantages of a late show. The Board, acting upon Pope's suggestion, voted that the next, the Ninth National Show be held in the Garden in January, 1909.

Commercial Car Manufacturers Form New Association

This association which had its conception at the recent Chicago show, was finally organized in Chicago, under the style, the Commercial Motor Vehicle Manufacturers' Association. Walter Wardrop is its chief executive, the other officers being as follows: President, G. M. Weeks, Weeks Commercial Vehicle Company, Chicago; vice-president, Oscar Lear, Oscar Lear Automobile Company, Springfield, Ohio; treasurer, H. F. Hamilton, Rapid Motor Vehicle Company, Pontiac, Mich.; secretary, J. E. Burke, Lambert Motor Truck Company, Anderson, Ind.

Vanderbilt Cup To Be Held

At a meeting of the executive committee of the racing board of the American Automobile Association a resolution was adopted to the effect that the William K. Vanderbilt Jr., cup commission promote a race for the William K. Vanderbilt, Jr., cup during 1908. The date of competition, the entry blank, the rules governing the competition, the form of declaration and the course, will be announced by the commission by July 1, 1908.

A. L. A. M. Mechanical Branch Meet

On Saturday, December 7, the Mechanical branch of the Association Licensed Automobile Manufacturers met in the committee rooms of Chicago Athletic Association. The principle topic was co-operation between automobile engineers and body builders. A discussion was also held with regard to what parts could profitably be standardizedtduring the coming year.

N. A. A. M. Decides on Later Show Date

Following the lead of the "Licensed" Association in reverting to the former midwinter dates for its annual shows in Madison Square Garden, the National Association of Automobile Manufacturers, at its recent meeting in Chicago, has decided to hold its next annual show in Chicago the first week in February, 1909, or two weeks later than the Garden show.

At this meeting a proposition to establish a comprehensive traffic department was referred to the Transportation Committee and resolutions of regret in the death of M. L. Goss of the Executive Committee, were adopted.

A. C. A. To Control Ormond Beach Races

At a meeting of the contest committee of the Automobile Club of America held on Wednesday evening, December 19th, at the club house, the report of secretary Butler on racing conditions at Ormond-Dayton Beach was presented and discussed and the agreement with the Florida East Coast Automobile Association turning over the entire control and management of the races to the Automobile Club of America, was ratified and approved.

The date of the races was fixed for the week beginning Monday, March 2nd, 1908.

At thet time the weather conditions and temperature are at their best and the tidal conditions will afford from five to six hours daily of good beach.

Arrangements have been completed to provide an approximately 16 mile straightway course with loops at each end. The loops will be constructed of two inch planking, furnishing a roadway 32 feet wide, and will be banked six feet high at the outer edge of the curve.

By this means a 32-mile circuit is available, beginning and ending at the club house of the F. E. C. A. A. on the beach at Daytona, in front of which all of the long distance races will start and finish.

It is possible that no race will take place for the Thomas Dewar International Automobile Trophy at Ormond-Daytona Beach this year as the present holders of the trophy, Stanley Motor Carriage Company of Mass., refuses to allow an amendment of the rules under which the trophy is to be competed for, as will be necessary if the requirement for competition stands as stated by the Automobile Club of America, that all cars entering for the international Mile Dewar Trophy must first of all take part in a hundred mile event and show a speed of sixty miles per hour.

The auto clubs are planning for special trains to the event, which takes place at the zenith of the Florida season.

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General Index

Additional indexes will be found at the back of the book; a "Buyers' Classified Index" of the entire contents of the book, both reading and advertising pages, and an alphabetical index to the advertisements.

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A. A. A. Grants Sanctions

Three sanctions were granted at a meeting of the executive committee of the Racing Board of the American Automobile Association on December 29, at the association's headquarters, at 437 Fifth Ave., New York. Automobile Club of America, Ormond-Daytona, Fla., week beginning March 2, 1908; Savannah Automobile Club, Savannah, Ga., stock car road races, week beginning March 15, 1908. Robert Lee Morrell, chairman, first road race for Briarcliff trophy, Westchester County, N. Y., April 24, 1908.

Third Annual Meeting S. A. E.

The Society of Automobile Engineers held its third annual meeting in New York January 3. A. L. Riker, president of the society, opened the afternoon session and after the various committees had made their reports the annual election of officers was held. Thomas J. Fay of New York was elected president. E. T. Birdsall, Rochester, N. Y., second vice-president and Henry Hess, Philadelphia, treasurer. The other officers are Henry Ford, Detroit, first vice-president, and H. P. Maxim, L. T. Gibbs, H. M. Swetland and H. W. Alden, managers.

After the election papers were read and discussed. The annual dinner was held in the evening, followed by a second business session. It was decided to hold quarterly meetings in the future, the next one being scheduled for Boston during the progress of the local show there March 7 to 14.

New York Tire Chain Ordinance Protested

A hearing was recently accorded the protestants against the ordinance prohibiting the use of tire chains in any of the public parks or traffic roads of New York City under the jurisdiction of the Board of Parks, without permission. The protestants were supported by C. T. Terry counsel for the N. A. A. M. Little was accomplished however. The Board would not listen to any suggestions that it acted outside of its rights and stated that this question would have to be fought out in the courts.

Motorists in general feel that the ruling is based on an insufficient knowledge of the action of different anti-skid devices as it is well known to automobilists that there are other devices which cause even greater damage to roads and these are not condemned by the Board.

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"R-S" MOTORCYCLES

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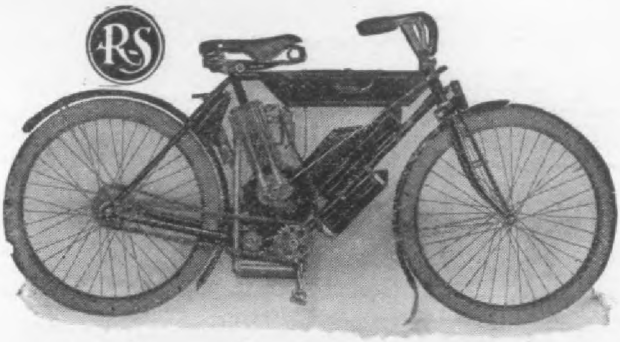

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The Reading Standard Bicycle line includes single frames, Truss frames, Double Head frames; Roadsters, Road Racers and Racers and Pace-followers from $25.00 to $60.00.

The "R-S" Motor Cycle line includes single Cylinders, Twin Cylinders, Motor Bicycles, Tricycles, Ladies' Tricycles, Men's Tricycles, Delivery Tricycles. Prices from $175.00 to $325.00.

ALL "R-S" MOTOR CYCLES except Model "B" have the "R-S" MECHANICAL INTAKE VALVE MOTOR, the first and only Real Mechanical Intake Valve Motor manufactured and marketed in the U. S. today. The advantages and superiority of the mechanical intake valve motor over the automatic are so apparent that other manufacturers are now beginning to follow our lead.

Write us for catalogue and full description.

READING STANDARD CO.

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CYCLE AND
AUTOMOBILE
TRADE JOURNAL

ENTERED AT THE PHILADELPHIA POST OFFICE

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Single Copies - - - - - - - - - - - 20 cts

Change of advertising copy must reach this office not later than the 10th of each month. New advertisements will be accepted as late as the 20th.

Philadelphia, February 1st, 1908

Our New Binding

Attention of the readers of the Cycle and Automobile Trade Journal is called to the new method of binding without wires, used for the first time on this issue. Kindly test it for serviceableness. We will be glad to hear the opinion of any of our readers of this new binding.

New Models Each Season a Mistake

Perhaps one of the greatest mistakes that is being made in the automobile business at the present time is the complete change of models each season. Under this system many cars embodying features, known to be less-reliable or effecient than constructions already tried out by makers, are sold and the latest improvements withheld, simply that they may be incorporated later in the new models. The time was, when changes were so many and each necessitated such radical and wholesale alterations in the arrangements of the other parts of the mechanism, it was almost necessary to make a complete new model each time improvements were introduced. The advances in car design were so rapid that each year new cars made the previous models look, and often in comparison run, like "back numbers," Under these conditions, there was not only excuse for a complete change of models each year, but this change was in reality necessary. Wealthy purchasers were nearly always induced to turn in their old car at a great sacrifice as part payment on the new one, so the change of models really was an advantage to the manufacturer, although, of course, during this period, what was gained in additional purchases was offset by additional cost of special machinery. Gradually, however, the changes in the standard type of touring car became less and less and purchasers showed tendency to hold on to the old model for several years. This practice most of the makers seem to discourage, and at the present time a large part of the makers seem to be endeavoring to perpetuate the system of complete model-changes each year by changing as far as possible even the external appearance of the machines, although the mechanism is practically unaltered and there are not really marked improvements; apparently in order to make the previous model look antiquated in the hopes of inducing purchasers to buy the latest types.

We firmly believe that at the present time the "change-the-model-each-season" policy is a grave mistake and is an injustice to the unfortunate late-season car purchaser, as in numerous cases where real improvements have been perfected by the makers,these are withheld, and many of the last of the models of the season are put through without the sometimes needed improvements. Purchasers at this season, are, therefore, deprived of the benefit of the changs and are often made dissatisfied and discontented. But not only are the purchasers made discontented, but by this arrangement the selling season is much shortened to the great disadvantage of the agent, who finds that in the late summer and fall which ought to be a good selling time, the public will not buy, but wait for the next year's model, although in many cases they really want and would enjoy the use of a car for the remainder of the open season. In this way, the selling season is practically limited to the spring after the shows and part of the summer, instead of being continuous.

The automobile shows have also had a strong influence toward the continuance of the yearly new models. Each maker desired to keep quiet his new feature and designs, to spring them, as it were, at the show. Thus, the yearly-model habit has become so strong that many makers do not seem to realize, the industry has really progressed beyond that stage, and the continuance of an abrupt change of models at a definite time each season is unfair both to the agent and purchaser and will doubtless react even on the makers themselves.

Several well known and progressive manufacturers, however, realizing the present conditions, have openly announced their policy

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of immediately incorporating in their cars, constructional changes and improvements as rapidly as manufacturing conditions will allow, thus, assuring the purchaser that at any time be will get the very latest ideas and constructions of the designer and the very best car the company is capable of producing, and not a machine containing several unsatisfactory or obsolete features which the makers themselves know are objectionable. The immediate improvement policy if adopted by many of the makers, would produce a practically continuous selling season and not one, unnaturally curtailed at certain periods and forced or rushed at others, as is now the case. This policy would not in any way interfere with exhibiting at one or two purely National and representative shows and is it believed that the general abolition of the system of a yearly change of models will do much toward bettering, not only conditions for the purchaser and agent, but also for the manufacturer and the entire industry.

Farmers' Autos and Good Roads

Too much cannot be said in regard to the good roads movement which is steadily increasing throughout the country. The bettering of road conditions has been discussed for years, but the actual work of improving conditions has progressed but slowly, until now, the advent of the automobile and its growing numbers and popularity has probably done more to bring about actual improvements than any other one previous agency.

The farmer for years has been content to plod along at a snail's pace over all but impassable roads, but just as soon as the same farmer becomes the proud possessor of an automobile, no matter how antiquated, he immediate becomes dissatisfied with the road that was previously good enough and forthwith joins either the ranks of the good roads workers, or the larger fraternity of "kickers," who however help along the agitation.

One of the silent workers for the cause of good roads is the stationary gasoline engine, which is surely, if slowly, educating the male members of the farming communities to the use of the internal combustion engine, from which it is but a step to the use of the automobile. The prevalence of these small stationary engines in the rural districts is increasing at a rapid rate and already many farmers have, through their use, been lead to take up the auto.

Another feature which is also working for the common good is the fact that the horses are gradually becoming accustomed to the automobile, there are fewer accidents and this fruitful source of antagonism toward the motorist and everything for which he stood, has been to a large extent removed.

The introduction of the high-wheel type of auto has also had its share in influencing the farmers of our country districts toward a more friendly attitude to the self-propelled vehicle, for in the buggy-type was apparently recognized an old friend without the limitations imposed by the horse. In fact, the modern buggy type of automobile fulfills the dream of more than one mechanically-inclined American farmer and has already done much, and in the near future will do more, to change his attitude toward automobiling.

With motoring becoming almost universal and the old antagonism of the members of our farming community, a thing of the past, it is but a question of time when our country will be interlaced with as splendid a system of highways as those seen in many European countries, for as a unit all will be working toward the one, long cherished ideal,—the perfect highway.

The Tire Chain Ordinance

No little comment and criticism has been aroused by the recent passage by the Board of Parks of New York City, of an ordinance prohibiting the use of tire chains on any of the roads in the public parks, under the jurisdiction of the Board. Even the question of the legallity of this ordinance has been brought up, but this, of course, is a matter for settlement in the courts. The point has also been raised and justly, that if wet, greasy, roads are dangerous, they should not be made more so by the action of the Park Board, by enforcing ordinances preventing the use of certain non-skid devices.

Not discussing these points, however, the fact remains that the Board has discriminated against only one type of anti-skid device—the chain, what about the others? Has the Board made any preliminary tests as to the detrimental effects of the different anti-skid devices at present employed by automobilists, that they single one device and say nothing whatever about the others. It would seem not, for it is well known among automobilists that the loosely fitting chain is one of the least harmful of anti-skid devices and it would appear but reasonable that before such a radical action was taken, that tests, at least of an elementary nature should be made.

That the automobile especially at high speed and equipped with anti-skidding devices has a detrimental effect on the roads is not questioned. However, the speed of the machines in the Park system is very seldom high and is not such as to be particularly harmful But, in wet weather such devices are necessary and especially so in cases of emergency when the successful negotiation of a shorter turn than usual, may mean the avoidance of a serious accident.

It is usually conceded that roads are made for all classes of vehicles, and not vehicles for

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the roads, and when a road is particularly dangerous it certainly looks like a move in the wrong direction to prevent the use of saftey devices, even though these may be somewhat detrimental to the road surface, and it looks especially peculiar when but one of a number of such devices is singled out as an offender apparently without suitable tests having been previously made to determine their relative destructive effects. We sincerely hope that the Metropolitan motorists will follow up the matter until it is either entirely done away with or suitable amendments made.

Dealers' Spring Opening Week

The Spring opening week idea seems to be gaining ground among the automobile dealers. The recent decision on the part of the New York Automobile Trade Association and the Dealers' Association of Chicago to hold carnival opening weeks, sets a precedent which will, doubtless, soon be followed by the dealers in many other cities thruout the country. It is proposed to hold open house during the week, everybody welcome, to have the salesrooms decorated and also have an automobile parade.

Dealers everywhere realize the importance of giving the mind of the buying public a chance to review the good points of the various make of cars and compare one with another, just before the actual driving season opens. The effect of the automobile shows, except that in Boston which is usually held very late, has worn off by spring and those who have not purchased cars desire another chance for comparing the different cars. The open week among the dealers gives just the opportunity needed for the buyers' ideas to crystalize and take definite form. The carnival week will also stimulate the dealers to activity, and the necessary making ready of the salesrooms will be a splendid preparation for the work of the coming busy season. Everything must necessarily be put in shape for inspection, and it is believed the result will be very beneficial to all. The necessary meetings among the dealers in preparation for such an event will make them better known to each other and may in certain cases, lead to organizations which will be not only beneficial to the members, but thru systematising the dealer's methods will prepare the way for better service to the purchasers.

In most of the large cities the automobile dealers are collected in a comparatively small section making it possible for visitors to view the leading makes without much difficulty. The time of year is suitable and road demonstrations or contests could well be held during the week, thus giving the purchaser a much better chance of comparing actual performances than is given during the Winter months.

Ignition Testing Department

In our December issue page 64, was published a letter by Mr Jackson of the Semi-Dry Battery Company, Harrison, N. J., suggesting the establishment of a Department of Ignition and stating the need for experimental work and testing as a basis of formulating rules.

We have heard from a few of our readers in favor of such a project and are ourselves heartily in sympathy with the idea of systematic tests, as a basis for standardizing and simplifying ignition equipments. However, there are too many laboratories well equipt for such work, and too many organizations which would naturally interest themselves in such a testing department, for us to attempt to carry on such a series of exhaustive experiments as would be necessary to obtain important results.

We do not agree with the suggestion that such investigations be carried on by a man who has not had scientific training even tho he has "the mental equipment for investigation," much better, have a man with this same mental equipment backed up by every bit of information available from the experiments and failures of others and thoroughly familiar with the state of the art, unless time and money are to be thrown away. The automobile industry has already suffered too much from the abortive efforts of the untrained but experimentally inclined.

We call attention to the fact that there already exists an organized body of engineers, intimately associated with automobile industry, a body which is "non sectarian" as it were, who are eminently fitted to undertake this investigation; we refer to the "Society of Automobile Engineers," which is unofficiated and which could give unbiased opinions.

We herewith suggest that if the matter is of paramount importance to the advancement of the automobile, the above mentioned society undertake the work and make public results. The Cycle and Automobile Trade Journal will be only too pleased to place before its readers any new facts which such investigations may bring forth.

Thru an error the address of the Lane, Motor Vehicle Co., well known maker of the Lane Steam Cars, has twice appeared incorrectly in our columns. The factory of the Lane Motor Vehicle Co. is at Poughkeepsie, N. Y., and the Lane Sales Co., which handles the output is 514 West 145 St. New York City.

The Tincher Motor Car Company of South Bend, Ind., was recently elected to membership in the American Motor Car Manufacturers' Association, making a total of 52 members belonging to the independent organization.

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The winning White Steamer driven by Hal Sheridan
ru the 172.6 miles of hard going with a perfect score in
e Quaker City Motor Club's Endurance Run from Phila-
phia to Allentown- Pa. and return and which covered
e distance of 172 miles in 8 hours and 48 minutes on the
rd day with another perfect score when deciding the
between the White, Studebaker and Peerless.

The finish of the first day at Allentown
showed but eight clean scores out of
thirty-nine starters. This elimination
largely due to the frightful road condit

The return was thru Reading, Potts
and Norristown, a distance of 93.7 n
which, with the run out of 78.9 miles, m
a total of 172.6 miles. The Norristown A
Club regaled the passing guests with hot c
and sandwiches and the speed laws
temporarily suspended as the contest
passed them, each crossing being guarde
a member of the local club. Between P
town and Norristown many cars were st
on the hills, but could have proceeded
making trifling adjustments or repairs;
as everything was penalized heavily t
was little use. The finish was at City
and thence to the Majestic Hotel, where
technical committee probed every detai
the car to ascertain its condition and l
nuts, lamps, or even brackets were the
ject of black marks; a discussion arose a
whether a broken shock absorber shoul
penalized as a part of the car or an access

The class "C" trophy from all cars was
on by the Maxwell. The Packard won in
ass "B" for large runabouts having shown

The perfect score Studebaker starting on the return run from Allentown, Pa., in the trying ordeal of the two day En
e Run of the Quaker City Motor Club. This contest was notable for the relentless penalizing of the technical commit

fect performance. In class "A" for tour-
cars the White, Peerless and Studebaker
re tied for the MacDonald and Campbell
phy. The tie was run off the following
y in 8 hours and 48 minutes for the 172
es with the White as winner having again
de a perfect road score. After being nar-
rly examined by the technical committee,
was penalized one point, the Peerless was
ond with 9 and the Studebaker third, being

The scores of the contestants in the th
main classes follow:

CLASS A.

No. 1, Stearns, 9; 2, Oldsmobile, 5; 3, Locomobile,
4, Locomobile, 109; 5, Mitchell, 186; 6, Stevens-Dur
26; 7, Lozier, 2; 8, Columbia, 174; 9, Peerless, 10; (pe
zations afterwards removed by the committee) 10, St
baker, clean; 11, Studebaker, 64; 12, Stoddard-Day
45; 13, Acme, 26; 14, Matheson, 1; 15, Peerless, 31;
Franklin, 11; 17, White, clean; 18, Kissell Kar, 24;
Matheson, 3; 20, Autocar, 107; 21, Pullman, 7; 22, Fra
Miller, 41; 23, American Mors, 222; 24, Corbin, 42;
American, 121; 26, Garford, 65; 27, Royal Tourist, 38;
Crawford, 168

Fires, Failures, Judgments, Etc.

Atkinson Automobile Co., Lockport, N. Y., filed an involuntary petition in bankruptcy with assets of $3,909.25, and liabilities of $3,006.47.

Auto and Motor Co., Baltimore, Md., Chas. M. Quigley has been appointed receiver.

Buckeye Motor Car Co., Columbus, Ohio. At a recent meeting of the stockholders, action was taken to dissolve the corporation.

Caille Perfection Motor Co., Detroit, Mich., sued by the Termaat & Monahan Co., of Oshkosh, Wis., for alleged infringement of patent.

Cargill, W. W. La Crosse, Wis., garage destroyed by fire; loss $15,000.

Colt Runabout Co., 1876 Broadway, N. Y. City. Judge Hough has appointed Harvey Osterman receiver in bankruptcy; bond $500.

Craig-Toledo Motor Car Co., Toledo, O. Joseph W. Lane, trustee of this company has instituted a suit for $18,000 against Geo. L. Craig, vice-pres. of the company to recover the difference between $2,000 held to be a fair settlement to a creditor and $20,000 allowed Craig in the form of eight Craig-Toledo automobiles at the time the company went into bankruptcy, June 1907.

Delaware Auto Storage and Repair Co's. building, Eleventh and West Sts., Wilmington, Del., damaged by fire. Loss to building $25,000, and to cars $15,000; partly insured.

Dolson Automobile Co., Jackson, Mich. At the creditor's meeting E. R. Hathaway was appointed permanent receiver.

Duryea Power Co., Reading, Pa. Judge McPherson, of the U. S. District Court, filed an opinion sustaining decisions of Referee Samuel E. Bertolet, in his rulings in connection with the bankruptcy proceeding of the Duryea Power Co. When the matter of electing a Trustee for the bankrupt came up, Mr. Bertolet would not permit the claim of Herbert M. Sternbergh, President of the company, to be voted owing to the contention that Mr. Sternbergh was not a creditor but in reality owed the concern $26,000 on his stock subscription. This decision prevented Mr. Sternbergh in securing the election of the Trustee favored by him, giving the Berks County Trust Company a majority of the claims and amount.

Echo Bicycle & Automobile Rooms, Young St., Buffalo, N. Y., destroyed by fire, causing a loss of $5,000.

Elmore Auto Co., 243 W. 68th St., New York City; ground floor damaged by fire; loss $150.

The Electric Vehicle Co's. estate, Hartford, Conn., is valued by the appraisers at $1,709,603.08, which does not include the Selden and other patents.

Fay, Owen H. & Co., 243 Michigan Ave., Chicago, Ill.; garage threatened with complete destruction by fire, but flames were distinguished with small loss.

Funke, Albert H., Brankrupt, New York City. The Referee in Bankruptcy, Mr. John J. Townsend, declared a second and final dividend out of the above estate of 11¼ per cent., on Dec. 20th 1907, all claims for which were paid out on Jan. 10, 1908 by Messrs. McLaughlin, Russell, Coe & Spragne, 32 Liberty St., New York City.

Guarantee Tire & Bicycle Co., Indianapolis, Ind., damaged by fire; loss $15,000, which was covered by insurance.

Harrington Auto Station No. 1, Worcester, Mass., petitioned into involuntary bankruptcy; claims amount to $565.

Harrison, H. O., 1214 So. Main St., Los Angles, Cal., garage damaged by fire; loss $1,250.

Holmes-Booth Auto Co., 10550 Euclid Ave., Cleveland, Ohio. A receiver has been appointed. The concern places its assets at $3,000 and its liabilities at $6,000.

Huntington Automobile Co., Jamacia, L, I; Clifford M. Tappen has been appointed temporary receiver.

Interurban Express Co., 62–66 Washington St., San Francisco, Ill. Fire starting in the company's garage on December 31 st 1907, caused the destruction of an entire block in the business district. The loss is estimated at $35,000.

Kansas City Motor Car Company, Kansas City, Mo.; Mr. J P. Ryland, of the firm of Ball & Ryland, has been chosen trustee in bankruptcy.

Kings County Automobile Co., Brooklyn, N. Y., which did a general garage business and handled the Glide car, has assigned.

Larchmont Automobile Co., Larchmont, N. Y., filed petition in bankruptcy with liabilities of $2,268 and assets $341, in stock, fixtures and accounts.

Northwestern Motor Co., Seattle, Wash.; Geo. R. Tennant has been appointed receiver.

Pope Mfg. Co. Receiver of the company has been authorized to sell their factory at Thompsonville, Conn.

Prestolite Co., Indianapolis, Ind.; main pumping station entirely demolished by explosion of gas tanks.

Times Square Automoblie Co., N. Y. City, sued by Rear Admiral James J. Kane, U. S. N., for the sum of $2,600.78, to recover amount paid for repairs etc. on machine bought from said company.

Zwich & Kleese, dealers in automobile and automobile supplies, 114 Wick Ave., Youngstown, Ohio. Receiver has been appointed by Judge Roberts to take charge of the business, and arrange for the dissolution of the partnership.

Trade Changes

Buckeye Motor Car Machine Co., of 494 N. High St., Columbus, O., consolidated with the North Side garage of the same address, under which name in the future both concerns will be known. E. B. McDowell will continue as manager.

Christoffer, C. M. 530 Stanyon St., San Francisco, Cal., is succeeded by I. W. Houchin.

G and J Tire Co's, Philadelphia branch, 711 No. Broad St., has secured new quarters at 713 No. Broad St., directly across the street in a corner building, which gives them about twice the amount of room formerly occupied.

Gleason-Peters Air Pump Co., removed its offices and factory from 121-125 Mercer St., N. Y. to 225-261 Classon Ave., Brooklyn, N. Y.

Gordon Auto Supply Co., moved from 217 Eliot St., Boston, Mass., to 1024 Boylston St., Boston, Mass.

Indestructible Steel Wheel Co., recently moved its Chicago office and salesroom from 1303 Michigan Ave, to the Auto & Parts Bldg., 1221 Michigan Ave.

Janssen, Orey, Rock Island, Ia., has sold his Ford automobile agency to Wm. Klockau of the same city.

Morrison, McIntoch & Co., Grinnell, Iowa. Mr. McIntosh has retired from the firm, and the business will hereafter be conducted under the name of Morrison-Ricker Mfg. Co.

Rainier Motor Car Co., Broadway and Fiftieth St., New York City, moved to larger quarters on the corner of 58th St. and Broadway.

Stebbs Automobile Co., West Seventh and Chestnut Sts., Chattanooga, Tenn., has been bought out by W. H. Burke, of the same city, who will continue the business there as formerly.

Terre Haute Automobile Company of Indianapolis, Ind., has changed its name to the Chaney Automobile Company.

Watkins, F. M. Mfg. Co., Sixth and Baymiller Streets, Cincinnati, Ohio, was recently incorporated under the name of the Watkins Motor Works Co., with a capital stock of $10,000.

West Haven Motor Co., The, Hartford, Conn., has filed a preliminary certificate of dissolution.

Legislative and Legal

NEW YORK.

Albany.—A bill was recently introduced at Albany, N. Y., to prevent motorists from escaping after running down persons, on the public highways. After an accident, failure on the part of the operator to give the name and address of the owner of the car, either to the injured person or to the first officer to arrive, is made a misdemeanor.

OHIO.

Toledo.—Hereafter arrests for speeding and subsequent fines must be made under the State statutes only, as the city ordinance was recently declared invalid.

BUFFALO'S AUTOMOBILE TAX ILLEGAL.

Buffalo's obnoxious automobile tax ordinance, which has been strenuously opposed by the Automobile Club of Buffalo, received a death blow on Jan. 8th, when the Appellate Division upheld Judge Hodson's decision, in the Dai H. Lewis test case instituted by the club, that the tax was contrary to the state law. The point was made that the local ordinance conflicted with the State act in that it resulted in a double tax.

AUTOS OBSTRUCTING STREETS TO BE SEIZED.

New York,—William Robbins, general superintendent of the Department of Street Cleaning of New York City, in a letter to his district superintendents, instructs them to warn all garages that automobiles obstructing the streets will be taken in charge, as the law compels their seizure by officers of the department.

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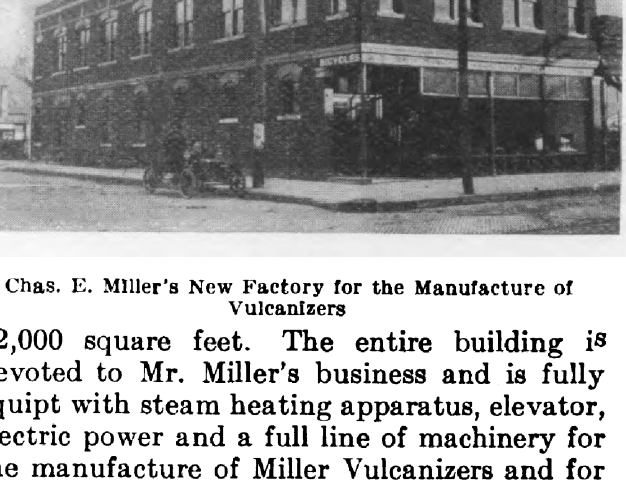
At the meeting of the Executive Committee of the A. C. A. eld in New York January 7, 1908, the report of the Legislative Board by Charles Thaddeus Terry, covering the progress f the last two months was made.

The bill for a uniform Federal Automobile Law was reintroduced on the opening day of the present session of ongress and is known as House Bill Number 428. It was eferred to the Judiciary Committee of the House The gitation for more reasonable State laws concerning autonobiles by the passage of a proposed uniform State motor ehicle law appears to be bringing results in most of the tates, but the uncomprehensible attitude of the authorities f the State of New Jersey is a disagreeable feature. The eport states in regard to the two objectionable New Jersey aws; "There are no arguments to sustain their position in upport of the obnoxious laws on their statute books governng automobiles, except the frankly-confessed one that it rovides revenues, and the remarkable part of the situaon is that they consider that argument all sufficient."

Miller's New Vulcanizer Factory

The accompaning illustration is of the new uilding recently erected for Charles E. Miller f Anderson, Indiana, manufactuerer of Tire ulcanizers, etc. This new building has two tories above the ground besides a full size asement and contains a total floor space of

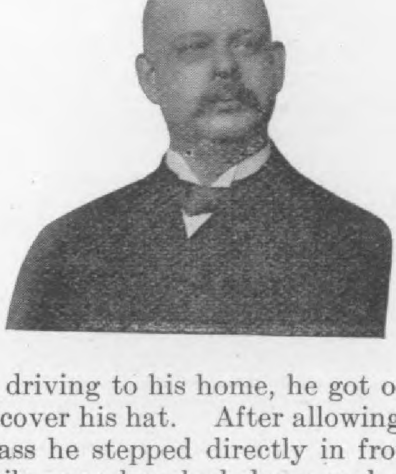


Chas. E. Miller's New Factory for the Manufacture of Vulcanizers

2,000 square feet. The entire building is evoted to Mr. Miller's business and is fully quipt with steam heating apparatus, elevator, ectric power and a full line of machinery for e manufacture of Miller Vulcanizers and for e repairing of automobile tires, which is also one in the building. The total cost of the uilding and grounds is $20,000.

We are informed by the Rushmore Dynamo orks, Plainfield, N. J., that in the suit against e Manhattan Lamp Works which has been ending for over a year, a sweeping injunction as granted by the decision of Judge Ray, gainst further manufacture or sale of imitaons of the Rushmore lamps, shells, rear vers, front doors and ventilators, and also gainst the use of the name "Flare Front" connection with searchlights.

Baker Motor Vehicle Co. comes as a sko his numerous friends in the trade in whi has been an active worker having bee executive officer of the N. A. A. M. and T urer of the Association of Electric V Manufacturers.



While driving to his home, he got out car to recover his hat. After allowing a car to pass he stepped directly in front automobile, was knocked down and run but was apparently not seriously injured. drove his car home and complications did set in until the third day and on the f he died. He refused to state who ran him and entirely exonerated the driver.

He leaves a widow and a daughter, Geo. Beach, and a son Ralph H. Goss.

Savannah Races

The announcement has been formally by the Savannah Automobile Club that two days' racing carnival in the suburb the city of Savannah will be held during week of March 15th. The races will co of, first, an event of approximately 300 over an 18-mile course and, it is unders there will also be two short distance r For the greater event there will be a chall trophy given by the City, valued at a $2000. Arrangements have been made the state of Georgia, whereby there wil 1200 troops of the National Guard to p the course. In addition, all cross roads be fenced off and the entire course will be

The complete route for the automobile from New York to Paris, to start from T Square within a month, has been defin fixed and is officially announced herewith each stage of the notable journey. It invo a total distance of 20,000 miles, nine-te of which is on land under power of the testing cars alone. Two thousand

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Hints on Care of Tires

BY WELL-KNOWN MAKERS.

Much of the trouble experienced with automobile tires can be avoided if proper care is taken and in most cases this care is not exercised, simply because the user is not familiar with tire construction and is not posted as to the best methods of caring for these expensive and all important parts of the car. For the benefit of our readers, that they may have the minimum of trouble and the maximum of wear from their tires, information was solicited of the well known tire makers and this first hand advise has been embodied in this article.

As many are now laying up their cars for a few months the following general remarks on the treatment of tires during this period may be of advantage.

STORING AND HOUSING OF TIRES.

If the car is in frequent use it is better to leave the tires inflated, however if the car may remain for some time without being used, it is a good plan after having placed jacks under the axles, to let the air escape. In any case, care should be taken that the car does not remain in the motor house with deflated tires unless jacks are under the axles, for the rims pressing on the rubber of the covers will seriously damage them.

Never leave the covers in a damp place or the canvas will soon get rotten and nothing can then be done for them. Do not forget that the same causes which make iron rust, will prove injurious to canvas.

If it is certain that the tires will be out of service for some time, the best plan is to deflate and take them off the rims, and carefully wrap each one separately in a moisture proof covering. The tires should then be laid out *flat* in a dark, dry place with an even temperature of from 40° to 65°. Rapid changes of temperature are bad for tires and being laid out flat will prevent their warping or getting out of shape. Never hang or stand a tire up if it is possible to avoid it. Some advise, putting them in a tight fitting box with a saucer of turpentine in the centre of it, as this it is claimed, prevents the sulphur incorporated in the rubber by the vulcanizing process, from hardening the rubber. It should be remembered that oil, grease, and long sustained heat are very destructive to rubber, causing disintegration, hence the surface of the tires should be kept free from these. Light will result in oxidation of the rubber causing it to break and crack. A cool dry place not directly exposed to light is therefore the best for the storage of tires.

Before putting the car into commission in the spring, it will be well to look the tires over carefully and also see that the rims are in good condition.

The rims should be examined occasionally, the rust removed with emery paper and a coat of lacquered varnish applied as rusty or rough rims often cause much damage to tires.

One of the chief causes of tire failure according to Morgan & Wright, Detroit, is due to the missuse which tires receive owing to the lack of knowledge of tire construction on the users part. This company states, that users should thoroughly understand the detrimental effects produced by unnatural strains on automobile tires, therefore the general method of tire construction is given.

The principal materials entering into pneumatic tires are long staple cotton and rubber. The former is specially woven into fabric of great tensile strength. Tread stock, friction stock, tube stock, etc., are each distinct compounds, each formula being determined to meet an end. The strength of a tire is contained in its fabric, while the rubber acts as a binder, a coating to keep out moisture, and to prevent the fabric from direct wear. All fabric is cut on the bias, hence there is a high degree of mobility, and it thus readily takes the desired shape, also equalizes the strain on the several threads. We all know that a thread will easily cut another if there is a sawing motion. To meet this natural process the fabric is coated on both sides with rubber, which process is termed frictioning and the resulting fabric is known as friction stock.

The body or carcass of a tire is built up of several layers of frictioned fabric, and when the carcass is vulcanized the friction rubber thoroly encapsulates each individual thread, and also welds together the several plies. If the tire has been properly built, good material being used, there is no danger of separation of the plies under proper care. Rubber being waterproof, the outer surface of a tire is coated with extra rubber for two purposes. First, to give additional wearing material to take the abrasion, and, secondly, to keep water from the fabric or body proper. We cannot emphasize too strongly the necessity of keeping moisture from the fabric. Small cuts and punctures allowing water to get in, lead to rapid destruction. Therefore they should be given prompt attention.

SELECTION OF TIRES AND APPLICATION TO RIMS

In regard to the selection of tires and the method of applying them to the rims the Empire State Tire Co., Buffalo, N. Y. call attention to the fact that at the very outset, the purchaser of a new car should give his attention to specifying tires of the proper size and become familiar with the manner of executing emergency repairs. The automobile manufacturers, in the past year have found it advisable to supply larger tires,—the increased

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mileage and general satisfaction more than justifying the additional expense.

There is some variation in the schedules of weights which the different tire manufacturers guarantee their tires to carry and while the following table has not been adopted, it is generally approved:

MOTOR CAR TIRES.

Dia.	Maximum Weight the Tire can bear.	Load on each tire.	Pressure per square inch required.
2½"	600 lbs.	340 to 400 lbs. 440 to 600 lbs.	50 lbs. 64 lbs.
3"	480 lbs.	330 to 440 lbs. 440 to 480 lbs.	50 lbs. 57 lbs.
3¼"	660 lbs.	440 to 550 lbs. 550 to 660 lbs.	71 lbs. 64 lbs.
3½"	990 lbs.	550 to 770 lbs. 770 to 990 lbs.	57 to 71 lbs. 71 to 78 lbs.
4"	1140 lbs.	660 to 990 lbs. 990 to 1140 lbs.	57 to 71 lbs. 71 to 78 lbs.
4¾"	1320 lbs.	880 to 1100 lbs. 1100 to 1320 lbs.	64 to 71 lbs. 71 to 78 lbs.
5¾"	1490 lbs	1100 to 1430 lbs. 1430 to 1650 lbs.	71 to 78 lbs. 78 to 85 lbs.
6"	1650 lbs.	1100 to 1430 lbs. 1430 to 1650 lbs.	71 lbs. 85 lbs.
2-PASSENGER TOURABOUT.			
2½"	375 lbs.	220 to 300 lbs. 300 to 375 lbs.	35 lbs. 43 lbs.
3"	375 lbs.	220 to 300 lbs. 300 to 375 lbs.	35 lbs. 43 lbs.
3¼"	480 lbs.	330 to 390 lbs. 390 to 480 lbs.	43 lbs. 50 lbs.
2-PASSENGER RUNABOUT.			
2½"	220 lbs.	110 to 175 lbs. 175 to 220 lbs.	28 lbs. 35 lbs.
3"	260 lbs.	110 to 175 lbs. 175 to 260 lbs.	28 lbs. 35 lbs.
3¼"	300 lbs.	130 to 220 lbs. 220 to 300 lbs.	35 lbs. 43 lbs.

For weights exceeding 1,000 lbs. per wheel, 5 inch tires or over are recommended.

PUTTING ON THE TIRE

As there are so many styles of rims on the market, both regular and quick detachable, and different methods of application recommended by respective manufacturers, it will not be advisable to outline any particular instructions in regard to the manner of assembling, further than that which will apply generally. To apply any regular clincher tire to the rim, it is the quickest and safest way to first lay the outer case flat on the ground and in it place the inner tube, inflating same just enough to round it out nicely to prevent pinching by the clips or tire tools. Now, the clips having been placed in position in the rim, the tire should be fitted to the flange of the rim toward the car by lifting up the bead with a tool to permit the clips to adjust themselves. Then, starting at the valve, force the outer bead of the case over the flange of the rim and secure same by pulling the valve out as far as possible and tightening it with washers. Working toward the right, push the bead in position all around the rim, holding the clips up in the tire. Be sure that they work freely and do not pinch the inner tube,—then the tire is ready for inflation.

INFLATION

New tires, after being used a short time, assume a larger volume due to the stretching of the fibre in the fabric, therefore they should be reinflated after a service of a week or ten days. To increase the resiliency, the tires are quite often abused from under inflation. The separate plies of fabric or canvas of the tire do not pull together uniformly when soft and a separation or breaking will occur due to the friction produced from the resulting activity. Some tire manufacturers recommend a schedule of pounds for inflating each size of tire but, considering the effects of climate, speed at which the car is driven, weights to be carried and numerous other equally important conditions, it is best to use a more flexible rule, —therefore inflate any size tire, under a weight which it is able to carry, to a pressure that will cause the tire to round up nicely and, if the fabric or canvas is in good condition, this volume from expansion on a long drive or hot day will not cause ruptures or blow outs. If a tire should become very soft at any time, it is probably due to a leak in the splice of the inner tube, small puncture, rupture in the fabric or similar injury and the tire should immediately be removed from wheel and examined carefully to make sure that there is no puncturable object in it which of course, if not removed, would injure any number of tubes that might be put into the case, causing no end of annoyance. Small ruptures in the fabric, resulting from stone bruises or other causes, are sometimes quite difficult to discover and it is time well spent to make a thorough examination.

It seems that there is some fear on the part of the novice of bursting the tires by inflation and he, as a result, goes to the other extreme. When tires are not well inflated, the beads do not fit the rim snugly and quite often the inner tube is pinched.

TIRES RIDDEN SOFT OR DEFLATED

For runabouts and touring cars, it is generally conceded that the pneumatic tire is preferable over the solid because of its resiliency, ease of operation and its quick and simple method of repair, however, all pneumatic tires are susceptible to punctures and other injuries which, if not given the proper attention, result in a soft or deflated tire. The user, quite often through an ignorance of the technical construction or probably from an indifference to the result, will ride the tire a considerable distance deflated, to find later

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that some injury has been done necessitating quite an expenditure for repairs, sometimes rendering the tire unfit for further service. Altho it is not always convenient to make repairs or replacements with an emergency tire carried for that purpose, it is beyond doubt advisable, in view of the injuries that will probably otherwise occur.

The injuries resulting from a soft or deflated tire are equally bad. A soft tire may result from a worn valve plunger (valve inside) or from a patch not properly applied or vulcanized. The heat, from the increased activity of the tire when soft, dries the adhesive properties of the fabric or canvas and starts a separation after which, from the uneven strain assumed from one ply by another, chafing occurs and the friction wears through the threads,—a complete blow out sometimes occurring. Of course the tires ride much easier and are more resilient when ridden soft because they easily pass over obstacles and in this way the vibration of the car is absorbed by them, but, as the automobile manufacturers, in the last year, have materially improved this condition by adopting springs calculated to relieve the tires as well as the mechanism of the car from vibration, there is not much excuse for riding the tires soft and it will be conducive to their longevity if inflated so that they do not belly under the weight of the car, passengers, baggage, etc. From riding the tires deflated, the beads of the case are cut and torn due to chafing by the rim which is often rough and irregular from bumping over obstacles in the road and unless given attention, will injure every perfect tire that may be applied to it thereafter. Even when ridden deflated for a quite a distance, the tires may appear from an examination of the outer surface of the case to be practically uninjured, but the fabric or canvas which is of most importance to the life of the tire, has been bruised, cut or otherwise injured or the inner tube may be cut in places by the clips or by chafing of the beads of the case. Sometimes it is more convenient to apply an "emergency band" to a case that has blown out. To do so, remove one side of the case from the rim, patch the inner tube, place a reinforcement between the inner tube and rupture in the case and assemble the tire on the rim. Then apply the emergency band directly over the blow out, lace tightly and inflate to proper riding pressure.

SKIDDING

Excessive wear to the tread of the tire results from rounding corners quickly, turning sharply on wet pavements, driving in car tracks, or by stopping the car suddenly by a severe application of the brakes. In every instance, the tires receive an unevenly proportioned strain, causing injuries to the fabric and premature wearing out of the tread from the grinding effects. It is difficult to secure traction when starting the car quickly on a wet street or sandy road and a slewing or grinding of the cover will occur from the wheels spinning round.

CUTS IN THE TREAD OR COVER.

A cut in the fabric, when that part of the tire is under the weight of the car and in contact with the road, has a tendency to expand, owing to the elasticity of the rubber, and foreign matter forces itself into the cut. When the injured part is relieved from the weight of the car, this matter cannot be released, owing to the contraction of the rubb r, and with each revolution of the wheel it acts as a wedge and further forces itself between the cover and fabric eventually causing, if neglected, a complete separation. In many instances necessitating an entirely new cover. When cuts are neglected the fabric absorbs moisture which is detrimental to the adhesive properties, causing mill-dew and disintegration, invariably resulting in a blow out.

The following instructions are from the Michelin Tire Company.

INFLATION MOST IMPORTANT

The tire should always be sufficiently inflated to prevent any obstacle from ever touching the rim, even when driving over cobble stones. Owners should see to it that their cars are not moved around the garage or motor house either by hand or under power with deflated tires as this apparently harmless proceeding is often responsible for tires becoming prematurely weak.

The air pressure in the tire must be proportioned to the weight it has to support and for this reason drivers are advised to weigh their cars carefully and to inflate their tires according to the table appended herewith, showing the maximum weight Michelin Tires can bear and the pressure required.

Size.	Weight per wheel.
28 to 36 x 2½	225 lbs.
28 to 36 x 3	350 "
28 x 3½	400 "
30 x 3½	450 "
32 3½	550 "
34 and 36 x 3½	600 "
30 x 4	550 "
32 x 4	650 "
34 x 4	700 "
36 x 4	750 "
32 x 4½	700 "
34 x 4½	900 "
36 x 4½	1000 "

PROPER INFLATION DETERMINED BY FLATTENING

Whether the tire is properly inflated or not is shown by the extent to which it flattens. When the car is loaded the tire should flatten about $\frac{2}{5}$ of an inch, but should never under any circumstances, be depressed more than $\frac{3}{5}$ of an inch.

It is by means of the breadth of that part of the inflated tire which comes in contact with the ground and which under the rolling takes a special aspect, that one can tell whether the tire is well inflated or not. This breadth

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should not exceed about 1-½ inches for 2-½, 2-½ inches for 3-½, and 3 inches for 4-½ to 5″ tires. Do not be afraid of bursting the tires, for most pumps are not capable of exercising a pressure of more than 170 lbs. per sq. inch and good tires can stand a pressure at least equal to that. Beginners are always afraid of inflating the tires too much with the result that they rarely inflate them enough.

SUMMER AND WINTER INFLATION PRESSURE

All other conditions being equal, tires should be inflated to an equal pressure for summer and winter. At any given pressure a tire will contain more air in winter than in summer. This is owing to the greater density of cold air. But as it is pressure and not quantity which effects a tire, summer and winter pressures should be the same at the start of any run. To secure the best results however, the difference of temperature between summer and winter must be taken into consideration. Owing to the higher temperature in summer, the heat generated by the kneading of the tire walls (when in service) will not be dissipated nearly so quickly as in winter. This causes the tires to become hot very rapidly (especially in fast running) the heat is absorbed by the compressed air thereby causing considerable expansion. It is not uncommon for a brisk run with a heavy car in warm weather to raise the pressure 10 lbs. Turning corners, at high speed is bad at all times but especially injurious to tires under the conditions above mentioned. For this reason, as soon as tires have had sufficient exercise in summer to become thoroughly hot, the pressure should be taken with a gauge and enough air let out to reduce the pressure to normal, care being taken however, not to deflate the tires too much.

HOW TO LOCATE THE TROUBLE

If on the road the inner tube leaks the trouble is due to one of the following causes:—Puncture by a nail or other article. Blowout through either pinching of the inner tube or defective casing. Leakage of the valve plug. Leakage of the valve cap. Leakage at the junction of valve with tube.

The usual precautions should be taken to see that the inside of casing is free from foreign substances, the trouble when found should be attended to in the usual way and it can be located as follows:—

Leakage of the inner tube through puncture usually makes itself known at the time it happens by a hissing sound, greater or less according to the size of the puncture. In the most frequent case, that of a nail, the noise of the running car often prevents the hissing being heard and the tire does not become deflated for several hundred yards. When it is quite flat however, there will be noticed an appreciable difference in the softness of the car's running. It is absolutely essential that the car be stopped as soon as possible and the puncture repaired. Remove the inner tube in whole or part from the casing and if you cannot immediately locate the trouble, proceed as follows:—

Slightly inflate the tube, you will then be able to locate a puncture by the stream of air produced in the dust or against your cheek. Always see that there are not two punctures in the tube. Imperceptible leaks, for instance those made by needle-puncture, which empty a tire in two or three days may be discovered by plunging all the different parts of the inflated tube into a bucket of water and stretch it so as to dilate the puncture. Only then may air bubbles be seen rising to the surface of the water. Instead of plain water soapy water can be used as this indicates the trouble more clearly.

In looking for punctures the inner tube must not be too highly inflated for a bulb would form at some part in which the excess of air would lodge itself. In such a case deflate your tube at once if you do not wish to see it burst. Pure rubber cannot resist the pressure; this is done by the cover which is lined with canvas. The swelling is a proof of the excellent quality of the rubber employed for tubes; rubber of inferior quality would burst without swelling.

Always examine the casing carefully inside as well as out before replacing the inner tube to see that the article which caused the puncture is removed, for if it remains, the tube will puncture again before you have travelled 300 yards.

It is impossible to repair a blowout of the inner tube satisfactorily on the road. The tube should be returned to the makers for repair and an *old* tube carried with you for the purpose, inserted instead. This applies where you have to patch up the blown out tire, as it is unwise to put a new tube in a casing which may give out again.

(*to be Continued.*)

Every automobile dealer should be sure to secure a copy of the March number of the Cycle and Automobile Trade Journal, as it will be the eighth annual complete vehicle number, containing illustrations and specifications of every 1908 model produced by American automobile manufacturers. It is in compact form for ready reference, with proper indexes. It is invaluable to dealers, as it keeps them posted on the machines handled by their competitors, and also gives them information where to look for additions to their line which would not conflict with those they already have.

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liam R. Hines, Chief Plant Engineer, nal Screw and Tack Company, Cleveland, U. S. A., an engineer of wide experience, d his attention to mechanical traction 01 and built his first car, a rear-entrance au-body with seats for four passengers, 02. The motor was a single 4-cycle cyl- 5x6 ins. This was a heavy car, 2000 r over and after about a year of driving Hines changed the motor to a 6x6 ins., e single cylinder. This new 2-cycle made the Hines car a strong hill-climber ave it about 35 miles an hour on a good The performance of the motor was ctory, and convinced Mr. Hines that the e motor was superior to the 4-cycle for iving.

the Hines motors have been very strong on throttled charges, where the small port-area is ample for the passage of the decreased charge volume.

In this same year, 1906, Hines was called upon to give more power to the car of an acquaintance, and built a motor with two of these same 2-cycle 4½x4 in. cylinders. This car was light, 1500 lbs. or so, surrey body to seat 4 passengers. This motor gave abundant power for bad roads and hill-climbing, with about 35 miles on good roads. All the Hines motors give maximum power at about 700 R. P. M., and make their cars strong in slow work though not very fast with 3½ to 1 gear because of the limited port-area. Mr. Hines believes that the limited port-area is con-

1. Hines 2-cycle 5-passenger touring car. Wheel-base 106 ins., gauge 56 ins., tires front 30x3½ ins., rear 32x4 tor, four-cylinders, 4½x4 ins., 2-cycle, water-cooled, crank-box-pressure charge-supply through carburetor. Sliding orward speeds and a reverse to bevel gear and full floating rear axles. Front and rear wheels and bevel gear are all en rollers. The gear box bearings are hardened steel for both line-shaft and side shaft. Plain cone-clutch, leather springs under clutch-cone leather, 5-passenger tonneau body. Weight of car about 2650 lbs. as here shown.

next attempt of Mr. Hines took the f a 3-cylinder 2-cycle motor, cylinders ns., nominal 24 H. P., which he placed Brew-Hatcher 5-passenger car, total 24 or 2500 lbs., 30 inch wheels, geared , making a very strong drive in mud and s, with about 40 miles on a fair road.

906 Hines built a second 3-cylinder 2- motor, cylinders same dimensions, 4½x4 aking a change in the throttling and it in the same Brew-Hatcher car. This 3-cylinder 2-cycle motor was much built than the first one and gives a better on throttled charge, though the same

ductive to fuel economy, and for that reason makes his ports as shown in the drawings reproduced herewith.

The successful operation of the one, two and three cylinder 2-cycle motors made Hines certain that the 2-cycle was the right thing, and early in 1907, he built a four-cylinder, 2-cycle motor, same 4½x4 in. cylinders and placed it in a chassis built by himself, 106 ins. wheel base, tires 30x3½ ins. front and 32x4 ins. rear. Same wheels front and rear, but fitted with special rear tires to give the 32 ins. diameter. The reduction ratio from crank chaft to drivers was made 2½ to 1. Both axles are

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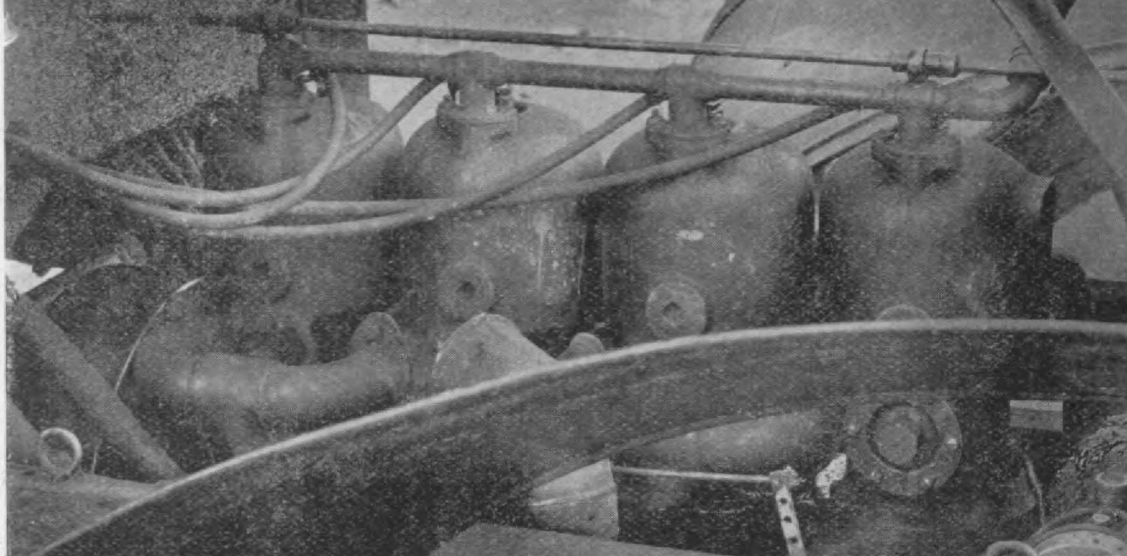

Fig. 2. Hines 2-cycle-motor-driven, 5-passenger touring-car. The intake pipe from carburetor is on the ri side and the exhaust pipe is on the left hand side, thus keeping the heat away from the charge supply and giving reac bility. This illustration shows the low placing of the motor, although the connecting rods are 8 ins. center to ce strokes in length. This car has been driven without mercy, and the tires show hard usage.

no repairs and no changes except to try different lining metals for the crank-wrist ends of the connecting rods.

The 16000 miles of road work of the 4-cylinder Hines touring car has included five round trips between Cleveland and Buffalo, 210 miles apart, one run to Wales Center, N. Y., and return, 450 miles, and a round trip Cleveland—Pittsburg, 160 miles with return by way of Greenville, Pa., 215 miles, round trip 375 miles, and a week on the road to Wheeling, West Va., and return, 1000 miles total. The remainder of the 16000 miles has been made in daily runs out of Cleveland and return, and in the course of business, but all with the view of trying out this 4-cylinder, 2-cycle motor so fully and thoroughly that there could be no doubt whatever as to power, reliability and moderate fuel-consumption.

This car weighs with two passengers 3000 lbs. and a run from Pittsburg to Cleveland, carrying two passengers, 160 miles, was made in 8½ hours with 13 gallons of gasoline, a little better than twelve miles to the gallon at nearly 20 miles an hour for the total elapsed time from start to finish, much of the way over bad roads.

From Cleveland to Wales Center, N. Y., 225 miles, 4 passengers, weight about 3400 lbs. was made in 10 hours and 10 minutes, first stop at Westfield, N. Y., 143 miles from Cleveland, with 15 gallons of gasoline Cleveland to

of fuel, but on the contrary gives a lar tance per gallon and a large ton-mile a

One argument advanced by 4-cyc vocates is fuel economy, and the other claim is for motor flexibility. How 2-cycle-motor-driven car known to the made over 31 miles to the gallon, bac forth over a 6¼ mile clay road course, inders, total weight of car and pas 1910 lbs., the writer's own observation.

These Hines car runs show far bette the average 4-cycle motor results in f onomy, while the 4-cylinder Hines motor is everything that could be ask in the way of flexibility and sensitive re to throttle regulation.

To meet constant inquiries regardin cessful 2-cycle motor practice, complete ing drawings of the Hines cylinder are with all important dimensions. It m borne in mind that the small port area the motor speed down, so that the motors show maximum power at abo R. P. M.

The writer has no doubt that the cylinder is over-cooled and under-porte as these motors show extremely well road, this car having made 16000 mile absolutely no engine repairs, the c drawings are of very great value, an doubtless be carefully studied by all J readers who are 2-cycle investigators.

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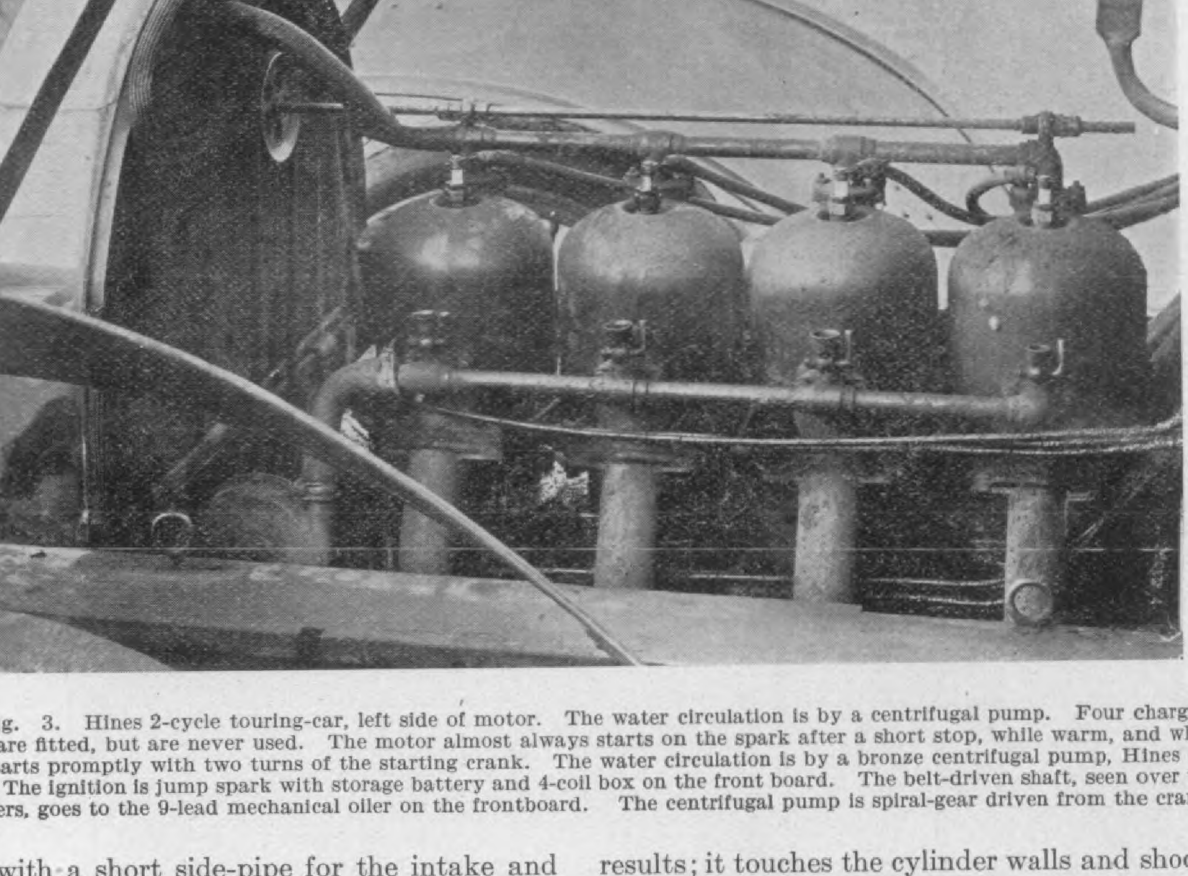

g. 3. Hines 2-cycle touring-car, left side of motor. The water circulation is by a centrifugal pump. Four chargin are fitted, but are never used. The motor almost always starts on the spark after a short stop, while warm, and whe arts promptly with two turns of the starting crank. The water circulation is by a bronze centrifugal pump, Hines d The ignition is jump spark with storage battery and 4-coil box on the front board. The belt-driven shaft, seen over th ers, goes to the 9-lead mechanical oiler on the frontboard. The centrifugal pump is spiral-gear driven from the cranl

with a short side-pipe for the intake and pening in the piston wall so as to avoid learance due to a full length intake side- or "by-pass."

e intake and exhaust ports are both the circumferential width, $2\frac{3}{8}$ ins., Mr. Hines ving a narrow port to be economical. The x box intake port is $\frac{1}{2}$ in. long x $3\frac{1}{2}$ ins. , with one bridge. If the crank-box in- port was 23-32 long, one port would al- be open to the carburetor, but there d be a loss of 7-16 of an inch crank-box- pression piston-travel. The crank-box in- port is placed on the rear side of the cyl- with the passage carried round to take carburetor pipe on the right side of the or, opposite the exhaust on the left side. degrees of the down bend of the exhaust rmed in the cylinder casting, as shown ing only a small curve needful in the steel- exhaust-branches.

e water space is ample all round, 11-16 imum, and nowhere less than 9-16. As water jacket is not broken up by valve- s the circulation is free and the radiator only never boils, but in fact is hardly ever m to the hand, and never needs refilling does not leak.

o single detail is a more potent factor in

results; it touches the cylinder walls and shoot the charge straight upward on the intake sid of the cylinder interior.

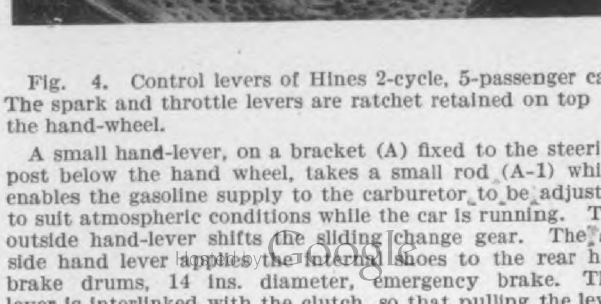

Fig. 4. Control levers of Hines 2-cycle, 5-passenger ca The spark and throttle levers are ratchet retained on top the hand-wheel.

A small hand-lever, on a bracket (A) fixed to the steeri post below the hand wheel, takes a small rod (A-1) whi enables the gasoline supply to the carburetor to be adjust to suit atmospheric conditions while the car is running. T outside hand-lever shifts the sliding change gear. The side hand lever applies the internal shoes to the rear h brake drums, 14 ins. diameter, emergency brake. T lever is interlinked with the clutch, so that pulling the lev

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THREE CYLINDERS OR FOUR CYLINDERS?

Mr. Hines is now placing his 3-cylinder motor, same 4½x4 ins. cylinders, in a runabout, with a view to trying out the 3-cylinder 2-cycle motor as thoroughly as this 4-cylinder motor has been tested and camparing mileage results with the 4-cylinder performance.

Unquestionably, the car buyer is more interested in the actual road work of his car than in any laboratory tests, no matter how complete and indisputable they may be, and Mr Hines has taken the sure way of driving cars with one, two three and four cylinder motors, over long distances and under all conditions to satisfy himself as to what is really the best number of 2-cycle cylinders for use in automobiles: the choice lies between three cylinders and four cylinders; the four-cylinder performance as here detailed is excellent, far better than that of the ordinary 4-cycle motor, and it will be interesting to note the comparative performances of the three and four-cylinder motors, all cylinders exactly the same.

ON THE ROAD.

The writer made a number of short runs on Cleveland pavement, Mr. Orion Alexander always driving, and one run of 51½ miles, Friday, January 3, 1908. All of the runs were made on Cleveland pavement, the condition of unpaved roads being such as to prevent any instructive demonstration.

For the 51½ miles run of Friday the fuel tank was filled near Willson Avenue, and then driven to the park on the Lake Shore, west side, where pictures of the car were taken. Then the car was driven to the East side and sent over the whole length of the Euclid Ave. pavement three times, and then back from the eastern end of the pavement to Woodland and Willson avenues, 51½ miles in all, when the gasoline tank was refilled with 4½ gallons of gasoline, showing 11 $\frac{1}{9}$ miles to the gallon. The car weighed before starting, with two passengers and a full tank, 3060 lbs. Part of the distance a third passenger, weight 150 lbs., was carried.

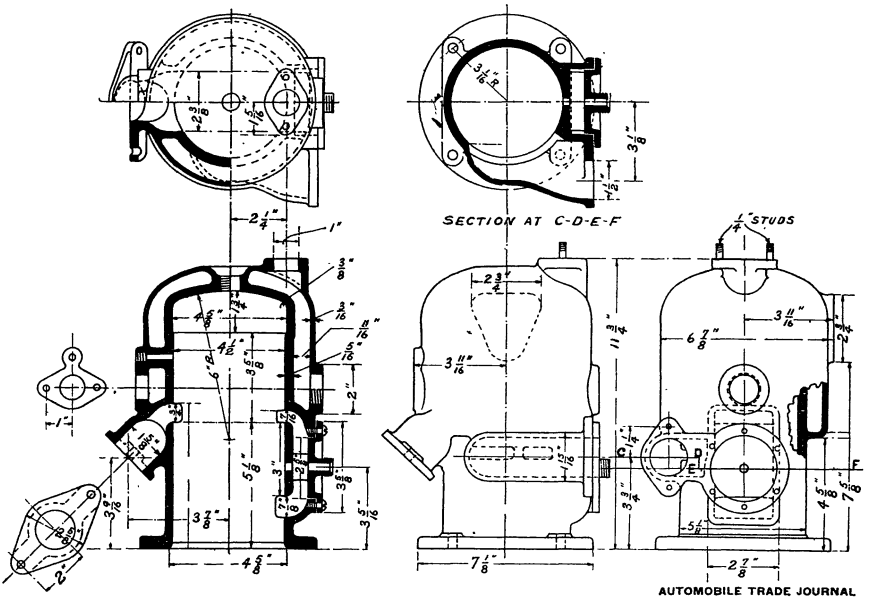

Fig. 5. Hines Cylinder working drawings reproduction, vertical section, horizontal partial section and elevations. This illustration is given with the most important dimensions and inscriptions.

Fixing the average total load at 3060 lbs., distance 51½ miles and fuel at 4½ gallons the ton-mile duty was 17½ miles to the gallon, which is very good for a level course where the motor has to work every foot of the way.

The run was almost all in city streets, with some full stops and a great many slow-downs, while the whole run was made on a restricted course, 15 miles speed limit. The slow downs and stops and rushes to take advantage of openings for passage, caused, probably, at least 20% higher fuel consumption than if the course had been over an equally good surface with nothing in the way.

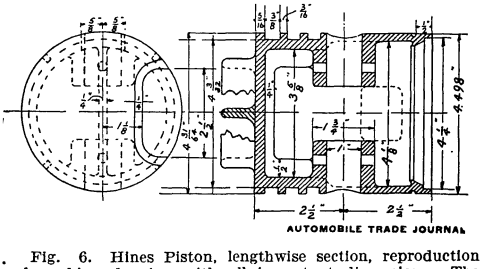

Fig. 6. Hines Piston, lengthwise section, reproduction of working drawing with all important dimensions. The deflector form and placing are notable, because this Hines motor appears to waste no fuel. Note 1½ in. opening for charge passage in the piston wall, shown dotted.

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The car was at all times under perfect control, Mr. Alexander having driven it many thousand miles and handling it with entire confidence, and was extremely handy, while the abundant power enabled the driver to take instant advantage of every opportunity

The car is on "Perfection" Quinn Springs, and rides very easily in the tonneau as wel. as in the front seats. As there are always two cylinders working there is no vibration at any time. The motor is absolutely silent and this Hines car is one of the best ever seen by the writer, as its 16000 miles performance with no repairs conclusively proves.

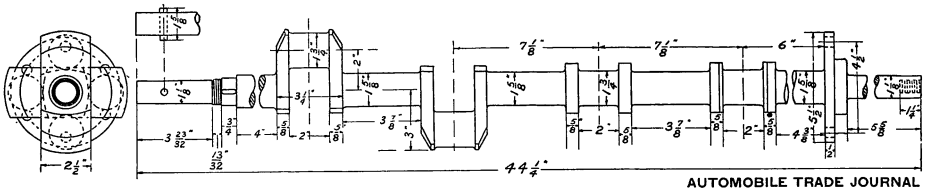

Fig. 7. Hines Crank-shaft, working drawing reproduction. The cranks are in two groups of two cranks set 180 deg. apart in each group, the two groups being set at 90 deg. to each other. The firing order is 1, 3, 2, 4.

The crank-wrists are 1¾ ins. dia., journals 1⅝ dia., wrists ⅛ larger dia. than journals, reversing usual practice where wrist and journal diameters differ from each other. Hines increases the wrist diameter, not to obtain crank-shaft torsion resistance, as a wrist of same diameter as journal is larger than torsion resistance demands, but to obtain a larger diameter wearing surface for the crank wrist and rod-end.

Our Eighth Annual Complete Vehicle Number

The chief feature of the March number of the Journal is the complete vehicle review included in its pages. This complete vehicle review constitutes one large section of the March Journal and consists of summaries of specifications and illustrations of each model of every make of American motor cars. This summary, appearing as it does in advance of the buying season, is of incalculable value to the trade and prospective car purchasers as a guide in making selections, and comparisons. Every yearly subscriber to the Journal i ssure of getting a copy of the complete vehicle review, but transient readers should assure themselves of getting this valuable number by subscribing at once. $2 pays for the Journal for a whole year and if sent promptly will assure your receiving the March Journal containing the eighth annual complete vehicle review. Send remittances to the Cycle and Automobile Trade Journal, 49th and Market Sts. Phila.

Harrisburg Club Run

The contest committee of the Motor Club of Harrisburg is now preparing for the club's second annual endurance run, which will be held on May 4–5, 1908. The route selected leads thru Lebanon, Reading, Kutztown, Allentown and then to Philadelphia on the first day, where the stop over night will be made. The return will be via Norristown, Pottstown, Reading and Lancaster.

The contest will be a sealed bonnet affair and all engines must be kept running at all times except where the laws of the road require a stop. After the run all cars will be examined by a technical committee.

School for Automobile and Carriage Body Drafting

A school for instruction in the design of vehicles and the making of working drawings and fashion plates of them, was opened in New York City in 1880, with evening classes only. It grew until in 1892 a day school was added. Recently Andrew Carnegie donated half a million to it and it is now housed in a splendid building with large library at 20 W. 44 St. and is one of the most complete schools of its kind in existence, there being several abroad but no other in the United States.

It is open to men employed in the automobile or carriage building or accessory trades and is entirely free. A correspondence department is open the entire year while the regular school has a Fall term, October to Xmas and a Winter term, January to the last of April. The school is now a part of the Mechanics Institute under the auspices of the General Society of Mechanics and Tradesmen of the City of New York.

During 1907, according to figures compiled by Secretary of State Whalen, there were 13,980 owners registered and 9,386 registrations for chaueffeurs at Albany N. Y., against 11,649 owners and 7,335 chauffeurs in 1906.

On February 8th to 12th, inclusive and again on February 29th to March 4th, inclusive, merchants' reduced rates to New York will be in effect from Central Passenger Territory, as arranged by The Merchants' Association of New York. The rate, as heretofore is authorized on the certificate plan, the return limit, including the date of the sale of the transportation, to be thirty days.

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This year, as in previous years, the entire output of the Elmore factory is pledged and sold—with agents urging an increase of their allotment

Far and away the most active car in the American sales market today is the valveless two-cycle Elmore.

For five years it has been the steadiest selling car in this country.

These are positive effects due to a fixed and positive cause.

The stability and prosperity of the Elmore, past and present, has arisen primarily from the fact that it is a *two-cycle* and a *valveless* car.

The history of all four-cycle cars has been one of change and caprice in public choice—largely due to caprice and change and uncertainty in construction.

The history of the valveless two-cycle Elmore has been one of steady progression and steady popularity due to the gradual evolution of a fixed principle of whose correctness every Elmore owner has been enthusiastically convinced.

Thus, today,—no Elmore owner can be coaxed or coerced away from the Elmore. This is due to the riding and operating results he gets *because* it is valveless; and *because* it is two-cycle.

Owners of four-cycle cars may and do waver in their allegiance, change cars, become discouraged and abandon any and all four-cycle cars—the Elmore owner will remain supremely loyal because he is supremely satisfied.

After the Elmore two-cycle engine was perfected and all valves eliminated, only one thing remained to emphasize and widen the gap between the Elmore and all other cars, to wit: the ignition system.

In the 1908 car has been installed an ignition system substantially as amazing in its results as the action of the two-cycle engine itself—a system, for instance, which will run the car 2000 miles on one set of six-inch dry cells.

The paragraphs give you in the rough some idea why the sales of the Elmore are impervious to changing conditions which affect four-cycle cars—why we are inclined to bend a listening ear to the appeal of our agents that each and all of them be alloted more cars.

THE ELMORE MFG. CO.

904 AMANDA ST., CLYDE, OHIO.

MEMBERS A. L. A. M.

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MECHANICAL AND TECHNICAL DEPARTMENT

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.

Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

PROPORTIONS OF AIR AND GASOLINE FOR CORRECT MIXTURE

SAN DIEGO.

Kindly answer through the Automobile Trade Journal, the proper proportions of gasoline and air to make perfect combustion for gasoline engines.—I. C. B.

I do not know. I have never tested this for myself and do not know where it is given by an authority that is to be relied upon. I answered this question in these columns some time back but have forgotten the result. One recent writer states that the varpor of gasoline must have 47½ volumes of air for proper combustion. Another states that gasoline vapor has a volume 130 times that of the liquid. If these two statements are true, then the proportion of air to liquid is 130 times 47½ equals 6175 to 1. My guess today is as follows: A full pint of fuel, (for easy figuring 30 cu. in.), will develop a H. P. H. At 1,000 ft. piston speed per min., an engine can deliver a H. P. for each 12 cu. in. piston displacement. Since, however, the piston makes three idle or non-sucking strokes to each sucking stroke it is evident that there are but 250 ft. of suction strokes in each minute, so 250 times 12 equals 3000 cu. in. per H. P. per minute, which multiplied by 60 gives 180,000 as the total volume of mixture per hour. Divide this by 30 and we have 6000 to 1 as the relative proportion of mixture and liquid. This does not take into consideration the fact that part of this is gasoline vapor, which is stated above as being more than $\frac{1}{130}$ but if we remember that mixtures are seldom perfect and that differing gasolines vary in their vapor volumes and that more than the amount stated is usually used, it will be seen that the results given altho corresponding closely are but ruff approximations.—C. E. D.

(We understand Tests on Mixtures have recently been made in the Laboratories of the Massachusetts Institute of Technology, Boston, as Thesis work and the results are open for inspection.—Ed.

DOES HE INFRINGE PATENTS

WAYNESBORO, PA.

I would like to ask a few questions in regard to build-automobiles. Do the manufacturers have to pay a royalty to any one, to manufacture machines of their own design? Would they have to pay royalty to use a transmission of the Lambert type or the Orient, with two disc and about what would the royalty be? Would heavy leather do as well as paper to cover the disc. RALPH FRUSHBORN.

The motor vehicle is so old that there are no basic or master patents. Every necessary detail is quite old and you can build without danger of infringing. There are, however, some patents on valuable details which certain makers are using and if you copy these you are likely to get into trouble. If you write any maker you may think you are likely to infringe and ask for a list of his patents you will usually get them and then you can ask a patent lawyer as to whether our construction is covered by the said patents or not. Many friction substances have been used and each seems to do well in its place but in some other place the result is often not so good. The Lamberts discovered and patented the use of aluminum as a friction disk metal superior to iron. Leather against iron is used with success and I recently saw tarred paper against iron.—C. E. D.

WANTS TO TAKE AWAY THE SMELL

CLEATON, KY.

If a gas engine cylinder is 6 in. bore by 7 in. stroke, what should be the size of intake and exhaust valve, and how many pounds per square inch compression should the engine have?

Has there ever been any way discovered to do away with smell of exhaust of gasoline engine so as not to be injurious or dangerous to work in same room, say exhausting in same room with a small portion of air circulating.

I have used limewater in exhaust or muffler, is there any other liquid or chemical that has been tried.—J. C. B.

Your letter does not give enuf facts about the engine to permit a valuable answer. The engine is probably not an auto engine and so not intended to run at such high speeds. It therefore does not need such large valves, and if on a heavy base with big fly-wheel and plenty of cooling water it may use a higher compression. The exhaust valve two inches in diameter or slightly larger will suffice and the inlet 1½ ins. to 1¾ ins. These sizes are at the inner edges of the seats. 70 lbs. compression is high enuf.

Both the man and the engine must have fresh air to breath. If you turn the burnt gas back into the room you both poison the man and stop the engine. You can condense the water out of the exhaust and the carbonic acid gas can be caused to unite with lime and be precipitated; but unless you supply fresh oxygen for both the man and the machine, there is nothing for them to use. The handiest and cheapest way is to exhaust out-of-doors and admit lots of fresh air.—C. E. D.

GASOLINE OR STEAM FOR AN AIRSHIP

WATERVILIE, OHIO.

Please tell me what engine you would recommend me to use for experimenting on building a flying machine and whether to use a gasoline or a steam engine and what style to use.—A. R. S.

I would recommend a gasoline motor by all means for aeronautic work. It leads the world for this purpose today. I have supplied a number of these motors in the past but am not in position to do so now and have not kept closely in touch with builders of them for some time, but feel sure you will make no mistake if you deal with the G. H. Curtiss Mfg. Co., who have made a number of such motors and advertise in our columns.—C. E. D.

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HOW TO CALCULATE POWER TRANSMITTED BY FRICTION

SCHENECTADY, N. Y.

I have been studying the friction transmissions of the dozen or more runabouts and trucks that are just now being prominently exploited in the columns of the Motor Press, and have been unable to reconcile any of these constructions with engineering formulas for calculating the power and dimensions of friction. Several of these constructions at least appear to be successful but why? According to Prof. Goss of Purdue University, in a paper read before the A. S. M. E. and recorded in vol. 18 of the transactions of that society, the most economical working pressure of wheels is about 150 lbs. per inch of face and 250 lbs. about the limit practicable for paper or tar board pinions. For calculating the horse power that can be transmitted by a given wheel, he gives the following formula: D x W. x NX .000397, for 250 lbs. pressure per in. of face, where D equals diameter of driving pinion, W equals width of face, N equals number of revolutions per minute. Now if this formula is correct how can say 20 H. P. be transmitted by wheels within the limit of size practicable for any kind of motor vehicle and especially where the speed is to be greatly reduced, as well as transmitted?

According to my calcultions, using Prof. Goss's formulas the general run of friction drives will transmit only from 25% to 50%, at the most, of the power of the engine. If I am right, then why is it necessary to use, say an 18 H. P. motor when but 5 or 10 H. P. can be transmitted?

According to Prof. Goss the fibre wheel should always be used as the driver and the metal wheel as the driven wheel. Now in many cars this is reversed. Why is this? Has Prof. Goss's dictum been disproven or have more efficient and durable friction materials been produced?

In view of the prominence of friction driving at present, these questions seem to me to be pertinent and discussion of the subject would seem to be of general interest. If you can find space in next issue to answer these questions I should be pleased to have your opinion in regard to same and anything else you may have to say on the subject.—A. M. CASTLE.

I am not able to reconcile the formula you give with the facts. You do not state whether the diameter of the pinion is to be expressed in feet or inches. I suggest that you write to Prof. Goss and get his explanation. Possibly there is an error in the printing. If you do this, we will be pleased to publish the information you obtain, for the benefit of other interested readers.

In Kents pocket book, p. 905, is the following: H. P. equals the pressure at the point of contact times the velocity of the disks at this point in feet per second times the friction coefficient of the contacting materials divided by 550. This seems a rational formula. The width of contact should be as little as possible but must be enuf so that the pressure does not crush and destroy the material. A wide surface is less efficient than a narrow one if other things are equal, for the difference in the rates of speeds introduces a loss that increases rapidly as the line of contact is widened. On the other hand, a wide surface will require less pressure and so will make less friction on the bearings and similar parts and this must be looked out for. These friction drives are very fine if every thing is kept right but if the friction surface is allowed to get oily and the bearings a little dry, there may be as much or more friction at the bearings as at the disk contacts with the result that they fail to drive; and increasing the pressure only aggravates the difficulty. Then the operator gets mad and condemns the device and all of its kind.

Kent also says, "The value of the friction coefficient for metal on metal may be taken at .15 to .20; for wood on metal, .25 to .30; and for wood on comprest paper, .20." Also that "The tangential driving force may be as high as 80 lbs. per inch width of face of the driving surface but this is accompanied by great pressure and friction on the journal bearings." I have tried to make this as plain as possible that it may easily be understood by those less familiar with such things than yourself. In theory, the soft surface should be the driver for at starting it will slip on the driven surface and this grinds off the high spots, and keeps the surface true and circular. If the soft surface is the driven one this slipping will grind a flat spot on the driven wheel and make a rough and noisy wheel. In practice, the driver learns to set his wheels together quickly and there is always a little slack to the chain and similar parts so the driven one starts at once and while there may be some slipping it is distributed and hits the high spots hardest and so smooths up the surface and gives good results. Makers have found this out and fit up their vehicles in the manner that is handiest to them. It is usually easier to put a friction surface on the edge of a disk than a similar surface across the face of a disk and this is the reason so many makers do it. You can readily see that it might be difficult to get a piece of leather of equal thickness and hardness to cover the whole side of a disk but that this same leather, cut into strips and put around the edge of the disk, would not have all of its thin spots at one place.—C. E. D.

OFFSET CYLINDER IN OPPOSED MOTOR

FREDERIKA, IOWA.

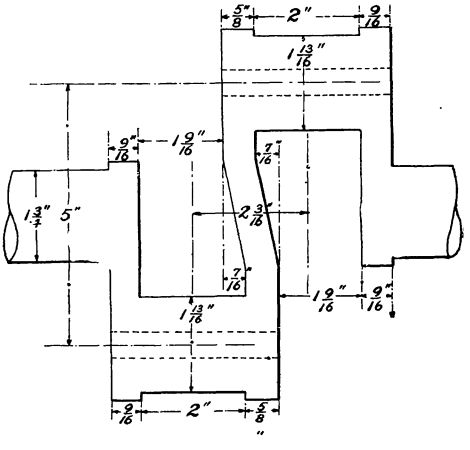
Not having availed myself of the privilege of using your columns heretofore I would like to have you answer the following:

Is it practical to offset cylinders in an opposed motor? In a 5x5 would ⅝" be too much offset? Would the accompanying drawing be all right for crank shaft? If not what changes would you suggest? I wish to "hook up" two well known cylinders that have never been made opposed to my knowledge.

I am not a mechanical draftsman but think I can make myself plain. The offset in the crank shaft is to economize in space; bring the cylinders in a more direct line, also give direct thrust on piston and connecting rod also crank pin without using offset crank bearings.

What should the fly-wheel weigh for such an engine? Will not a low compression give less vibration than a higher one? I mean by low say 60 to 65 lbs. Would a radiator with 5 sq. ft. cooling be sufficient without a fan, with four gallons of water used.—C. E. CARR.

It is practical to offset the cylinders of any engine that does not reverse, but since an opposed motor is usually horizontal it is not considered well to have one cylinder tilted up at the crank end and the other down. Some other placing, as for example with the shaft vertical, would overcome this objection and be the proper thing to do. A good offset is ⅛ of the crank length so I would favor ¾ or ⅞ of an inch. The



crank sides shown are a little thin, but they will serve if quite wide the other way or if of stiff steel. You can bore an inch hole thru the pins with safety. It is not uncommon to overhang the crank pins as you propose and its only objection is the increased cost in making. The proper weight of fly-wheel is determined by the speed wanted. If it is to be run at a very low speed the wheel must be heavy. I would suggest an 18" wheel weighing about 80 or 100 lbs. A low compression will not only run smoother and start easier but will also give better torque or turning effort at low speeds. 5 ft. of radiating surface per H. P. ought to suffice without a fan. Much depends on the placing of the radiator, and on the condition of the engine. If there is no leak past the rings the cylinders will not get very hot.—C. E. D.

[The accompanying drawing and the statement that the offset will "bring the cylinders in a more direct line" indicate an intention to make the offset in a plane at right angles to the plane of swing of the connecting rods. Attention is called to the fact that the advantages of offset cylinders are only obtained when the offset is in the plane of swing of the rods.—Ed.]

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WIRING A TWIN CYLINDER MOTOR

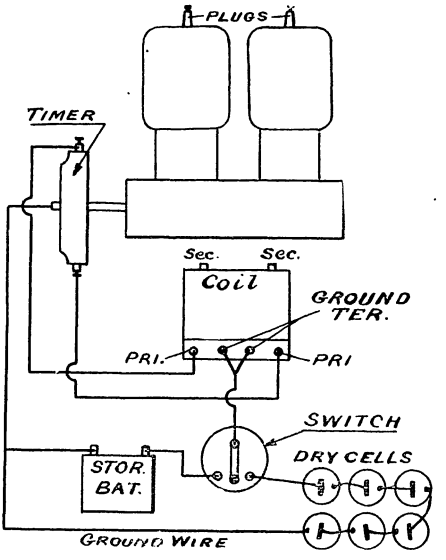
EAST ST. LOUIS, ILL.

Being a reader and subscriber of the Cycle and Automobile Trade Journal, I would like to ask the wiring of a two cylinder car.

I have drawn a sketch, and will mail you same, showing the location of the spark coil, timer, dry cells, and storage battery, and also ask that you draw the wiring on this sketch as I have drawn it out, so that I can wire the car from the sketch.

The switch is a three-way, and I would like to have it wired, so that one point of the switch comes from the dry cells and the other point from the storage battery. This seems to be the trouble with my wiring of the car.

MACHINE SHOP FOREMAN.,
East St. Louis & Suburban Ry.



I have moved the sketch of the switch down so as to make the wiring shorter and plainer. It is quite plain that the use of the switch is to turn on either battery, so connect them to it. You can swing the lever on to either one. Next connect the switch with the coil and since it must supply current to both it must connect to like wires of both and the handiest ones are the ones marked "ground." The other primary terminals must go to the timer so the proper coil may be in circuit and now you have only to ground the timer and other end of the batteries or connect them. The high tension or secondary wires must go to the plugs of course but if the timer is not grounded on the engine but is only connected to the batteries as shown, you will not get a strong spark, for the spark also needs a path and you must then supply one by grounding some part of the primary circuit since it seems evident the coil is wired with one end of the secondary wire attached to the primary grounds. It could be possible that one of the coil posts marked ground is for the high tension secondary current and that the switch needs only to be connected to the other. This you can tell by trial.—C. E. D.

TWO OR FOUR CYLINDERS, WHICH?

SEWARD, NEB.

As a subscriber, I would like to have a comparison between a two cylinder and a 4 cylinder automobile, the cost of either machine not to exceed $1,000.

I have operated a 2-cylinder and also a 4-cylinder machine, and am ready to buy the third, and am on the fence whether to buy a 4 or a 2-cylinder.

How much more real efficiency is there in a 4-cylinder than a 2-cylinder. Is not the "up keep" less in a 2-cylinder, than a 4-cylinder. Generally speaking, can you realize the same amount of power on hills and speed in a 2-cylinder that you derive from a 4-cylinder.

My experience seems to be that it takes more every day attention on a 4-cylinder than a 2 and adjustments must be made oftener on a 4-cylinder. What I want is a machine which is simplified, the "up keep" nominal and yet, I want plenty of power. To me, it seems easier in a 2-cylinder to keep both cylinders firing regularly than a 4-cylinder. Also that the battery consumption seems to be much less in the 2-cylinder. On the other hand, the gasoline consumption on a 4-cylinder seems to be the least.

My fancy dictates that I purchase a 4-cylinder, but laying aside pride, my common sense tells me the 2-cylinder will give less trouble. Your unprejudiced views will oblige.—W. E. LANGWORTHY.

You have exprest the situation so well that there is ittle need for me to say anything. If your standing n the community is indicated by the number of cylinders on your auto, then get all you can. This has been about the argument that buyers previous to this year have acted on. If value received, lots of service with little worry is wanted, then there are many people who believe a "one lunger" is best. This latter belief has received a strong forward impulse recently abroad where a lot of small single cylinder vehicles have been shown. I believe that the average man can carry his family with much under twenty H. P. and that there is no need to bother with a big overgrown affair when the light little rig will be handier as well as cheaper in every way and will be used more times per year with greater satisfaction. Large parties are the exception and when they occur you can borrow your neighbors rig or make two trips. The small rig can be driven by two cylinders without having them so large that they make a lot of noise and vibration and it is certain their parts will cost less than more parts of the same kind even tho slightly smaller. Therefore use the smallest number that will give the results wanted. This means a 2-cylinder for it is difficult to balance a single and over come the heavy impulses. Personally, I favor 3-cylinders for a 4-cycle engine for it is the least number that can be balanced and put into compact triplet form. The two cylinder must be of the opposed type unless it is a 2-cycle or has special balancing parts. More cylinders mean more friction, more oil and gosoline, more cost and the slight gain in flexibility does not compensate for the losses.—C. E. D.

PUTTING AUXILIARY PORTS IN OLDSMOBILE ENGINE

Would you please give me your valued opinion as to an auxiliary exhaust port on my 4-cycle Oldsmobile runabout engine, 1903 model; bore 4⅝ins. x 6 in. stroke. Where would be the best place to put it, in the bottom, side or top of cylinder? Would'nt the auxiliary exhaust at the end of the power stroke, help the power of the engine and also the speed? How big should this part be? CHAS. R. HALL.

You can doubtless improve the power at high speed by adding an auxiliary port as you propose, so if it is higher speed you need, this will be a good thing. Where the auxiliary port is used for the purpose of increasing the power you must be careful not to open it too soon but to keep it and the exhaust shut nearly to the end of the stroke so as to get as much power out of the gas as possible and then open both the port and the valve abruptly and let out the gas before the piston can return and make a back pressure. The size depends on the speed you can obtain on your roads. There is no use cutting ports for a higher speed than you can use or get. The safest way would be to cut and try till a size was found which further cutting did not improve. I would begin with four holes of 5-16 diameter placed at the end of the stroke so as to begin to open about 25 degrees ahead of dead center. These could next be filed triangular so as to offer more opening along the side first exposed. Put them on the bottom if convenient. They will carry off the excess oil here and not interfere with the lubrication so much as they might if on the side or top where oil is found less freely.—C. E. D.

WANTS HIS COIL TESTED

BOSTON, MASS.

I have a Rainier Model A, 4-cylinder car fitted with a La Cross coil and it seems impossible to time it regular, that is to say, when running engine to get the explosions correct. I lay the fault to the coil. Kindly let me know through your column how I can get this coil tested and to whom shall I go for same. Also what method would be used to test coil.—J. F. MANNING.

First be sure your batteries are strong. Many a man is sure on this point only to be mistaken. Substitute another coil and note the effect so as to be sure it is in the coil. Then, if as you think, return the coil to the maker or his agent, Leon Rubay, whose advertisement you will find in our columns. It is wise to write and get shipping instructions before sending it. The usual jump coil is too delicate for inexperienced hands to try to better. —C. E. D

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WOOD TIRES FOR A RUNABOUT

DOVER, N. H.

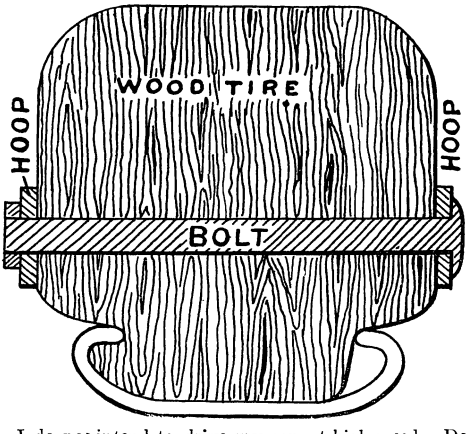
I intend to make wood tires for my Cadillac Runabout for winter use. The tires used on my car are 28 x 3.

The wood tire is to be made up of blocks 1" thick, end of grain to the tread (see sketch). The blocks are to be sawed out on a hand saw, and tapered a little on a buzz planer by holding them in a form.

As shown in the sketch each block clutches under one side of rim. In making up the tire, one block is to clinch under the right side, the next under the left side and so on, every other block clinching under the one side and the others under the opposite side.

A steel hoop is to be clamped to each side of tire by bolts passing through the tire.

I intend using elm wood for the tires. Can you recommend anything better?



I do not intend to drive my car at high speed. Do you think these tires would be practical? Would they work all right on icy roads if chains were used? Do you know of any wood tires being used on a runabout?—GEO. WILLS.

Your wood tire certainly looks practical if one is satisfied with the slight resiliency coupled with the weight of such a tire. Wood tires are not new in theory, but I do not remember seeing one like yours. I do not think of any better wood than elm, which is both tough and elastic particularly when wet. You may have some trouble to hold the wood in place but this a trial will show. It may rim-cut and get full of sand at the rim, but a new tire need not cost much. I think it will have ample traction without the use of chains, for the fibres of the wood will pick up grit and will not wear smooth. I have never heard them being suggested for a light vehicle.—C. E. D.

TROUBLE WITH REAR CYLINDER

MADISON, S. DAK.

I would be much obliged if you will aid me in diagnosing my motor trouble, in your publication.

I have a 22 H. P., 2-cylinder, opposed motor in my car and am at a loss to understand why it "skips" lately. In cranking the engine it, in nearly every instance, runs very nicely; the motor when the car is standing still, running as evenly and slowly as could be desired. However, when I advance the spark and open the throttle slightly on starting, the rear cylinder skips for probably half a minute or a minute. Or it may run alright and when I engage the low speed it skips (always the rear cylinder) for a distance of about 20 to 40 feet. When the engine gets speeded up the skipping ceases. Or when I am running along on the high speed and open up the throttle, the engine again skips for a few moments and then runs normally again. At times, too, when I am running along smoothly on high gear there will be occasional skips, which, course, decreases the power materially. I notice that when this skipping occurs the vibrator of the coil vibrates just as regularly. I have taken the spark plug from the front cylinder and put it in the rear and still it acted as before. Have tried various spark plugs and gaps, but with no result. My battery is very good, being a storage and registering now somewhat over 6v.

Carburetor is O. K. I believe, for the front cylinder runs smoothly and intake for each cylinder is equidistant from carburetor pipe. Commutator must make connection O. K. or vibrator would not work when rear cylinder skips. Is it possible that there is a "short" in the coil for the rear cylinder that could only manifest itself occasionally? Would the vibrator still vibrate in that event? I have followed out the secondary wire carefully and can find nothing wrong there. The valves seem alright and the compression in both cylinders good.—H. H. F.

I think you are getting liquid gasoline into your rear cylinder. Change your secondary wires so as to use the coils on the opposite cylinders and see if the skipping goes to the front cylinder. You will of course have to change the timer wires also. I imagine that your gasoline is not so high grade as commonly you have used and that a lot of liquid gathers in one of the pipes and when you speed up even a little, it is drawn into the rear cylinder and makes the mixture therein too rich for several revolutions with misses. Shut the carburetor needle and see if this does not lessen the trouble. Bushing the carburetor pipe at the spray tube will make the air flow faster at that point and make a better spray and probably stop the trouble. Try these things and report for the benefit of the rest of us.—C. E. D.

EFFECT OF INCREASING THE DRIVING WHEEL DIAMETER

NEW YORK.

Kindly answer the following through the Mechanical and Technical Dept. of next issue.

I have a 45 H. P. seven-passenger touring car geared 3 to 1, with 34" wheels, and as this model is now being put out with 36" wheels am thinking of having mine so equipped, but, before making this change should like your opinion as to the advisability. Should also appreciate an answer to the following:

Would such a change make any particular difference in the "pull" of the motor, and would the ability of the car in heavy going or in climbing steep hills on 2nd or low be noticeably affected? If so could this be overcome by any changes in 1st and 2nd gears in gear set?

Are the results with 36" wheels and 3 to 1 gear so far as hill climbing on low or 2nd is concerned practically the same as 2½ to 1 gear with 34" wheels?—READER

The increase in wheel diameter will gear your car up $\frac{1}{17}$ and to restore conditions to their original ratio you will have to increase the large bevel gear or decrease the small one a similar amount. If you make a change in the gear box you will leave the direct drive higher than before and be obliged to change both of the other gears.

The effect of this gearing-up will be about the same as if you added $\frac{1}{17}$ of the present weight of the vehicle and load to the present weight; and this method of finding out if your motor will handle the car properly under the changed conditions will probably be close enuf for practical purposes. The gear change you suggest is $\frac{1}{3}$, or more than three times the wheel change, but may be an improvement.—C. E. D.

HOW TO TIME A 4-CYCLE MOTOR

BROOKLYN, N. Y.

Will you kindly send me a list of different cars and brakes or different gears. Also proper way to time a 4-cycle motor. HOWARD VAN DEWATER.

In the March issue we will publish a list of practically all American cars with specifications covering the number and kind of brakes used on them. This will include the wheel sizes but not the gear ratios. To time a motor one must be pretty well acquanited with the size of the cams so as to know what is possible and then the timing can be done intelligently. Ordinarily the exhaust valve should close at or slightly after dead center and open 25 to 30 degrees before the lower dead center. The inlet should open quickly after the exhaust closes and remain open to the end of the suction stroke or in some cases slightly longer. C. E. D.

TESTING CAUSE OF MUFFLER EXPLOSIONS

Please tell us the cause of explosions in the muffler, these occurring about every ninth or tenth revolution. Is it because the exhaust valve is not closed or because the spark misses and the next charge explodes the muffler?—G. S. WATERS.

Your engine probably misses fire in the cylinder for if it fired there it would exhaust burned gases which cannot be fired again. If the exhaust valves leak some mixture escapes each time, and so the muffler contents slowly become more nearly explosive until after 8 or 10 times it does explode. Test the spark with a spark gap and test the compression by turning over slowly and listenting for a leak, or use a candle at the exhaust valve with pipe removed.—C. E. D.

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DOUBLE FRICTION DRIVE.

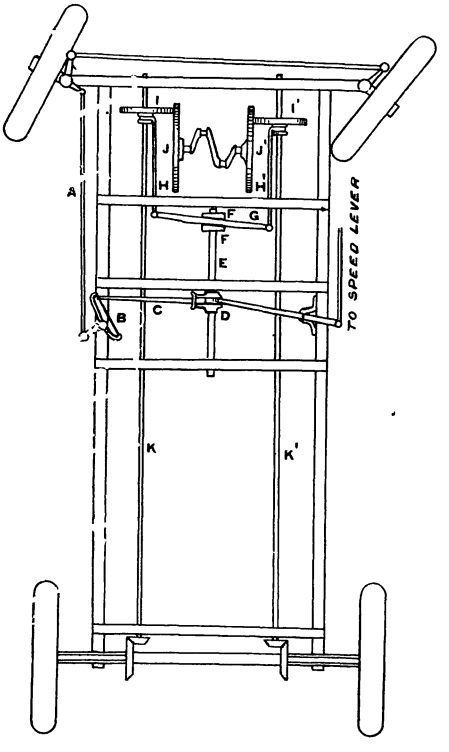
HALE, MO.

I enclose drawing and description of an improvement, made by myself, in friction transmissions for automobiles.

The drawing and enclosed data will enable you to see that it will do away with differential gearing and will not only permit but compel the outside driver to revolve faster in rounding a curve. Kindly give me your opinion of the device, if possible, in the next number of the Journal. ELMER BENNETT.

DESCRIPTION OF TRANSMISSION GEAR.

The steering wheels of the car being turned, as in the drawing, the rod A pushes the pivoted link B, as shown. drawing connecting rod C with it, thus, by means of the part D, giving sliding shaft E a partial revolution. This, thro the agency of the beveled washers, or flanges, F F (fixed to shaft E) causes the arm G to assume a diagonal position, thus, by means of the rods H H 1, pushing friction disc I farther away from the center of the driving disc J and pulling disc I1 toward the center of J1, thereby causing— through the medium of splined shafts K K1—the left-hand drive wheel of car to revolve faster than the right-hand driver in rounding a curve.



The speed-changing arm L moves the whole system endwise by means of its engagement with part D, which is fixed to sliding shaft E. It will be seen that, as arm C is always held at a right angle to E, it will, at any position of speed lever, assume a correct position on link B and the same will be true on the reverse.

Of course the starting crank of engine, would have to be bevel geared to some part, preferably the back face of one of the driving discs.

Some means could be provided for separating shafts K K1 so as to throw friction discs out of engagement with each other if necessary.

Your device for avoiding the differential is a good one and should be of value to some builder of motor buggies. It further combines the advantage of a double friction drive and so lessens the need for such severe service out of a single set of disks. The principle fault with friction drives is that they are worked beyond their limits and then eat power. (See another answer covering this subject.

The broad idea is not new, however. It was shown on a buggy at the last Chicago show or rather described as used thereon, and was patented by R. D. Scott on May 10th 1904, No. 759559. I do not know how broad this patent is and there may be others. I use it in one form on my buggy autos altho it is not a necessity.

In railroad work, no balance gear is used but the wheels are expected to slip in rounding a corner as they can readily do being metal to metal. There is some provision in the fact that the wheels are slightly larger close to the flange than away from it and that as a wheel is crowded close to a rail it runs farther per revolution and so gets ahead of the other and gets away from the rail farther. This provision is of more value in preventing friction on straight running than in turning corners so the railway requirements are much like the road requirements in the matter of turning corners. The road vehicle is at a disadvantage however in that its front end may skid sidewise easily and that its tires are likely to be damaged by slipping on the ground so it is necessary to use a balance gear if the drive is positive. With a friction drive, this is not true but the slipping can take place at the friction disks if two are used or at the ropes or similar slipping driving devices. And it will take place here if the friction at this point is less than at the point of wheel contact with the ground, the difference in leverages being taken into account of course. Your device will turn a corner nicely under ordinary road conditions even if you do not shift the disks. But to slip a wheel on the ground or a disk or driving device on its surface takes power and takes it just when power is needed, for the rig runs harder around a corner, and so some device that will serve as a balance gear without the cost, complication, weight and weakness of the usual gear will be found valuable and find use in future.

Your device adds some complication probably equal to what it saves but its advantages overcome this. It will maintain the same speed around the corner as straight away and this is a defect. We want a device that will slow up on a corner just as a horse slows up in turning. Such a device will save tires and wheels, prevent accidents and add much to the sweetness of auto using. This too is not a new idea and will find use as autos get more practical and less ostentatious.—C. E. D.

ABOUT SHORT AND LONG STROKE MOTORS.

ST. LOUIS, U. S. A.

Will you kindly favor me with an answer to the following question?

Assuming that the mean effective pressures are equal; that valve areas, lifts etc., are worked out in a similar manner, and that in both cases the piston speed in feet per minute is the same. What would be the relative power of a six cylinder, four-cycle engine of 4½-in. bore x 4-in. stroke, as compared with a similar engine of 4½-in bore x 5½-in. stroke? CHESTER E. CLEMENS.

Under the conditions assumed in your question as I understand it, there would be no difference in power at moderate speeds. At high speeds it might be that one engine would fill more completely than the other and thus develop more power but this would be rather a matter of length and size of pipe and carburetor than of difference in engines. If the engines are proportioned alike so far as valve openings and sizes are concerned they should draw in the same amount of new charge since they run at the same piston speed per minute and they should use this fuel with equal efficiency and so develop equal power.

There are chances for differences that would probably be found. The short stroke engine will be hotter than the long stroke one because it has less wall surface than the other and so it will probably be more economical of its heat and give more power on that account. But the other being normally a slower speed may not open its exhaust valve so soon and so get a little more expansion out of its charge. This last phrase must not be interpreted as meaning that a long stroke engine expands its charge more than a short stroke one, as many people think; for it does not do so if the valves open at the same time. The short stroke engine is more likely to have losses due to loose bearings and improper clearances than is the long stroke one. In short it is harder to make a perfect short stroke engine than a long stroke one. Per contra, two of the requirements of the Carnot cycle are little wall to the combustion space and quick expansion of the gases and both these are best in the short stroke engine. For auto use I prefer a short stroke engine "square" or even with stroke less than bore.—C. E. D.

(Attention is called to the fact that if the power is equal in these two engines both having the same piston speed, the long stroke engine is developing this power at less revolutions than the other.—Ed.)

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2-Cycle Engines

HUGH DOLNAR.

WANTS 2-CYCLE MOTOR DESIGNS.

I wish to improve my engines, make them lighter and increase the power. I want to get in touch with one or two of the best experts, who I could get to get me out some good designs, without charging me fancy prices. I have from time to time tried experiments taken from your Journal, but it is too expensive to try everything that comes along. In a few numbers back I saw an article where Mr. Roberts designed the Elmore engine, but other parties had improved it so it is twice as good an engine now. Well, if that is the case, Mr. Roberts is not as great an expert as others seem to be. I see a French designer this two or three months back reduced the H. P. weight to 2.2 lbs.

I wrote Mr. — some 6 months ago about designing an engine, but his figures were so high I could not afford it; if I could get in touch with some one who stands at the top of the profession and would get me out some nice perfect designs, etc., as perfected to date, at reasonable figures, I would give them many different sizes from time to time to get out for me as I gradually climbed up in the business.

Now, could you suggest one or two of the best designers in this country, or in France, who does a little designing of two cycle and four cycle engines for] outside parties?

Another question I would like to ask—can you tel me what is the best carburetor made? I have asked hundreds; one says one and one another. The Schebler some say is the best, others say there is none today equal to the Longuemere, French make. I write you as I know you people are in touch with all kinds and are in a position to know what is what. I have either to get some spray valves, or some carburetors for some engines I am making, and I would like to get the best that can be had for good running, and would like your opinion and advice on them. I have used the James spray valves mostly on my engines the past years with fairly good results, but wish to get something better if there are any to be had. — NEMO.

Replying to this highly suggestive communication from an actual supplier of 2-cycle motors it should be said, first, that his condition is that of the whole class of present American 2-cycle motor manufacturers, so far as met by the writer. Some of the 2-cycle motor builders are good machinists, while others are poor constructors; all, without exception, have copied the work of others; with no attempt at understanding the operations of the 2-cycle motor and have been well contented to produce motors that run when called upon to do so, without knowing why or how they worked. At the most the American 2-cycle motor builders have only sought to obtain individuality by minor improvements and changes, almost all, so far as yet seen by the writer, supplying the cylinder charge by crank-box pressure.

Because of the superiority of foreign motor cars in 1902, all driven by 4-cycle motors, most American builders of small gas-engines, suitable for driving cars and small boats, neglected the 2-cycle motor and devoted all their powers to improving the multi-cylinder, 4-cycle motor, water-cooled, leaving the 2-cycle motor to builders of the lowest-priced engines, many of whom were contented to build anything, no matter how poor, that could be sold.

Every successful manufacturer must at least build work that will stay together and do what it is said to be able to do. So far, the simplicity and low cost of the 2-cycle gas engine, which is by far the lowest-cost heat engine known, has obtained purchasers for this class of motor, hardly more ignorant than the builders, neither maker nor buyer knowing anything about the engines except that they could be sold and would do work better and at less cost than small steam engines or domestic animals. With gasoline at four cents a gallon any kind of an engine gave cheap power. Now that gasoline costs four or five times as much fuel economy becomes important, and, as in the instance of this correspondent, makers of low-cost 2-cycle motors are beginning to see the need for improvement.

As to particulars, it must be borne in mind that gas engines of the small sizes here referred to have steadily increased in power from the first until now, and the doubling of the power of the Roberts-Elmore motor was an ordinary occurrence; as an example, the Buick motor was brought up from 14½ H. P. to over 30 H. P. maximum, with no changes that seemed of great importance except better machine work. It is not at all likely that any competent gas-engine designer will supply this correspondent with the best small gas engine, 2 or 4 stroke cycle, for less prices than quoted by Mr. —.

It m st also be remembered that any real improvement in small gas engines can be covered by a very valuable patent.

As to carburetors, all makers adve tise in the Journal, and any of them will send a sample and a salesman to any manufacturer who wa ts to try it out.

If this correspondent really desires to improve his motors he must first install a testing plant which will tell him what power his engines can deliver by burning a gallon of fuel, and he must next go to the cost of making changes and ascertaining the results following those variations. There certainly is no probability of obtaining the best small gas engine or even one a little better than common, without some ork and cost. It is also extremely probable that the less money an engineer asks for his work, the less profitable his work will prove to be.

The best small gas engine that can finally be produced is one of the most valuable of inventions and the only way any man can hope to own it without paying a large sum of money for it, is to invent it himself, and patent it in his own name.

The Journal will print working drawings of many 2-cycle motors during the coming year, and will print all information obtainable concerning 2-cycle motor performance. Several new cars driven by 2-cycle motors are now on the road, some of the motors being air-cooled, and 1908 bids fair to ee the superiority of the 2-cycle motor for car-driving indisputably established by actual work on the road.—H. D.

RULE FOR CALCULATING COMPRESSION.

CHICAGO, ILL.

We have a 4x4 2-stroke-cycle engine of automarine type: what we desire to know is, when our piston head is in the top stroke it is only $\frac{7}{8}$ from top of inside of cylinder. We use 3 rings $\frac{1}{16}$ wide 2 at top and one for base compression. do you think it is to close for compression space? What should be the correct space? The dimensions of our ports are, intake, $\frac{3}{8}$x4, exhaust, $\frac{7}{16}$ x 4½. We give the exhaust port $\frac{3}{16}$ of a lead over the intake, is there any harm in doing this? Our compression in base is very great. Which should have the most and how much? B. M. McCAIN.

Replying, would say that there is no functional relation between the crank-box pressure and the maximum pressure of the compressed charge. The high crank-box pressure is undesirable, but is inseparable from maximum cylinder charge volume with crank box cylinder charging, because the largest cylinder charge must be had with the least crank-box clearance and the least crank-box clearance must give the highest crank-box pressure. It would be better to charge the cylinder with no charge pressure, which can be done by means of a separate charging cylinder but is impossible with crank-box cylinder charging.

With four ins. piston travel, a $\frac{3}{4}$ exhaust port and $\frac{7}{8}$ compression space the motor, cold, will compress an atmospheric pressure volume of 4⅛ units into $\frac{7}{8}$ of one unit, that is, it will compress 33 volumes into 7 volumes, giving, with the cylinder above the top of the exhaust port full of air at 15 lbs. more or less, ordinary atmospheric pressure, 33x15: 7=70⅝ pounds compression, if the compression space horizontal plane area is everywhere equal to the piston area, that is to say, if the compression space is a prolongation of the cylinder bore. The compression space is commonly of greater diameter than the cylinder bore, and it is also common to round the top corners of the compression space; the greater diameter reduces the compression and the round corners increase the compression. Your motor probably has about 70 lbs. compression, cold air, piston tight, and moved slowly from the top of the exhaust port to the top of its compression stroke, so as to transfer to the cylinder walls and piston the heat squeezed out of the air, as compression proceeds. If the compression stroke is made very rapidly, then the heat generated by compressing the air will greatly increase the final compressed charge pressure; also any leak in the piston packing will decrease the compressed charge pressure. If your piston is ordinary snap-ring packed, then it is not tight, and if moved upward very slowly might show very little pressure. On the other hand, if the piston

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is tight, and is moved rapidly, say so quickly as to make the compressing stroke at 2500 R. P. M. rate, in less than 0.012 seconds (12-thousandths of one second) the compression might be close to 150 lbs,, owing to the heating of the air, the heat having no time for transfer to the piston and cylinder walls.

Speaking in ordinary loose terms, your motor has 70 lbs. compression, full charge of pure air, and is ordinary practice.

Initial working pressure is, loosely speaking, about three times the compression pressure, if the charge is well and speedily fired, which would give approximately 210 lbs. initial pressure. The actual pressure can be ascertained only by a manograph in a manner too long to describe here.

As to intake and exhaust port dimensions measured engthwise of the cylinder practice varies, but it is common to make the exhaust open the full length of the intake port before the intake port is opened. You cannot open your exhaust port too rapidly, nor can you make your exhaust too free. I should say make your ports $\frac{3}{8}$ and $\frac{3}{4}$, with the piston head of such form as to have the exhaust open $\frac{3}{8}$ at the time the intake port begins to open, and have your exhaust open $\frac{3}{4}$ when the intake port has its full opening of $\frac{3}{8}$, length twice that of the intake. which would make your exhaust $\frac{3}{4}$ long instead of $\frac{9}{16}$.

Personally, I believe your ports should be about $\frac{7}{16}$ for the intake and $\frac{7}{8}$ for the exhaust, as there seems to be no gain by holding the burning charge very long in the cylinder. A 3-ins. stroke 2-cycle motor, observed by me, was very strong with $\frac{1}{4}$ inch compression space and an exhaust port 1 inch long, measured lengthwise of the cylinder.

The compression-finding rough rule, is to obtain the cylinder length from the top of the exhaust port to the cylinder head, and the compression space length from top of piston at high point to inside of cylinder head in fractions having a common denominator, multiply the larger numerator by 15 and divide by the smaller numerator.

Example, in your case with $\frac{3}{4}$ in. exhaust port and 4 ins. stroke $3\frac{1}{4} - \frac{7}{8} = 3\frac{3}{8}$. $33 \times 15 = 495$. $495 \div 7 = 70\frac{5}{7}$, the compression space being $\frac{5}{7}$ of an inch.

Your elementary questions are here answered at length because they are often asked, and it seems best to reply to them fully and finally, once for all. Actual compression and economy results are dependent on many variables, and cannot be accurately determined by calculations; the testing stand alone can tell the truth.—H. D.

COMPOUND PISTON OR CRANK CASE COMPRESSION.

BROOKLYN, N. Y.

Will you kindly give your opinion on the values of the following types of two-cycle motors.

1. A two-cycle, two or four ylinder motor with open crank-case and differential or compound pistons, the enlarged lower end of piston in one cylinder forming a pump-chamber which pre-compresses air only. This air is then by-passed to the inlet port of the other cylinder. In passing from the pump chamber to cylinder the air is carburetted by injecting the fuel forcibly into the by-pass. What would be the objection to using an inlet valve in cylinder head instead of regular ports?

2. A two-cycle motor in which a separate pump driven by crank shaft is used to pre-compress air only. Air is then by-passed to either a valve in the morking cylinder head or a regular inlet port. Carburetting occurs in by-pass as air is passing to working cylinder. It is assumed that all parts will be properly proportioned and of good design.

3. If, in either of these engines, three fuels, alcohol, kerosene and gasoline, can be used without material change, would the motor fill a commercial need and find a ready market, provided a motor of either type would show considerably more H. P. than others of the same size.—B. H. S.

Replying to B. H. S., (1) the "comp und," or better, the double integral-piston has been used as specified, with a carburetor, with good results, and has probalby been used with a pure air charge, fuel injected by pump or other means. With either method of fuel supply this scheme is practicable, and is much superior in every way to crank-box pressure cylinder supply, so far as functional considerations only are concerned. It is ture, however, that crank-box pressure supply can give equal power at lower cost of motor, with satisfactory flexibility and good fuel economy, altho not quite so good as with the two-diameter double-piston.

There is no prohibitive objection to extending the side-pipe to the cylinder head fitted with an automatic intake valve. The plan is old and open to public use, and is offered in the "Wolverine" 2-cycle, motors, Grand Rapids, Michigan, which have given, and, so far as known, are now giving satisfaction, but are not markedly superior to the common form of crank-box, 2-cycle motors which use the piston as both intake and exhaust valve.

2. The plan proposed is practicable, and has probably been successfully worked, though it has not been seen in operation by the writer.

3. Any fuel can be injected during the passage of a pure-air charge to the working cylinder. The Secor 4-cycle kerosene motor does permit a little cold kerosene to drizzle through a needle valve into a cold portion of the pure air intake pipe, and runs perfectly well with no vaporizing of the kerosene until after it is carried into the compression space and cylinder, by the suction of the piston during the intake stroke.

As to demand, the writer is convinced that the three cylinder, 2-cycle motor will displace all other forms of heat engines for motor car driving, and for small boats and flying machines. As to "finding a ready market" that depends on business management, as there is nothing broadly patentable in the suggestion of this correspondent. A car driven by a 3-cylinder motor all as suggested in (1) save that the charge is drawn through a carburetor, is now running in Cleveland, and if not described in this issue of the Journal, will soon be fully illustrated and described in this publication.—H. D.

A POWER DRIVEN LOGGING TRUCK

I have in mind the construction of a ten ton truck, to be used in hauling timber over ordinary dirt roads. This truck will have not less than a 60 H. P. motor, sliding gear, four speed and reverse transmission, jack shaft and side chain drive. The high speed will not exceed seven to eight miles per hour. Wheels will be steel, forty inch in diameter. Front wheels will have twelve inch steel tire, and rear wheels sixteen inch steel tire, crossbarred. The front wheels will have a raised center to keep them from sliping sideways. Frame will be "I" beam steel, two full eliptical springs in front only, no springs over rear wheels. The tread measure from center to center of each wheel will be somewhere near sixty inches. Brake bands will be very large, between the two rear wheels. Drive chains will be on sprokets on the outside of each rear wheel. Front part of the frame will be brought in so as to be only a trifle wider than fly-wheel of the motor. Back of the motor it will widen out to about ninety inches across. Loading platform will be about fourteen feet so as to take fourteen to eighteen foot cuts of timber. The rear wheels will be placed so as to take most of the weight. Body of course will extend over the rear wheels. Radiator will be suspended on springs so as not to be injured by vibration.

Now we only expect to use truck when roads are in good condition. We have read a number of your articles in the Cycle and Automobile Trade Journal, and would appreciate very much your opinion as to the practicability of using some trucks in the South for hauling timber, construction somewhat as outlined above. O. H. JEAN.

A logging truck, driven by steam, was built some few years since by A. O. Lombard, Waterville, Maine. The writer never saw this truck, but has been informed that it was extremely well adapted to work in the woods, and it would seem wise to become fully acquainted with the Lombard logging truck before undertaking costly original work in the same line.

If obtainable, some detail information as to the Lombard logging truck will soon be given in the Journal. Meantime Mr. Lombard would be likely to inform this correspondent fully, if addressed by etter. H. D.

CLAIMS FIRST EXTENDED PISTON MOTOR.

NEW HAVEN, CONN.

Noticing article in Journal, Oct. 1, relative to the Henderson motor, I wish to state that I made a motor, 1891 or 1892, having precisely the same pure-air ports as described by Henderson. This motor had a 3-port system. I have the old cylinders of that motor yet, and believe it to be the original extension-piston type.

The motor worked O.K. until it was well warmed up, when the extension became over-heated and caused premature explosions. For this reason, I abandoned this form of motor.—C. W. FOSTER.

It does not appear on the face of the design that this piston extension must, of necessity, cause premature ignition, though it undoubtedly did so as built by this correspondent.

An abandoned experiment, however, is no bar to a valid patent.—H. D.

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BLOWER CHARGE INJECTION.

NEW YORK DEC. 23, 1907.

I have lately become interested in the two-cycle engine and have been reading with great interest the articles in the Mechanical and Technical Department of the Journal. I have gone carefully through the back numbers for the past two years, and note that you advocate the use of an auxiliary charging cylinder. I suppose this is to get away from the crank-box pressure which I should imagine would force out oil, and if the bearings were at all loose would cause an appreciable leakage of mixture, besides being an undesirable structure from a manufacturing point of view in the case of a two or three cylinder engine

As an alternative to the auxiliary cylinder would it not be practicable to use a rotary blower to force the charge into the cylinder, the blower being located between the carburetor and the engine? I suppose this method has probably been tried by some one, but as I have never seen anything in your columns in reference to it, I believe that a discussion would be of quite general interest.

As it appears to me the greatest argument which could be presented against this arrangement would be the possibility of a part of the fresh charge passing out with the exhaust, due to the constant pressure which would be maintained by the blower, but I think this could be overcome by throttling the charge, so that the loss, if any, would be only at maximum load, and full charge, a condition which you seldom get in automobile driving.

If this failed there are, of course, ways of "measuring" the charge, as is done in regular two-cycle practice without the addition of extra moving parts other than valves, and still retain the pressure blower for charging.

The only other objection which I can see to this scheme is the handling outside the engine of an explosive mixture under some pressure, but I understand that wire gauze will positively prevent back firing, and if so, it should be an easy matter to guard again this danger, and at the same time provide sufficient area of gauze to allow free passage of the charge.

My ideas at this time have not taken any more tangible form than a few sketches on paper, but I favor an engine having three vertical cylinders with exhaust ports extending all the way around, and with automatic intake valves in the heads. The bottom of the valve and the adjacent portion of the cylinder wall would be so formed as to prevent any of the old charge remaining under the valve. This works out in the form of a sort of inverted cup in the centre of the cylinder head with automatic intake valve located in the top of the same and the ignition mechanism close beside it. The entering charge would then sweep the burnt gases to the lower part of the cylinder and even with the throttle nearly closed the engine ought to run well as there would always be sufficiently good mixture in this cup shaped chamber to give an explosion. In connection with the engine, I would propose to use a blower giving, say, six or eight pounds pressure to introduce the charge into the cylinder, and control by means of limiting the travel of the intake valves.

I should like to have your comments on the arrangement outlined above, and if you know of any books which give any more information on the subject than has appeared in the Journal (which I doubt) would request that you kindly name them.—A. J. H.

Crank-box pressure gained by working-piston displacement does not give so much charge volume as to fill the vertical cylinder from the top of the exhaust port to the top of the compression chamber, as must be done to obtain maximum power.

Again, throttling reduces the charge volume and the compression, and so prevents the motor from making a working stroke with so little fuel as if the small fuel charge could be placed under maximum compression; herewith comes the stratified charge consideration. First, the most "flexible" motor, namely, the motor which will run with certainty through the largest power-variation range, is desirable, and the higher the compression the "leaner" the ignitable charge may be, hence constant compression is desirable, though it cannot be had with a throttled charge, because if a combustible charge is drawn into the crank-box and thence goes through a throttled passage to the cylinder, then the compression must be reduced, since the charge volume is not enough to fill the cylinder. Hence it is clear that reducing the combustible charge volume to reduce the fuel supply and motor power reduces compression and so causes ignition failure when there is enuf fuel in the cylinder to cause an explosion if the compression were normal maximum, all going to reduce the power range of the motor.

Suppose the cylinder to be charged with pure air only, and that this entering pure-air is, in some way, charged with a variable quantity of a combustible as it enters the cylinder, then the compression would be constant and a leaner charge would ignite than if, as with the throttled charge, the compression were reduced by the volume reduction to obtain fuel reduction.

So far, equal diffusion of fuel through the entire volume of the compressed charge is supposed. Now, as to the stratified charge.

A charge refuses to ignite when it is either too rich or too lean. This writing does not consider the too-rich charge at all, but deals with the too-lean charge only, which will not ignite because it does not contain particles of fuel close enough together to light each other, speaking in common language.

Now suppose a pure air compressed charge has fue injected close to the spark point, and that the spark is delivered when the fuel is injected; under these conditions it is evidently possible for a very small volume of rich charge to surround the spark and ignite under high compression and burn vigorously in contact with abundant air to ensure complete combustion, so that the fuel should deliver its full value in work on the motor piston.

This is the theory of the stratified charge, richer in fuel in some places than in others. The stratified charge was once considered important, but has now dropped out of sight, though recent experiments by Purdy, which I am not free to disclose, show conclusively that the stratified charge is of great value in the ordinary opposed cylinders form of car-motor, increasing both power range and fuel economy, in a highly desirable manner.

Now as to the fan supply, not of combustible mixture, but of pure air. This has been proposed many times, and was carried out by the late C. P. Malcolm, who drove a fan by directing the motor exhaust against the vanes of a fan motor which worked the pure-air fan and forced a charge of pure air through the cylinder, completely scavenging it. At the proper moment the fuel for one stroke was injected into the current of pure air entering the intake port and the charge was then compressed by the ascending piston. Mr. Malcolm died believing this system the best for small gas engines.

The "Euclid" car description appearing in the next issue of the Journal, details a successful application of the charging piston and cylinder to the 2-cycle motor. This plan has often been proposed but in the "Euclid" is carried out by an individual charging of the cylinders, in which one charging cylinder supplies only one working cylinder, in a manner not before seen by me.

Scavenging by overcharging with pure air is no valuable when it makes the cylinder colder than need be for proper lubrication. The quick opening of the large exhaust port instantly extinguishes the flame in the 2-cycle working cylinder and brings the cylinder pressure, I believe, below atmosphere. If this is true, then scavenging is needless, and all that can be done with the ordinary form of motor is to fill the cylinder down to the top line of the exhaust port with air or mixture at the lowest possible temperature, and compress the charge by the piston up-stroke, supplying the pure air charge with fuel at the proper time. In Harry Eason's 2-cycle motor the cylinder charge supplying and compressing proceed together at the same time, rendering it possible to charge the cylinder with any desired charge volume at atmospheric pressure, regardless of working cylinder dimensions.

The "Wolverine" 2-cycle engines, Grand Rapids, Mich., carry the side-pipe up from the crank-box to an automatic valve in the cylinder head, and are well liked. This intake valve placing is old and open to public use. My own preference is for the pure air charge not obtained by either fan or crank-box pressure, and injected fuel, doing away with the carburetor entirely.

There is no book printed, so far as I know, that contains anything of present value in relation to either the 2-cycle or 4-cycle small motor. The books were all obsolete before they reached the binder's hands, and the only, printed, useful, 2-cycle information is that given in the mechanical papers. The present issue of the Journal contains the most important 2-cycle motor information ever published anywhere, and will continue to publish all the real news of the 2-cycle motor obtainable.—H. D.

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WANTS 2-CYCLE AIR COOLED MOTOR.

PORTLAND, OREGON.

In common with many others, I am interested in the 2-cycle type of gasoline motors and would very much appreciate the following information: Is the 2-cycle type as easily cooled as the 4-cycle? Have the manufacturers of the 2-cycle succeeded in producing a successfully air cooled, 2- or 3-cylinder motor of 10 to 15 H. P? If so, I would like the names and addresses of such manufacturers.—C. A. P.

Replying to C. A. P., the 2-cycle motor is very much more easily cooled than the 4-cycle motor.

I do not know that any maker is prepared to supply you with air-cooled 2-cycle motors.

The Euclid Motor Car Company, Cleveland has a successful 3-cylinder, 2-cycle, air cooled motor in a first car, 22 H. P.

The Page Auto Co., Adrian, Mich., has a successful 4-cylinder air cooled, 2-cycle motor in a first car, 25 or 30 H. P.

The E. W. Stevens Company, East New Market, Maryland, have, I believe, successful air-cooled, 2-cycle motors.

I have no doubt that the air-cooled, 2-cycle motor will displace all other motors for motor car work.—H. D

(A. H. Yocom & Co., Reading, Pa. can supply you with 2-cycle air cooled motors from 10 to 40 H. P.—Ed.)

RELATIVE POWER OF TWO AND FOUR CYCLE MOTORS

OLD FORGE, N. Y.

In the September issue of the Trade Journal, you published a H. P. table prepared by Mr. Worby Beaumont. Nothing was said about two or four cycle, so I suppose it was only for four cycle engines. If so, what would be the correct figure to multiply the result by to get the H. P. for a 2-cycle engine? In other words, what proportion do you consider the power of a 2-cycle engine to that of a 4?

I trust you will find room in your valued technical department to answer the above.—C. F. NORTON.

The 2-cycle motor is not so well standardized as the four and it does not give so dependable an output. On this account it is difficult to state a rule for comparison that is of any value. The charge cannot be compresst the full stroke of the piston for the exhaust port is not closed during the first one sixth of the stroke, so one sixth of the charge gets out. If this happens to be old gas there is nothing lost but if it is fresh gas the power is reduced thereby. It has been pretty generally accepted in the past, that the motors take 50% more fuel for the same power but the later motors undoubtedly do better. I think that adding 50% to the 4-cycle table will indicate as much power as you can expect, altho there are exceptional motors which will give more.—C. E. D.

Difficulties Successfully Overcome by Users

Under the above heading we will be pleased to publish how *you* solved *your* automobile difficulties. Many troubles have been successfully overcome by means of the answers in these columns. We earnestly urge those who have been thus benefited or any who have overcome such difficulties to send a brief account of the same to the Editorial Department of the Cycle and Automobile Trade Journal.

STEAM VERSUS GASOLINE A STRONG STEAM ADVOCATE

It is difficult for the lover of the up-to-date steam car to resist making answer to contributions such as the one indulged in on Page 86 of your December issue by "C. E. D." under the caption "GASOLINE versus STEAM,"and in my humble way, as an owner and user of a steam car built not far from Boston, wish to protest against the "facts" as quoted by "C. E. D." in answer to the question by "C. D. Flack."

1. I concede that the steamers use more water —this to their disadvantage.

2. It does not use more fuel if Kerosene oil is used (and to my mind after four seasons' use of Kerosene Oil, it is the only legitimate fuel for steam cars.) The up-to-date steamers do not have more parts. It does require more time to get ready, but once ready this is more than offset by the fact that it is ready at an instant's notice thereafter until again put out of use for the day, and does not have the uncertainty of the gasoline car with its variations in mixture which changes with every change in atmosphere, also other carburetor troubles and compression, ignition and over-oiling troubles. It does not have 100 symptoms for one trouble which keeps you guessing sometimes for hours as to what the trouble really is. As to air-cooled motors, which "C. E. D." endorses so highly, we think this reflects on his intelligence as an authority on motor cars in general. He says, "The intense flame is often destructive to the boiler." This is news to me. I have seen one boiler used constantly for four years and have then seen this car sold for within $200 of its original price, and is now running every day.

It does not require near the care to keep a steam car in order that it does the gasoline car capable of doing the same work, as it is not nearly so heavy and is not necessarily so expensive in construction. He admits after steam is up that they are more easily started; can be easily reversed; have a greater flexibility, have no clutches, speed change gears, etc; can pull hard from standstill, can be driven slowly without stalling, and he might add that a little $1,000 steam car can make a $3,000 gasoline car look cheap going up a hill, or on the level for that matter. He states that owing to some of the early steamers being "high financed" and their early development being too rapid, "it has had its best day."

"Oh! my friend, "C. E. D.," come off with your prejudice, and take another ride in an up-to-date steamer and you will learn something new.

My opinion is that the steamer is retaining its friends, and is rapidly getting more every year, and is far from its limitations as to development. Writing of limitations it seems that in order to keep up with the game it is now necessary to put in six cylinders, complete engines, into one car, adding to weight, also to price, and catering constantly to a narrowing market with each added engine, that it would seem that the gasoline car is rapidly approaching its limitation both mechanically and commercially. On the other hand one steam car manufacturer has three different powered cars with three different sized engines with great variations in power, has only one pair of cylinders in each car, and for speed, and hill climbing has no equal in the whole world, and when more power is wanted does not find it necessary to add another pair of complete engines.

Owing to lack of space it is impossible to go into many other arguments in favor of steam as against the internal combustion driven car, but to conclude let me say that both types have some very good points wherein they are superior to the other, and which cannot be supplied by the other; therefore, both have their field, but it seems that from both the mechanical as well as the commercial standpoint that the steamer is making greater strides, and that its limitations as to power with reasonable weight and expense, combined with all its acknowledged superior points, that it has not so nearly approached this stage as has the explosive car.

[The question of the relative advantages of steam and internal combustion motors is one that can be discussed almost ad infinitum without settlement but the preference of the public is clearly shown by the relative number of steam and gasoline cars built. For last year the proportion was about 6% steam to 87% gasoline. Ed.]

ANTI-FREEZING SOLUTION.

According to Mr. J. D. Maxwell, of the Maxwell, Briscoe Co., "there are three preparations which are mostly used in the radiator of an automobile to prevent freezing, namely: Calcium Chloride, Glycerine and Wood Alcohol. The calcium chloride solution has a tendency to attack the solder and destroy the metal. The glycerine is injurious to the rubber hose. The alcohol is absolutely harmless. A 10 per cent. solution of alcohol will withstand a temperature of 15 degrees above zero. A 25 per cent. solution will stand a temperature of zero, and a 40 per cent. solution will stand a temperature of 24 degrees below zero. Generally speaking, a 25 per cent. solution will be found sufficient. The alcohol evaporates more rapidly than water and any loss should be replaced by equal parts of alcohol and water."

Denatured alcohol, which is now made commercially, can be used for the same purpose. It is cheaper than wood alcohol, and can be obtained in most localities at about fifty or sixty cents a gallon.

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WANTED EXPERIENCES WITH WATER REGULATOR

COLUMBUS, GA.

I would like to find out whether or not, F. W. Oldfelds Automatic Water Regulator could be safely depended upon to do the work that it is advertised to do if it were attached to a fire tube automobile boiler carrying, sometimes, as high as 700 lbs. of steam. I do not presume that you would feel at liberty to give a direct reply to this query yourself, but if you will kindly request any of the readers of the Cycle and Automobile Journal who have had experience with this device to give me the benefit of their experience therewith, I shall feel that you have done me a service for which I shall ever feel most grateful.—H. S. FLOYD

LOCATING A WEAK VALVE SPRING

Weak valve springs often are the cause of the sluggish action of a motor. A simple test to determine if this is the trouble can be made by simply inserting the end of a screw driver between the coils of the suspected spring while the motor is running and giving a twist to the screw driver. This spreads the coils and increases the resistance of the spring. If the motor running is improved and it speeds up slightly, it indicates that the valve has been acting sluggishly, usually due to a weak spring but sometimes due to a bent valve stem or one ruffed up owing to too great heat and poor lubrication, so before stretching or putting in a stronger spring carefully examine the valve stem.

HOW THE ENGINE ACTS AS A BRAKE

PHILADELPHIA, PA.

There has been much discussion about the use of the engine as a brake, some even claiming that to use it in this way is injurious. I have always made a practice of using the engine as a brake when descending long hills to save the regular brakes and when operating an air cooled car, to keep the engine cool and have never noticed any injurioous effects. However, if, when coasting down hill rapidly with engine stopped, the clutch is suddenly let in, injury might result particularly if the clutch was "fierce" or the car on the low gear.

The real cause of the braking effect seems to be a matter of discussion. My experience leads me to believe that the resistance is due largely to wire drawing and the passage of the gas thru the parts and passages as closely throttling the engine seems to increase the braking effect. Of course, the friction of the change gears and engine and the compression of the charge gives additional resistance, but, as the compressed charge upon expanding again gives back a large part of the energy expended upon it except for the heat dissipated, it would seem that the compression does not play as important a part in the braking effect as commonly supposed.—F. D. S.

CARE OF ALUMINUM PARTS.

DENVER, COLO.

As aluminum is so commonly used in automobiles, a word as to its care may be of interest to your readers.

The floor boards and running boards of my car are of aluminum, dull finish, they gradually became scratched and scuffed looking. I remedied this appearance as follows: By vigorously scrubbing the flat surfaces with sand soap and No. 60 or 80 emery, the scratches dissappeared and a dull or Roman finish was produced. The roughened or tread portions can also be improved in the same way, using a very stiff brush.—G. C. E.

TO REPAIR CRACKED CYLINDERS.

From time to time different methods of repairing cracked cylinders and water jackets have been published in these columns but until recently no special preparation has been offered for this purpose. Chipping into the crack carefully to form a dovetail groove, and pounding soft solder into the crack has been successfully done. Brazing the crack together with "Ferrofix" has also been successful but these successful methods can hardly be done on the road. A substance is now being marketed known as "Smooth-On" which is an elastic iron cement which can be applied soft and will harden to an almost iron-like substance, slightly expanding while hardening.

The method of repair is as follows: remove carefully any oil or grease from the crack and surface near it and heat the parts to about 600° F. with a torch or by running the engine. Then fill the crack with the Smooth-On, using a putty knife or jack-knife if on the road. If the cylinder is warm enuf the cement will melt somewhat and fill the crack completely, hardening very rapidly. A layer of cement should be spread over the crack and around the metal after the crack is full. Heating the metal makes the cement harden more quickly.

The engine will be almost immediately ready to run and the repair is permanent owing to the slight expansion of the cement upon hardening which makes it completely fill the crack and force itself even into the pores of the iron.

REPAIRING LEAKY RADIATOR.

Empty the radiator and with the cement about the consistency of putty by mixture with water, carefully fill the crack and let it harden, then cover it with a layer of the Smooth-On elastic cement and the radiator can immediately be used.

Gasoline is thinner than water and will pass thru a crevice so small that water will not leak thru it. Advantage can be taken of this in testing valves and leaks. If the valve will hold gasoline it will not leak gas.

When your car starts to skid, don't put on the brake but immediately shut off the engine. Brakes applied at this time only lock the rear wheels even if only moderately put on, owing to the very slippery road surface As soon as the wheels stop turning the tires are as free to slip in one direction as another and the skidding motion of the car will only be made the easier.

When cleaning a spark plug it is not nearly as essential to carefully clean the ends of the electrodes as it is to clean the insulating surface between the central electrode and the outside shell. The tips of the electrodes will take care of themselves unless the gap between them is actually bridged over by oil and carbon. The insulation is the important thing to be cleaned, for if it is coated, the current can easily travel across from electrode to shell or vice versa and thus short circuit the plug.

In drawing the water system of a car which must be left in a cold place during winter nights, the greatest care must be taken to be sure all the water has been removed. Occasionally air prevents all the water from drawing off and causes a bad freeze up. The lowest point in the system must be opened. In many this is the circulating pump and is fitted with a drain cock, if not the pipe should be disconnected. Shaking the car by standing on a running board will often start the pocketed water. Running the motor while the water is draining off also helps unless the pump is of such type as to prevent the water from returning thru it Care should be taken not to overheat the engine but simply have it hot enuf to help evaporate the water. Jacked carbureters sometimes have to be drained independently.

It has been found that with acetylene as a fuel the spark could be advanced much further without any preceptible piston pounding and also that the explosions were more violent and quicker. In regular traveling a mixture of 3 per cent acetylene and 79 per cent of air proved suitable, but the mixture percentage would probably have to be arranged to suit different cabrureters.

The Automobile Manufacturers and Dealers Association of St. Louis Mo., during the week of D cember 14, held a most successful show in the Jai Alai building, St. Louis, Mo., The exhibits numbered 31, eighteen exhibiting thirty-two different makes of cars, one exhibiting two makes of motorcycle and twelve concerns showing accessories.

At the annual meeting of the Board of Managers of the Association of Licensed Automobile Manufacturers on Jan. 6, the resignation of Charles A. Wardle, which had been in hand for some time, was accepted. Mr. Wardle is one of the best known men in the industry and has been actively identified with the Association since it was organized.

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The Demoralizing Effect of the Shows

That the automobile makers and accessory manufacturers are deeply interested in the question of reducing the number and expense of the shows, is indicated by the large number of answers to our letter asking for opinions on the editorial "The Demoralizing Effect of the Shows," which appeared on page 73 of the January issue.

The following are a few of the many answers received by us and are indicative of the general feeling on this subject, some containing suggestions for the improvement of show conditions:

PHILADELPHIA, U. S. A 12-27-07.

Dear Sir:—Your valued favor of December 26th, together with enclosure of editorial dealing with the subject of shows, received. From my own point of view, and the opinions I have heard expressed by other manufacturers on the subject of shows, it seems to me that the points in this article are all well taken. While the burden of expense falls upon the manufacturer for the shows in the large cities, it is unquestionably a fact that the results obtained are comparatively small in consideration of the tremendous expense incurred.

Don't you think an automobile carnival week, with practically open air exhibits, in conjunction with a Vanderbilt Cup Race, stock car race and numerous other events, would serve to bring about greater interest in the automobile generally? One function of this sort, over a period of seven days, could be made such a suburbly interesting affair each year that a class of people who might not be reached in any other way would make it a point to attend, and with the people so inoculated with the motor car subject, I think it would contribute to greater interest from those able to purchase any type of automobile.

It seems to the writer that a stupendous national event of this sort would make it possible to concentrate publicity work and to give every manufacturer an opportunity to exhibit and demonstrate their claim for superiority to an audience which should, in a measure, constitute a national assemblage.

So many methods exist whereby it is possible to mislead the average owner or prospective buyer of a motor car into believing that certain makes are unqualifiedly superior to others, whereas the manufacturers who cannot afford to enter on an elaborate scale the various endurance contests, races, etc., would have an opportunity to so direct their appropriations for this purpose that it would be possible for them to compete with even chances and to honestly reckon with the big fellows in an affair conducted on the basis above mentioned.

Yours very truly,
CHADWICK ENGINEERING WORKS.
H. B. Carzrlere,
Sales Manager.

Gentlemen:—Replying to your favor of the 26th, in which you enclose an editorial which will appear in your January issue of your publication, will say that for several seasons past the National Motor Vehicle Co., has been very much opposed to indoor shows, such as have been held at Chicago and New York. We believe that the indoor show, such as we have been having, has outlived its usefulness, though there was a time when such shows served as a stimulant for the automobile business. These shows in the past served to popularize the automobile, but at the present time it is a hard matter to point to a town in the United States in which you will not find one or more automobiles, therefore we feel that the automobile has become sufficiently well-known to the American public to make shows of this nature altogether unnecessary.

The National Motor Vehicle Co., is one of the oldest makers of automobiles in this country, and consequently has attended all of the Chicago shows and all but one of the New York shows, and we feel that we are in a position to judge as to the merits of these National Shows.

There is one point, which you have not mentioned in your editorial, which has occured to us in our past experience, and that is the fact that in many cases, these National Shows prove a detriment to some of the small dealers in the small and medium sized towns. These small dealers, in most cases, have failed to realize the injury that these National Shows do them, but we think that upon investigation you will find that numerous prospective buyers in towns with a population of 80,000 or less, have been so influenced by National Shows as to become almost impossible customers for the retail dealers in their own towns; for example, a town of 25,000 will have three or four retail dealers, each carrying three or four representative lines of cars, making twelve or sixteen makes of cars handled in that town by dealers. If there were no National Shows, it is natural to suppose that the prospective buyer in that city would select one of the twelve or sixteen cars handled by his local dealers, but because of the National Show, and because that show is open to the public as well as dealers, many of these prospective purchasers will visit the National Show, look over all of the cars shown there, and will become what you might term "automobile wise," and he goes home without having purchased a car, and proves to be a very hard customer for anyone of the local dealers to handle, for the reason that he has seen points on one car and other points on other cars which appeal to him, and he has in mind some sort of a composite car, which the local dealer is unable to furnish for him. He has talked with the representatives of most every line made in this country, and he has gotten information which does him no good, but which places the retail dealer at a disadvantage in trying to do business with him. This prospective purchaser in many cases, will combine with several of his friends and arrange to buy three or four cars from some manufacturer if he can get a favorable proposition. He goes to the show and peddles his proposed order of three or four cars from one exhibitor to another, and in many cases gets quotations, which he would not get were it not for the National Show. We think for this reason in many cases the retailer has been materially effected by these National Shows.

We believe in an out door show to be held at some central point where cars can be demonstrated on a track, and where the dealers of the country can congregate and inspect the product of the various manufacturers, under canvass if necessary, and we believe that at a National Show of this kind, a race meet could be held to advantage, and we think the final outcome of the automobile shows will be an out door show of this description.

We have preached against shows for the last three years persistently, and we still believe that these National Indoor Shows have outlived their usefullness as a trade stimulator.

NATIONAL MOTOR VEHICLE CO.,
Geo. M. Dickson.

Gentlemen:—We have yours of December 26th, enclosing an editorial, which you stated would appear in the January issue of your publication, asking us to carefully read same over and write you a letter containing our opinion.

We have done this, although a little bit late getting at it, and however late, we can assure you that we heartily agree with the entire article, with the possible exception of the sixth paragraph, which states that "one or two representative exhibits with no admission fee," etc., etc., could doubtless be made profitable, and we think that these are unnecessary, and could not possibly agree with you that they could be made profitable from any point of view. We believe that on account of the multitude of pieces and parts of every kind that enter into a motor car, a live agent desires to see them before assembled and to see them in course of assembling, and therefore will look up the factory so as to get a good line up on the outlay before making contract, all of which he cannot do at any show.

FORD MOTOR COMPANY,
J. Couzens, Sec'y. & Treas.

Gentlemen:—In reply to your inquiry concerning our opinion as to the editorial which will appear in the January issue of the Trade Journal, would say that after carefully going over your argument, we would like to express to you our belief that the conclusion you reach is correct, and that the sooner elaborate automobile displays and exhibitions are done away with, the better it will be for the automobile industry, as a whole, viewed from the manufacturers' standpoint.

THE CORBIN MOTOR VEHICLE CORP'N.,
Guy Hutchinson,
Sales Manager.

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Dear Sir:—I am under obligations for your courtesy of the advance copy of an editorial entitled "The Demoralizing Effect of the Shows," and I certainly want to congratulate you upon the courage which you show therein. There is little or no doubt that the national automobile shows have outlived their usefulness, and from now on, may be expected to follow the course that has been taken by similar annual exhibitions in other industries, is gradually approaching the time when they are of no interest whatever to anybody except those who have freak inventions or novelties of one kind or another to introduce.

The shows are now no longer even a place for the placing of an agency, and as a rule retail sales are otherwise accomplished.

In addition to the various demoralizing effects enumerated by you, we might add that the national annual shows tend to restrict the engineering development of automobiles to given calendar dates, instead of encouraging the making of improvements wherever required by circumstances and experiences. This is a bad thing, both from an engineering and commercial standpoint.

Neither do we believe that the exhibition of commercial vehicles will be of any advantage except to those with freaks to show, whether or not the question of the stimulation of the demand for commercial vehicles does not turn upon the question of invention, but mainly are a public comprehension of how to apply them to advantage, and to this end, shows contribute not at all. They rather tend to confuse the issue.

STUDEBAKER AUTOMOBILE CO.,
Hayden Eames,
General Manager.

Dear Sir:—Replying to your favor of the 26th ult., enclosing copy of editorial relative to the advantages and disadvantages of the automobile shows as a general proposition, which will appear in the January issue of your Journal, would say that I have read this with considerable interest and believe that the views expressed therein are the correct ones. It would seem, however, that so long as the New York and Chicago shows can draw a large attendance, not only from their immediate vicinities but from all over the country, they must be of considerable advantage to the automobile industry as a whole and that their elimination would be a detriment rather than otherwise.

OLDS MOTOR WORKS.,
W. E. Stokes,
General Sales Manager.

Gentlemen:—We acknowledge receipt of your favor of December 26th, enclosing your write-up regarding the demoralizing effect of the shows. In a great many respects you are right, but we cannot agree with you to entirely eliminate the shows. We do not feel that the automobile business has reached the stage where it is advisable or desirable to entirely discontinue the shows, and at the present time we are still in favor of shows and early shows at that. In the first place it keeps up the interest and enthusiasm of the public and the early shows compel the designers as well as the automobile manufacturers to get their models out early and in this respect it is a great help. Many features in your write-up are only too true. The expense part and all that are facts, but we still feel that it is a part that we have to bear under the present conditions.

STEVENS-DURYEA CO.,
C. C. Hildebrand,
Sales Manager.

Gentlemen:—We thank you for sending to us an advance print of the editorial of your next issue, which we have read carefully, and with full approval of its arguments. It is our opinion that if the trade press would keep hammering away in this and similar strains, it would bring about the desirable result of putting shows upon the only reasonable basis that is possible for so large and promising an industry.

MAXWELL-BRISCOE MOTOR CO.,
Ernest Coler,
Publicity Dept.

Gentlemen:—Your letter of the 26th ult, has been received, and we have read the copy of the editorial attached which is to appear in the January issue of your paper. In reply to your letter would say that we are in full sympathy with the statements outlined in the editorial referred to.

CADILLAC MOTOR CAR COMPANY.

Gentlemen:—

There is a good deal of sound sense in the editorial referred to in yours of the 26th.

THE WINTON MOTOR CARRIAGE CO.
per M.

Gentlemen:— We have your letter of Dec. 26th with editorial upon the demoralizing effect of the shows. We beg to say that we believe you state the facts none too strongly. We have always regarded the shows as a positive nuisance and have believed the cost in time and outlay, out of all proportion to the benefit derived and that they have generally been organized for the benefit of a lot of grafters, rather than of the manufacturers who have humbly paid the bills.

As we are doing a large business in more staple lines, we have been able to see the foolish waste in the automobile business. Dealers in engines, dynamos, marine searchlights etc., get along very well on a margin of5%, while the average automobile dealer declares that he cannot pay expenses on less than 30% and some of the so called jobbers demand 50% and more and cannot seem to make both ends meet.

It is true that heavy electrical machinery is sold mostly to people thoroughly familiar with such apparatus and that only a comparatively small amount is spent for advertising. The salesmen employed in this established line are mostly technical graduates who know the value of a dollar, and are trained for efficient work.

In the automobile trade, however, many of the leading lights are former bicycle and race track promotors who have had no training, whatever, in regulay mercantile business and seem utterly incapable of undertaking anything without making a "good time" for everybody.

We shall welcome the day, and we think it not far distant, when the get rich quick men will have sought other fields and the manufacture and sale of automobiles and accessories will be conducted along strictly business lines. Then goods will be bought and sold solely on their merits and a salesmen will be judged by his worth and ability, rather than by his capacity for liquid refreshment.

RUSHMORE DYNAMO WORKS.
S. W. Rushmore.

Gentlemen:— We have yours of the 26th., enclosing copy of an editorial, which you say will appear in your January issue. In our opinion there is a great deal of sense in your editorial, and in the main we agree with you. We are, however, in favor of one National Eastern Show and one National Western Show if it could be arranged so that both the licensed and unlicensed auto. manufacturers could unite in each of these shows the same as they did in Chicago this year. There is very little actual business in the shows for us, but we find them sufficiently beneficial in the way of meeting our customers and keeping generally posted to pay us for exhibiting at the two National shows if they could be held as we have suggested. The main difficulty seems to lie in the fact that New York city does not appear to have a building large enough for the purpose, and Chicago only manages to do so by using two or three buildings at the same time; otherwise, we think the licensed automobile manufacturers could put up with the society of the unlicensed manufacturers, and vice versa for at least a week in the east and another in the west. In our opinion the shows were held about two months earlier this year than they should have been.

BROWN-LIPE GEAR CO.
H. W. Chapin.
Manager.

Gentlemen:— We are in receipt of your esteemed favor of the 26th inst. enclosing article on the demoralizing effect of the shows and we fully agree with all that has been said in this article and think with you that the "Show" is getting to be a very expensive proposition from which very little results are obtained. Our opinion has been for the past year or two that as far as Accessory Mfgrs. are concerned a strictly business show held once a year, at some central point, where the manufacturers, jobbers and dealers could get together, see the patterns and models for the coming year and get posted as to what would be on the market is about the only show necessary and would accomplish more than the dress parades that shachgawsob deteriorated into.

We talked with quite a number of the Accessory Mfgrs. at the New York Shows and failed to find a person that was not thoroughly dissatisfied.

We think the time of the show was altogether too early and that with the financial trouble, which came on at that time, made the shows, as far as we could judge, nearly a complete failure, as concerns actual business. We should be more than pleased to see a radical change and if a show is to be held let it be held on business principals and for business only.

C. T. HAM MFG. CO.
Geo. W. Ham, Pres.

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Gentlemen:— Replying to yours of the 26th, regarding the editorial in the Cycle & Automobile Trade Journal, will say that we have read same over carefully and believe that it coincides in nearly every particular with our opinions. We have already decided not to exhibit at more than two shows next year and possibly not more than one.

If we sift it down to one show, it will be the Chicago Show. We believe that there is no need to have more than one national show in this country, as anyone sufficiently interested in automobiles to make a trip could come to Chicago as well as to New York, excepting of course those living in the local district itself.

We note that France is trying to cut out one auto show and have the show only every other year. If they can stand it every other year, we certainly do not need to have more than one in one year.

We believe that a great deal of extra expense and inconvenience has been thrown upon the various manufacturers and especially the accessory manufacturers who are forced to show at both licensed and unlicensed shows. If this expense were cut out and the same amount of time devoted to increasing one's product, much better results could eventually be obtained.

We are heartily in sympathy with your project and trust that your paper, as well as others, will advocate at least not more than one show and this show should eliminate all attempts at making it a beautiful work of art or an expensively decorated reception room. people should come there with the intention of doing business and forget their social duties long enough to give the products exhibited a careful inspection.

THE SWINEHART CLINCHER TIRE & RUBBER CO.
B. C. Swinehart, Vice. Pres.

Gentlemen:— We are in receipt of yours of the 26th by your managing editor, enclosing printed copy of editorial which is to appear in your January issue with reference to Automobile Shows.

We fully endorse all you have to say in the article. There was a time in the early stages of automobile manufacturing when these shows were of great benefit, but of late they have certainly become a great hardship and a detriment.

We believe, however, that in large cities shows might be successfully held by local agents representing the manufacturers. Here would be exhibited regular stock cars such as the local agents propose to handle for the ensuing season. The cars for these exhibits should be purchased outright from the manufacturers, or in other words regular stock cars, and dates for these shows should be so timed as to make it possible for the manufacturers, without any unnecessary or demoralizing effort, to produce the cars in regular course of manufacture. Such shows would be patronized by people living in the selling territory, controlled by the agents, and prospective buyers would come in direct touch with the agents actually controlling the sale of cars in the territory. Such exhibits as above proposed could be successfully and profitably given without any great expense attending and with but a minimum admission fee charged, simply enough to keep out the undesirable and maintain an air of respectability. These are our ideas of what Automobile Shows must ultimately come to.

KINSEY MFG. CO.
Isaac Kinsey, Gen. Mgr.

Gentlemen:— In regard to your letter of December 26th enclosing circular in reference to early shows. My opinion is that there ought to be one big show centrally located in the United States, early in the Fall of the year for the benefit of dealers, and not for the public, where the next year's product may be shown, the same as the carriage manufacturers have, and allow no one in these shows except the trade. Then if the individual dealers wish to carry on shows in their own cities for a money making proposition, it is up to them and not the manufacturer of automobiles or their parts, therefore, the only expense to the manufacturer would be for the one show in a year.

This is my idea in reply to your letter of December 26th.

GABRIEL HORN MFG. CO.
C. H. Foster, Mgr.

Gentlemen:— We beg to acknowledge receipt of your favor of December 26th asking our opinion of your editorial "The Demoralizing Effect of the Shows." We are heartily in sympathy with your views on this subject and look forward to the time when all unnecessary display will be eliminated and when the shows, reduced in number to a minimum, will be conducted on a strictly business basis.

A. O. SMITH COMPANY.
A. O. Smith.

Dear Sir:— Answering your valued favor of the 26th beg to say that it is the writer's opinion that your article which you state will appear in the January issue of your paper, draws the matter very midly and is absolutely true, but not strong enough.

The automobile and accessory people have been fooling away money for the last two years going to shows. It cost us between $2,000 and $3,000 to attend the two New York shows in October and November, and the success of the shows did not warrant any such expenditure,—every manufacturer that attended these shows lost money by the venture.

The sooner the automobile and accessory people cut the show business out, the better off they will be, as you are right in regard to it taking away the best of a man's force to attend the shows and leaving the factory in a state of chaos. Everyone of the people who attend the shows should be at home attending to business and perfecting their cars or accessories, and we are about done with the show business ourselves.

We think that the same amount of money expended in advertising in your Journal or any of the papers would bring ten times the results. We know that we did not get but very few orders at the shows that we would not have gotten anyway, and could just have well done the business from the office or through our agents.

We suppose we will have to attend the Cleveland Show, it being local, and the writer being a member of the Cleveland Automobile Club, etc., but we are going to cut out the others, now, henceforth and forever.

THE SPRAGUE UMBRELLA CO.
Jas. H. Sprague, Pres.

Gentlemen:— We can only fully subscribe to every statement made in your editorial for January and nothing would please us more than to see these Automobile Shows dropped out. We mean by this, not only the various small shows, but also the two main shows in New York. From our point of view we can see absolutely no good that is served by these shows as promoters of business. We feel absolutely confident that the existence or non-existence of the shows would not affect our business one cent's worth. We do not so much mind the expense of attendance at the shows, although, of course, this is a factor, but we object to the demoralization that they necessarily bring about. This demoralization is not only that of our own business, but is evident also in the dealings with our various customers, whose influential men, in many cases at least, are practically not to be found during the unsettled show period. The only fancied advantage that the show has to bring about, of giving a change to meet people, is altogether elusory. It has been our experience that people have tried to meet us and we have tried to meet them and we have repeatedly made appointments during the show period, but have always been so taken up by others, that we have often found that we have had to make appointments later on, after the termination of the shows, in order to get together.

THE HESS-BRIGHT MFG. CO.
Henry Hess.

Gentlemen:— Your letter of the 26th at hand, enclosing copy of editorial which recently appeared in your Journal. We had read this editorial and it certainly contains material for serious thought, particularly in view of existing conditions, the result of several contributing causes.

There is no question but what the show business is being sadly over done. It is a severe tax any way you figure it, on the car builder, as well as the component part maker and while there is no denying the fact that these expositions have contributed largely to the public interest, as well as assisting in developing the demand for the automobile, at the same time, it would appear that the great increase in the number of these exhibitions has grown in all proportion beyond the growth of the industry itself.

The local dealers' shows should do much to further the interests of the automobile maker and one annual National Show should, at least, be sufficient for general purposes.

This, of course, does not take into consideration the development of the commercial car. This is an entirely different proposition and will have to be developed and have publicity invited along particular lines, applicable only to this industry. One thing is certain, the pleasure car builder, as well as the component part maker, are being asked to shoulder entirely too much expense to obtain results that are not at all in keeping with the disbursement.

TIMKEN ROLLER BEARING AXLE CO.,
E. W. Lewis, Asst. Sec'y & Mgr. of Sales.

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Gentlemen:—We have your favor of the 26th inst. enclosing editorial which will appear in the January issue of your paper. We have read this editorial with considerable interest and disapprove of it only because it is not half strong enough. It would seem as though this show situation called for the strongest language permissible in descent print especially after the withering blast which struck the industry as a result of the early shows of some months ago.

As you know, the writer's opinion has been for years that a Trade Show will probably be a good thing for automobiles, the same as it is in other lines of manufacture, but one of these shows should be sufficient and it should be held without attendant enormous expense. It should be held out doors, the natural place of the automobile, instead of in a building, and it should be held where the machine can be seen in motion, where various friendly contests can take place. I am sure that without any trouble one or two large circus tents could be obtained for the occasion and the show could be held at the time of the year when such affairs ought to be held.

If local communities decide that a show is a good thing at the beginning of the season, let the local trade associations hold these shows as long as they find it pays. If the expenses of these local shows were put on the local trade they would soon find out whether or not such shows pay, and finding this out would in itself do a lot more toward clearing the atmosphere.

HYATT ROLLER BEARING CO.
P. S. Steenstrup,
Secretary and Sales Manager.

Gentlemen:— We have read your editorial article on the demoralizing effect of shows and most heartily coincide with your views, except, in some respects, you do not state it as strongly as we would.

The promoter of shows will keep them going as long as the Automobile Manufacturers and Accessory people will stand for it. They are simply being worked. One goes because his competitor goes, not because he wants to.

The Accessory Manufacturers particularly get the worst end of it in these Automobile Shows. He is tucked away up in some out of the way corner. The people he is most anxious to do business with (the Automobile Manufacturers), are busy placing agencies and do not care to be importuned at that time to place orders; he is there to sell and not to buy. The shows are not held at the time of year when jobbers and dealers want to place orders.

We took an independent stand this fall and did not exhibit at the shows in New York and Chicago and have been advised by a number of accessory people that it was a frost as far as any business they transacted.

As you have well said it is a waste of time and money. In its early stages it was all right. Local shows by dealers only in the spring may be a good thing for dealers who handle automobiles in the various cities.

ATWOOD MFG. CO.

Dear Sir:—Replying to your favor of the 26th, would say that after reading your editorial for the January issue we can say that we quite agree with you. We believe that two shows, at the most, would be amply sufficient for the manufacturers of the country: one in New York and one in Chicago held in the Fall of the year would, we believe, give as good results as the great number of shows that are now held, and would save the industry a great deal of expense. We believe that the admission to these shows should be free to dealers, but do not think there is any objection to making a charge to the general public.

If the dealers in small cities wish to hold local shows we do not know that there is any objections to this course, but think that it is a mistake for the manufacturers of accessories to think that they must go to the expense of exhibiting at every show in the country.

If your movements results in there being only one New York Show next year, we think you will deserve the thanks of every manufacturer in the country.

LEATHER TIRE GOODS CO.,
per C. B. Woodworth.

Gentlemen:— We are in receipt of circular letter of the 26th.

We beg to advise you that we would be greatly pleased if the entire trade gave up automobile shows.

They are an expense and a nuisance, and the sooner they are got rid of the better. GRAY & DAVIS.

Gentlemen:—Replying to your esteemed favor of the 26th, with copy of editorial which you state will appear in the January issue of your Journal, would say: that in our opinion your editorial states some very plain truths and outlines the situation very clearly as it exists at the present time. Of course, our business being largely in the way of an allied industry, we are perhaps not as largely or vitally interested as the automobile manufacturers. But it certainly has seemed to us for some time that the enormous expense which the manufacturer had entailed by the shows has become burdensome and that it is time that steps were taken to better the existing conditions and it seems to us that your action in this matter is well timed and will, we trust, lead to a better and healthier condition.

MERKEL MOTOR CO.,
per Edw. Buffum, Sales Manager.

Gentlemen:—We have your letter of Dec. 26th, and have read over the editorial which was to appear in the January issue of your publication, and I am firmly convinced that there are altogether too many shows at the present time. I am in favor of not over two shows being held during that portion of the season which will produce the greatest results. This is a matter on which there is considerable difference of opinion, but it does seem that through joint action of all interested, a proper date can be selected. The indiscriminate exhibiting of automobiles has served its purpose, and the automobile shows of the future should be handled strictly from a cold-blooded business point of view, with the idea of producing the greatest benefit to the greatest number of manufacturers.

SHELBY STEEL TUBE CO.
H. S. White, Ass't. Gen'l. Mgr. of Sales.

Gentlemen:—We are in receipt of yours of December 26th, enclosing an editorial which appeared in the January issue of the "Cycle and Automobile Trade Journal." We have read it carefully, and we certainly can commend it.

Without doubt, the Dixon Company has been able at the New York and Chicago shows to interest very many people in the practical working of automobile lubricants, which they would not have been able to have done without the facilities afforded by the auto mobile shows.

With the exception of the New York shows, the Boston and Chicago shows, the Dixon Company has not attempted any exhibit of its automobile lubricants at any of the various shows held throughout the country.

JOSEPH DIXON CRUCIBLE CO.,
Geo. E. Long, Treas.

Dear Sirs:—Answering your letter bearing date of Dec. 26th, regarding your proposed editorial on "The Demoralizing effect of the Shows," would say: the writer believes that the last analysis of this show business is advertising. The question of whether you shall set your advertisement up in attractive form so that it may appear artistic, is entirely a matter of personal judgment. We believe that answers a part of the contention of your article. Whether we shall have many shows or few, is answered by the question whether we shall advertise in many papers, or not; that is a matter purely of personal judgment.

If the "Public" does not patronize the shows, they will cease. If people do not advertise in the papers, they will not be published, you cannot write the show business out of existence. Public opinion is, "The Power behind the Throne." Just as long as they are patronized and interest the public, just so long shows will be held; when they cease to be profitable to the public and the promoter they will stop.

THE STANDARD WELDING CO.,
W. S. Gorton.

Gentlemen:— Your favor of the 26th instant at hand with article enclosed regarding the promiscuous holding of shows for the automobile and accessory trade, and would say we think you are on the right track.

Personally, we see no need of a show of this kind under present conditions, except, in three or four of the leading cities of the country. Certainly, no good can come from these shows, as the missionary work has been pretty thoroughly done, and it certainly is a drain financially, and a worry to the manufacturers, who feel as if they have to exhibit on account of their competitors doing the same. We think this matter should be thoroughly agitated, and we also believe that when the automobile trade looks this thing straight in the face they will see the nonsensical side of it, and will get together in abating what has come to be almost a nuisance.

Assuring you of our approval of the way in which you have taken the matter up, and with the compliments of the season, we are,

PITTSFIELD SPARK COIL CO.
Wm. S. Wood, Treas.

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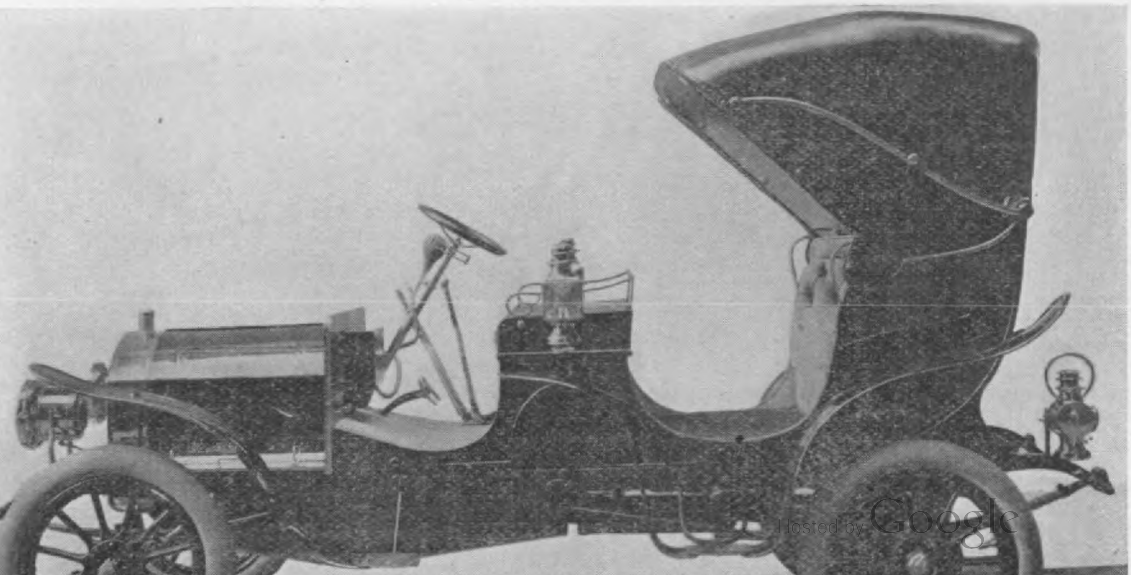
1. 1908 Stoddard Dayton Doctor's Car, known as Model 8 H. This small closed body car with but 88 inches se is good, it is claimed, for all kinds of weather. It is powered by a 4-cylinder vertical water-cooled motor 3⅞x3¾ ated at 18 H. P. and a three speed and one reverse selective sliding change speed gear mounted on adjustable roller The frame is a special one of prest steel of the company's own make. The car weighs complete 1650 lbs. and with ment of gas lamps, side lamps, oil lamps, generator, horn and complete set of tools, the price is $2,150.00.

ddard Dayton Doctor's Cab and Laudaulet

Dayton Motor Car Company, Dayton, has recently added to its 1908 line Model oupe, which is a light weight, medium based machine, with closed body giving tion in all kinds of inclement weather. motor is 4-cylinders, cast in pairs, valves on opposite sides, 3⅞ in. bore by 3¾-in. stroke, rated as 18 H. P. A selective sliding-gear change speed giving three forward and one reverse speed is employed, the shafts being mounted on Timken adjustable roller bearings. The rear axle is of floating type also on roller bearings. A special prest steel frame made by the Dayton Company is used and the springs are semi-elliptic both front and rear, all two



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inches wide, the front being 36 inches and the rear 46 inches long.

The car is shaft driven and provided with emergency brakes on the rear wheels, and a foot brake on the change speed gear shaft. The wheels are 30 inches using 3½-inch Goodrich detachable tires. The wheel base is only 88 inches, making the car easy to handle in crowded streets. The clearance is 9 inches, and the car complete weighs but 1650 pounds. The body is of wood, any color being supplied. The price is $2,150.00 F. O. B. Dayton, Ohio, and includes an equipment of gas lamps, side lamps, tail lamps, generator, horn, and complete set of tools.

MODEL 8 N LANDAULET.

This neat machine has the same engine as the small Doctor's car and also the same general chassis specificactions. However, it is much longer being 101 inches in wheel base and the tires are 4 inches instead of 3½ inches. The car weighs 1400 lbs. and the price including the same equipment as on the small car, is $2,300.00.

It is a practical town car and the claim of the company is, that "it knows no closed season."

The New A. C. A. Dynamometer

Probably the most complete apparatus yet constructed for accurately determining the performance of any automobile is the new Dynamometer of the Automobile Culb of America, in its new building on 54th St. This unique machine will determine instantly and indicate, so it can be read directly from a large chart, speed in miles per hour and feet per second, draw-bar pull or tractive effort, brake horse power at the rear wheels, grade climbing ability and the power exerted by the brakes, of any type of automobile that may be placed upon it. It is claimed to be the most complete instrument of its kind in existance.

It will be used by manufacturers to determine the exact performance of cars, speed tests can be made without using the public highways without danger of accidents and also hill climbing ability can be instantly determined. Intending purchasers can unerringly compare the performance of one car with another.

The new device is not only a dynamometer or instrument for measuring the draw-bar pull of a car, engine or railway car but actually computes the results which are instantly and continuously shown by automatic pointers on a chart of large size.

THE MECHANISM.

Instead of traveling along as on a road the car is held stationary by cables upon the floor with its driving wheels resting upon two large drums which reach up through the floor and which the motor of the automobile causes to revolve. The revolution of the drums is resisted by a huge pendulum hanging below the floor, and attached to the drum shaft, not rigidly, but through a device furnishing a degree of friction which can be varied.

The pendulum, in consequence, swings out from the vertical a distance exactly proportional to the pull exerted by the car upon the drums. The amount of this pull, or "tractive effort" is indicated by a pointer moving across the scale and actuated by a special motor so it indicates accurately the movements of the pendulum. The more difficult measurement of the speed indicated by a vertical ruler moving across the large chart, upon which are horse power and speed curves, is based upon the running by a special motor, of a cone at as nearly uniform speed as possible, this speed being verified by a bell which rings at each 100 revolutions.

A wheel or roller, driven by the automobile and therefore revolving slowly or fast to correspond, rolls upon the surface of the cone and is pulled, by an independent motor, back and forth between the small and large ends of the cone until it finds, by means of a system of electrical contacts, the point where it does not slip because that portion of the cone presents the same speed as the roller. This longitudinal adjustment of the roller is transmitted by a wire cable to the speed ruler on the chart, and the power required for moving the ruler is thus made independent of the automobile. In other words, none of the power of the automobile is used in operating the indicators on the chart.

The speed of the car may be read from the chart directly, in either of the popular ways of stating it: Miles per hour, or minutes per mile, kilometers, etc., by means of several different scales provided, no calculation being required. All of the measuring apparatus is made reversible so that when running backward the performance of the car may be measured.

As a secondary apparatus, a grade meter is provided, operated by the pendulum indicator of the dynamometer. To use the grade meter the clamp is set upon the sliding scale at the point representing the weight of the car. The moving lever then assumes at each movement the angle of inclination of the grade the car would climb (if there were no wind resistance, slipping, etc.), with the effort that the car is then making.

To observe an automobile coasting down hill, either forward or backward, it is necessary merely to start the electric motor on the shaft carrying the two large drums upon which the driving wheels of the automobile rest. The brakes may then be tested and the wheels, gears or engine may be run free (not run by the power of the automobile) and the relative friction losses in these mechanisms determined.

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e Earl Motor Car Company, Kenosha, nsin, U. S. A., began building cars from vn designs in 1904 and had its first car e road in 1905.

e notable features of this car included a ylinder opposed motor, $4\frac{3}{8}$x$4\frac{1}{2}$ ins. nom- 5 H. P. with a friction drive and chains e rear wheels. The chassis frame sides nds were of white oak wood, $3\frac{1}{2}$x$1\frac{3}{8}$ inch, reinforced full length inside with steel ches wide x $\frac{3}{16}$ inch thick, the reinforced being long enough to bend inward and corner braces for the chassis frame ends. riction drive was an aluminum disc, 18 in diameter, normally spring-pressed st a friction wheel 16 inches diameter, r fiber faced, $1\frac{5}{8}$ wide.

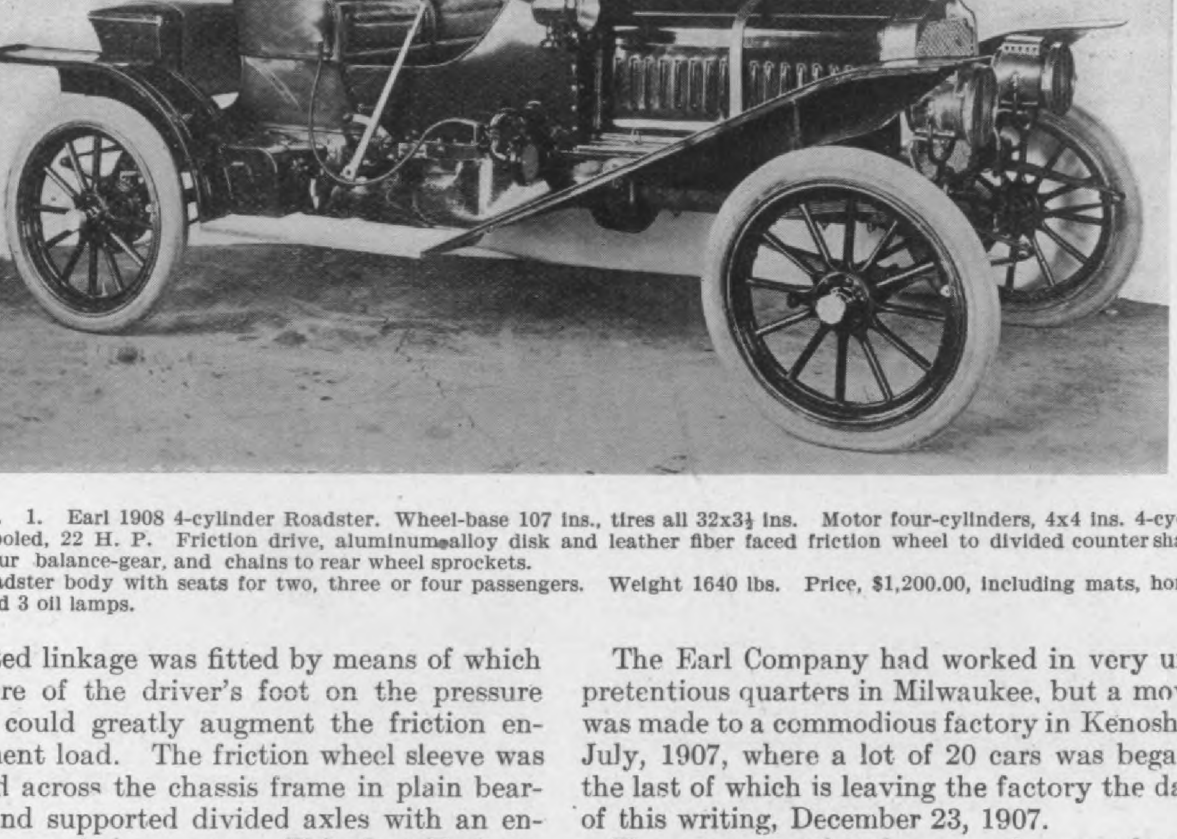
ides the coiled-spring thrust a pedal-

painting and new tires and the one new facing for the friction wheel.

A second Earl Roadster was begun when the first one had covered 16,000 miles. No change was made from the first model save to improve the body lines. This second car ran in the same wholly satisfactory manner as the first. The Earl Company guarantees the fiber friction ring to do 10,000 miles before requiring renewal.

The roadster, it is claimed, makes 21 or 22 miles to the gallon of gasoline and, as its repairs are very small, it is one of the cheapest cars known for running expenses.

The company began a first lot of six cars January 1906, which were all sold before completion at $950.00 each, and delivered as soon as finished.



. 1. Earl 1908 4-cylinder Roadster. Wheel-base 107 ins., tires all 32x$3\frac{1}{2}$ ins. Motor four-cylinders, 4x4 ins. 4-cycle oled, 22 H. P. Friction drive, aluminum alloy disk and leather fiber faced friction wheel to divided counter shaft ur balance-gear, and chains to rear wheel sprockets.
adster body with seats for two, three or four passengers. Weight 1640 lbs. Price, $1,200.00, including mats, horn, d 3 oil lamps.

ed linkage was fitted by means of which re of the driver's foot on the pressure could greatly augment the friction en- ent load. The friction wheel sleeve was l across the chassis frame in plain bear- nd supported divided axles with an en- spur-balance-gear. This first Earl car ed about 1460 lbs., tanks full, had 100 wheel-base and was on tires 30x3 inches. ght weight made the car fast for its power, better than 40 miles on a good straight-

The Earl Company had worked in very unpretentious quarters in Milwaukee, but a move was made to a commodious factory in Kenosha, July, 1907, where a lot of 20 cars was began, the last of which is leaving the factory the day of this writing, December 23, 1907.

The company placed a second opposed cylinders model on the road about November 15, 1907. The cylinder dimensions were increased to $5\frac{1}{8}$ x $4\frac{1}{2}$ inches, nominal 20 H. P., increasing the weight to about 1520 lbs., wheel-

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fully tested on the road, but the indications are that it will be close to a 60 mile car.

$950.00 for the two seat roadster opposed cylinder 20 H. P. motors.

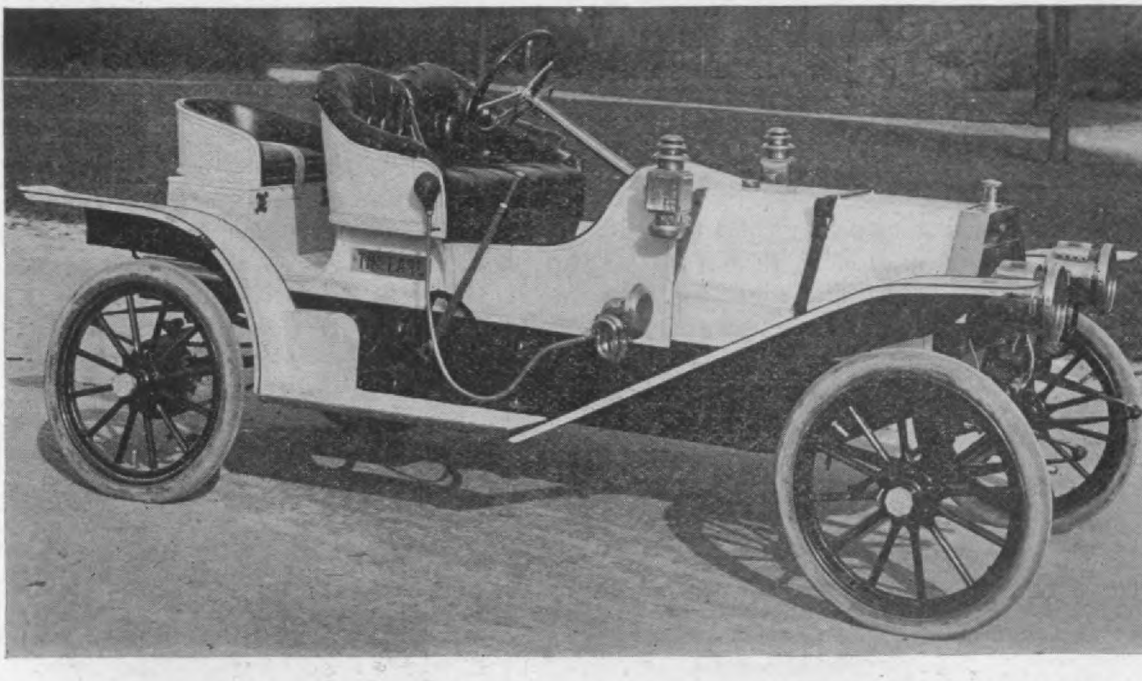

Fig. 2. Earl 2-cylinder Roadster, with bodies to seat either two, three or four passengers, wheel-base 100 ins., ins. Tires all 30x3 ins. Motor a pair of cylinders, opposed, 5¼x4½ ins., 4-cycle, water-cooled, 20 H. P. Friction drive to divided sproket shaft with spur balance gear and chains to rear wheels. Weight about 1520 lbs. Price, to seat 2-passengers $950, 3 passengers $965.00 and $1,000.00 for the 4-seat road cluding mat, horn, tools and 3 oil lamps.

To date, the company has delivered 31 cars, and is now finishing about one car per day, and has no unsold cars on hand and it is claimed, is filling orders which will bring the sales-total to 81 cars delivered January 15, 1908.

In addition to these two passen models, the company is now complet first commercial car, opposed cylinde H. P., pneumatic tires, 30 x 4 inches, road 1000 lbs only, 15 miles per hour

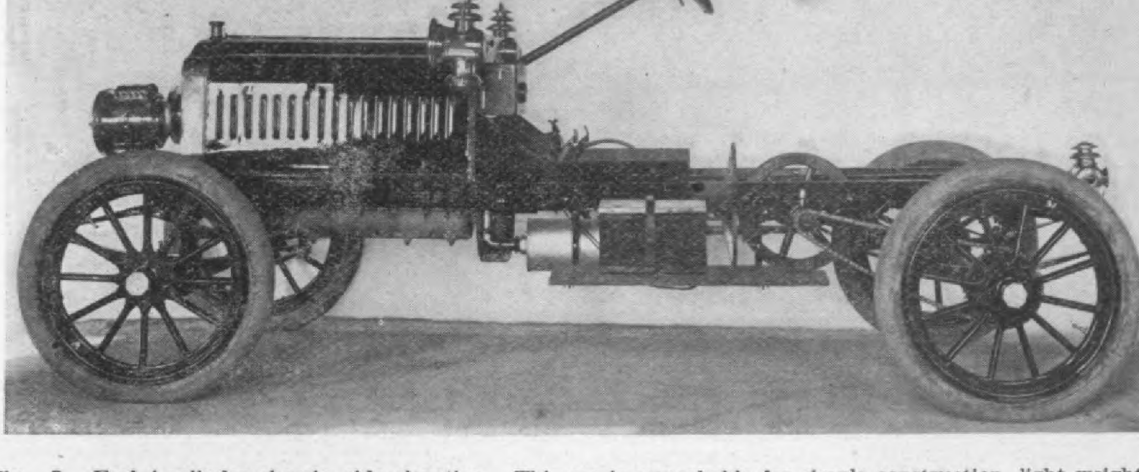

Fig. 3. Earl 4-cylinder chassis, side elevation. This car is remarkable for simple construction, light weight cost. The front axle is a straight tube, 2 ins. dia., the rear axle is a straight steel bar, 1¾ ins. square. The springs are all half-elliptics. The chassis frame is wood, 3½ ins. wide, reenforced and braced inside with st 3-16 in. thick. The drive is friction with chains to rear wheels. The steering gear is rack and pinion. 22 H. P., 107 in wheel-base, tires all 32x3½ ins.

The first opposed cylinder motor will not be

num speed, friction drive. The price

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on. A determined attempt to perfect car design by extended road-test and thening each part as it failed was backed ge capital and resulted, in round terms, loss of three years time and two millions lars with absolutely nothing to show is heart-breaking attempt.

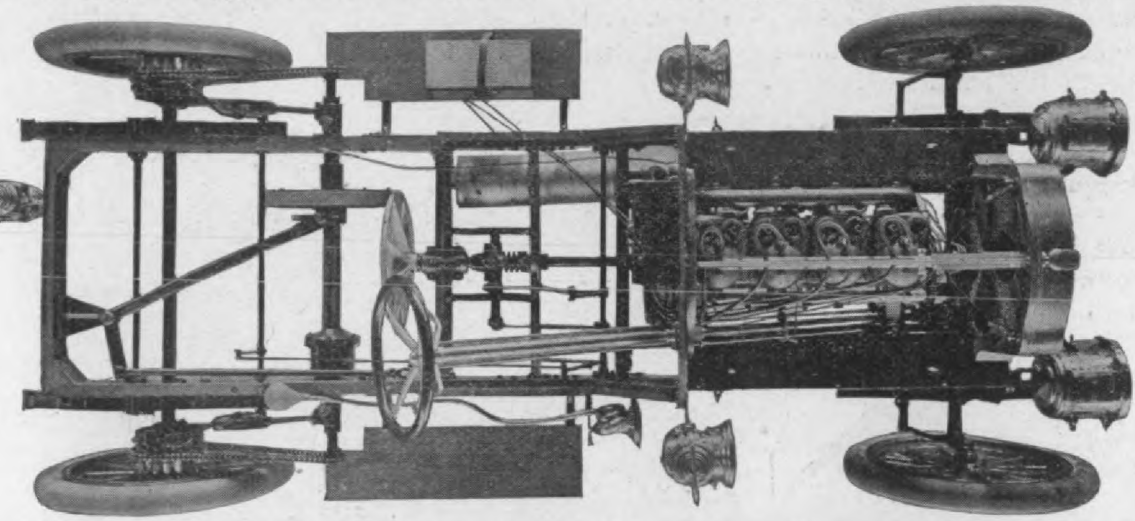
Earl light weight factors include a

BRAKES.

These are exterior bands only, on 10 ins diameter rear-hub drums. The bands are camel's hair belting lined and are 3-hole lever and pedal applied. No evener is fitted. The friction can be used as a brake.

SPRINGS.

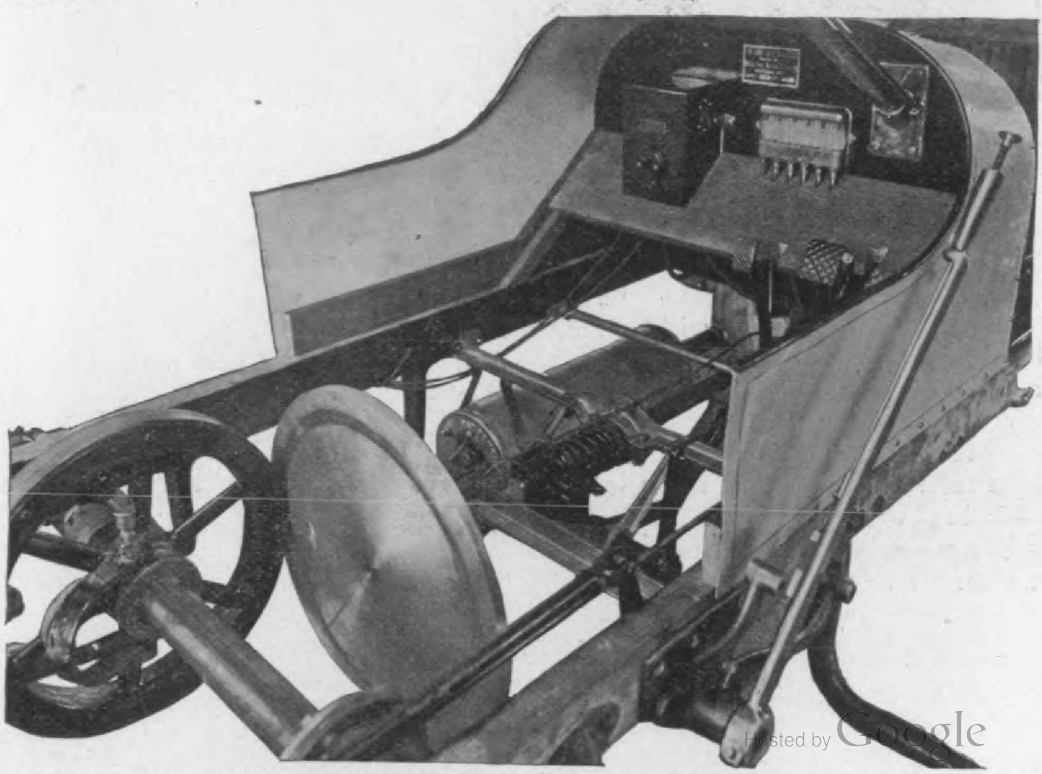
The Earl springs are all full elliptics, 34 ins.



. 4. Plan of Earl 4-cylinder chassis, showing the general arrangement of the engine, friction disc and levers and rol levers. This car is notable for simplicity of detail, light weight, and excellence of wooden chassis frame construction.

n chassis frame, the sills reinforced by plate, $3\frac{1}{2}$ inches wide x $\frac{3}{16}$ thick. This ced-wood, chassis-frame side has stood ll from the first, is low cost, and has not hanged at all.

long x $1\frac{1}{2}$ ins. wide, 5 leaves in front and 4 leaves in the rear. The rear springs are revolubly connected to the chassis frame bracket on top and the cars are claimed to be very easy riding.



5. Earl 4-cylinder roadster, friction drive and control described fully in the text. This illustration also shows

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shafts on either side of the steering post, with ratchet retained rocker levers under the steering wheel.

The friction drive shift is by a single outside hand-lever, with a rod to the short arm of a bell crank at the rear end of the chassis; the long arm of this bell-crank reaches forward to the grooved hub of the friction wheel with fork screw ends entering holes in a U-shaped bronze casting with its parallel members fitted to slide in the friction-wheel hub-groove.

ment of levers in such a way that push pedal forward aids the coiled-spring in p the disc to the rear against the leathe faced friction-wheel. The coiled spring sufficient engaging pressure to the dis wheel for driving the car with ordinary conditions. For very bad roads and hill-climbing the left pedal is used to in the disc and wheel friction. The li applied to the friction action are of the simple description, a long-armed bell

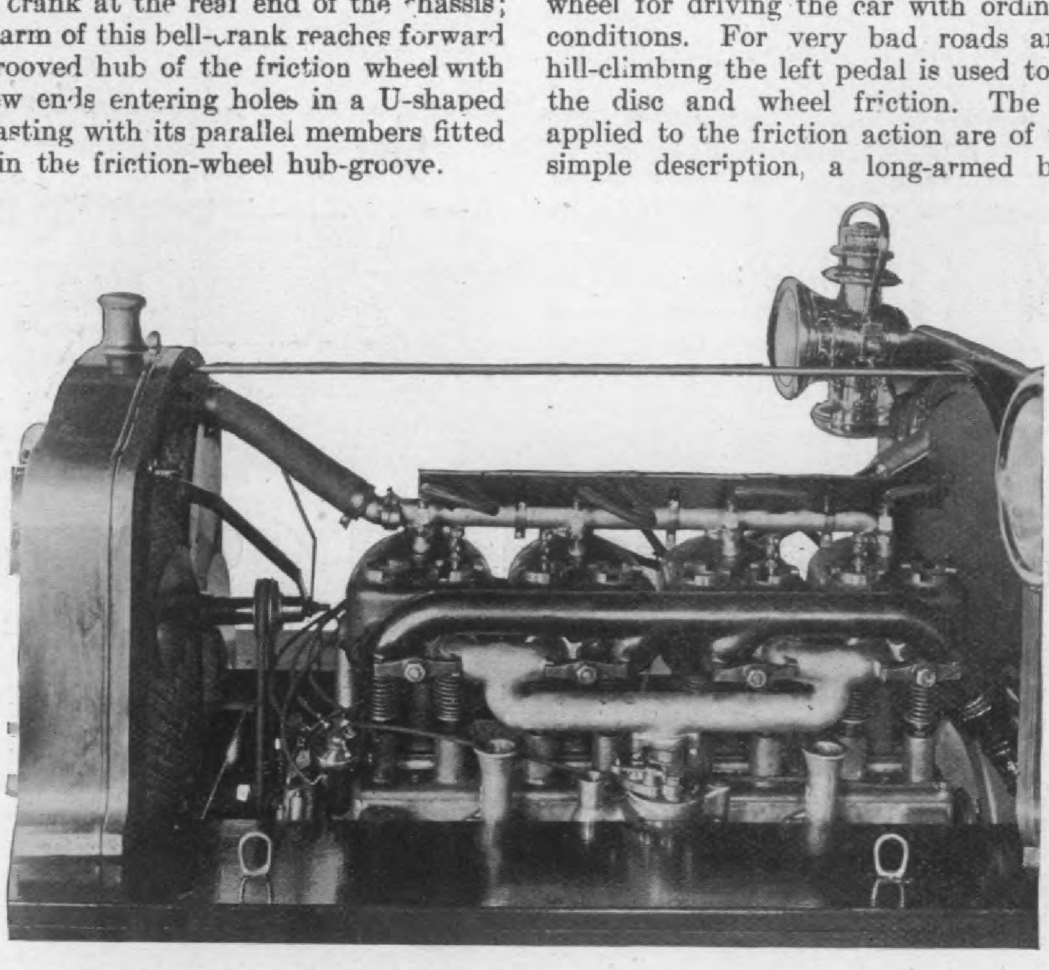

Fig. 6. Earl 4-cylinder Runabout chassis, left side of 4-cylinder motor. Cylinders are 4x4 ins., 4-cycle, water good standard construction every where, 22 H. P. The exhaust is carried over the intake, avoiding transfer of heat to coming charge.

There are three pedals on the driver's footboard The right pedal is pushed forward to apply the rear hub drum brake bands through a rock-shaft, no evener, with a long off-set in the brake links from the rocker arms to the 3-hole, brake-band closing-levers, the links have a screw adjustment for length to obtain equal brake action. The middle pedal is pushed forward to disengage the friction disc and friction wheel. The friction disc shaft slides in a plain bearing, and is normally coiled-spring forced to the rear until stopped by the friction wheel. The disengaging action is a pedal linked to a rocker which has a forked

for the friction wheel traverse, and a rocker carried in dropped hangers belo disc-shaft for disengaging the friction an by use of the left pedal, for increasin friction of the disc and wheel.

It was the intention to make a 100 measured fuel run on this new Earl car, is very light, is said to be easy riding a have a high per gallon mileage, but, mu the regret of all concerned, unforseen ci stances made this extended demonst impossible and the writer did not ride i Earl cars at all.

Everyone interested in automobiles, if not already a subscriber, should subscribe at once for the Cycle and Automobile Trade Journal

A. W. Harris Oil Co., 326 South W street, Providence, R. I., has added line a new lighter oil than formerl

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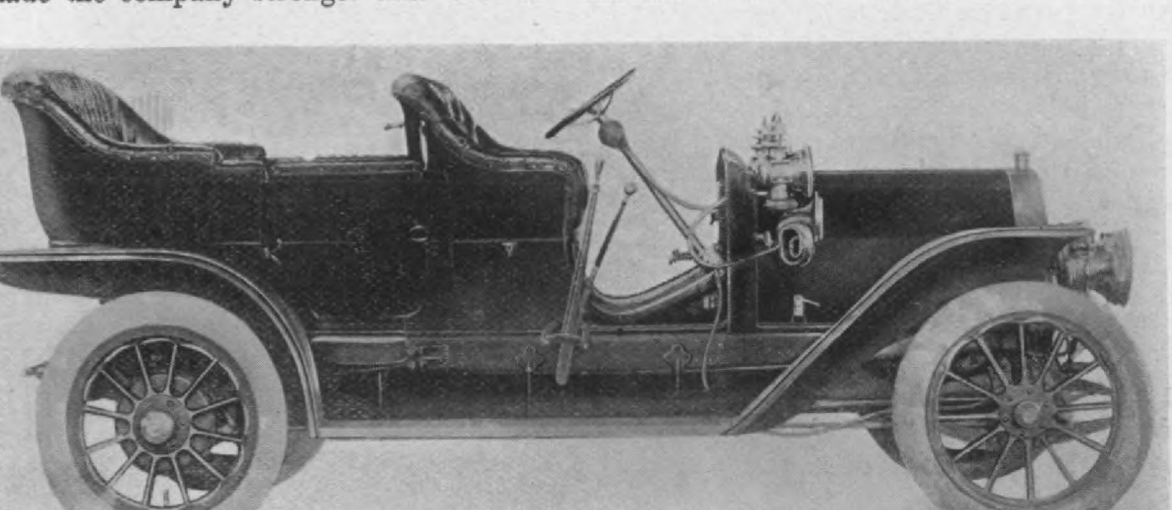
announcement that Nordyke & Mar-
Co., Indianapolis, Ind. was putting out
er-cooled touring car for 1908 in addition
air-cooled cars, was received by the
generally without surprise, it being
ently understood as a business step in
ght direction. The Marmon air cooled
are well known for their reliability and
act that the company has finally put a
-cooled car on the market is looked upon
y as a bid for the trade of those who
the water cooling system.

Marmon Air Cooled Motor for 1908
its improved detachable head cylinders,
away with valve cages. was illustrated
escribed in the November Journal, page
The success attained with the new motor
made the company stronger than ever in



g. 1. Model H Water Cooled Marmon. This new Marmon model is designed with the well-known features of pas
such as: double three point suspension, special oiling system, roller bearing steering column and cast aluminum body
otor is 4-cylinder vertical, water-cooled, 5x5 in., cylinders cast in pairs and is Marmon design and construction thr
it is rated at 40-45 H. P., which, it is claimed, is very conservative. The change speed gear is of the selective slidin
nd drive is by shaft and bevel gear. The wheel-base is 114 inches and 34 inch wheels, fitted with 4-inch tires in fron
-inch in the rear, are used. The car with complete equipment ready for touring is $3500.00.

lief in the air cooled motor and it proposes
ntinue the manufacture of air cooled cars
pply its increasing demand for this type
r.

e new Model H water-cooled car embodies
known features characteristic of Marmon
ruction; viz., double three point sus-
on, Marmon oiling system in the motor,
non roller bearing steering column, Mar-
cast aluminum body, etc. It is built as
ring car of five to seven passengers capa-
and also as a roadster carrying two to
The chassis of the latter is built especi-
for a roadster carrying out the latest ideas
esign, style and comfort.

SUSPENSION.

relieving the passengers from the effects of vibration and shocks usually experineced in traveling over rough roads. The body frame is mounted on the two full elliptic rear springs and is pivoted in the middle of the front end to the front end of the sub-frame. The sub-frame which carries the engine and transmission is mounted on the two front full elliptic springs and its rear end is carried in a large hollow trunion or ring-bearing which is supported in a hanger attached to a cross member of the body frame. Thus the body frame and sub-frame are each carried on three points of support. Fig. 2, shows clearly how the power plant is carried on the sub-frame.

The shaft drive from the rear of the transmission to the rear axle is had through two universal couplings, but since the sub-fram slopes rearwardly on a line with the cente of the axle, the driving shaft in normal position is straight, thus minimizing the movement o the universal couplings. A spring cushione torsion rod connects with the rear axle an body frame. Adjustable ball joint radiu rods extend from hangers attached to th body frame to the front axle.

THE MOTOR.

This new motor is of Nordyke & Marmo Co. design and construction, the best feature of notable foreign and American practice bein in a general way, closely followed and Mr. H C. Marmon, its designer, sees no reason fo

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water piping and gear driven centrifugal pump, all of liberal dimensions.

The valves have a clear opening of two and one-quarter inches diameter, taper seats and the intake valves on the right side are interchangeable with the exhaust valves on the left side. A hinged lever with a hardened steel roller in its outer end riding on each cam, lifts the valve tappets, thus preventing the side thrust on the tappets and consequent wear in the guides that follows when the valve tappets, either with or without cam rollers, are lifted by direct contact with the cams. These roller levers are hinged in bronze holders set in ports in the sides of the crank case, held to place in pairs by crow-feet. The guides for the valve tappets are of Parsons' white brass, also held to place in pairs by crow-feet. The crank shaft is a single steel forging two inches in diameter with flanged end to which the flywheel is bolted. The shaft is hollow and is mounted in Parsons' white brass bearings of liberal dimensions to insure long life without readjustment. The drop forged connecting

against the aluminum and through bol castellated nuts and lock washers, inste studs set in the aluminum case, are u other parts of the motor.

OILING SYSTEM.

The Marmon system of automatic lu tion is used. The oiling is accomplish means of a gear-driven gear pump which oil through a screen and forces it to the main bearings where it enters the hollow shaft through radial holes and is forced th the shaft into the connecting rod bearing through tubes up the connecting rods in piston pin bearings. The oil passage ex entirely through the crank shaft from the to the rear bearing, so there is absolute

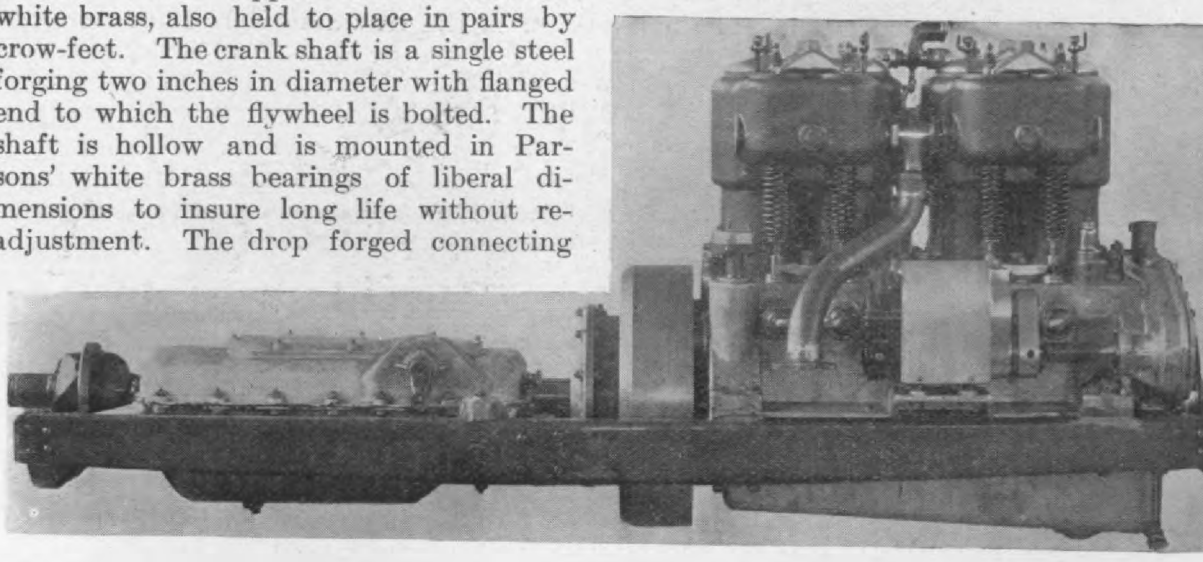

Fig. 2. Right Side Marmon Model H Motor. This new water cooled motor is of Marmon design and manuf t follows closely approved American and foreign practice. The cylinders are cast in pairs with valves on opposite sides ore is 5 inches and stroke 5 inches; 40–45 H. P. It is carried on the special sub-frame, mounted on the full elliptic llowing Marmon practice. The valves are lifted by rods resting on levers with hardened steel rollers at their outer en hese rollers rest on the cams. This construction eliminating side thrust on the valve lifting rods and guides.

ods and the pistons are made very ong, 13½ inches and 7½ inches respectively, enter to center, to give a smooth running notor at high speeds and to obviate excessive ylinder wall friction due to the angularity of hort connecting rods and small piston wall urface. The connecting rod bearings are arge and of Parsons' white brass with liners f the same metal and the bearing caps are ecured with through bolts with nuts securely ocked. The piston pin bushings are also arge in diameter and long.

The crank case is of cast aluminum liberally roportioned for great strength, the upper half arrying the three crank shaft bearings. A eature that adds greatly to the structural trength of the motor is the carrying of the ylinder hold down bolts through the crank

liability of the oil failing to reach and fectly lubricate all of the bearings. Un pressure is maintained by means of an ac able automatic relief valve conveniently p and a gauge shows the pressure of the oil ing through the system.

The cylinder walls, the cam shaft and ings and other parts of the motor are from the throw-off from the cranks. Th drains back into the crank case base or voir which holds about three gallons a used over and over. Above the rese proper and below the sweep of the cran an aluminum drain board from which th drains into a well and passes through a s before it enters the reservoir to be used a The screen and accumulation in the w easily cleaned out by removing a large

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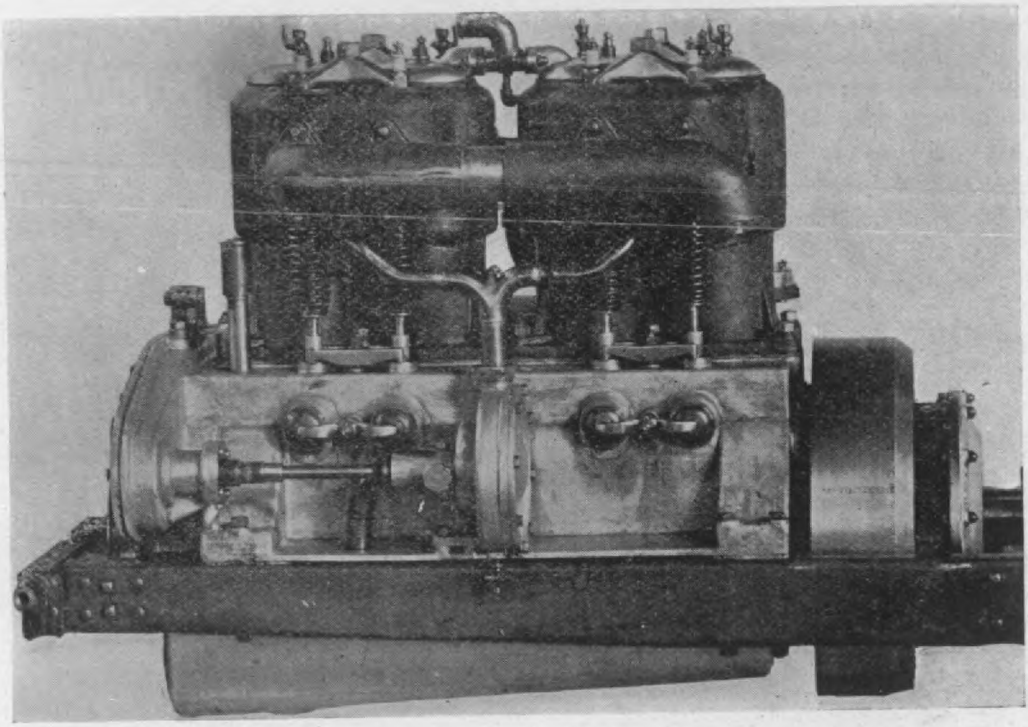
o complete and entirely independent of ignition are provided. A high tension eto with the spark plugs over the intake s makes one system and a four-point nutator with a four unit coil energized atteries and connected with spark plugs the exhaust valves, comprises the other m.

e exhaust gases are carried to the exhaust

clutch is capable of easily transmitting much more than the power of the motor. It operates with the smoothness usual with this type of clutch, starting the car gradually and firmly yet quickly and smoothly.

THE CHANGE SPEED GEAR.

The transmission is selective, three speeds ahead and reverse. It is of Nordyke & Marmon Co., design and construction, well pro



ig. 3. Left Side Marmon Model H Motor. The special oiling system as described in the text is used. The adjace tappet guides are held by crow-foot yokes and large hand holes are provided. The crank-shaft is a single steel forgi ntegral fly-wheel flange and runs in large bearings of Parsons' white brass. Long drop forged connecting rods are us he pistons are also very long to obviate excessive side thrust and wall friction.

ifold through separate ports thus preing the exhaust from one cylinder partially g another. The intake manifold is cast in cylinders and is water jacketed, thus pering the use of large diameters without of gasoline condensing in the intake pipe e running at low speeds. This intake sys- requires only one short pipe connecting the carburetor and it insures even disution of the mixture to the cylinders.

is needless to say that this motor has been oughly tried out and brought to a high e of perfection. Its rating of 40-45 H. P. conservative as the motor shows under e test, power much in excess of this rating.

THE CLUTCH.

multiple disc clutch of the company's own gn is used. It consists of several bronze es thickly studded with corks faced on

portioned and strong. The gears and shaf are made of special steel, which, under th treatment given it, has a very hard surfa while retaining a soft, tough interior. Th gears and shafts are mounted in large annul ball bearings and enclosed in an oil-tight, dus proof aluminum case. A simple automat locking device, placed outside of the tran mission case makes it impossible to effect gear change without first releasing the clutc and this device insures that the gears are full mesh before the clutch can be engage A small brake is also automatically appli when the clutch is released to slow down t clutch and gears of the transmission when gear change is being made, and tends to preve the liability of damage to the gears throu improper handling.

On the third speed or direct drive none the transmission gears are in action, the effe

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wheels run on large conical roller bearings on the axle tubes and are driven by the floating axles within, clutched to the outer end of the wheel hubs. The differential is of the bevel gear type, mounted on large conical roller bearings, and it is removable through a cover in the axle housing. The floating axles may be slipped out from the outer end of the axle tubes. The drive shaft carrying the bevel gear pinion is supported in bearings, both forward and back of the pinion. A torsion rod extends from the axle forward to a double spring cushion supported from the cross member of the body frame. This axle is of latest approved design, having large bearings, and is well proportioned.

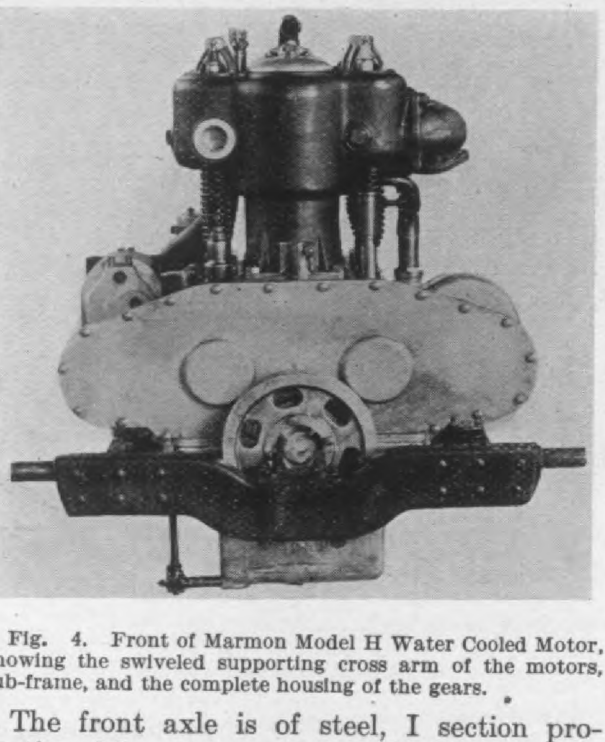

Fig. 4. Front of Marmon Model H Water Cooled Motor, showing the swiveled supporting cross arm of the motors, sub-frame, and the complete housing of the gears.

The front axle is of steel, I section proportioned for great strength and stiffness. The ads supporting the springs underneath are made integral with the axle. Large conical roller bearings are used on the wheel spindles and the weight is carried by ball bearings in the upper end of the spindle yokes. Heavy annealed steel forgings are used for the yokes and steering arms.

Each rear wheel has two brakes, one external contracting and one internal expanding, both having adjustments for wear. The brake shoes are lined with camels hair fabric and the levers are connected by rods to the outer ends of two equalizers across the body frame. The equalizers are operated by two long walking beam levers connected with short rods to the right

column is mounted on roller bearing, one at bottom of the aluminum case and the other at the top, thus supporting the screw and mechanism of the gear centrally between The bearings are adjustable. This spe well designed steering gear was fully desc in our May issue 1907, p. 107. The co carries a steel screw working in a large b nut, hard babbit lined.

The form of construction employed el ates lost motion between the parts and neglect in providing oil or very long cont use should bring it about, in which even babbitted nut can be readily replaced w new one at small expense.

Wood artillery wheels are used. The are cast steel and have turned brass hub The diameter is 34 inches, with quick de able rims for 4-inch tires in front and 4½ rear. The wheel base is 114 inches.

The springs are full elliptic front and and to minimize the effect of spring reco four springs are equipt with shock abso these being a part of the standard equip

THE BODY.

The body of the Model H touring c made entirely of the Nordyke &Marmon perfected aluminum castings mounted o substantial hardwood frame. This cons tion makes a body which is practicall destructible and not affected by any cli conditions. It is claimed it takes and a beautiful finish, is not easily marred and not shrink, swell or dent. The rear sea commodates three large persons comfor and the tonneau has sufficient room for extra seats, provision for which is made. front seat is divided. Compartments u the rear seat accommodate the battery, p jack, tools, luggage, etc. The floor in is of cast aluminum removable panels, a trap door in the tonneau gives access to parts under the body. A foot rail, robe and Wilton velvet carpet in the tonneau provided.

The upholstering is done with the bes genuine leather, white curled hair, coil spr etc. The cushions are made over spring fra with spring edges and coil springs are use the backs of the seats. The binding and are of leather and the workmanship and terial throughout, it is claimed, is of the hig order.

A complete set of tools is supplied, all ne and conveniently arranged, in a tool placed on the step. The gasoline tank is

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ndianapolis, Ind., for the season of offer four models on two dis- chasses. One chassis is the 4- der, 40 H. P., 5x5, and the other 4-cylinder, 50 H. P., 5¼x5½, each sis forms the base of two models. The ster and touring car on the 40 H. P. ses are both the same price, $3250, the 50 H. P. roadster is $3750. The I. P. 5-passenger touring car is $3750. same body and chassis, but equipt larger tires, extra swivel seats in tonneau for two passengers, and com- e equipment, sells for $4000.

ne 40 H. P. chassis is a continuation he model offered in 1907, but with il changes and improvements. The I. P. chassis is new this season.

side springs are 48 inches long and the cross springs 39 inches. The spring sad dles are located well back so that the for ward half of the side spring is almost equal in length, to the rear half of the spring plus half of the rear cross spring the claim being made that this gives a spring suspension equivalent to using semi-eliptics approximately 67 inche long. All the spring bolt bearings are provided with oil cups. Two diagona braces of the frame are united and ex tend beyond the rear cross members o the frame, forming a substantial an rigid support for the rear cross sprin saddle. The engine and transmission ar supported from the main frame by mean

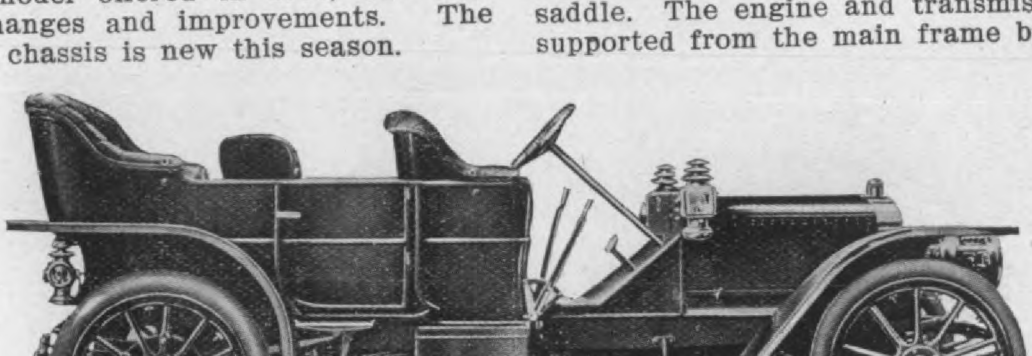

Fig. 1. 1908—50 American Tourist. This new American model has the latest straight line body with ample room passengers. Motor 4-cycle, 4-cylinders cast in pairs, water-cooled, 5¼x5½ inches; double ignition, high tension magne auxiliary coil and battery; sliding gear selective type, four speeds and reverse; shaft drive to floating rear axle; wheel-ba nches, tread 56 inches, road clearance 10½ inches; weight 2800 lbs. Price including two gas lamps, two oil lamps, c ight, French horn and complete tool equipmnet, $3,750 for five passengers and $4,000.00 with extra seats making t city seven.

50 H. P. TOURING CAR CHASSIS.

he wheel base is 124 inches, gage 56 nes, wheels 36 inches, with 10 spokes the front and 12 in the rear, alternat- spokes being bossed to take the bolts the rear wheel brake drums. The for- rd tires are 4 inches, while 5 inch tires supplied in the rear. The front ings are semi-eliptic, 40 inches in length, nches wide and 8 leaves, the rear end tead of being connected to the frame the usual linkage is supported in a new l novel manner, as shown in the ac- npanying Fig. 4. The device con- ts of a guide, somewhat similar to that the cross head of a steam engine, which riveted to the under side frame mem- r. In this guide a dove-tailed sliding ce which carries the spring bolt, slides. small compression grease cup is ar- nged on the side with ducts leading to e bearing surfaces of the guide. This vice eliminates the excessive back lash

of an integral crank case pan constru tion, no sub-frame being used. The re end of the transmission is supported a special cross frame member. The ca dan shaft housing is made in such for that it acts as a torsion rod, making t use of a separate torsion rod unnecessar The forward end of this housing is shap on the outside to the surface of a part sphere, and is free to slide longitudinal or up and down, or sidewise, in a pla cylindrical shell, thus giving it a univ sal motion. On the forward end of t cardan shaft is rigidly fixt on a long tap bearing a square block each of the ext nal surfaces of which are curved to low them to slip on the inner surface the motion of the springs. This blo fits into a square casting open at t rear end. This casting forms a gu and also transmits the turning effort, t slipping of course being due to the r tion of the body on the opening. F washers in suitable slots are arranged

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the engine on the main frame and obviates the necessity for the use of a subframe, while the lower half of the aluminum case is simply an oil pan, and can be removed without disturbing any of the mechanism, the bearings being held to the upper half of the case. The gears at the forward end are spirally cut and housed in an absolutely grease tight case, entirely supported from the engine crank case. These gears can be packed in grease which will last for a season. The crank shaft gear is steel, and the side gears are built up of fibre and gray iron, making them practically noiseless. The cam shaft has separate cams pinned and

ers, the lower end of the vertical shaft and worm can be moved upw downward, thus changing its posit the threads in the worm wheel, an advancing or retarding the contacts timer while the exterior of the tin which the wires are attached re stationary. This does away with l ing and breaking the attached wires

A double system of ignition is current being supplied by high t magneto or storage battery connecte a quadruple vibrating coils on the Two sets of plugs are used, the ma plugs being over the intake valves those for the coils over the exhaust v

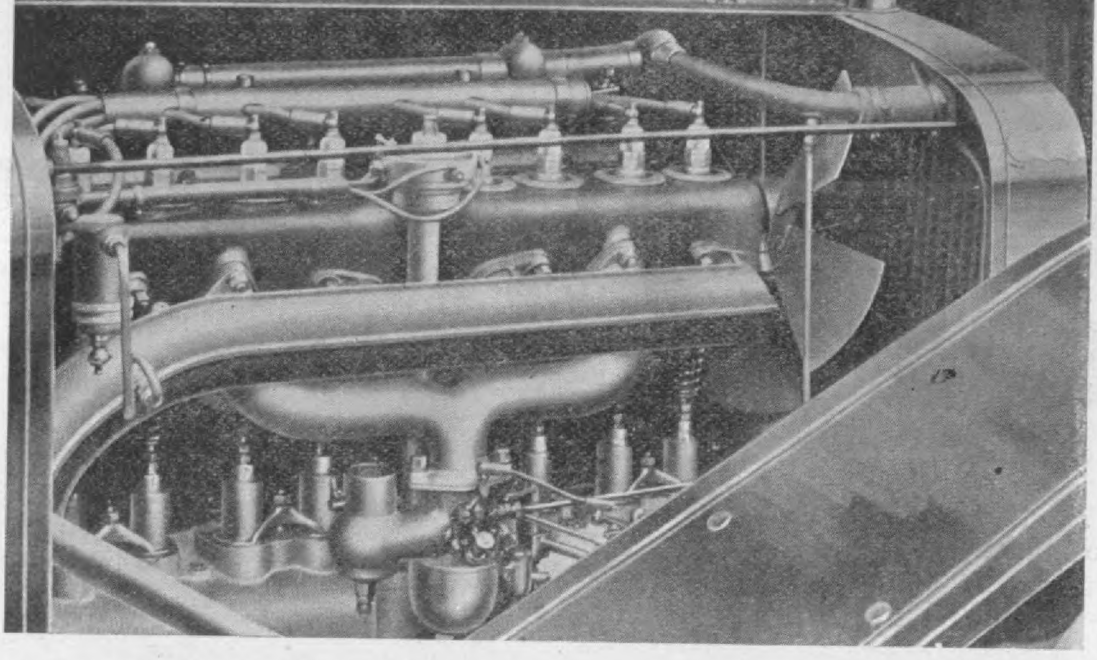

Fig. 2. Right side American 50 H. P. Motor. The cylinders are 5¼x5½ inches. The same general design as maller motor is followed with slight changes where the increased size would make greater strains and heat. All ge lange connected to their respective shafts. The cam shaft bearings are of progressively larger diameter toward the nabling the shaft to be pulled out easily. The timer is an upright aluminum column between the pairs of cylinders a imer shaft is driven by a pair of helical gears changing the relation of which to each other, advances or r he spark.

and keyed in position and has bronze bearings between each pair of cams, thus eliminating any spring. The contour of hese cams is such that when the first part of the motion takes place, the lift s very slow, but as soon as the valves begin to rise, the motion is exceedingly apid, thus eliminating pounding and giving a quick opening valve.

The cam shaft bearings are each of a lightly different diameter, so that in removing the shaft, as soon as it has been lid the length of one bearing, all the

The crank shaft is a special drop fo of high carbon steel with large bear each bearing cap being held by four and the connecting rods caps are he a same manner. The connecting rods of the usual I section drop forged struction. The pistons are very long carry four split, diagonally cut, ece rings above the pin, the upper rings ing prevented from turning by pins, the lower ring is allowed to float, e izing the wear on the cylinder, and a same time the ring openings cannot

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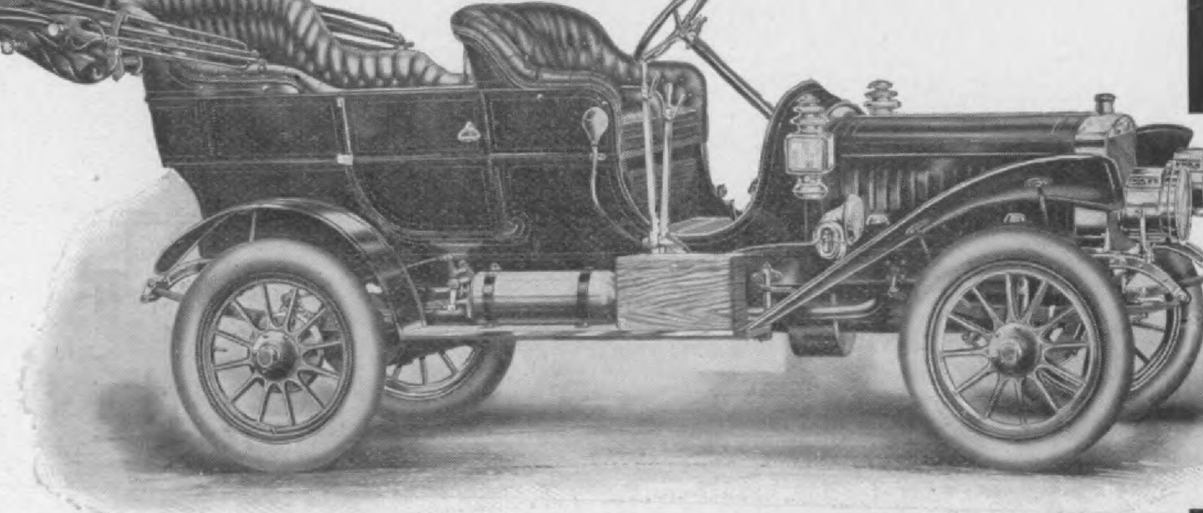

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Call up the Mitchell agent.

The Right Price for the Right Car

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vhich are carried on a small shaft supported at the end of an arm clamped to a oss on the front cylinder. This arrangeient allows the fan to be removed without disturbing any of the other parts, and lso gives a fan belt adjustment, the belt eing flat and one inch in width, runing on aluminum pulleys. The fan lades and the hub are a one-piece alumium casting.

WATER CIRCULATION AND OILING.

The water enters the cylinder jackets t a point on each side of the exhaust for ach pair of cylinders, thus equalizing the ylinder temperatures. The Schebler caruretor is used. The crank case is supported by an integral projection forming pan, and no front cross member is

1 inch by ¼ inch, and of about 75 pou tension. The clutch spring thrust justment is accomplished by means three member ball thrust, which is mo by means of a threaded bolt, whic retained in any position by a split being expanded by a wedge pulled int somewhat similar to the well known cycle handle bar fastening.

The thrust is controlled by a l thrust ball bearing, which is fully enc and lubricated by a compression gr cup carried in the end of one of the trunions by means of which the colla moved. This bearing rests agains flange which is a part of the claw coupl and transmits the power from the cl hub cam. At the rear of the fla

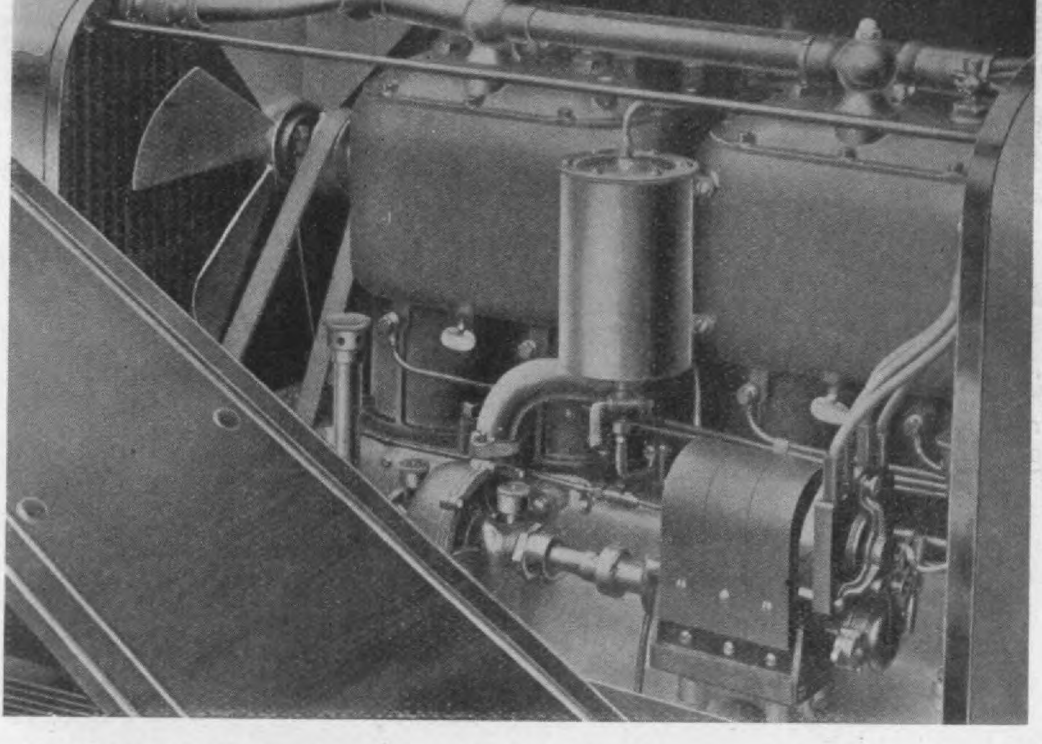

Fig. 3. Left side of 50 H. P. American motor, showing the high tension magneto, centrifugal pump and oil tank. ket of each pair of cylinders is fitted with a drain at the lowest point as shown which facilitates the removal of all the ja ter when draining the system. This engine and also the change speed gear are supported from the main frame by a ral crank-case pan construction no sub-frame is used. The fan is carried in ball bearings on an arm which is swively mou a boss on the forward cylinder, thus providing a means of belt tension adjustment.

ed in the frame, its omission being posble owing to the webbed pan of the enne case acting as a frame cross memr. This construction shortens the hood ngth by the depth of one cross frame ember. Oiling is by a force feed oiler rried under the floor boards at the rear the dash. This device is driven by a

against which the clutch control bear works is bolted and split a square gu and on the forward end of the transm sion shaft is fitted on a large taper a s ilar box. Between these two is a link w squared ends, the faces of which rounded in a similar way to that viously described in connection with

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selective operation. The secondary shaft, the sliding gear member yokes and the shifting rods in the case are all in a horizontal position, the gear case is also divided in a horizontal plane. This transmission is mounted on large annular ball bearings thruout, and the ends of the gear shifting rods protrude into a cap, and are not exposed when operated. The drive is direct on the fourth speed. The reverse gear at the bottom of the case is never in motion, except when the car is in the reverse. The main shaft is milled with four integral splines. A very large plate covers the case, making the mechanism accessible.

THE REAR AXLE AND BRAKES.

The rear axle construction is of the bevel gear differential floating type, the entire weight of the car being carried on the live shaft housing tubes, the shaft driving the wheels by means of squared inner ends and square outer ends, which engage claw clutches which drive the wheel hubs. The axle is provided with a turn buckle truss rod, and the central housing is well ribbed, the upper half being removable for accessibility, thus making a much stronger construction than when the housing is divided on the center plane. This entire construction is mounted on adjustable ball bearings.

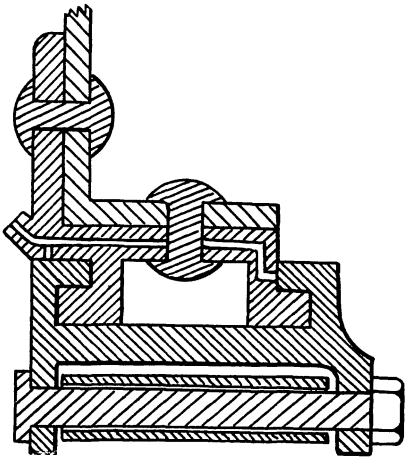

Fig. 4. The special cross-head-like slide used for the rear end connection of the front springs instead of the usual links. The guide is riveted to the under side of the side frame member or sill. In this slides the dovetailed piece which carries the spring bolts. The slide is lubricated by a small compression grease cup on the side with ducts, as shown, leading to the bearing surfaces. This device eliminates the excessive backlash usual with link connections and allows the frame to be placed a little lower with springs of equal camber.

On each of the rear wheels a double set of brakes is used. Both of these brakes are of the expanding type, and are placed side by side on the inside of the steel drum held to the rear wheels by bolts thru alternate spokes. The two brakes are exactly alike, and are working under similar conditions at all times. The brake bands are pivoted at diametrically opposite points, one at the front and one at the rear on studs, each stud not only acting as a support for one of the brakes, but a portion of it being formed into an expanding cam for opening the other brake. Two foot levers are used, the right operating one of the rear wheel brakes, while the left thru a 9 to 1 reduction controls the clutch. The usual hand lever controls the other rear wheel brake, and the gears are moved by a lever with thumb button release operating in an H slot. Spark and throttle levers are on a stationary notched sector on top of the hand wheel, the spark lever controlling both the timer and the magneto thru bevel gears at the foot of the column thru suitable linkage provided with special ball and socket jointed ends. The pull on the rear wheel brakes is thru an equalizer of single tree type, which operates concentric shafts on a cross supporting shaft between the side frame members.

THE UNDER STEERING FRAME RUNABOUT.

The particlar feature in connection with the runabout is the method of supporting the frame on the under side of the axles instead of above the axle, giving a low center of gravity as described briefly in the December, 1906, issue, age 160.

This frame construction, as shown in the accompanying photographs, consists of placing the forward springs on top of the forward axle in the usual manner, their rear ends being carried in a fixture riveted to the upper side of the side frame members, while their forward ends are link connected to the ends of the side frame members. The rear springs of the semi-eliptic type are revolably mounted on the rear axle, their forward ends being connected to brackets on the upper side of the frame, while the rear ends are link connected to a cross bar which passes complete across from sill to sill. With this construction, if a spring breaks at the forward end as the bolt comes out, the frame simply drops about an inch, and no material damage is done; in fact, the company claim for demonstrating, the cars are often driven with the forward end of one of the front semi-eliptic springs unsupported. Even if the front end of both springs should give way, the front axle position is maintained by the rear ends of the springs which drive the axle thru their rear rigid connection to the frame. With this dropt frame a slightly raised prest sub-steel frame for supporting the engine and transmission is used, the engine base having integral crank case supporting arms instead of the pan construction used on the other models. In other respects the engine is identical. In spite of the fact of this drop frame construction, the car has a universal clearance thru its entire length of 10¼ inches, the under side being covered by a shield, which is perfectly flat.

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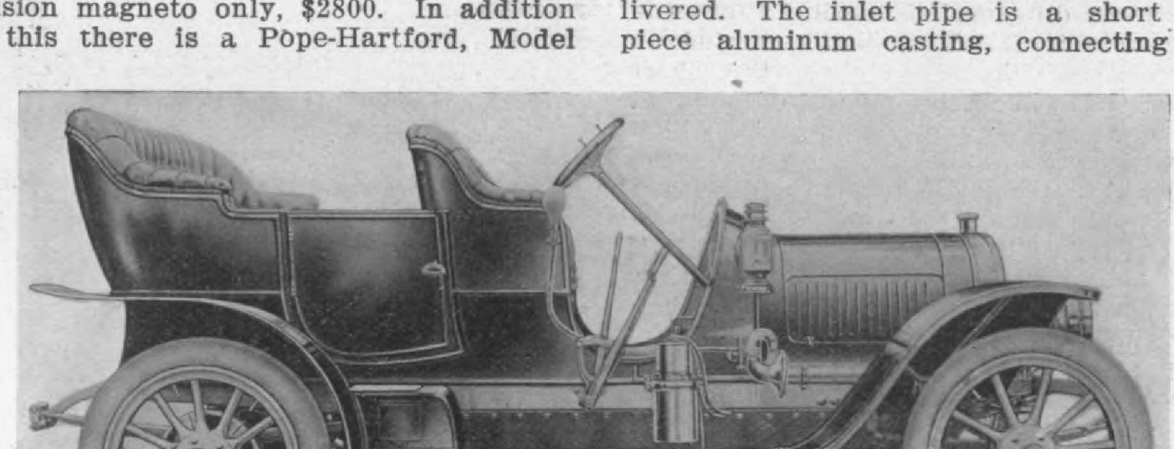
of Hagerstown, Md., offer for 1908 a large and varied line of cars. The Pope Tribune, which is a 4-cylinder, 20 H. P. runabout, with full lamp equipment, horn and generator, is listed at $1750, and the Pope Tribune, 5-passenger touring car, with full lamp equipment, horn and generator, at the same price, $1750. The Pope-Hartford, Model M, 4-cylinder, 5-passenger touring car, 30 H. P., full lamp equipment, horn and generator, lists at $2750. The same car equipt with Eisemann magneto and coil, is listed at $2950, and with Komet magneto and coil at $2850, or with high tension magneto only, $2800. In addition to this there is a Pope-Hartford, Model

tions, or approximately 1300 R. P. M the engine at a point directly between exhaust ports, and drops to the botto the jacket, and rising on the opposite passes out at a point also in the hea the cylinder. The cylinders are cas compact pairs. The valves are oper by vertical adjustable length push and rocker arms, the pivots of which each provided with oilers. The w jackets are cast integral with the c ders, and the valve chamber for each is in the casting between the cylinder, into this chamber the inlet gases are livered. The inlet pipe is a short piece aluminum casting, connecting



The New 1908 Model M Pope Hartford. This car has the distinguishing lines of the Pope Hartford's and is driven cylinder, vertical, water-cooled motor, with all gears encased; cylinders cast in pairs with integral heads and water ja echanically operated valves located in heads, all interchangeable, operated by one set of cams and push rods. A eel crank shaft with extremely liberal bearings is used. The clutch is of the leather faced cone type with 34 inserted e change speed is of the selective sliding type with gear shifting rods entirely encased and the case supported on three p aft drive, wheel-base 112 inches, wheels 34x3½ inch front and 4 inch rear tires. Price with an equipment of two large s ne search lights, generator, two side oil lamps, one rear light, horn and full set of tools and floor mats $2750.00. Exte p $150.00 extra.

, runabout, with the same equipment as e touring car. In addition a Model R, ope-Hartford, which is similar in design the 1907 Model L, with a few improvements and slight modifications, and is also quipt with a high tension magneto, is sted at $2500. The Models R and 10 Tribune have not been changed except as to inor details, but the Model M touring r and the Model M runabout are new is year.

MODEL M.

This new car is of the 4-cylinder vertical water-cooled type of the same bore d stroke as last year, the bore being 48 and the stroke 5⅛ inches.

The distinctive Pope-Hartford features, ch as the arrangement for timing of the

pairs of cylinders with the main int pipe which is copper running downw and backward to the carburetor.

CARBURETOR.

A new type of carburetor has been signed by the company and used on model. This carburetor is of the f feed type, having an annular float wh is concentric with the aspirating noz thus the height of the gasoline in the zle is not affected by the position of car body when on hills, side grades, The main air intake is thru a copper p the air being taken from around the haust pipe, this warm air passing up t the central opening of the carbure around the aspirating tube. A slid

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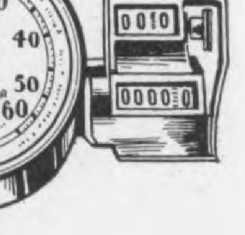

THE ORIGINAL *Loring* SPEED GAUGE

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oring Speed Gauge is sold on its and may be returned after 30 days' f not *entirely satisfactory.* The best or sold at a fair price.

Loring Auto Appliance Co.
3d Street, Cor. Broadway, New York City

The ignition is by jump spark with a 4-unit vibrating coil on the dash, current being supplied by storage batteries carried under the tonneau seat. The timer is of their own design of the La Costa roller type, and is mounted on a short shaft at the side of the crank case between the second and third cylinders, and driven by spiral gears from the cam shaft. Provision is made for the installment of a magneto, a bracket being formed integral with the crank case to carry the same. The magneto can be connected by short shaft with an Oldham coupling, to a gear in the forward casing, which meshes with the cam shaft gear. The plugs are located in the side of the cylinder heads. The bosses thru which these plugs pass are entirely surrounded by the water of the jacket. These plugs are, therefore, not subjected to any great amount of heat, as is often the case with plugs placed in the heads, and can very easily be removed, as the threads do not stick.

CONTROL AND BRAKES.

The spark and throttle levers are on a stationary sector on the hand wheel. These connect thru the steering column by means of the usual concentric tube and rod to short levers at the bottom of the column. All the connections from this point to both the timer and throttle, wherever the levers have to move out of a single plane, are provided with ball and socket joints similar to those used in the steering linkage. This method of connection eliminates all lost motion.

There are two pedals, and as in previous models the left pedal is connected thru an equalizing lever to the rear wheel brakes, and also disengages the clutch before applying the brake, while the right pedal can be ratchet retained in any position or not, as desired, by slightly tipping the foot. This pedal disengages the clutch and also operates the transmission brake, which is an external contracting band, the band being of sheet steel faced with camel's hair belting, acting on a prest steel drum, the drum being 12½ inches in diameter and 2¼ inch face.

The rear wheel brakes are of the internal expanding type, 14 inches in diameter by 2¼-inch face, acting in cast-iron drums attached to the flange of the rear hub, so that the braking effort, as well as the driving torque, are transmitted thru the same member of the hub. This feature is particularly important, as in many floating type of axles the drive to the wheels is thru lug clutches at the outside ends of the hub, while the brake drums are attached to the loose flange of the hub instead of the one which is integral with the driving end.

COOLING SYSTEM.

The water circulation is maintained by a gear pump mounted on an integral bracket of the engine case near the front at the left. This pump is positively driven by a shaft with an Oldham coupling connected with a gear in the forward housing meshing with the 2 to 1 gear, the pump being driven at engine speed. A continuation of the pump shaft also provided with an Oldham coupling drives the force feed lubricator, which is provided with 5 feeds, 4 of which lead to the cylinders, and the fifth maintains the oil supply for splash in the crank case. Four of these feeds are fitted with sight glasses on top of the oiler, while the fifth lead passes thru a sight feed on the dash, so that the driver can be sure that the oiler is in operation. A gage is also arranged in a convenient corner of the oiler, so that the amount of oil can be seen. A four-bladed fan is mounted on a column supported on top of the half time gear housing, and is belt driven from a pulley on the pump driving shaft. The radiator, which is, as in previous models, a distinctive Pope feature, is of the "Planetic" type, and is manufactured in the Hartford factory. The same outline, which has not been changed for three years, is still used.

The crank case is of aluminum, the supporting arms being integral with the upper portion of the case, which also supports the crank shaft bearings. The lower portion is as usual simply an oil pan. Special efforts have been made to have this pan oil-tight, so that the claim is made that no oil drips either when standing or running.

The crank case arms are supported on a prest steel sub-frame, the members being of channel section supported by cross frame members at each end. A metal pan extends under the engine and fly wheel to the transmission case. This pan is provided with a door on the underside, which gives access to the four drain cocks at the bottom of the engine case, and another opening which gives access to the carburetor, both for adjusting the aspirator valve and permitting the removal of the entire float chamber without disturbing the piping.

CLUTCH.

The clutch is of the inverted cone leather faced with 34 one-inch diameter corks inserted. The coupling between the clutch and the transmission is the same as used in 1907. The change speed gear is selective, 3-speed and one reverse, all gears being made of chrome nickel steel specially treated, the ends of the teeth being bevelled in a new way to ensure easier meshing. The gear shifting mechanism consists of two bars having forked ends, operated by a single ball-ended lever, mounted on a shaft having its bearings entirely in a bracket, cast integral with the cover of the transmission case. The rear changing hand lever is mounted on the outer end of this shaft, operating thru an H gate. The slots in

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this gate are clearly marked to show the speed they represent. The gear case is supported at 3 points by integral arms of the case. The bearing contains the shifting shaft, and is integral with the cover of the case, and has no other connection with the frame, so that there is no possibility of cramping of the shifting mechanism due to weaving of the frame on uneven roads. The drive is by cardan shaft provided with two universal joints of their own design. These joints consist of a central block which is hollow and filled with grease, the bearings for the pins being phosphor-bronze bushed, and felt washers are provided so that the grease cannot work out nor dirt work in.

REAR AXLE CONSTRUCTION.

The rear axle construction is of the floating or clutch type. The driving pinion is mounted on Timken roller bearings, the bearing nearest the pinion being very much increased in dimensions over previous years. The differential is of the spur type, and is assembled with the driving gear as a unit, and runs in phosphor-bronze bearings, the shafts being steel hardened and ground. There is a suitable means provided back of the bevel gear for not only taking the thrust of this gear, but making it possible to ensure a perfect meshing of the teeth, the thrust being taken by a ball thrust bearing. The housing is divided in a horizontal plane some distance above the centre line of the axle, the removal of the cover from this case making it possible to remove the entire differential and driving gear unit, also the bevel driving pinion without removing the axle from the car.

The rear wheels run on Timken roller bearings which are mounted on the outside of the rear axle tubes. These tubes and the case are of sufficient strength to carry the car without the necessity of truss rods, the company believing that the truss rod is a bad feature owing to the possibility of an inexperienced operator tightening up the turn buckle on the truss rod until all the bearings in the axle are cramped, whereas, with their construction free running bearings are always insured. The wheels are driven by nickel steel shafts thru claw clutches made of special steel hardened and fitting into corresponding notches in the end of the wheel hub. Particular emphasis is laid upon the construction of this hub, inasmuch as the driving and the braking are both thru the same member, the brake drums being attached to the flange which is integral with the hub barrel.

SPRINGS.

The springs are semi-elliptic, the front springs being 2x38 and the rear springs 2x52. These springs are attached to the axle by large sized clips of special material so as to do away with any possibility of play between the springs and the axle, this being a common cause of spring breakage. All the springs are shackled at their rear ends.

ARMORED WOOD FRAME.

The frame is the same armored wood type that has been used by this company for several years. The frame ends are much longer than used before bringing the axle directly under the center of the radiator. The guards are of special design and are provided with patent leather aprons extending from the front of the front guard thru to the rear guard, filling in the entire space between the running board and the frame.

The wheel base is 112 inches and the gage 56 inches. The front wheels are equipt with 34x3½ inch tires, and have ten 1¾ inch spokes. The rear wheels have 34x4 inch tires and twelve 1¾ inch spokes, the wheels all being mounted on Timken bearings.

STEERING GEAR AND CLEARANCE.

The steering gear is of the worm and sector type operated by a 17-inch wheel of new design. The steering connection is all of the ball and socket type, the cross connection being placed back of the axle in a position where it is well protected. While the car is equipt with larger wheels, the engine and transmission centres are very low, thus keeping the center of gravity down, yet the road clearance is large, being about 11 inches.

The car is furnished with the regular touring car body of the convex type, seating five people, all of the seats being wider and deeper than on previous models. The tonneau is also considerably longer. The dash is of the distinctive Pope-Hartford design, same as used last year.

MODEL M RUNABOUT.

The mechanism and frame construction of this car is the same as the Model M touring car, except that the wheel base is 108 inches. This car will be equipt with bodies of three distinct styles, a four-passenger runabout, having a double rumble seat; three-passenger runabout, with a single rumble seat, and a single seated runabout having a trunk on the rear deck. The hood is considerably longer than the regular model, the engine and transmission being moved back so as to get the weight on the rear axle. This permits of a much greater rake on the steering post, giving it quite a racy appearance.

Mr. Lee Counselman, formerly with the National Cash Register Co., has recently become identified with the E. R. Thomas Detroit Co., as sales manager.

Mr. W. H. H. Hutton, formerly with the Northern Motor Car Company, as purchasing agent, has been added to the purchasing forces of the E. R. Thomas Detroit Co.

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THE

NORTH AMERICAN

PHILADELPHIA

Each city has its daily newspape which is popular with automobilists, but is seldom that any one particular news paper in a city the size of Philadelphi reaches a point where it becomes pract cally the official motoring organ of it locality. Such is the unique position occu pied by **THE NORTH AMERICAN,** and s thoroughly does it dominate this particu lar field that many local manufacturer and dealers use it exclusively for adver tising automobiles and automobile acces sories.

In substantiation of these claims w refer you to the facts and figures on th opposite page.

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THE

NORTH AMERICAN

PHILADELPHIA

During the recent Automobile Show held in hiladelphia, seven leading dailies issued special show ımbers. **THE NORTH AMERICAN** carried in its ›ecial show issue 23,146 lines of advertising, which ıme within a few hundred lines of being twice much as its nearest competitor, and almost equalled e total lineage appearing in the other five papers ›mbined. These figures are absolute proof that **HE NORTH AMERICAN** is the recognized automo- le advertising medium of Philadelphia.

Wise advertisers realize that circulation ›th in quality and quantity is the element that ıakes a newspaper the medium through which it is ›ssible to reach high-class buyers. There are a mil- ›n and a half people in Philadelphia and a million ıd a half more nearby. Of these three millions the ass who can afford to own motor cars read **THE ORTH AMERICAN.**

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1908 Crawford Cars

The Crawford Automobile Co., Hagerstown. Md., builder of the Crawford Cars, offer for 1908 in addition its to well known line, two entirely new high powered shaft driven models of such lines and general design as to please the most fastidious 1908 car purchaser. These high powered 1908 models both have the same general chassis arrangements, with of course, the exception, that the weight distribution has been altered in the runabout. The motor in each, is of the 4 cylinder, vertical water cooled type, the cylinders being cast separately and having a bore of 5 inches and a stroke of 5 inches. These motors are rated at 40–45 H. P. The total weight of the touring car is but 2800 pounds making the car exceptionally speedy and a good hill climber.

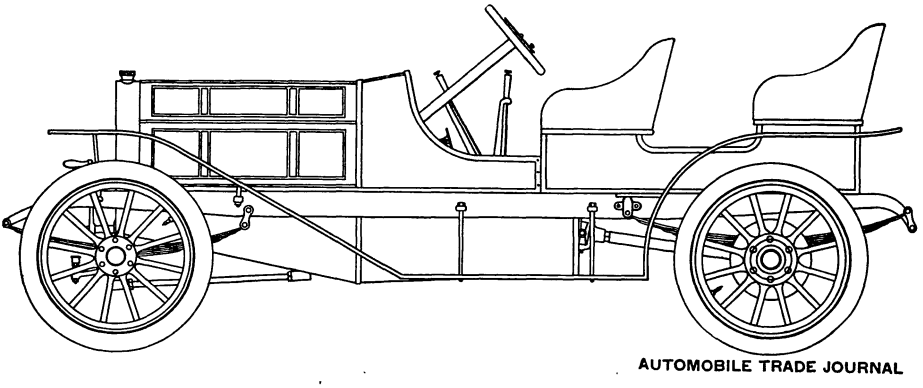

Fig. 1. 1908 Crawford Runabout. The chassis of this model and that of the touring car are essentially the same, except for weight distribution. Motor, 4-cylinder. vertical, water-cooled, cast separately, 5"x5", 40–45 H. P., shaft drive, 4 speed selective sliding gear direct on the third speed with accelerated tail shaft on the fourth, wheel base, 116", tread standard, weight, complete of touring car, 2800 lbs., price, including full equipment of five lamps, generator, horn, tools and tire repair kit, $3000.00.

These 1908 machines are shaft driven and provided with a change speed gear of the sliding type, there being 4 speeds ahead and one reverse with the direct drive on the third speed, the fourth being carried up, or in other words, the tail shaft is accelerated or runs at a higher rate of speed than the engine. By this arrangement is it possible to obtain a very high speed without racing the engine and at the same time the ratio of gearing is such that the car can easily negotiate heavy roads and hills on the direct drive, that would be impossible for a car of the same speed, weight and power but geared direct on the fourth speed. In other words with a gear as low as 3½ to 1 exceptional speed can be had without racing the engine.

SPECIAL FEATURES.

The special features of the previous Crawford design, such as the finishing of the lower portion of the cylinders below the water jackets by machining, and the use of two pairs of inelastic piston rings near the top fitted over a broad ring in the common groove in which all three rings are placed, are also incorporated in the new models. With this arrangement there is practically no chance for the gas to leak, regardless of the method of cutting the ring opening and in addition the outer rings against the cylinder walls are in their normal condition. Another set of these rings is placed at the bottom of the cylinder for oil distributing and circumferential oil grooves are also cut into the piston above the lower set of rings thus providing not only oil retention pockets but uniform distribution of the oil around the piston. Another special feature is the large bearing surface provided for the crank shaft, there being five bearings with an aggregate length of 15½ inches. These bearings are of babbitt as are also those of the connecting rod. The latter is of the usual drop forged pattern, the cap being held by two bolts. The valves are of large size placed on opposite sides and are removable through caps which are bolted to the tops of the valve chambers. These caps make a tight joint with the cylinder by means of copper asbestos gaskets. The exhaust is carried off by means of a generously proportioned malleable cast iron manifold and a muffler of proper design. The Schebler carburetor is used as exhaustive tests, it is claimed that this instrument is especially satisfactory in its workings on the Crawford Motor. The intake manifold, as in the previous models, is a single cast alluminum unit, as shown in the left side view of the motor. The two to one gears are entirely encased at the forward end, the gear on the engine shaft being of steel meshing with fibre gears on the cam chafts. The cam shaft is ingeniously arranged so that by simply loosening two nuts it can be removed and the bearings inspected or replaced. This is accomplished in the following manner: The cams are keyed on with Woodruff keys and

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sition even though the key should loosen. bearings are held in place by a bronze d alluminum housing in which the silent end valve lifting rods operate. These ngs are held in position by means of yokes orked ends which hold the two adjacent ngs, each yoke being held on a stud by le nut, and by simply releasing this nut oke can be swung out of position im tely allowing the housings to be lifted ncovering the cams and the bearings. alve springs are of the conical type so here is no chance for them to close solidly er. Comparatively low compression is giving smoother running at low speeds nger motor life and ability to pull evenly almost closed throttle.

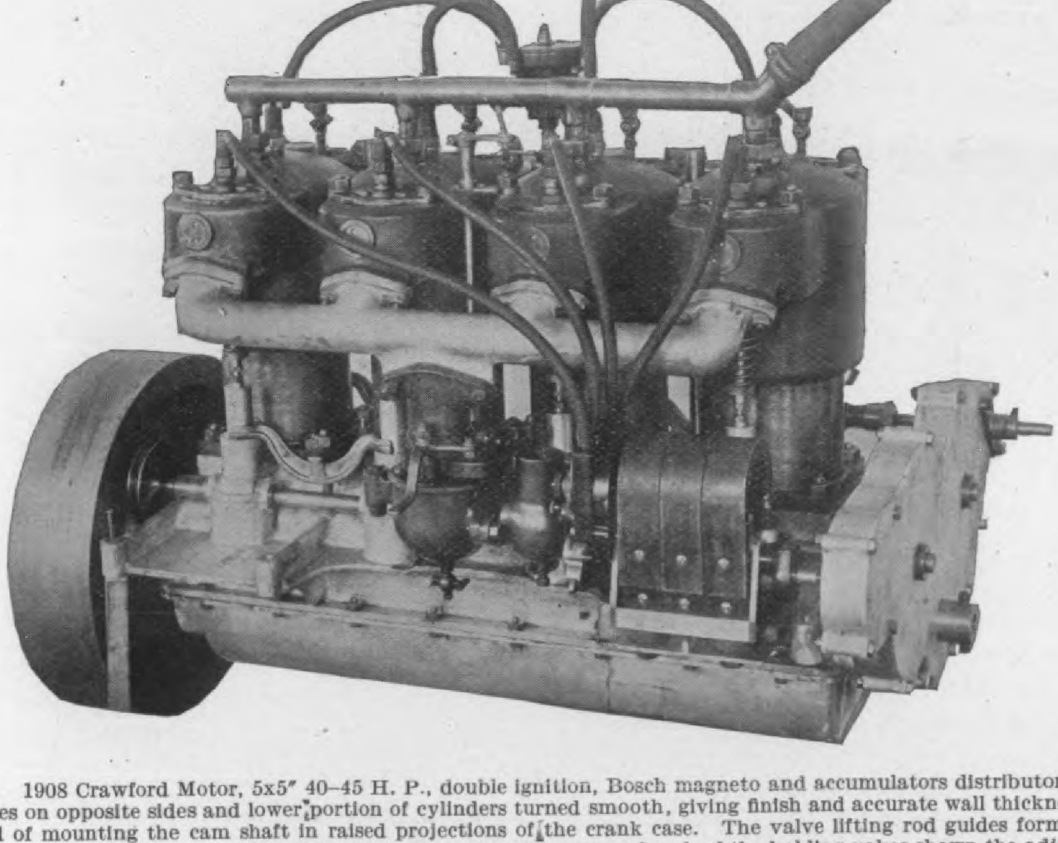
IGNITION.

ouble system of ignition is supplied on cars and consists of a Bosch high tension eto, which is mounted as shown in the panying photograph, and gear driven the half time gears, and a storage battery vibrating Connecticut coil, and distri-

the exhaust valve, which is fully jacketed and passing out at a point at the top of the opposite side, both the intake and the pipe to the radiator are suitably tapered to cause an equal distribution of water to and from the cylinders. Efficient means are provided for taking up the slack in the fan belt. A special feature consists in the weight disposition in the fly wheel which is comparitively light but has an extremely broad and thin rim with all the available weight at the periphery.

THE CLUTCH.

As in previous models a clutch of the multiple disc metal to metal type housed in the forward end of the change gear case is used. For 1908 the discs are saw-stock against mild steel instead of against bronze as the mild steel has been shown by tests to wear better and has no tendency to score or rough up. The plates are 36 in number each having its rim cut to form peripheral disengaging springs so that although the clutch runs in oil in the forward part of the change gear case, there is no chance for the plates to "oil drag" or adhere but instantly separate upon being released. A



. 2. 1908 Crawford Motor, 5x5″ 40–45 H. P., double ignition, Bosch magneto and accumulators distributor and single alves on opposite sides and lower portion of cylinders turned smooth, giving finish and accurate wall thickness. Note hod of mounting the cam shaft in raised projections of the crank case. The valve lifting rod guides form the upper he bearing housings and by loosening two nuts one at the center of each of the holding yokes shown the adjacent hous- y be removed and the cam shaft lifted out. All gears are encased and the distributor is accessibly located.

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direct on the third speed. The lay shaft is below the line shaft and the controlling lever operates selectively.

Referring to figure 4 it will be seen that there are three square section shifting rods which work in milled grooves in the case and are entirey enclosed. The gear shift lever is mounted rigidly on a tube which telescopes a transversely located brake shaft, is free to slide on it, and carries at its inner end the piece A, the end B of which engages the corresponding hollow in the upper side of which ever rod is to be moved. The speeds not in use are locked by a transversely sliding bolt in a groove across the under side of the three shifting rods. The sector like end C of piece A works in the slotted end D of this bolt moving it in unison with the gear shift lever, so that a groove in this bolt is brought under which ever rod is engaged by B, allowing that rod to move freely while the ungrooved body of the bolt locks the other rods. Special care has been exercised to make it impossible for dust or grit to work in between the sliding tube and the brake shaft upon which

entire under side from the radiator to t
of the change speed gear case is protecte
specially built pan which is divided transv
into a forward and rear portion so tha
possible by simply loosening thumb n
swing bolts, to entirely remove the rea
of this pan or vice versa, in a few m
The three cross-members of the sub-fra
in addition to the two straight cross me
of the main frame giving the frame five
members.

CONTROL.

The usual levers on top of the steering

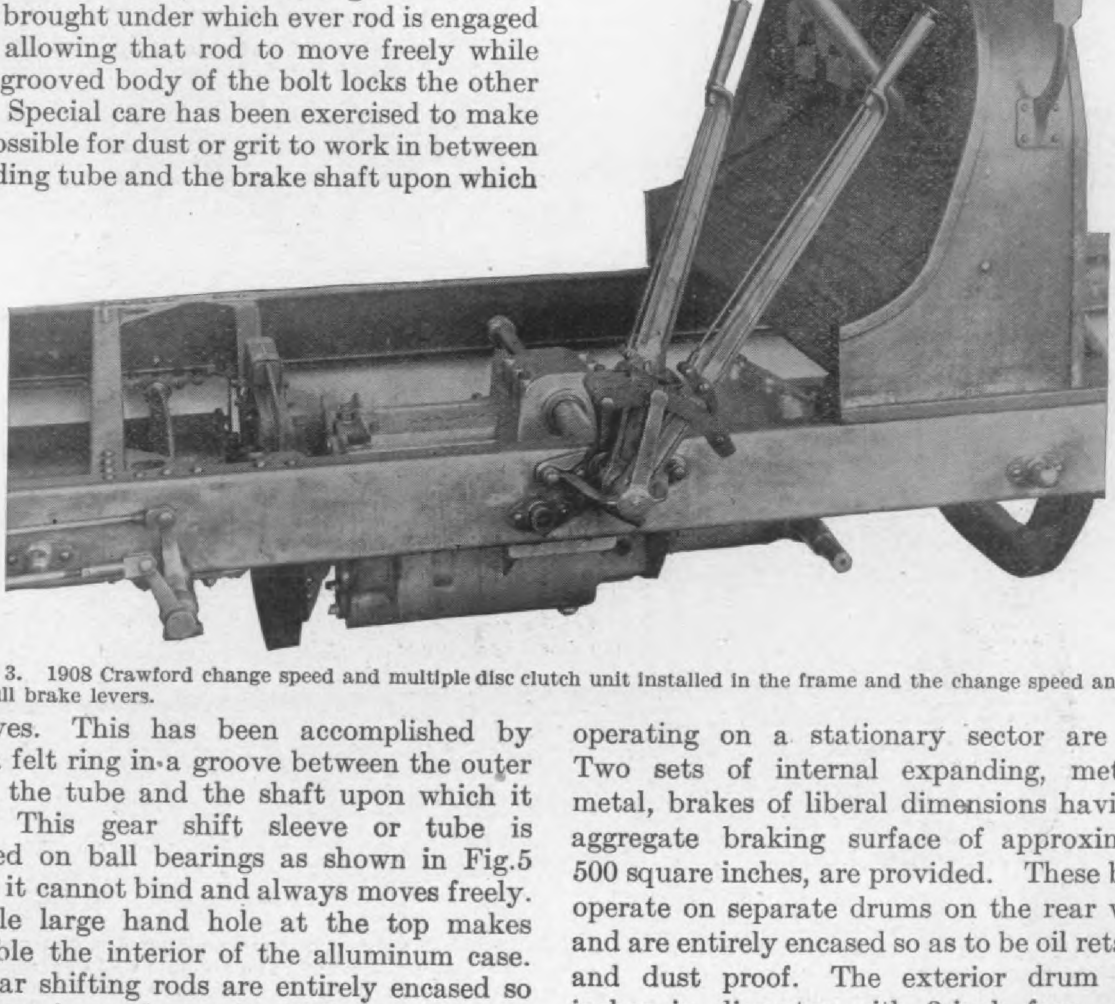

Fig. 3. 1908 Crawford change speed and multiple disc clutch unit installed in the frame and the change speed an
gency pull brake levers.

it moves. This has been accomplished by using a felt ring in a groove between the outer end of the tube and the shaft upon which it slides. This gear shift sleeve or tube is mounted on ball bearings as shown in Fig.5 so that it cannot bind and always moves freely. A single large hand hole at the top makes accessible the interior of the alluminum case. The gear shifting rods are entirely encased so that there is no chance for oil leaks and when the top of the case is removed these rods can be taken out easily as each is an integral piece.

AXLES AND FRAMES.

The rear axle is of the floating type driving the wheels by means of dog clutches, the weight of the car being supported on the ex-

operating on a stationary sector are
Two sets of internal expanding, met
metal, brakes of liberal dimensions havi
aggregate braking surface of approxim
500 square inches, are provided. These b
operate on separate drums on the rear w
and are entirely encased so as to be oil ret
and dust proof. The exterior drum
inches in diameter with 3-inch face.
brakes are operated by a lever of the pul
which is interconnected with the clutch, b
arranged that if desired, it is but a cou
minutes work to disconnect it, no parts b
to be removed so that it can at any tim
quickly put into service again. A pedal

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rear as are also the rear springs and both are directly attached to the frame at their forward ends. The forward springs are 42 inches long, seven leaves and the rear are 52 inches in length with nine leaves. Bands are used on the lower leaves of all the springs to preserve the allignment and prevent breaking on the rebound. The axles are attached to the

BODIES.

The bodies are made of sheet metal t built up on bent wood frames giving the est amount of stability with lightne doing away with all split panels an joints as all of the joints are of the blin being covered by half oval metal mo The upholstering of tufted type, is of t

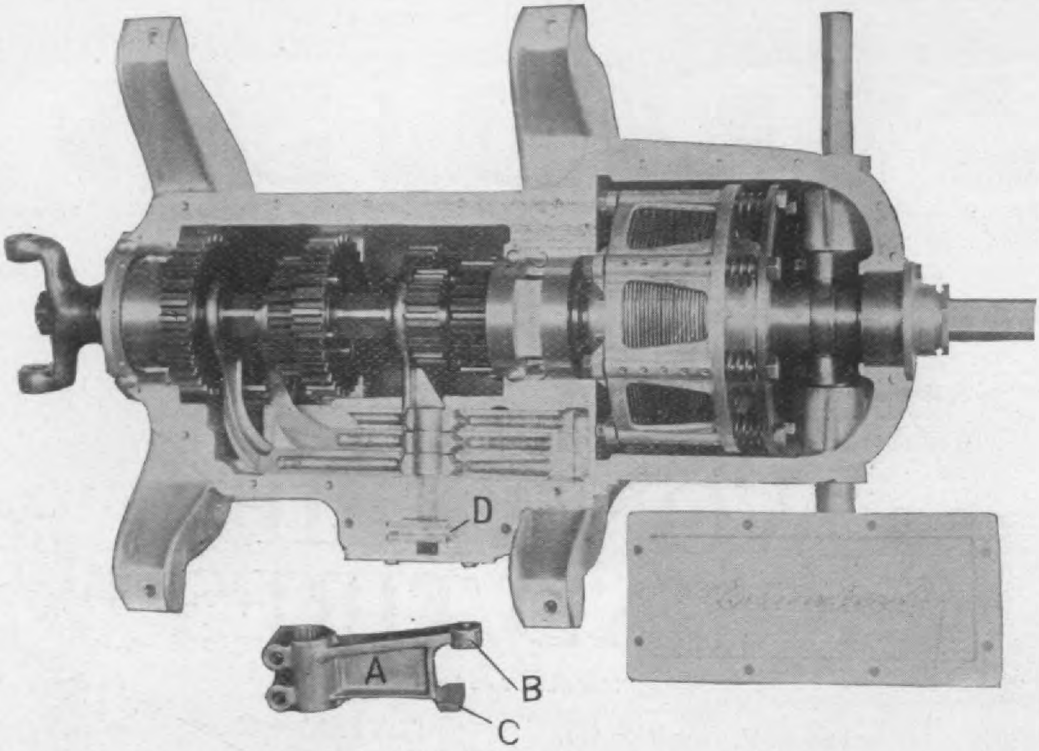

Fig. 4. The 4-speed selective change speed gear and multiple disc clutch. The lay shaft is below the line shaft drive is direct on the third speed. The operation is selective and all speeds are locked except that in use by a special ment as described fully in the text. The case is horizontally divided and the supporting arms are integral with the lo

springs about one inch forward of the spring center by heavy clips, a small bolt passing thru the spring leaves. The front springs are set 31½ inches apart center to center, and a corresponding measurement on the rear axle shows 39 inches.

The mud guards are corrugated sheet steel, reinforced by one inch flanges on the under edges which prevent mud from flying outward

material. Liberal carrying spaces ar vided both under the front and rear seat under the rear seat being accessible fr rear of the car and that under the front accessible from the tonneau. A 16 gallo is carried under the front seat. The b of this tank instead of being flat is curv lowest point being at the middle which the draining sure and prevents bucklin

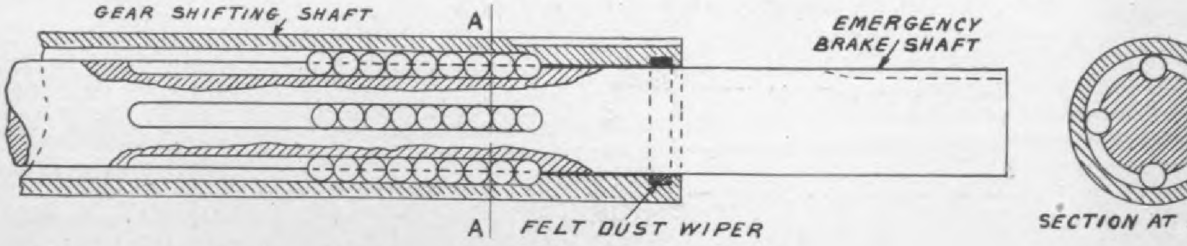

Fig. 5. Showing the ball bearing mounting of the gear shifting shaft so that it cannot wedge and must slide freel felt dust washer which prevents dirt from getting between the sliding gear shifting sleeve and the transverse brake r which it is mounted is also shown. A similar washer protects the joint between this sleeve and the gear case.

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ıger of loosening the cock by connecting onnecting the small pipe.

ıout the entire construction minor de- ave been taken care of and little con- ces arranged, for example, the starting does not require to be strapt in position simply placed in the proper position and

The tread of these new models is standard and the wheel base is 116 inches. Both the touring car model and the runabout sell for $3000, which includes the full equipment of 5 lamps, generator, horn and tire repair kit, and tools, ready for service.

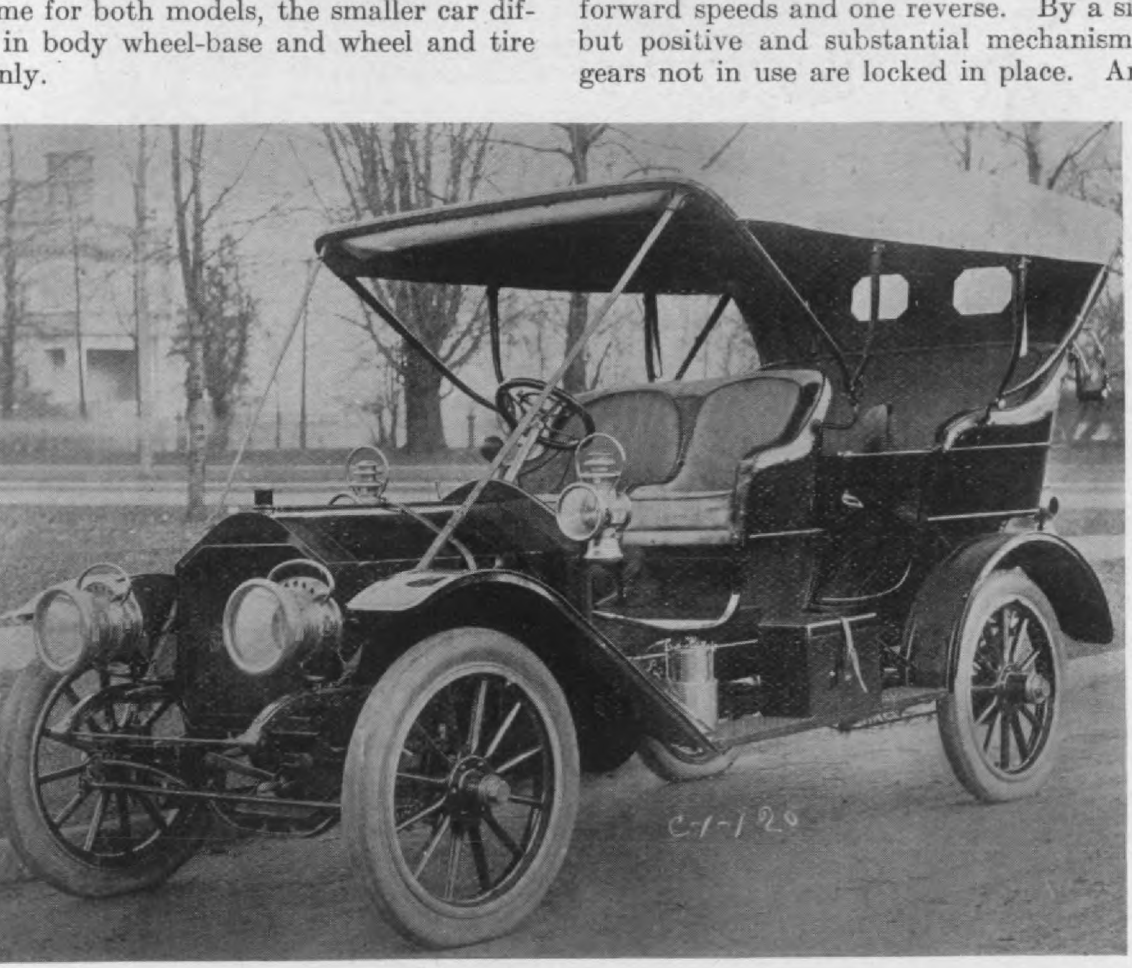
1908 Pungs Finch Cars

Pungs Finch Auto and Gas Engine Co., t, Mich., offer for 1908 two cars of 40) H. P. respectively, known as Models d 50. Both are of the four-cylinder cooled variety with cylinder cast in The general chassis arrangements are me for both models, the smaller car dif- in body wheel-base and wheel and tire nly.

the plates being of Jessop steel, tempered and ground and running in an oil both, thus giving satisfactory and very gradual engagement but good holding power.

THE CHANGE SPEED GEAR.

The same type of change speed mechanism is used in both models and is of the sliding gear selectively operated type, giving three forward speeds and one reverse. By a simple but positive and substantial mechanism the gears not in use are locked in place. An un-



1. 1908 Model 50 Pungs Finch. Motor 4-cylinders, 50 H. P., 5x5 inches water-cooled, cylinders cast in pairs; disc metal to metal clutch, discs of Jessop steel hardened, tempered and ground; selective sliding gear three speeds erse, gears not in use are locked and second and third speed engage by interlocking lugs, preventing gear stripping. ısly fitted body, ample room for seven persons. Complete car weighs 3000 lbs., tires 34x4 inches, wheel-base 116 price complete $3,500.00 F. O. B. Detroit.

MODEL 50.

1908 Pungs Finch is a very large and ously fitted, seven-passenger vehicle, a wheel base of 116 inches and a very omely fitted and roomy body with large

usual feature is the arranging of the second and third speeds, so that it is not necessary to clash the gears for engagement, but they are interlocked by dog clutches, making it impossible to strip the gears by mishandling.

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driving the wheels by outside clutches and are entirely relieved of any car weight.

The frame is of the usual channel section, cold rolled prest steel construction, well braced and riveted and a steel protecting pan extends under the entire mechanism of the cars.

an element of sporting blood and is on th out for a racing machine equally as exp

* * *—these will not be particularly ested in this story of the "Success Buggy," which, frankly, is not a mach such ambitious pretensions." But th

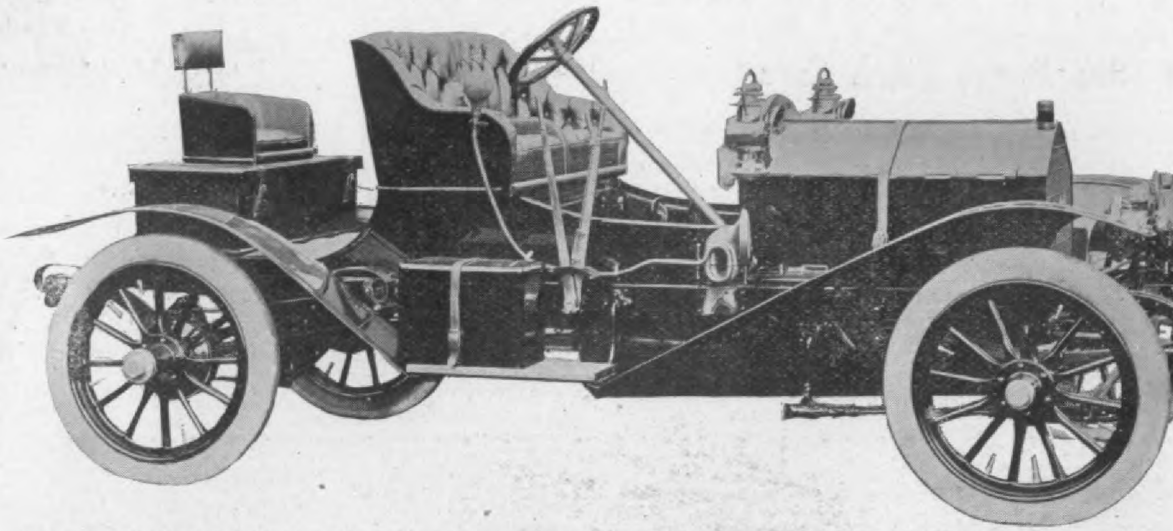

Fig. 2. 1908 Model 35 Rumble Seated Pungs Finch Runabout. Motor 40 H. P. 4¾x5 inches, water-cooled. chassis construction similar to the larger model, wheel-base 106 inches, tires 32x4 inches, weight 2500 lbs., price $2500.0 Detroit.

Two sets of brakes are supplied on the rear wheels. The foot operated, being externally contracting on the drum and the emergency brakes being internal expanding bands on the same drums and operated by a side hand lever.

The wheels are 34 inches fitted with 4-inch Diamond tires, both front and rear; the car complete weighs 3,000 lbs. It is claimed by the makers to be capable of a variation on the direct drive of from 3 to 50 miles an hour. The gasoline capacity is 19 gallons. The car is equipt with three oil lamps, two gas lamps, generator, horn, storage battery, magneto, top and complete set of tools and sells thus equipt F. O. B. Detroit, Mich., for $3,500.00.

MODEL 35.

This car is usually fitted with a runabout body and rumble seat. The motor is of the same general type as in the larger car but is 4¾ x 5 inches and rated as 40 H. P. The chassis is otherwise the same as Model 50, but the wheel-base is only 106 and the car weighs but 2,500 lbs. The tires are large for the weight, being 4-inch both front and rear, but the wheels are 32 instead of 34 inches. The equipment is the same as the other car and the price is $2,500.00.

1908 "Success Auto-Buggy"

practical light weight high wheel mod $250 and $400 respectively, will certain peal to a larger class of buyers."

Fig. 1. Model B Success Auto-Buggy. This l is driven by a single air-cooled cylinder of 3½x3 inche at 4 H. P. Drive is from a cross shaft by 1½ inch roll to sprocket on one rear wheel, no differential. The speed gear is planetary, two speeds and one reverse. ing is by wheel thru chain and sprocket to turn the o axle buggy fashion on a fifth wheel. The entire car 450 lbs. and sells for $250. Top rubber tires and ba ing wheels are extra. From 50 to 100 miles are cla a gallon of gasoline and that the cost of maintenanc than a single horse and carriage. A speed of 25 mile to be possible and that the car has good hill climbing and durability.

These vehicles are the out come of years of practical experience of their de and patentee, Mr. John C. Higdon, a me cal engineer of twenty-five experience pioneer builder, his first machine being

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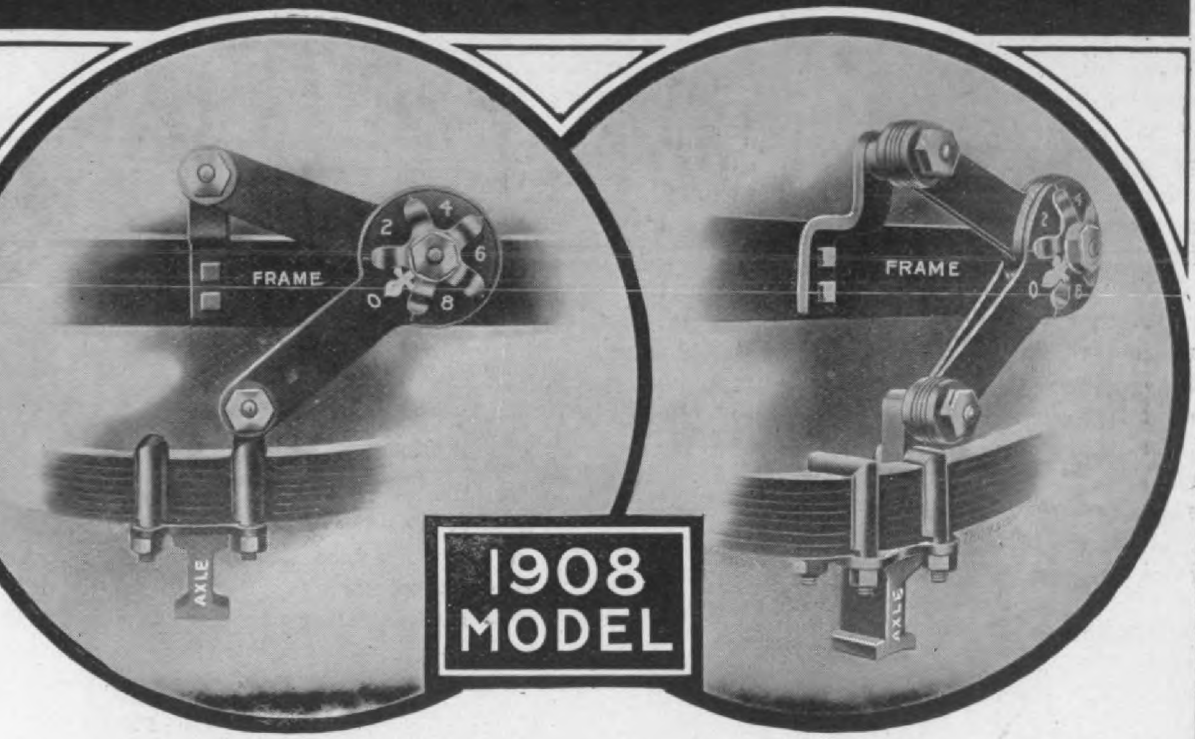
TRUFFAULT-HARTFORD SHOCK ABSORBER



THE DEVICE THAT MADE

afe, Speedy and Comfortable Automobiling Possible

The spring action of a car affects its smooth running qualities. Proper control of the springs pre-ts excessive oscillation, which insures LESS WEAR and TEAR, LONGER LIFE OF TIRES, REATER SPEED and GENUINE COMFORT.

This control of the springs can be secured only by the use of TRUFFAULT-HARTFORD ock Absorber—the device that has made SAFE, ECONOMICAL AND COMFORTABLE omobiling possible.

In the 1908 model we believe that we have practically obtained perfection.

A distinctly new feature has been added, consisting of a regulating dial with indicator, making it sible for even a novice to obtain a perfect and uniform adjustment to suit the exact requirements of car as measured in terms of its gross weight, and easily secure the maximum benefit.

The Truffault-Hartford is the only spring retarding device manufactured with a regulating dial. It utomatically lubricated, absolutely dust and water proof, interchangeable, practically indestructible and y guaranteed.

The superiority and individual qualities of the Truffault-Hartford Shock Absorber are best demon-ted by the fact that it has been adopted exclusively as equipment by such prominent cars as the:

PIERCE GREAT ARROW, STUDEBAKER, STEVENS-DURYEA BIG SIX, STODDARD-DAYTON SIX-CYLINDER, MARMON, CONTINENTAL, LANE, CONOVER, SULTAN, FRONTENAC, AND ACME SIX-CYLINDER.

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bined with low first cost are the strong talking points of its makers, the claim being made that actual tests have shown that one of their cars can be operated for less than a single horse and buggy.

CONSTRUCTION.

The 4 H. P. motor consists of a single vertical air-cooled cylinder of 3¼x3 inches supported on the right side outside the piano box type of body by a strap or yoke beneath the crankcase and held to the ends of two transverse angle irons securely bolted across the bottom of the body. This frame work also supports a cross shaft at the left end of which is a sprocket which drives the left rear wheel, at once doing away with the differential and yet sufficient it is claimed, for all needs of such a light rig. The engine drives by chain to a short cross shaft carrying a compact two speed and one reverse planetary a chain from which drives the before mentioned cross shaft. Special nickel steel chains are used and the reduction from motor to transmission is 6 to 1. The chain to the large rear wheel sprocket is of the roller type 1⅜-inch pitch. There are two hand brakes on the transmission sufficiently powerful for all ordinary use.

Fig. 2. Model C Success Auto-Buggy. This car has a two cylinder opposed air cooled by fly-wheel fan, motor set lengthwise under the body. Drive is to a countershaft with differential and planetary gear and drives to each rear wheel sprocket by side chains. 12 H. P. water cooled 4½x4 inch two cylinder opposed motors will be furnished at $50 extra. Car weighs 700 lbs. and sells for $400. Extra long body and two seats $100 extra. Rubber tires, ball bearing wheels and top extra.

The axles are 1-inch dust-proof and the reaches are ironed full length. Wrought Bailey loops are used. The front and rear oil tempered springs are each set crosswise,

either a float feed carburetor or mixing will be supplied. The gasoline tank ho gallons, sufficient for a day's run as, it is ed, these cars will do from 50 to 100 mi gallon, according to road conditions an speed up to 25 miles per hour on the lev in the low gear climb anything in sight.

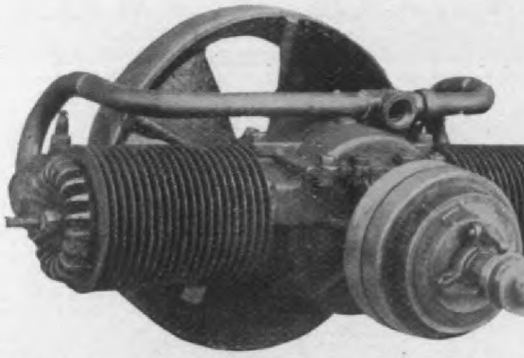

Fig. 3. 10 H. P. Success Motor 4½x4 inches. wheel spokes form the fan. The speed change gear tary giving two speeds and one reverse.

The seat is upholstered in good le fancy trimmed and an open bottom cushion is provided. The dash is leather with nickel trimmings and the inch body with swell sides is finished in the inside panels being rubbed out and fi The gear is Brewster green, New York carmine, nicely striped. The car co weighs 450 lbs. Tops are $25 extra.

THE 10 H. P. MODEL C.

This car looks much like the smalle but both rear wheels are driven by chain a jack-shaft having a differential and the is two cylinder opposed, air-cooled, and with the cylinder axis lengthwise und seat. The cylinders are 4⅛x4 inches, t wheel forming the fan. 12 H. P. 4½x water-cooled motors will be furnished extra, if desired. The axles are 1¼ inch and the car weighs complete 700 lbs body is 27x58 inches with one undivide 40 inches wide. Extra long bodies wi wide seats seating four to six persons, surrey or wagon type are $100 extra general specifications are the same smaller model. The price with steel t $400, with rubber tires $425, ball b wheels $25 extra, and tops are also $25

One of the strongest claims made fo cars by the manufacturers is durabilit economy of operation.

You can secure better information abou models from a perusal of the March nun

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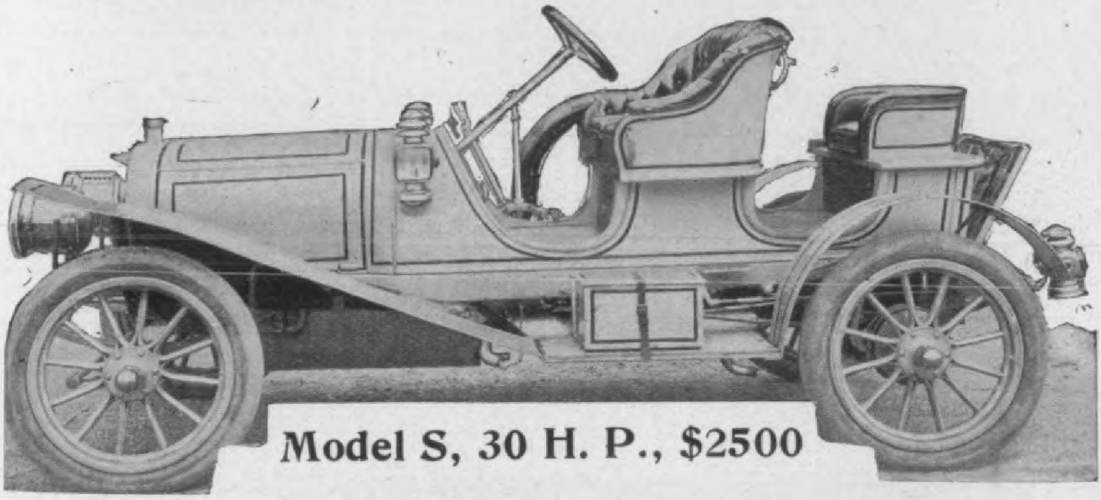
HAYNES



Model S, 30 H. P., $2500

A SAFE CAR TO BUY

We can claim for the Haynes engine absolute reliability, we can show cord of unfailing strength for the frame, we can promise to every purchaser omplete satisfaction and freedom from annoyance but other makers claim and romise such things too. Here, however, are a few facts about the Haynes hat are simple enough to be admitted at sight.

1. The Haynes design has not been extensively altered in three years, nd one model—the 30 H. P. Car—has undergone no variation whatever. A ar that has developed no weak points in that time is a safe purchase.

2. The Haynes won the great Chicago Motor Club Endurance Run, beg awarded the only perfect score in a test that included minute examination r any defects revealed by the contest. Likewise, in every other endurance n the Haynes has either been victorious or tied for first place. A car that ways stands the test is a safe purchase.

3. Haynes cars date from 1893 and the makers are the oldest automobile anufacturers in America. The production of Haynes cars is not a sky-rocket peculation, but a steady, permanent panic-proof business that means a secure acking to the agents' promises, and makes the Haynes, again, a safe purchase.

Haynes cars are bought as investments and charged up by owners as ssets, not expenses.

Model S, 30 H. P., $2,500. Model W, 45 H. P., $3,000. Model U, 60 H. P., $3,750.

For Catalogue address desk G. A Few Desirable Openings for Agencies.

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The Pierce Engine Company, Racine, Wisconsin, U. S. A., was organized in 1893, to take over and carry on the gas engine manufacturing business of A. J. Pierce of Racine who sold his first stationary gas engine in June, 1884.

The Pierce Company has continued to build stationary gas engines driven by gas or gasoline, up to the present time, the largest Pierce unit being 250 H. P. The Pierce-Racine Company was the second American builder to supply gasoline engines and was only about 30 days behind this first builder in making the first delivery of an American built gasoline motor.

This long experience of the Pierce-Racine company in gas engine building has given that concern a thorough knowledge of the gasoline motor in all sizes, and makes it reasonable to suppose that the Pierce car motors are designed with a full consideration of the conditions of the problem.

tachable seat surrey, 2 or 4-passenger
4x5 cylinder, 4-cycle, 8 H. P. This
wire wheels with single tube tires, was
at $800.00, and about 20 of them wer
and sold. In 1903 the Pierce-Racine Co
sold 150 cars, 2-cylinder motors, rea
tonneau and runabout bodies, at $
and $1150.00.

The first Pierce-Racine 4-cylinder
on the road in 1905, in which year the
Racine Company sold about 150 cars
which were driven by 4-cylinder motor
1906 the Pierce-Racine was a larger 4-c
car, price $2,600.00, 5-passenger t
body, about 90 made and sold in the se
1906. For 1907 the 1906 Pierce-Ra
cylinder was materially improved, a
offered for the same price, $2,600.00, an
200 cars were made and sold.

1908 MODELS D AND E

The Pierce-Racine 1908 models D
were placed on the road in Septembe

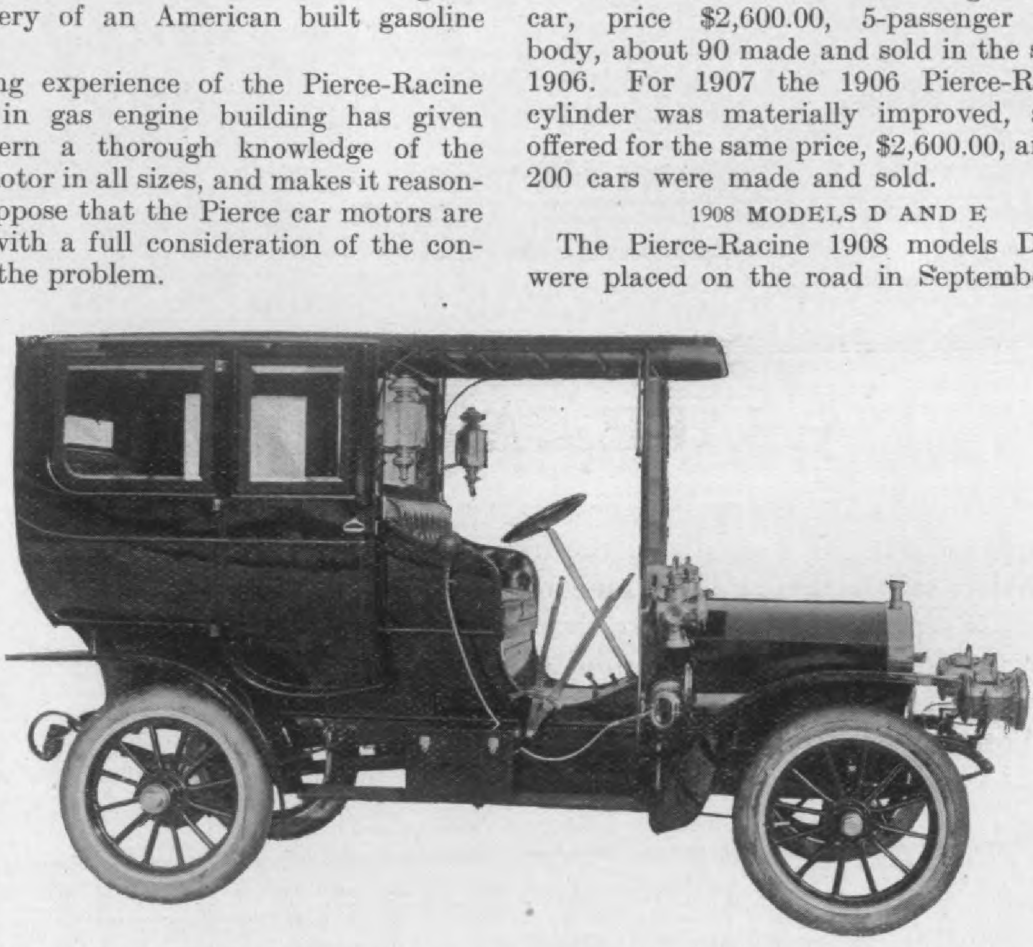

Fig. 1. Pierce-Racine 1908 limousine. The dimensions are liberal, the enclosure being 48 ins. long, fore and a ins. wide, inside measurements, giving ample room for three passengers on the rear seat. Individual folding seats for inside passengers, facing rear, are provided. The side lights and overhead inside light are electric. The inside furnis complete. The limousine is lighted by six sliding windows, provided with silk curtains on spring rollers. The rea are the Timme triple action, 52 ins. long, scroll ends. This luxurious limousine body is placed on the Pierce-Racine chassis, 40 H. P. The weight is 3100 lbs. Price $3,500.00 including two storage batteries, two side electric lamps one electric lamp inside, two side oil lamps, one tail oil-lamp, two acetylene head lights with horn and tools, complete particular.

The first Pierce motor car was placed on the road in 1894. The second Pierce-Racine model was placed on the road in 1899, and is thought to have been the largest American car up to that time, and was a close approximation to present lines altho the motor was 2-cylinder, 2-cycle, 5″ x 6″. This car could make 20 miles on a good road, and was sold

These two new models have had det
provements of some importance, but a
the same general lines as the first
Racine 4-cylinder chassis, 1905, so t
of the principal components have ha
or four years of highly successful work
road in the hands of a large number
chasers.

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The Future
OF THE AUTOMOBILE
DEMANDS

1st. That skidding be eliminated.
2nd. That the machine be efficient in bad weather.
3rd. That wear on Tires be reduced to a minimum.
4th. That the maximum power generated be used in propulsion.

Hedgeland
EQUALIZER

Fills all these wants. Is interchangeable with the differential in 22 makes of cars. Manufacturers, Garages, Owners, write for catalogue and prices.

Hedgeland
Manufacturing Company
Canton, Ohio

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gear, progressive, in 1906; ball bearing for both line and side shafts, and has not since been changed.

The change from semi-floating to full floating rear axles was made in 1905, for 1906

wide.

THE CHASSIS FRAME

The same chassis frame is used for D and E. The greatest depth is 4 ins., $1\frac{3}{4}$, thickness $\frac{5}{32}$. The frame is flat c

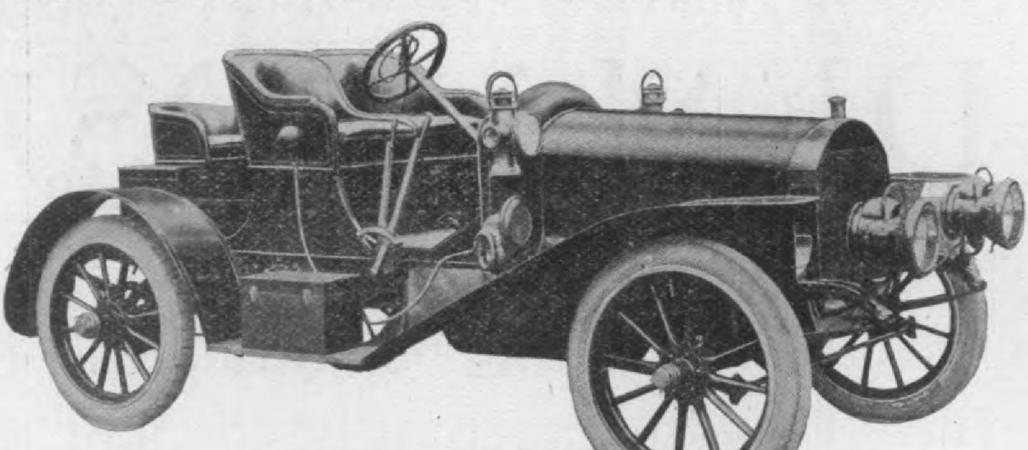

Fig. 2. Pierce-Racine 1908 Gentlemen's Roadster. Same body, 2, 3 or 4 passengers, on model D or E chas prices as touring cars, models D or E. Weights 2500 and 2150 lbs. Wheel base 106, gauge 56. With full equipment and generator, the price of this Pierce-Racine roadster body on model D chassis, 40 H. P., easy 60 miles on a gooc $2,530.00. On model E chassis, with 5 lamps and generator, everything complete, the price is $2,130.00, 30 H. P., per hour on good roads.

trade. From the first, all the Pierce-Racine 4-cylinder cars have had all wheels and axles on 4 point ball bearings, which will be continued indefinitely, as they have given and are giving, entire satisfaction. The type of 4 point bearing used is adjustable, which the Pierce Company prefers to the non-adjustable ball bearings. The Pierce-Racine axles are tubular steel, both front and rear. The clutch is a plain leather-faced cone, 17 ins. large diameter, 11 degrees angle. The steering gear is a worm and trunion nut. The chassis frames are all pressed steel, 4 ins. deep x $1\frac{3}{4}$ ins. wide. The springs are all half-elliptics. Both struts and the torsion arm are fitted. The axles are tubular steel, front and rear. The stub axles are Lemoine type with 4-point adjustable ball bearings. Inside balls $\frac{3}{4}$ and outside $\frac{5}{8}$ inches dia. The Pierce designers believe the tubular front axle to be vastly superior to the I-section drop forging because it is of equal strength in all directions, while the I-section is stronger up and down than it is side-wise. The rear axle construction is fitted with 4-point adjustable ball bearings thru out. The bevel gear housing is a steel casting with an aluminum cover. The lower portion of the housing has full circular ends fixed to the steel tube axle casing $2\frac{1}{2}$ inches dia. and $\frac{3}{8}$ inch wall, by riveting and keying, no brazing being used anywhere in the Pierce-

sides parallel, 34 ins. wide thruout. A nel-steel sub-frame is fitted, 22 ins. width, to carry the motor and gear box.

THE MOTOR.

The Pierce-Racine motor is the re long experience with the 2-cycle and motor in various sizes. The marked f of the Pierce motors are extreme sin and ample dimensions of wearing su The cylinders are $4\frac{1}{2}$ ins. x $5\frac{1}{2}$ ins. for H. P., and $4\frac{1}{4}$ ins. x 5 ins. for the 30 general construction the same.

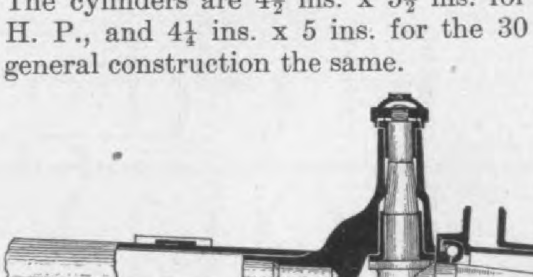

Fig. 3. Pierce-Racine 1908 front axle. The s are the Lemoine type. This illustration shows 2-p bearings, but 4-point, adjustable bearings are fitted Inside balls $\frac{3}{4}$ ins. and outside balls $\frac{5}{8}$ ins. diameter.

The cylinders have long water jac water space around the cylinders and space around the valves. The cylind dual units, cast in the Pierce foundry cylinders are symmetrical, valves on bot worked by two cam shafts. The ca

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PITTSFIELD

IGNITION

IT WILL PAY YOU, IN THE END, TO GET PITTSFIELD IGNITION IN THE BEGINNING. You may have to pay a trifle more, but this will be made up to you many times over in the increased service and efficiency of your car. PITTSFIELD MAGNETOS, or PITTSFIELD SPARK COILS, PITTSFIELD TIMERS and JEWEL MICA SPARK PLUGS have won and retained a premier position solely through merit. They will never fail you.

Insist on having PITTSFIELD IGNITION on your 1908 car. Any manufacturer will supply it. Let us send you our printed matter.

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An "oil" snap ring, $\frac{1}{4}$ wide, is placed close to the lower end of the piston. The piston-pins are steel tubes $1\frac{1}{8}$ ins. x $\frac{1}{2}$ in. and 1 in. x $\frac{1}{2}$ in. respectively, hardened and ground and fixed in the pistons by screws tapped thru the piston hub and the adjacent pin wall, screws turned down hard on the square heads and retained with one pin driven beside the screw head. The connecting rods are steel castings, top end bushed with bronze of a composition of 8 copper and 1 of tin.

The wrist rod ends are marine type, with two studs and half boxes of bronze, lined with real babbitt metal, 96 tin, $3\frac{1}{2}$ copper and $\frac{1}{2}$ antimony in 100 parts.

The crank shaft wrists and journals are all the same diameter, 2 ins. for 40 H. P. and $1\frac{3}{4}$ ins. for 30 H. P. The crank shafts have 3 journals, and are in bronze half boxes, babbited.

The crank shaft is made long enough to give symmetrical connecting rods, bodies in middle of wrist bearings. The motor base and oil basin are aluminum castings, the motor base fixed to the sub-frame by four lugs.

An Oldham joint is placed between the clutch and the line shaft. The propeller shaft is fitted with two special, Blood Bros. universal joints, heavier than the regular pattern.

BRAKES

These are external and internal, on and in the 12 ins. diameter rear hub drums, model D, and 10 ins. diameter in model E. In model

a jump-spark plug for each cylinder.

CONTROL

The spark and throttle control is by levers on top of the steering wheel. In D these hand levers are friction retain model E they are ratchet segment re There are two vertical hand levers; t the outside is pulled backward to app emergency exterior brake band only inside hand lever works the progressiv shift. Of the two large pedals on th board that at the left disengages the only, while that at the right applies t ternal, ordinary, rear hub drum brake A small plunger pedal opens the muffl

The control is the simplest known, no linking of actions, one lever for one fu only, with the expectation of rational on the part of the driver.

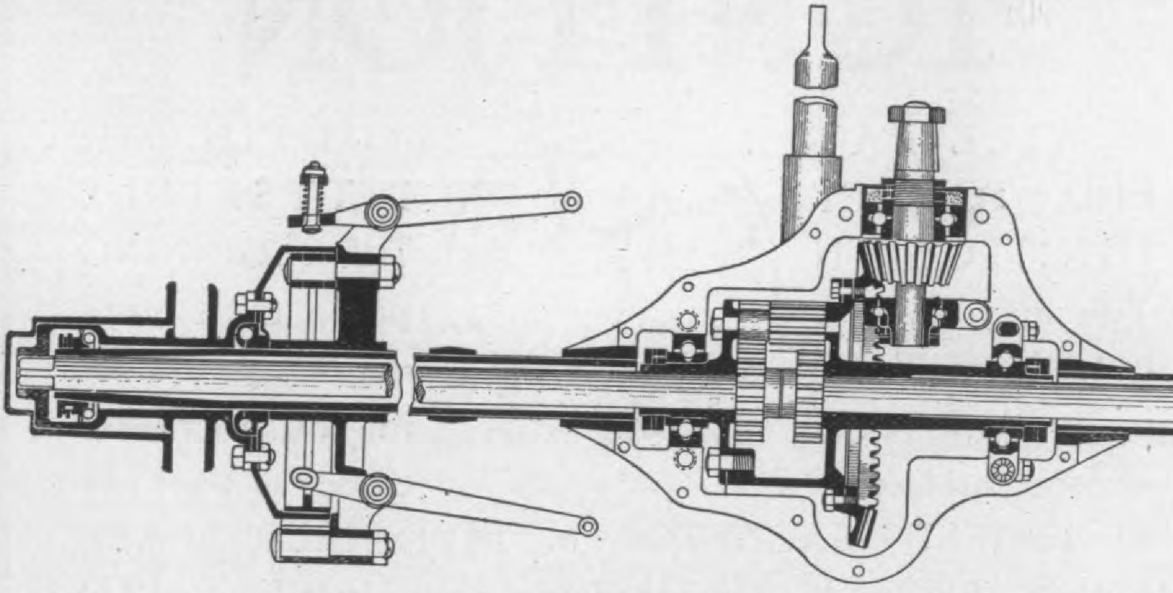

Fig. 4. Pierce-Racine rear axle construction, 4-point ball bearings, adjustable, are used thruout altho some bearings are shown in the illustration. The balance-gear is 8 spur-pinions. The bevel pinion shaft has an inside ball The bevel gear housing is a steel-casting below, with an aluminum casting cover. The lower gear casing member has f ends, fixed to the steel axle casings, 2-$\frac{1}{2}$ diameter, $\frac{3}{8}$ wall, by riveting and keying. No brazing is used anywhere in th Racine cars.

ON THE ROAD

Wednesday, Dec. 18, a Pierce-Racin model E, 30 H. P. touring car left 14t Michigan Avenue, Chicago, at 11:31, S. E. Wherritt at the wheel, George Tru and A. J. Pierce in the tonneau and the front seat passenger, bound for Elgi return, 88 miles round trip.

The day was sun and cloud and the was dry and mealy under our wheels turned into the raw Lake Michigan a headed north for Jackson Boulevard car had chains on the rear wheels only an

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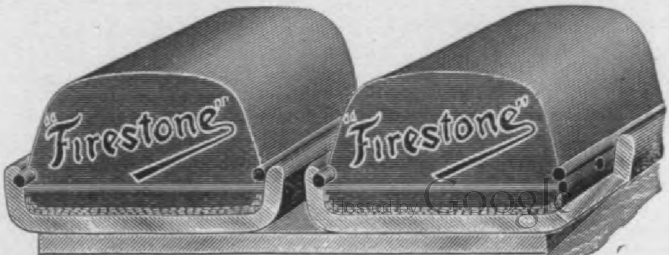
For Pleasure Cars

THE size of your 1908 tire bill will be determined largely by the name on your 1908 tires. If you are figuring beyond first cost your selection will be

"Firestone" TIRES

Firestone Tire & Rubber Co.,
AKRON, O.

ew York Boston Philadelphia Chicago St. Louis Detroit Buffalo Pittsburg



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wind blew coldly in our faces as the impatient hind wheels took first one side of the road and then the other to pass the front wheels. The snow was dry, the Model E had plenty of power and then some at the start, and busy Mr. Wherritt kept us from touching anything but the road surface, though the vicious hind wheels shoved the radiator towards everything except straight ahead, while the tears ran down our cheeks and our ears grew cold.

We stopped one minute at a turning blocked by a pile of packages and a Christmas delivery wagon, and 8 minutes under the railroad bridge to take up our chains, and then hustled out into the snow covered country.

There were very few stretches of clean road road surface and the car did not hold the road a little bit in the snow. The writer remarked to Mr. Wherritt thru the icicles on his mustachios that he was cold, and Mr. Wherritt cracked the film of frozen tears on his cheeks as he replied that he himself was not suffering from the heat. The tonneau passengers held their hands over their ears part of the time, and part of the time they pounded their hands on their knees.

At Addison, about half way out, the writer suggested a stop in front of a commercial emporium and everybody went in and bought caps and gloves, beautifully large and thick and warm, such as farmers wear. The writer after rubbing his fingers in the snow purchased a beautiful seal plush cap, made in London according to the label on the near-silk lining, for 50 cents, and a pair of big-fingered yellow gloves with thick knitted yarn linings for a dollar—perfectly delightful gloves, and we started after our 20 minutes

wheel a snatch which put the front back in the track and gave the deter hind wheels a chance to pass on the left they promptly did, and shoved the car across into the ditch at the right, axl in the snow. Fortunately there were no under the snow and after some few tri car pushed itself up the pike side and in road again, much to the delight of all writer took notice that Mr. Pierce d

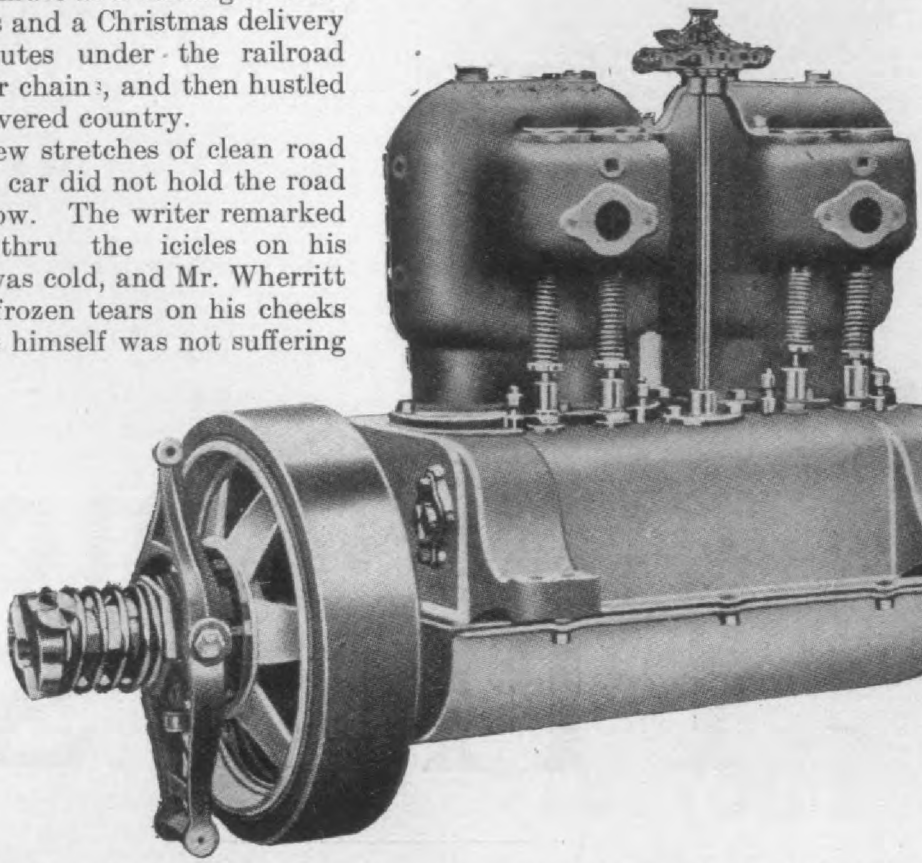

Fig. 5. Pierce-Racine 1908 motor, 4 cylinders. Right side and rear oblique view. The motor base and oil-b joined in the plane of the crank-shaft and the motor is fixed to the sub-frame by four lugs.
For construction of motor, see text, sub-head "The Motor."

again ignore the speed limit, in soft s

Our batteries were weak, and we ra Elgin at 1:55 with only two cylinders ing and we put in new dry cells. At everybody had an appetite.

The run back was made in great co all four cylinders working merrily, the not so sharp in our faces and everybody

Mr. Pierce can handle the Model made the most of what clean road there was; we had one little delay in snow when we were too far to the left pike, but we made 14th and Michigan A at 5:02 P. M. Our running time out w minutes, and 117 minutes for the retur time, with a few minutes lost in the sno

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Our Stewart and American Speedometers backed by a

5-Year Ironclad Guarantee

A Guarantee that is Absolute

Our Famous Ironclad Guarantee

WE guarantee each Stewart and American Speedometer against everything but misuse for a period of five years from date of purchase. This guarantee and warrant covers materials, mechanical construction and accurate operation of the instrument, flexible shaft and all connections. Each instrument is calibrated, tested and sealed before leaving the factory. Any instrument returned to us, at our factory, charges prepaid, with seal unbroken, that has failed to give proper service, or failed to register accurately, or which has otherwise proved defective in material or construction, within the above mentioned term, will be repaired or replaced free of charge.

They are the Best

that genius can devise or money can buy

Send for Catalog **$40**

List of Prices

No. 4. Stewart Combination Speedometer-

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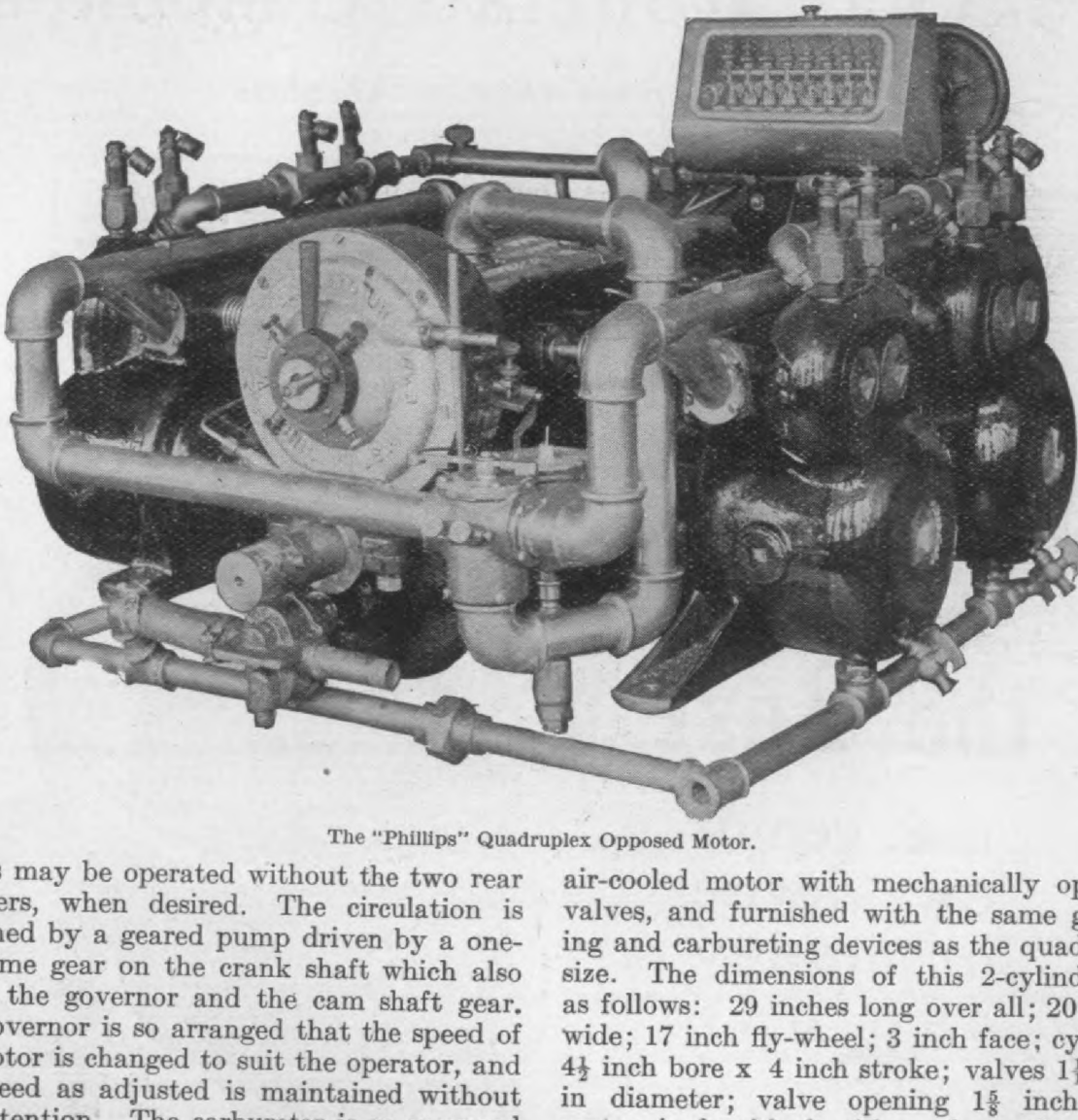
The accompanying cut shows the Phillips quadruplex opposed water-cooled motor manufactured by the Phillips Gasoline Engine & Motor Co., Franklin and Indiana sts., Chicago.

The crank shaft is made of a hammered forging of high grade steel, finished all over and flanged to the fly-wheel. The shaft is 1–⅝″ in diameter and the main bearing is 5″ long—other bearings in proportion. The bearings are made of Parsons' white bronze. The size of the cylinders are 4–½″ and 4″ stroke, fitted with a Duplex governor and carbureter, which enables running the motor with one to four cylinders, as desired. The two forward cylinders may be operated without the two rear cylinders, when desired. The circulation is furnished by a geared pump driven by a one-half time gear on the crank shaft which also drives the governor and the cam shaft gear. The governor is so arranged that the speed of the motor is changed to suit the operator, and the speed as adjusted is maintained without any attention. The carbureter is so arranged that when the motor is running on slow speeds an extra supply of gasoline is provided without the automatic air valves. A drip-cock is furnished in the lower corner of each cy-

of in a very neat manner, by passin between the two cylinders. The weigh motor is 550 lbs. including equipment

The cylinders are made of French r fine grade cast iron, as are also the pis piston rings. The carbureter is of alu as well as the governor plate and th on top of the engine. The carbureter is polished brass tubing. The water when desired, is made of polished bras cylinders are finished in black enamel on. All bearings are provided with ments for taking up the wear. The may be run from 150 to 2,000 R. P. M

This concern is also building a 2-c air-cooled motor with mechanically op valves, and furnished with the same g ing and carbureting devices as the quad size. The dimensions of this 2-cylind as follows: 29 inches long over all; 20 wide; 17 inch fly-wheel; 3 inch face; cy 4½ inch bore x 4 inch stroke; valves 1 in diameter; valve opening 1⅝ inch motor is furnished with underneath supports. Two separate cylinder p are used in order that the exhaust m pass over the inlet, but that the inlet



The "Phillips" Quadruplex Opposed Motor.

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MICHELIN

FRANCE, ENGLAND, ITALY, AMERICA.

Some motor car manufacturers and a good many AGENTS have not sold their cars. Not because the cars they built or sold were not powerful, fast, beautiful, roomy machines, for they were. But because these cars cost the owner so much to keep.

High cost of upkeep is fatal to large and profitable sales. The largest item of upkeep cost is TIRE cost. The car owner who says "I went through an entire year on one set of tires" makes as many sales for the CAR he drove as for the make of tire he used.

Michelin Tires reduce upkeep cost. They are famous the world over for durability and reliability. They are admittedly the Tire Standard of the world and EVERY MOTORIST KNOWS IT. Car buyers are DEMANDING Michelins to-day and GETTING them on their new cars. Agents are SPECIFYING Michelins and manufacturers—the able men of affairs who build the leading American cars—are equipped with Michelins.

Mr. Manufacturer, how will your Agents sell their cars in 1908 in the face of competition which offers Michelins on cars of your price and class? You can AFFORD to equip with Michelins to-day. The public KNOWS it and your AGENTS know it.

At the Importers' Salon over 50% of the pneumatic-tired cars exhibited were equipped with Michelins. This is according to an official count made in the presence of and signed by an official of the Salon.

MICHELIN TIRE CO., Milltown, N. J.

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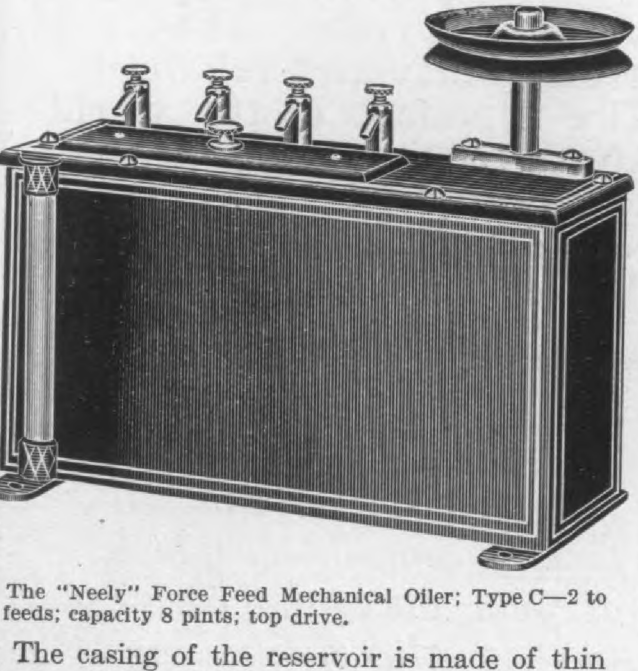
tensive line of zinc, lead, copper, brass, tin, aluminum and steel novelties for use in automobile construction.

Some of the products largely manufactured by this concern are as follows: Eyelets and grommets for use on aprons and side curtains, also on patches which are placed over the defective spots in tires; preforated metal fronts for use in front section of automobile to allow ventilation to keep cylinders cool; lacing hooks, snap fasteners and buckles used in casings for extra tires. Besides these and other small parts the concern also manufactures automatic power presses, punches and dies, riveting machines, rivet heading machines; skiving machines; punching machines, kerosene oil burners, etc.

Neely Force Feed Mechanical Oiler

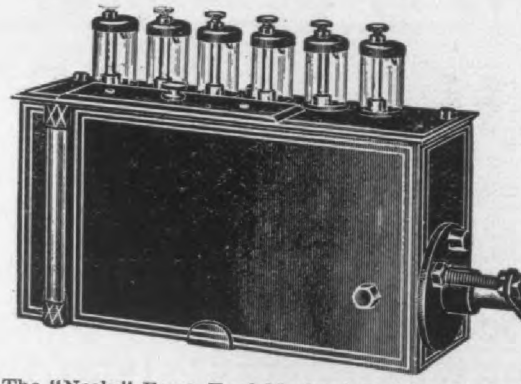
The main feature of the Neely oiler aside from its positive lubricating qualities lies in the accessibility of all its valves, the construction being such as to make the valves accessible without disturbing the inside mechanism. This oiler is the product of Edward Neely & Co., 244–246 Wells St., Chicago, Ill. who are prepared to furnish them in any number of feeds and any capacity desired.



The "Neely" Force Feed Mechanical Oiler; Type C—2 to feeds; capacity 8 pints; top drive.

The casing of the reservoir is made of thin teel metal, which materially reduces the eight of the oiler. The pumps which are ertical are supported by an inside plate and re fastened to the back of the reservoir. he pumps have inwardly projecting flanges etween which the cam shaft revolves, which

The oil reservoir can be placed eitl the dash or under the hood. The amo



The "Neely" Force Feed Mechanical Oiler; Type I 8 feeds; capacity 10 pints; end drive.

oil pumped can be ascertained by op the screw on top of the sight feed. The of the oilers range from $5.00 to $30.0 cording to the number of feeds and ca of reservoir.

Improvements in the 1908 Sire

The SirenO which was described in December 1907 issue page 228, has rec been improved by the manufacturer the S Co. 39–41 Cortland St., New York city.

The main change consists of fitting the instrument with ball bearings. Changes also been made in the design of various which allows the turbine and motor to up instantly upon pressing the button. sound it is claimed now carries a much gr distance with less consumption of curre

Paul Symonds has been appointed manager of the Monarch Motor Car Com of Chicago Heights, Ill.

The Winton Motor Carriage Company's Francisco, (Cal)., branch is now house its permanent home at Van Ness and C avenues.

The Studebaker Company, of South B Ind., has just been notified by the James Exposition Jury of Awards, that its A mobile Exhibit at the Jamestown Tri- tennial Exposition has been awarded a Medal and Diploma.

Mr. F. C. Tindoerfer, who, for the months, has been associated with the department of the Logan Construction C pany, has severed his connections with company and is no longer associated wi in any way.

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On January 2, the formal opening of

ne Price For Warner

uto-Meters

Never until this year of 1908 has there been a speed indicator sold at one absolutely fixed list price.

Manufacturers have "named" a list price and some even required the dealers to sell at "that" price.

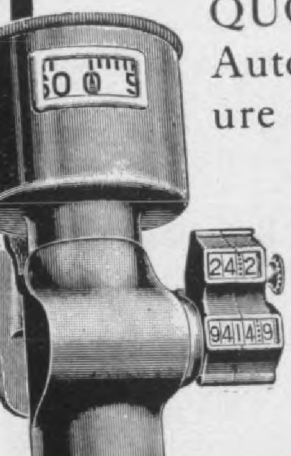
Only one "insisted" upon it being observed. That was ourselves. But, unfortunately, we sold to the jobber also — and the jobber cut the price.

Then there was fun in the camp. That hurt us—it hurt the dealer, too.

Then, in his haste to close a sale, the jobber would let wrong gear ratios go out—that hurt the consumer, the dealer and ourselves. For the jobber knows no law.

SO WE'VE CUT THE JOBBER'S QUOTATIONS OUT. If he gets Warner Auto-Meters he pays for them the exact figure the dealer pays. If he cuts, he gets no more Auto-Meters.

THIS STAND IS POSITIVE.



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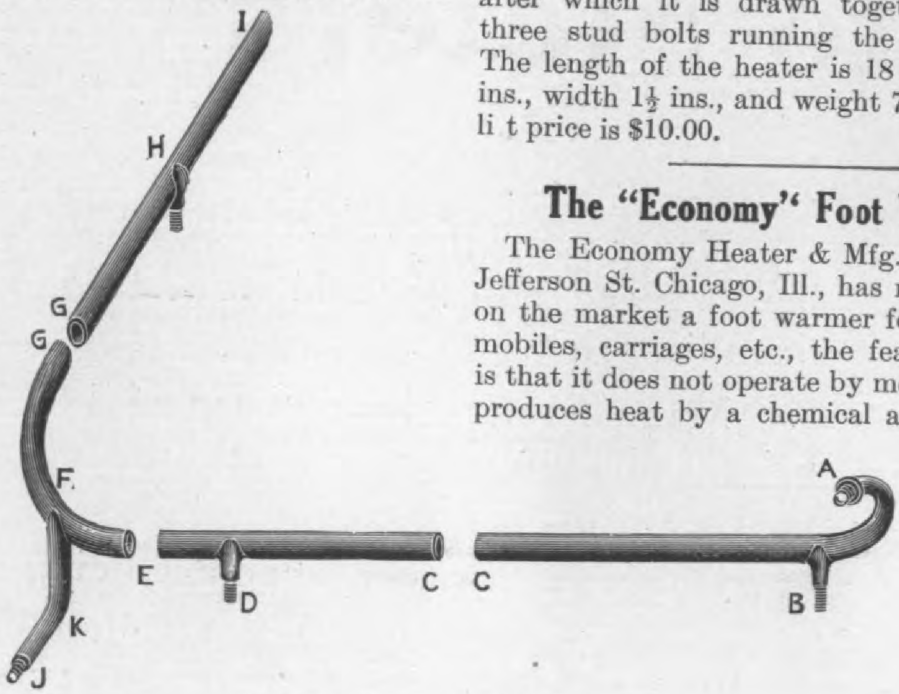
Warner Instrument Compa

custom top builders and others who have a few odd tops to build.

The rails are furnished with either a drop or straight prop iron. The size of the stock is ¾ inch by ⅜ inch oval. The dimensions of

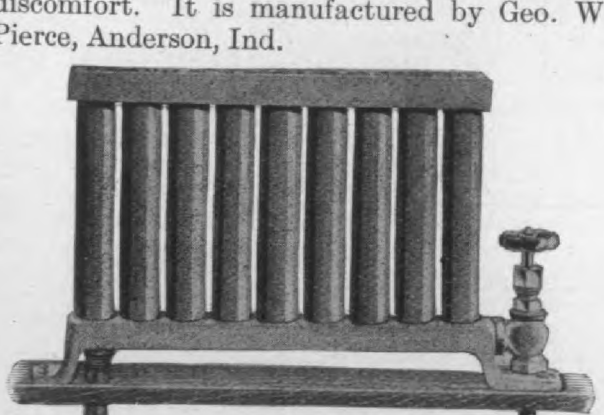


The Cortland Automobile Shifting Rails.

the rail herewith illustrated are as follows: A—B, 4½ ins, 2½ ins. rise from the bottom of the rail to the center of the bolt; B—C, 10 ins; C—D, 7 ins; D—E, 3 ins; E—F, 4 ins; F—G, 7 ins; G—H, 6 ins; H—I, 15 ins.; F—J, 3 ins., ⅝ inch square. With these rail parts it is only necessary for the blacksmith to shape the rail to the seat, fit to the seat irons and weld the parts together.

The "Pierce" Automobile Heater

The Pierce automobile heater can be used in limousine bodies, tonneaus, runabouts, etc., in fact in any motor car where cold causes discomfort. It is manufactured by Geo. W. Pierce, Anderson, Ind.



heath the auto at random. The base are of the best grey iron castings, tu of cold drawn steel and the valve of soli

The heater is first machined and nickled, then assembled and prest t after which it is drawn together firm three stud bolts running the entire The length of the heater is 18 ins., he ins., width 1½ ins., and weight 7 pounds li t price is $10.00.

The "Economy" Foot Warme

The Economy Heater & Mfg. Co., 23 Jefferson St. Chicago, Ill., has recently on the market a foot warmer for use i mobiles, carriages, etc., the feature of is that it does not operate by means of produces heat by a chemical action.

The device consists of a steel shell in is placed a harmless compound enclo a canvas bag; chemical action taking upon the application of about three our water.

To operate the device the bag is re from the steel casing, and the water tributed as evenly as possible over th which is then shaken up to get the mo distributed thruout the contents. In two minutes heat is produced, when th is again replaced in the steel casing whic give a continuous heat of 150 to 180 d for about eight hours. This operatio be repeated consecutively or intermit from 20 to 25 times, and the battery c replaced at a comparatively small cost danger due to combustion, explosion nauseous odors is entirely eliminated.

Globe Brass Parts

The Globe Brass Works 13–15–17–19 comb St. Detroit, Michigan, general founder and finisher makes a specialty of automobile accessories. The line consis curtain hooks, strap loops, snap loops, air cocks, etc.

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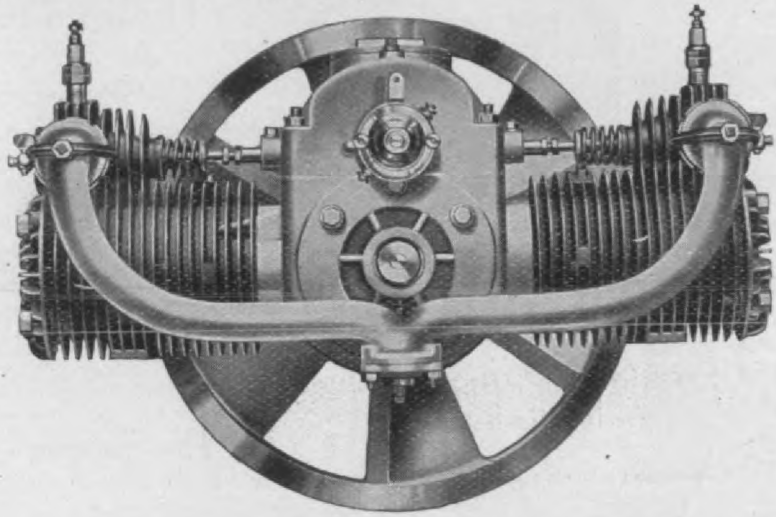
DeTamble Buggy-Type ENGINE

Prompt Deliveries



Attractive Prices in Quantities

Opens a Profitable Field For Automobile Manufacturers

The lack of a suitable, reliable engine, until this season, has greatly retarded the advance of the buggy-type automobile.

The success of the DeTamble assures immense progress in this new and fertile field of automobile construction. Its heavy sales indicate that manufacturers appreciate this.

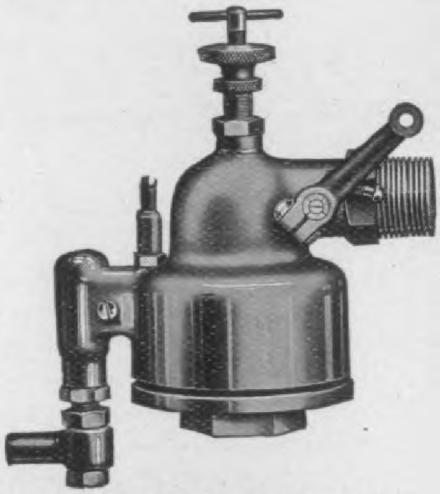
It is a high-grade, carefully constructed engine, perfectly balanced and free from vibration. We strongly warrant each engine to deliver the rated power and keep cool. It is compact, powerful and thoroughly reliable. Suitable also for any light runabout or light delivery wagon.

Specifications:—Two cylinders, 4 x 4, double opposed. Air cooled. 10-12 H. P. (conservative rating). Weight including flywheel, 180 lbs. Overall dimensions, including spark plugs: length, 30 in.; width, 16¾ in.; depth, 19½ in.; depth without flywheel, 11½ in.

We also build the famous

CARRICO *Air Cooled* ENGINE

4 cyl. 4 x 4. 24 H. P.



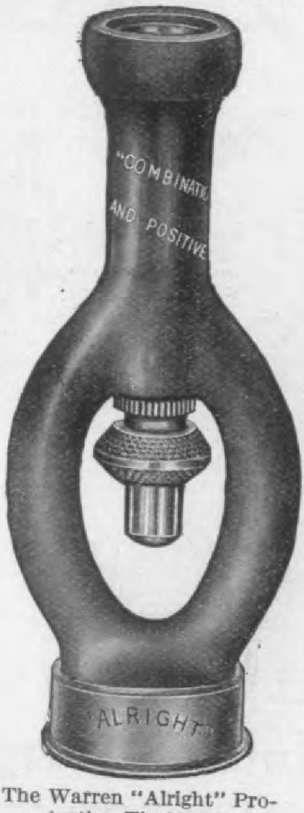
SPEED Carburetor

Positively Guaranteed to produce *greater* power, speed, flexibility and economy in the engine than *any other carburetor*, or purchase price refunded.

Hosted by Google

operator to accomplish better results in washing vehicles and at the same time save the enormous amount of water wasted in washing with the open hose. This device is manufactured by Marion Warren, of Rochester, New York.

In order to prevent damage to the highly polished surfaces of automobile and carriage bodies, due to careless handing of the hose or nozzle, the end of this nozzle is fitted with a rubber protector tip which fully encircles the outlet end. The operation and construction of this nozzle is as follows: Situated midway between the ends of the nozzle is small corrugated nut on the stem between the body of the nozzle and the sliding thumb and finger piece. This corrugated nut is intended as an adjustable gage for regulating the flow of the water. The water can be regulated so as to emerge in the form of a contracted spray, or can be subdued or forced as the operator desires. When used in spray form it is in the correct form for perfect washing with the sponge. To instantly change the flow of the water from a spray to a sharp stream it is only necessary to slide the thumb and finger fixture away from the corrugated nut; different distances producing different streams, until the full capacity is obtained. This feature is of particular value when it is necessary to remove lumps of mud, in which instance a sharp stream can be instantly had.



The Warren "Alright" Protection Tip Nozzle.

The "Wille" Renewal Piston

This is a new device recently placed on the market by P. A. Wille, 597 Gates Ave., Brooklyn, N. Y. for the purpose of increasing the efficiency of worn out cylinders and pistons of automobile, marine, and all kinds of gas and gasoline motors, thereby dispensing with the cost of reboring, and putting in new pistons. The Wille [illegible]

regular diameter of the piston in order to [illegible] for the insertion of asbestos packing between the piston and the metal ring. Upon the top of the piston is placed a metal cap which covers the entire top of the piston, and held in place by means of a bolt screwed into the center of the cylinder head.

The outer edge of the cap is made with a downward turned beveled flange, which, together with the cap itself is of the same thickness as the width of the packing space. The effect of this cap with its flange is to bear down on the packing thereby compressing the [illegible] in turn forcing the metal ring outward and [illegible] places where the bore is worn. On account of the ring being of a softer metal than the cylinder and piston the wear will naturally fall on the soft metal ring only, thus preventing any further wear on the cylinder walls.

The Battery Saver

One of the latest devices brought out for the purpose of prolonging the life of dry [illegible] when used for emergency purposes in automobiles, motor-boats, etc. is the Battery Saver manufactured by the Battery Saver Co., 1717 Locust St., Pittsburg, Pa., and shown herewith.

The makers of this device state that a battery when carried around in an automobile even tho disconnected, will in a short time become weak in amperage, due to vibration of the machine. This vibration, it is claimed, will loosen the carbons, jar the connections

The Battery Saver.

loose, crack the packing and injure the ingredients of the battery to such an extent as to make it practically useless. To avoid this trouble is the object of the Battery Saver. The device consists of a coil spring resting on a metal plate which is easily and quickly

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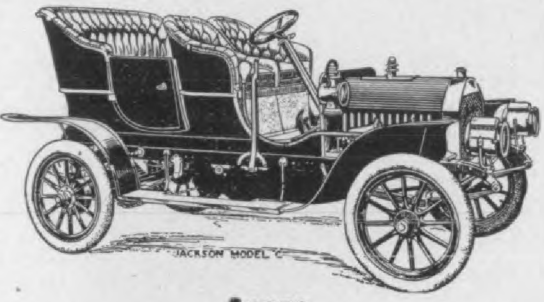
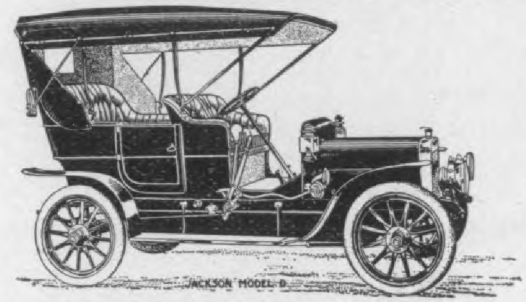
Jackson

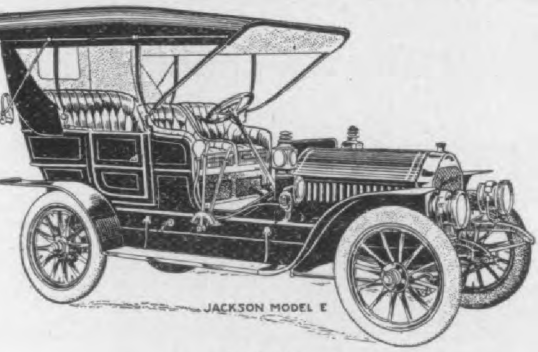
"No Sand Too Deep—
No Hill Too Steep."



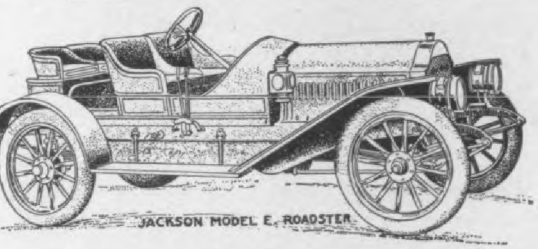
$1250



$1500



$2000



$2000

Jackson Model E Runabout

For 1908—A Line of Cars of Unparalleled Excellence.

We do not like to advise anyone to move along the "line of least resistance"—it is violating the ethics of social energy—but that is really what we are compelled to do when we encourage a dealer to sell Jackson cars: their merits are so apparent and so easily demonstrated that the cars literally *sell themselves!* But these same merits, we find, attract a selling organization of the highest efficiency—men of intelligence who are quick to appreciate correct mechanical principles, and a good, staunch, thorough-built car throughout—and for a few more of such we can find room in unoccupied territory. Write at once for catalogue and terms.

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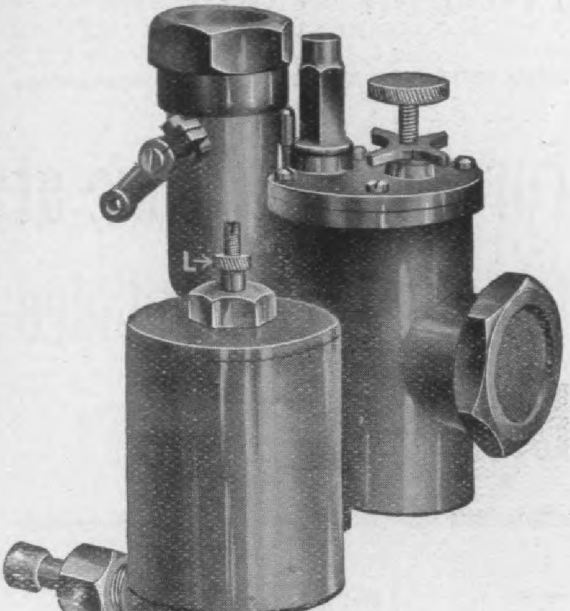
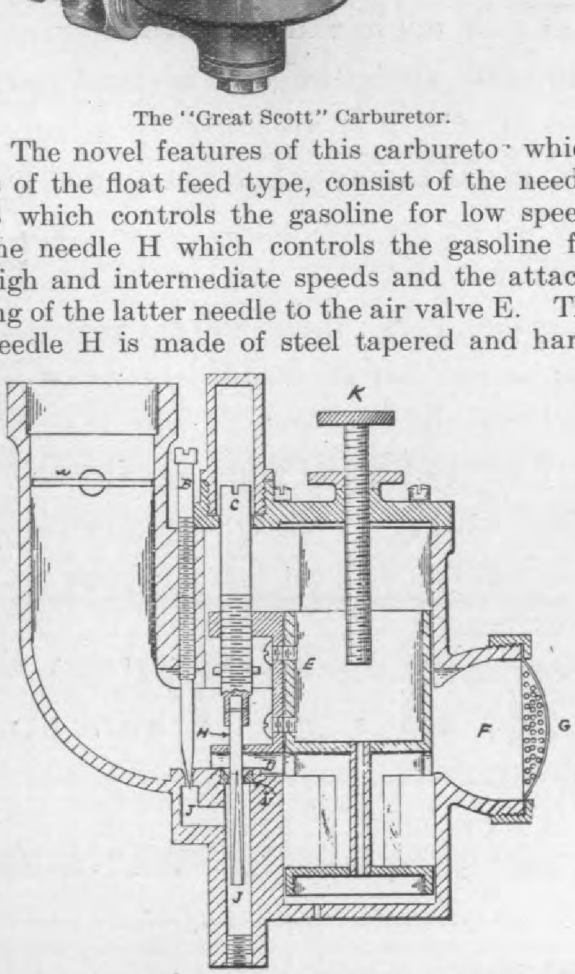
y Scott & Sons Co., Fulton and Valley Sts., Medford, Mass., and is shown herewith in perspective and in sectional view.



The "Great Scott" Carburetor.

The novel features of this carbureto which is of the float feed type, consist of the needle B which controls the gasoline for low speed, the needle H which controls the gasoline for high and intermediate speeds and the attaching of the latter needle to the air valve E. The needle H is made of steel tapered and hard-



Sectional view of the "Great Scott" Carburetor.

ened. This needle passes thru a hardened steel bushing I into the gasoline passage J. It will be observed that the bushing I is cupped

ing the air valve E. At intermediate high speeds this passage is not sufficient sequently, the air valve E is lifted b vacuum created by the motor until suff area is obtained to supply the air require previously stated, the high speed needle tapered and is attached to the air valv Consequently, it is moved up or down wi and as the taper on this needle is proport to harmoni e with the area created b lifting of the air valve, it follows that t creased volume of air is always supplied an increased amount of gasoline, and this portion is accurately maintained at all speeds. The carburetor is made in three and listing as follows: 1 inch $25.00, 1¼ $30 00 and 1½ inch $35.00.

The "Gotham" Sta-Rite Plug

The latest addition to the Sta-Rite l spark plugs manufactured by the R. E. Co., 86 Watts St., New York city, i Gotham Sta-Rite plug, which has the end partly closed so some extent protec porcelain from heat and oil. The por has a single, hollow packed with copper tos filled gaskets cannot become wedg This type of plug i ticularly well adapt engines where the p exposed to an u amount of oil, in case it is claimed erate continuously out short circuiting

The "Gotham" Sta-Rite Plug.

Practically all th Rite plugs are readi arable with a wren connection of the being by full ma threads, so that no how long the plu been used, it will tighten and the remain at a prope tance; and all sp points are adj without adjustin central elec-trode.

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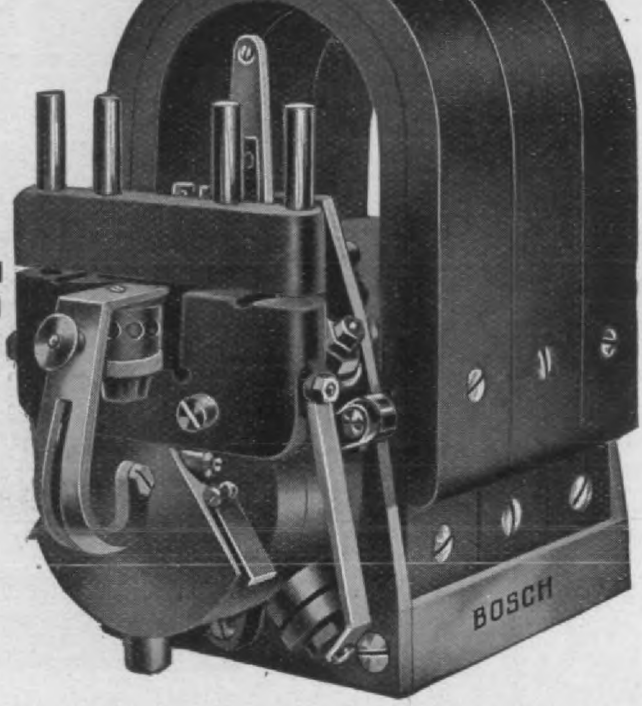

A Gasolene Engine Never Reaches its Highest State of Efficiency Until it is Equipped with the BOSCH MAGNETO :: :: :: ::

The Bosch System of Ignition is recognized throughout the World as STANDARD.

Your Motor car will run to its highest efficiency with Bosch Magnetos installed. The Bosch System of Ignition is absolutely reliable and accurate at all times and under all conditions. Full, hot, snappy sparks are always produced, capable of developing the maximum horse-power of the engine.

No Engine ever reaches its highest state of efficiency. No engine is perfect without the Bosch Magneto.

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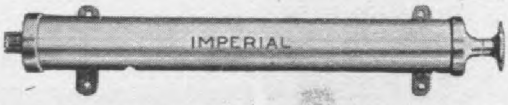
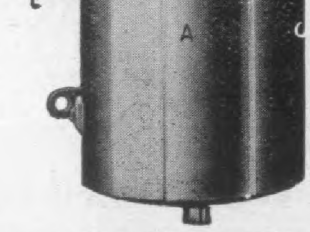
factured by the Imperial Brass Mfg. Co. 241–249 S. Jefferson St., Chicago, Ill. This concern carries in stock an extensive line of brass and aluminum specialties and is prepared to make on order from customers' specifications work of the most difficult nature.



The "Imperial" Gasoline Tank Pump.

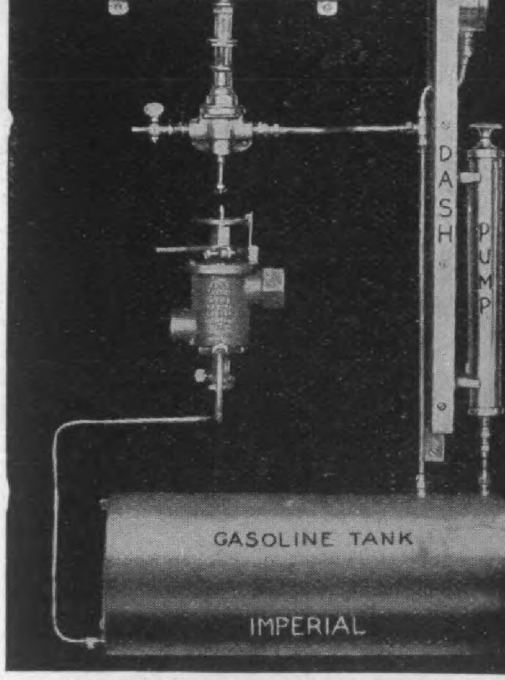
The Imperial gasoline tank pump is used for putting an air pressure in the gasoline tank to force a supply of gasoline to the carburetor, when ascending hills or when the gasoline tank is located below the level of the carburetor, or for pumping oil in connection with the lubricating system. It is made of the best quality brass, highly polished, and is made in three sizes listing as follows:No. 2 D, 5x1¼ ins. $4.00; No. 3 D, 8x1½ ins. $5.00 and No. 4 D, 10x1¼ ins. $5.00. Each pump is fitted with a reversible check valve which can be set to operate in either direction.



The "Imperial" Auxiliary Gasoline Tank.

The Imperial auxiliary gasoline tank consists of a polished brass reservoir (A), 4½″ wide by 7″ high, which contains a cork float operating by flotation a needle valve in the inlet chamber (B). The gasoline is supplied thru a pipe connected at (C) under pressure, and is admitted to the inlet chamber by a needle valve opening as the float falls in the reservoir. The tank as illustrated lists at $18.00 each.

This concern manufactures a gasoline control system by which exhaust pressure from the engine, operating thru their Imperial pressure regulator automatically maintains a uniform pressure in the gasoline supply tank, thus securing an absolutely reliable pressure feed of gasoline to the carburetor and permitting the placing of the gasoline tank and carburetor wherever desired or most con-



"Imperial" Gasoline System, showing exhaust feed and the auxiliary dash pump in place.

tank and forcing the gasoline thru the pipe (which is connected at the bottom gasoline tank) to the carburetor. A nection to an 8 or 10 lb. gage located dash of the car indicates the pressure gasoline, and a small pump located dash or at the seat and used for prod initial pressure on the tank when the is not running, completes the system. regulator can be set to operate at any d pressure from one-eighth of a pound t pounds.

The Imperial gasoline strainer is ma brass, the main body consisting of a cy cal brass casting chambered or cored ou a central tube which extends from th down to the middle of the cylinder, the being open at top and bottom and sl flared out at the lower end. Below the are a series of four wings or lugs exte inwardly from the body or shell of the cyl In operation the gasoline enters at the of the strainer and, striking the inner tu deflected downward and outward in a fugal manner against the wings or lugs, by separating all water from the gasolin disengaging any dirt or refuse; thus ca all foreign substances to remain at the b of the strainer where it can be drawn the pet cock. The discharge of the ga is thru the screened central tube and the top of the strainer. The list price strainer is $2.50.

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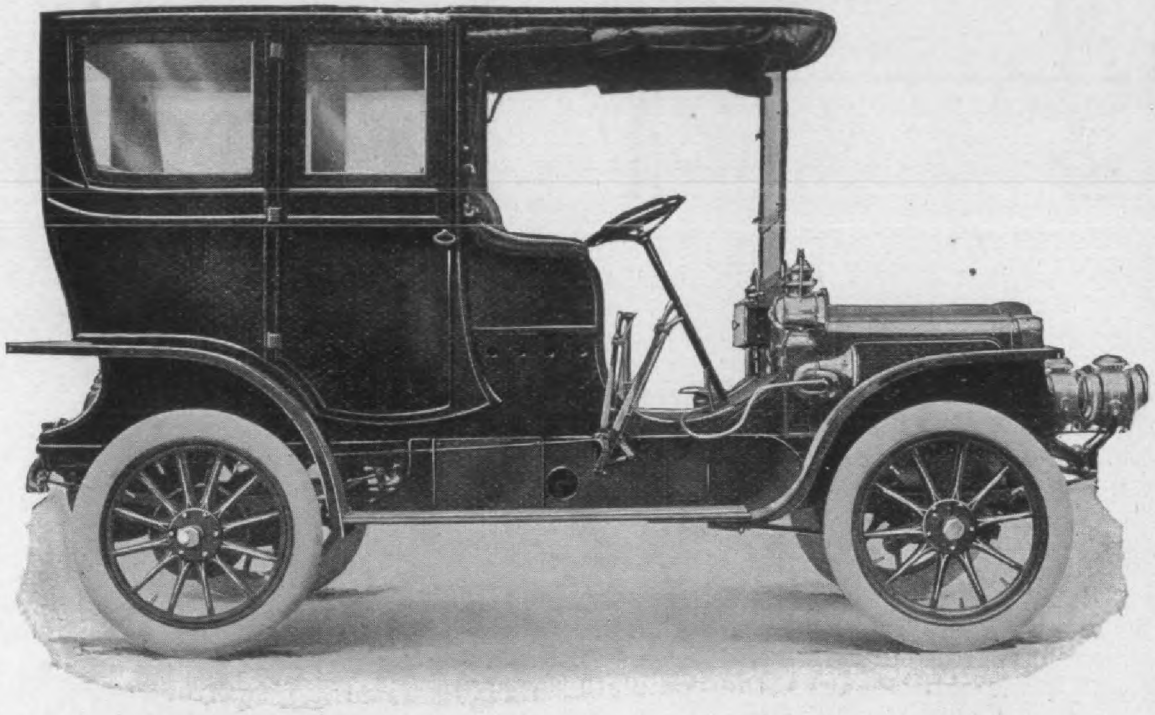
THE INCOMPARABLE WHITE

THE CAR FOR SERVICE



Exclusive Features of the White Limousine

The exclusive White quality of absolute noiselessness of operation is of rticular advantage in a limousine because, in a car with a closed body, any oise made by the mechanism is even more noticeable and annoying than in n open vehicle.

Another exclusive White quality—namely—genuine flexibility of con-ol, permits of the machine being guided safely and speedily through the owded city streets. The speed of the White may be accommodated to e exigencies of street traffic without any changing of gears, jerky starts or e embarrassing and sometimes dangerous "stalling" of the engine.

As regards graceful lines and luxuriousness of equipment and finish, the hite limousine must be seen to be appreciated.

Write for Catalog and the address of the nearest branch or agency.

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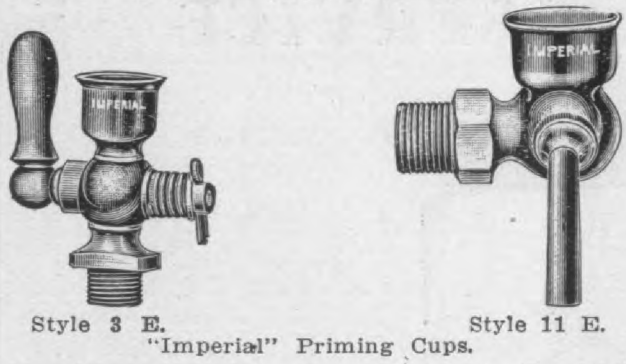
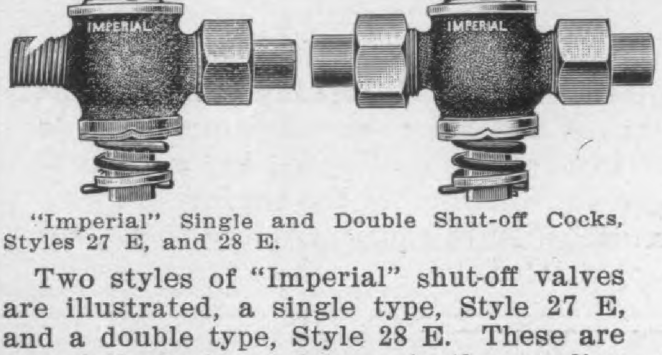
Jefferson street, Chicago, Ill., is offering a very extended line of priming cups, relief cocks and gasoline shut-off cocks for 1908, including several new types. Those illustrated herewith are suggestive only, as a very wide variety of styles is offered.

The "Imperial" priming cups and relief cocks are carefully ground and accurately



Style 3 E. Style 11 E.
"Imperial" Priming Cups.

machined, and the best material is used in their manufacture. The keys or plugs are thoroly ground into the body and the makers guarantee them not to leak. Any slight wear that may occur is automatically taken up by the spring. Style 3 E priming cup, here shown, has ⅛-inch iron pipe threads and a ¼-inch size of the same style is also offered, cataloged as Style 4 E. Another ⅛-inch size, Style 11 E, is also illustrated. It has an angle shank. The ¼-inch size of this type is known as Style 12 E. Some of the Imperial priming cups have forked handles, some have long and some short shanks, the complete line including suitable cups for every requirement. This company also offers several types of relief cocks with phosphor bronze spring keys and with both long and short shanks.



"Imperial" Single and Double Shut-off Cocks, Styles 27 E, and 28 E.

Two styles of "Imperial" shut-off valves are illustrated, a single type, Style 27 E, and a double type, Style 28 E. These are especially designed for use in the gasoline pipe line between the tank and carburetor, but may be used to advantage in many places on a motor car. As in the other valves mentioned, wear on the key is taken

The "Visor" Combination Hood, Mu and Chest Protector

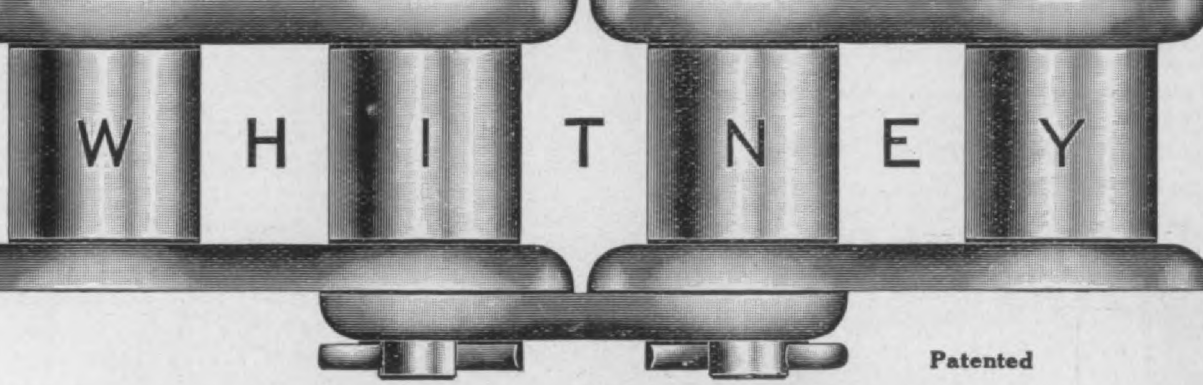
The accompanying cuts show the hood manufactured by the Visor Knitting Co., Niagara Falls, N. Y main feature being its convertibility many combinations.

The "Visor" Hood in use as a neck mufl chest protector.

One of the accompanying cuts the Visor hood in use as a neck m and chest protector. This way the lies double over the chest and arour neck. For automobiling or driving hood is thrown over the cap like and fastened up in front with five socket fasteners. In this manner it the cap down close on the head clings to the face and ears, leavi

The "Visor" Hood as a face and head tor while automobiling.

chance whatever for the wind to cu flesh. The lower part of the openin be brought up higher if desired, le only the eyes exposed. The hood is



Patented

"WHITNEY" CHAINS

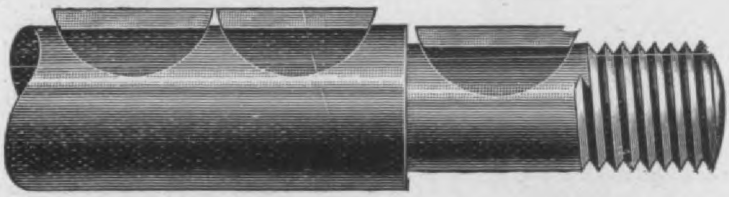
anuary 1, 1907 to November 1, 1907, conditions as follows:

On January 1, 1907 we were renting about 38,000 sq. ft. of floor space in a build-ng not adapted for our growing business. At the same time we were giving much ttention to our new buildings which were under construction and not completed ntil July 1907. During this period we moved our entire equipment to our new actory and for a number of weeks were obliged to operate machinery in both plants. Ve also carried on important experiments and constructed much special apparatus or our new factory. While thus handicapped we could not fully meet the increas-ng demand for "Whitney" Chains. Nevertheless, we succeeded in shipping a reater number than ever before for an equal period of time.

"WHITNEY" CHAINS

lovember 1, 1907, to December 31, 1908, conditions as follows:

New fire-proof factory, one of the best, strongest and safest in the country: loor space over 70,000 sq. ft. Best of light and excellent condition for employes. ocation one of the best in Hartford. Private side-track connecting with main ne between New York and Boston. Land area over ten acres. Large in-ease in new machinery and tools. Improved methods. Inspection system ore rigid than ever. Greater accuracy. Increased strength by the use of new aterials and improved treatment. Greater durability. Better finish.



"WHITNEY" MACHINE KEYS AND KEY-SEAT CUTTERS
(For The Woodruff Patent System of Keying)

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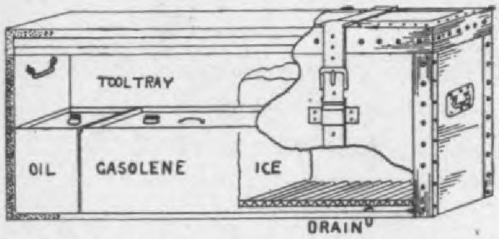
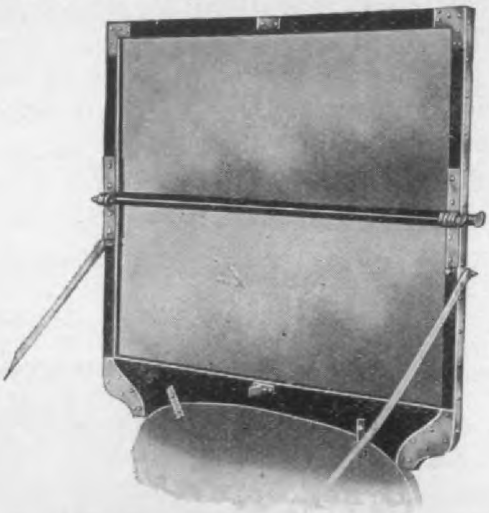
The Auto Rebuilding Co., Chicago, Ill., s offering for the 1908 season an extensive line of automobile specialties, such as runks, tanks, wind shields, etc., some of the leaders being here shown.

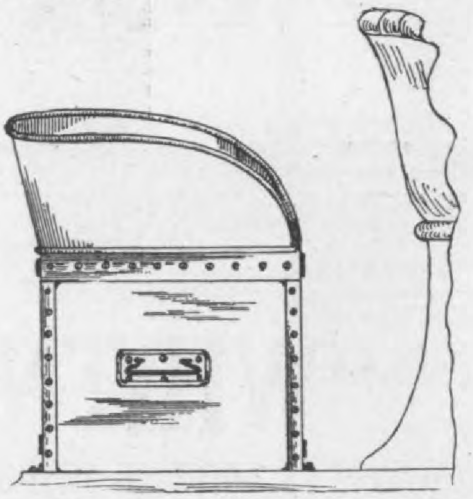


The "Arco" Trunk, No. 1, showing the inner onstruction.

The Arco trunk, No. 1, holds two gallons of cylinder oil, eight gallons of gasoline, 25 pounds of ice, 2 dozen quart bottles, and a large tool tray. The trunk is made entirely of steel, and is trimmed with No. 20 gage polished brass, put on with round head brass bolts. The walls are double, and are filled with ground cork. Two large buff straps go entirely around the trunk, which is fitted with "Yale" lock and slip hinges so that the lid can be entirely removed if wanted. This trunk is made in three different styles, Nos. 1, 2 and 3, as follows, the outside appearance of all being the same. No. 1, same as illustrated, with refrigerator attachment, oil and gasoline tanks, tool box, baggage tray, etc., price $35.00; No. 2, without refrigerator attachment, but with tool tray, oil and gasoline tanks, baggage tray, etc., price $25.00; and No. 3, trunk alone, with baggage or tool tray only, price $20.00. The size carried in stock is 28 inches long, 16 inches wide, 14 inches high; tool tray, 28x 14x4 inches; gasoline capacity, eight gallons, cylinder oil tank holds two gallons.

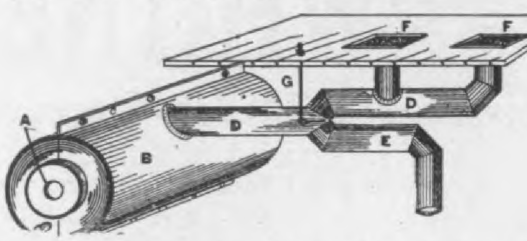


serving as a filler to be fitted to the board. The list price is $32.50; in brass, $55.00.



The "Arco" Rumble Seat with Trunk

A new style of rumble seat for con ing touring car bodies into gentlem roadsters is here shown. By remo the rear seats and substituting a flat covering, and by using the Arco ru seat and trunk, this change can be e made. The seat is all steel with ⅜ brass beading on the top edge, only cushion being upholstered, which is nished in either red, green or leather. The prices are as follows: only, $15.00; with Arco Trunk, N $50.00; with trunk No. 2, $40.00, and trunk No. 3, $35.00.



The "Arco" Automobile Heater. A, m B, casing over muffler which retains the C, shows how the two halves of casing are nected; D, D, main hot air pipe; E, thr pipe for eliminating entirely all heat o muffler from the car; F, F, shows regist floor of the car, one for front seat and o the rear; G, cut-off valve which turns he or on, as desired.

The Arco automobile heater is bas the same principle as the well k hot-air heating system. The accom ing cut shows clearly its construction makes further description unnecessa lists at $35.00.

The Pittsburg Automatic Vise and Co., Pittsburg, Pa., call attention patented improvement made in their described and illustrated in our Oc

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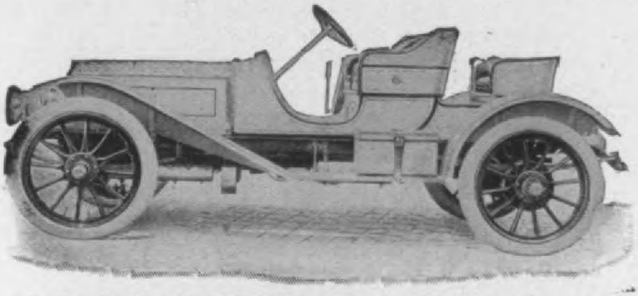
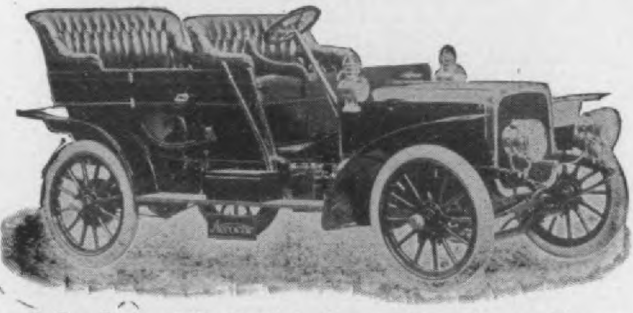
Aerocar



Model "E" Touring Runabout
$1,500

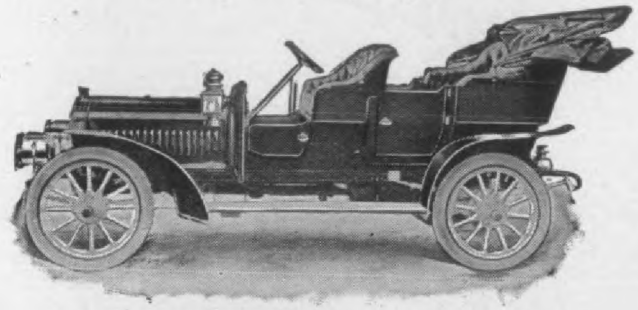
Air Cooled, 20 Horse Power Motor, 104-inch Wheel Base.



Model "D" Light Touring Car
$1,500

4-Cylinder Air Cooled, 20 Horse Power Motor, 104-inch Wheel Base, Four Passenger.

With 4-Cylinder, 25 Horse Power, Water Cooled Motor, $1,850.



Model "F" Touring Car
$2,200

4-Cylinder Water Cooled, 40 Horse Power Motor, 115-inch Wheel Base, Five Passenger.

FOR 1908

These three models at these three prices are the greatest Automobile values ever placed upon the market.

Many who have always thought that they could not afford an automobile, will buy one of these cars at these prices the coming season.

Either 20, 25 or 40 horse power; three, four or five passenger; air or water cooled motors; multiple disc clutches; sliding gear transmissions; shaft drives; and the very best of materials throughout.

Agents who are out for making money next season, will do well to secure our Dealer's Proposition.

Write at once if we are not represented in your territory.

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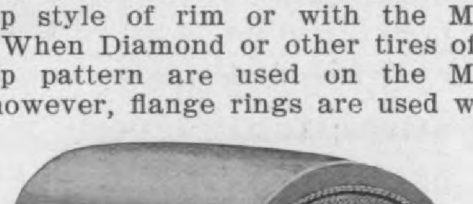
slightly new types of tires, the Diamond Electric and the Diamond Mechanical. As the name indicates, the Diamond Electric has been specially designed for use on electric motor cars, and for this reason is made to obtain extreme resiliency, exhaustive tests having shown that the mileage of the battery in an electric car is greatly affected by the resiliency of the tires. To obtain great resiliency they have used in this tire a fabric made expressly for the purpose and a pure rubber stock

The Diamond Electric Tire.

possessing extreme resiliency. Altho light in weight, the Diamond electric tire is very tough and has great wear-resisting qualities, we are told. For the present this tire is made only in the regular clincher type with round tread, and the list prices are the same as for their regular clincher tires.

The Diamond mechanical tire is the same in construction as the 1907 wrapt tread tire, and is for use with the usual Dunlop style of rim or with the Marsh rim. When Diamond or other tires of the Dunlop pattern are used on the Marsh rim, however, flange rings are used which



The Diamond Mechanical Tire.

are interchangeable with the regular Marsh rim flanges and which the Diamond Company are prepared to furnish at any time. This tire is not provided with a clincher bead, but is held tightly to the

Several new sizes of circulation p have been added to the line made by Lipman Mfg. Co., Beloit, Wis., inclu both larger and smaller sizes than put out heretofore. The new pump clude Model 62, gear type, 3¼-inch 2 11-16-inch wide, and 4 7-16-inch length; Model 53, gear type, 4-inch 5½-inch high, 5¾-inch length of s Model 55, gear type, 6¼-inch high, 4½ wide, 7⅝-inch shaft length; Model gear type, 4⅜-inch wide, 8 3-16-inch length, 6¼-inch wide. The compan also prepared to make special pump meet various requirements. The c system used in some of the Lipman p renders one grease cup sufficient fo the bearings.

The Lipman Electric Speed Indic have also been improved in several de Accuracy in all temperature change assured by the use of a combinatio coils on which temperature variations opposite effects so that the effects atmospheric changes, heat, cold, etc. neutralized. The new arrangement away with springs that were formerly The dials are now made of brass, silv and are all hand made.

The Lipman Company has also add its line a pneumatically operated tank a distinctive feature of which is the that it can be placed above, below c the tank, its position having no effe its operation. In appearance it resem somewhat, a thermometer, consi chiefly of a glass tube containing a indicating liquid, the tube bracket suitably spaced off to measure the va heights to which the liquid rises.

Connection to the tank is made flexible copper tube which must ente tank from the top and extend to with inch of the bottom.

As the volume of liquid increas the tank it rises in the copper tub the same time compressing the air is trapped in the tube.

This air pressure acts directly o bright red indicating liquid in the tube.

There is nothing about this gage t out of order as there are no mecha moving parts used.

Connection of tube to gage is made the back so that nothing but gage s on the dashboard. The gage is abou inches high over all. Price, finishe polished brass with six (6) feet of necting tube is $7.00.

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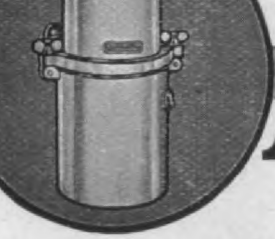
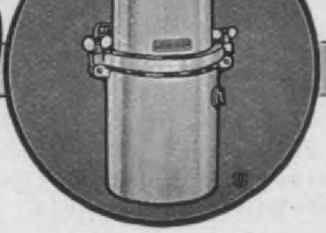


ATWOOD



QUALITY LAMPS

Skill in the building, care in selection of material, and practicability as well as beauty in designs have made the Atwood Lamps and Generators the foremost product of their kind in the world. Constant improvements, the most severe tests upon completion, and careful and minute inspection through every process of construction have conserved the reputation for quality so consistently earned during 35 years in the building of lamps.

Write for Catalogue

ATWOOD MANUFACTURING CO.
Amesbury, Mass.

LAMPS

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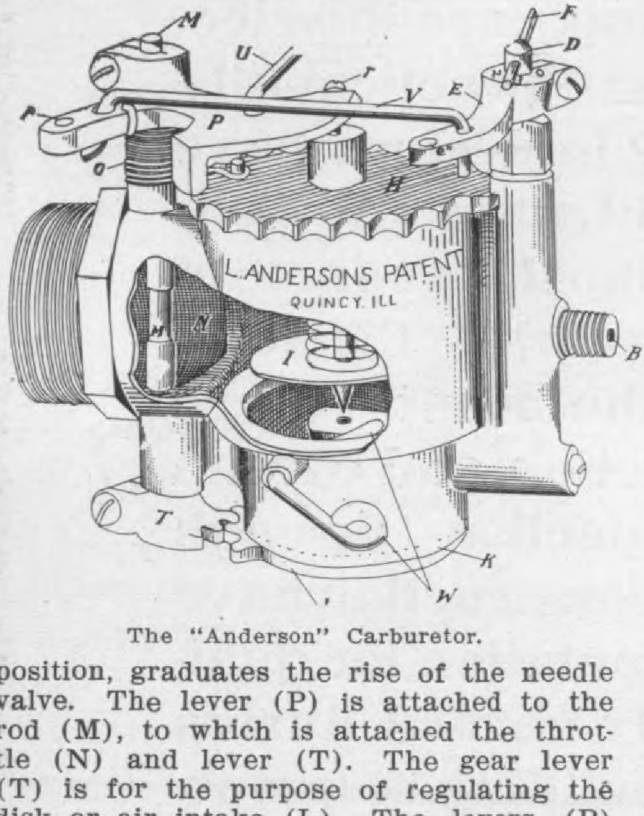
Miller, 1223 North Eighth street, Quincy, Ill., shop rights of which are for sale.

The carburetor is of the floatless mechanical automatic type. The following is a description of its construction and operation: The needle bar (D) is adapted to regulate the amount of gasoline from the supply tank, it being set according to the capacity of the engine. The needle valve, which is located exactly in the center of the carburetor, works automatically, regulating the supply of gas in accordance with the amount of air allowed at the air intake. The lever (P), which is directly over the needle valve in an oblique



The "Anderson" Carburetor.

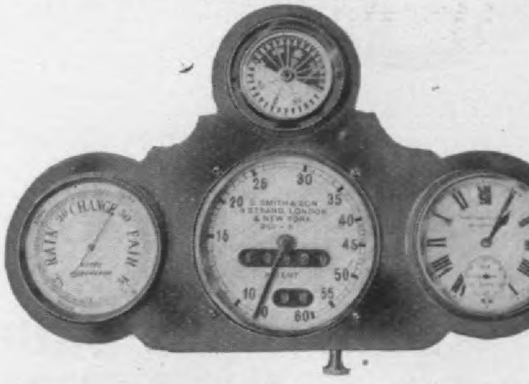
position, graduates the rise of the needle valve. The lever (P) is attached to the rod (M), to which is attached the throttle (N) and lever (T). The gear lever (T) is for the purpose of regulating the disk or air intake (L). The levers (P) and (E) are connected by the rod (V), thereby connecting all parts except the needle valve with a disk and spring which work automatically as soon as the thumb latch (W) is raised for the first explosion or primer. The spring (O) keeps everything closed until the rod (U), which is attached to the lever (P), is pulled out or set as desired, the rod (U) being the point at which the carburetor is controlled, as it can be lengthened to control from any direction from the position of the carburetor.

Smith's Tourists' Companion

Among the many combinations of dash

& Son's own make, and a Speed Ind
with a mileage recorder included.

The central feature of the combin
is of course the Speed Indicator, whicl
described in our January issue, page

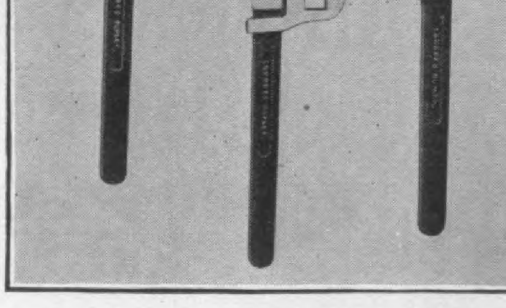


Smith's Tourists' Companion, comprisin
well known Smith Speed Indicator and m
recorder; a high grade barometer, compass
an eight day clock.

The mileage recorder counts to
miles, and the trip recorder which rev
at zero at a touch of the button, reg
99 miles.

The "Lowndes" Duplex Pipe Wr

One of the latest things in wre
recently placed on the market is
Lowndes duplex pipe wrench, man
tured by Janney, Steinmetz & Co., Phil
phia, Pa.



The "Lowndes" Duplex Pipe Wrench.

It is especially adapted for autom
use where a good strong wrench is ne
It is 14 inches in length and will
from ¼-inch wire up to ½-inch
Other sizes are in course of construc
The wrench is made of tool steel

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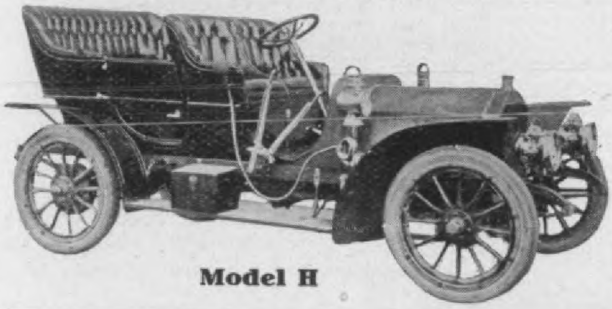
Pullman AUTOMOBILES

Not Only the Best at the Price But the Best at Any Price.



Model H

MODEL H, LIGHT TOURING CAR

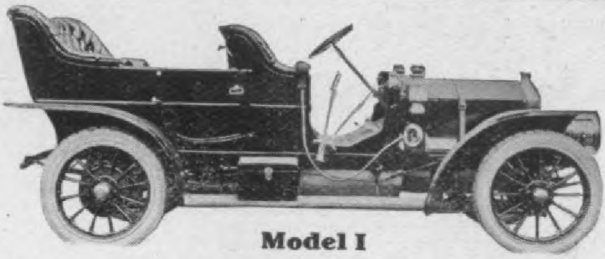
Price $1875

4-cyl., 20 H. P. motor. Transmission,—selective type, three speeds forward and reverse. Wheel Base, 100 in. Pressed steel frame, I-beam front axle. May be converted into a runabout. Full equipment and storage battery.

MODEL I, TOURING CAR

Price $3250

4-cyl., 40 H. P. motor. Double ignit on system, battery and magneto. Transmission,—selective type, four speeds forward and reverse. Pressed steel frame; I-beam front axle, with roller bearing steering knuckles. Wheel base, 118 in. Full set lamps, generator, horn and tools.



Model I

"6-30" Runabout

6-30 "PULLMAN" 6 Cylinder Runabout

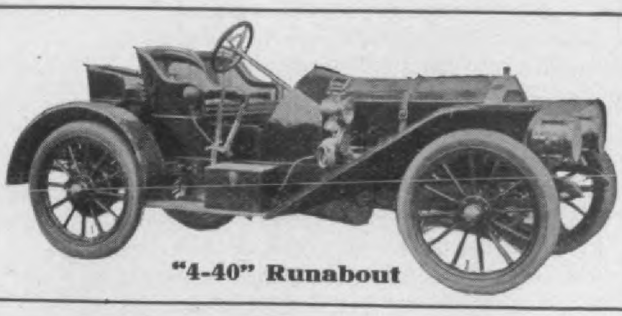
Price $2750

6 cyl., 30 H. P. motor. Double system of ignition, battery and magneto. Transmission,—selective type, three speeds forward and reverse. Wheel base, 104 in. Speed 60 to 65 miles per hour. Full equipment of lamps, generator, tools and horn.

4-40 "PULLMAN" RUNABOUT

Price $3000

4 cyl., 40 H. P. motor. Double ignition system, battery and magneto. Transmission,—selective type, three speeds forward and one reverse. Wheel base, 108 in. Speed, 60 to 65 miles per hour.



"4-40" Runabout

In construction, appearance, power, running qualities and price, the "Pullman" cars are unequalled by any on the market. They offer an excellent line for the dealer who wants to handle quick-selling cars. Write for our proposition.

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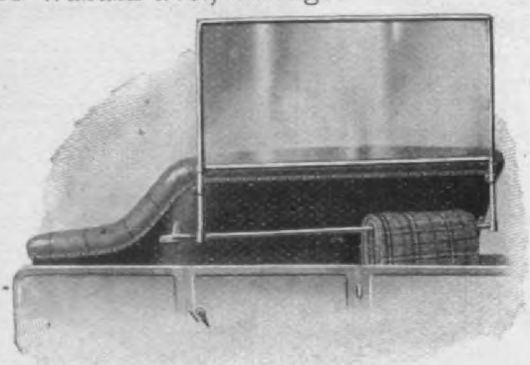
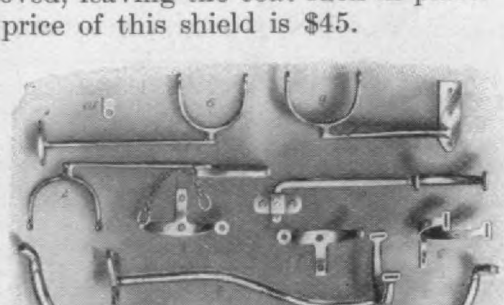
ctured by the Adapt Machinery Co., 1620–
30 Wabash ave., Chicago.



The "Adapt" Model F Solid Brass Tonneau Shield, with
at Rack.

The adapt tonneau windshield is made of
olid brass and makes a very convenient ar-
angement where protection is desired for the
ccupants of the rear seat of the car, where
is not convenient to equip the car with a
egular shield. The shield is made in special
imensions and with special brackets to fit
ny standard make of tonneau. It is so con-
tructed that the glass shield can be easily
emoved, leaving the coat rack in place. The
st price of this shield is $45.



"Adapt" Tire Irons.

The tire irons are specially forged, and are
nade to fit all standard makes of cars and tires.
They are made in several different designs
s will be noted. Each set consists of three
pieces. The finish can be had in black Japan-
d, nickel or brass plated. The list prices are
s follows: Japaned $8.00; nickel or brass
plated, $10.00.

The "Paxon" Bow Separator

The Auto. Equipment Co. 144 North Broad
St. Philadelphia, Pa. has recently placed on

for three and four bow and $5.00 per pai
five bow.

The "Comanche" Automobile Whis

The Comanche Whistle Co., 335 S
Spring St., Los Angeles, Cal. has rec
placed on the market a new style of
signal and alarm which is blown by the
haust and manipulated by a highly poli
neat-appearing, bronze foot-lever.

The whistle is made of brass thruout.
tone of the whistle can be varied abou
octave and a half. It is operated by m

The "Comanche" Automobile Whistle.

of the foot-lever which pulls out the pl
and allows the exhaust from the engi
pass thru the whistle. The further dow
foot-lever is prest the lower the note prod
By gradually releasing the foot-lever the
is changed from low to high and by rel
the foot-lever entirely, the whistle is sil
The whistle is made in three sizes, na
size A, $1\frac{1}{2}''$ by $15''$; B, $2''$x$15\frac{3}{4}''$and C, $3'$
listing at $6.50, $8.00 and $10.00 each.

The "Emancipator" Tire Filling

The Emancipator tire filling tank is
factured by the Liquid Carbonic Co., 67
st., Chicago, Ill., and consists of one
drum, containing 20 lbs. of carbonic ga
regulator and gage; 10 ft. of $\frac{3}{8}$ inch hos
connections; one carriage traveling on
casters, on which the outfit sits; one
key wrench and one outfit wrench.

The manufacturers claim carbonic gas
better than air for inflating tires on ac
of its dryness which preserves the rubbe
prevents rotting. They also state th
requires less than $\frac{1}{5}$ of a pound of gas to
tire from complete deflation to 80 lbs. pr
which makes on an average of 120 tire
20 lb. drum. Besides being made fo

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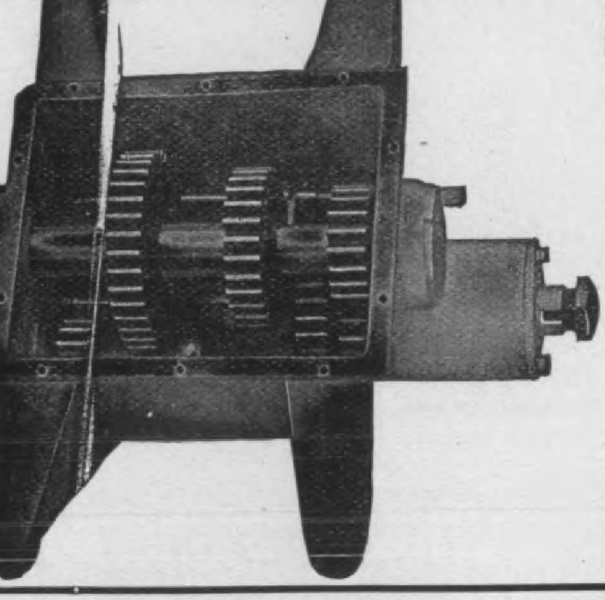
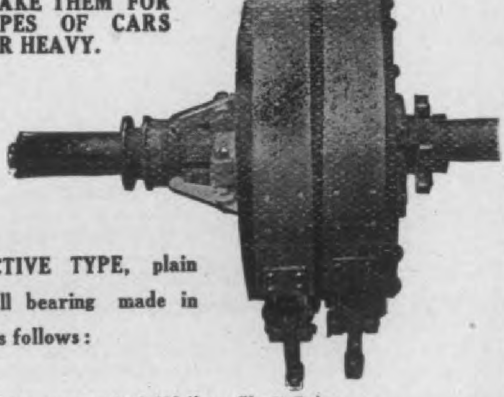


WE MAKE THEM FOR ALL TYPES OF CARS LIGHT OR HEAVY.



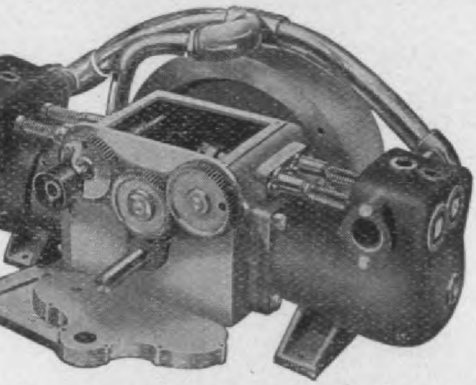
SELECTIVE TYPE, plain or ball bearing made in sizes as follows:

No. 3 for cars up to 2,000 lbs. Shaft Drive.
No. 3½ for any size motor up to and including four cylinder 5x5.
No. 4 shaft drive and double chain drive, built for the largest types of pleasure and commercial cars and trucks.
PLANETARY GEARS Made in two sizes: No. 3, for cars up to 1850 lbs. No. 4, for the heaviest types of pleasure and commercial cars. Let us quote you prices.

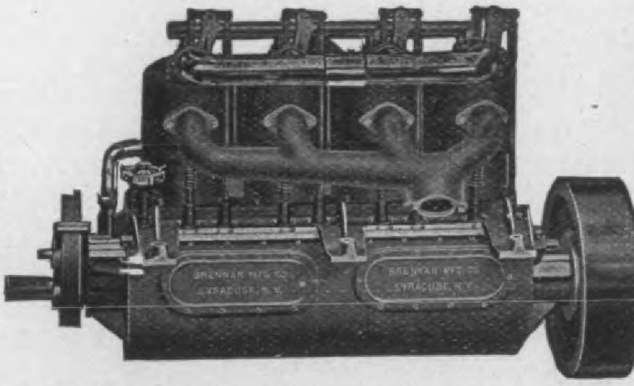
SYRACUSE GEAR CO., - Syracuse, N. Y.

RENNAN STANDARD
Motors and Transmissions

solve the power problem for you. We have models to suit al
uirements of the automobile builder.



Our horizontal ball-bearing motor two cylinder, 5½x5, 20-24 H. P. is es pecially adapted for shaft drive or chain drive. The two cylinder 5x5 engine i an ideal equipment for runabouts.



For touring cars of from five even passengers, the standard e is our four cylinder, 5x5, H. P. motor. This is a triumph motor building, being power- silent-running and reliable.

For high-powered runabouts or light touring cars, as the Aero Pope Hartford, Etc., our four cylinder, $4\frac{9}{16}$ in. bore x 4 in ke is unsurpassed.

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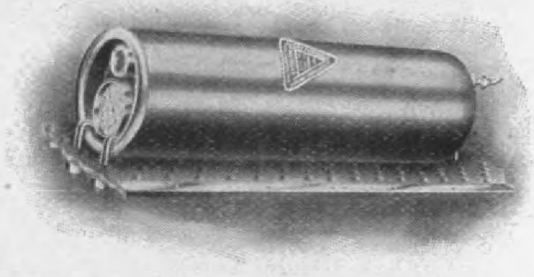
furnish Motors and Transmission Gears complete on steel frame or presse

known manufacturer of the "Autogas" tank, has recently improved its method of holding and securing the Autogas tanks to the automobile running board.



The "Autogas" Tank Holder.

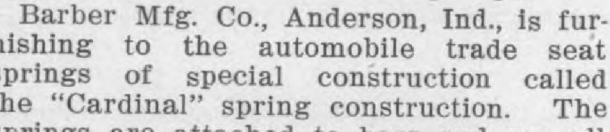
The new method does away with the bands encircling the tanks, and makes a more secure fastening, at the same time leaving the surface of the tanks perfectly free, so that it can be polished easily.

The "Autogas" Tank Key.

As some complaints have arisen because owners lose their keys, the Avery company has brought out the key shown herewith, it being a steel drop forging with a ring on its end for attaching it to one's key-ring or to some hook on the auto.

"Cardinal" Cushion Springs

Barber Mfg. Co., Anderson, Ind., is furnishing to the automobile trade seat springs of special construction called the "Cardinal" spring construction. The springs are attached to bars and are all ready for use so that it only takes a half hour to spring a seat with them. The cross bar which carries the springs consists of tempered sheet steel. It is corru-



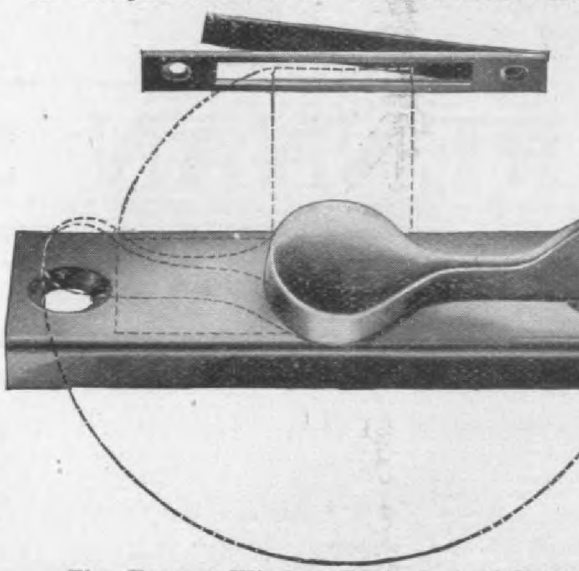
Set of "Cardinal" springs on steel base bar.

gated lengthwise and has its edge turned upward and inward forming a catch for the bottom of the spring. The bottom coil of each spring is formed to fit into the

springs are made of high grade s wire, re-tempered.

The Banner Window Lock an . Anti-Rattler

The popularity of limousines has rise to an urgent demand for an at ment to prevent rattling of the sliding dows in this class of car body, and to the requirements of the case in the plest manner, C. Cowles & Co., of Haven, Conn., the well known make high class body fittings have desi and placed on the market a combined and anti-rattler. The use of this d in conjunction with the Cowles lo



The Banner Window Lock & Anti-Rattl

handle described in our October nun page 178, renders the interior of a li sine body entirely proof against pilf in the owners' absence.

The dotted lines on the illustratio dicate plainly the method of operating device. A rectangular lug is brought engagement with an ordinary slot in window frame but the lug bears ag a flat blade spring and the window is held rigidly in place. This device at 75 cents.

The "Yale" Spark Lock Switc

The New York Coil Co., Inc., 33 Pearl street, New York City, have re ly placed on the market a Yale Switch, the purpose of which is to vent outsiders from tampering with ignition system of a motor car.

The switch has contacts for two se batteries, or one battery and a mag It is suitable for both marine and aut

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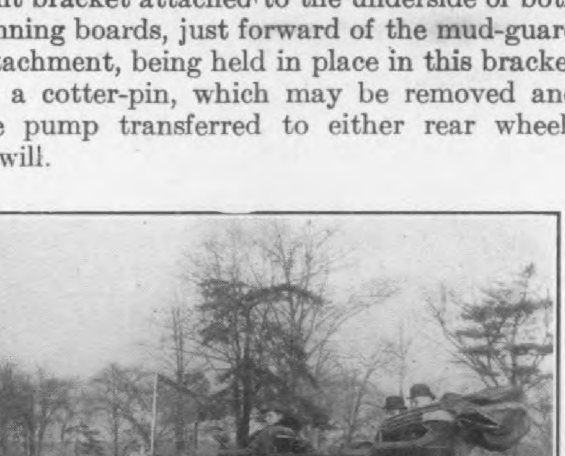
Whitmer & Rung, 200 Girard Trust Bldg., iladelphia, Pa. While this pump is operated the power of the motor, it is not directly nnected with the motor but gets its motion m one of the rear wheels. The pump proper

he Rung Automatic Tire Pump connected up ready for

a standard "Skinner" compound foot pump arranged as to be readily adjustable to any tomobile hub. It is fastened to a perma-nt bracket attached to the underside of both nning boards, just forward of the mud-guard achment, being held in place in this bracket a cotter-pin, which may be removed and pump transferred to either rear wheels will.



e Rung Automatic Tire Pump in operation. The wheel hich it is being actuated is jacked up a few inches from ground and is thus free to revolve while the other rear el remains stationary.

The piston end of the pump is attached to a nk fitted to the hub of the wheel by an ustable screw clamp. Twelve feet of hose kes it possible to pump up anyone of three is possible to obtain 200-pounds pressure desired.

The operation is simple—the rear wheel which the pump is attached is jacked up a f inches from the ground, the connections made and the operator starts the engine v gently, increasing its speed as desired.

The differential gearing in the rear a permits of a free action of the jacked-up wh while the other rear wheel remains stationa

Once the permanent brackets are placed the running boards, the attaching and deta ing of the pump becomes a matter of a f seconds, while the adjustable clamp wh holds the crank to the hub may be fit almost instantly.

Skinner & Skinner of Chicago, are act as western distributors for Whitmer & Ru while they handle the eastern trade dire A. Stevenson being manager.

"Radium" Decarbonizer

For cleaning the carbon deposit fr cylinders, piston rings, valves, etc., General Accumulator & Battery Co., Second street, Milwaukee, Wis., has cently placed on the market a soluti known as "Radium" Decarbonizer. This an oily substance mixt with chemicals t will combine with the carbon when vola ized by the heat of combustion in the cyl der. They then pass off thru the exhaust the form of a dense smoke, leaving cyinders, rings and valves perfectly f from carbon and resinous substances. T manufacturers claim this product be absolutely harmless when used in c nection with gas, and gasoline engin and that a thoro cleaning of the worki parts can be accomplished in 15 minut This Decarbonizer is put up in quart ca one dozen in a case, listing at $18.00; gallon cans, ½ dozen in a case, $16.50; a one gallon cans ½ dozen in a case, $30. Quart, ½ gallon and gallon sample ca are furnished at $1.50, $2.75 and $5.00 ea

The Empire Automobile Tire Co., of Trent N. J., has secured a license to make and the Baily "Won't Slip" Tread Tires, and Tr Bands, for automobiles, motor cycles a bicycles, and is producing a full line of si for each vehicle.

Sidney A. Bean, 1780 Broadway, N. City, has been appointed general sales manag of the Autocoil Co., 136 Seventh St., Jers City, N. J. and he is also acting as dir

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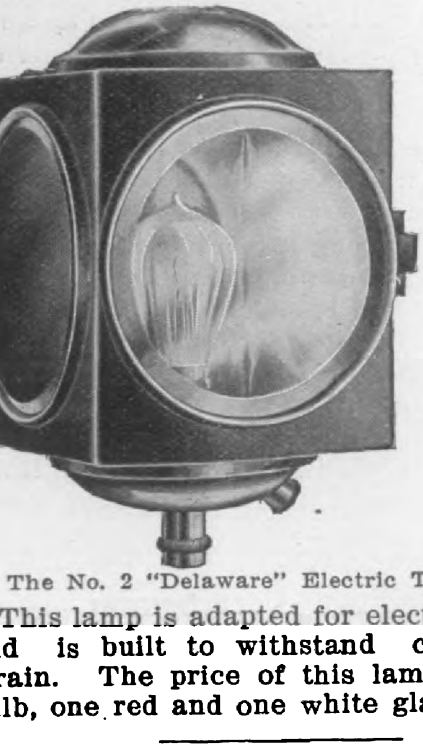
ater and Chestnut street, New Haven, nn., have added the No. 2 Delaware tail mp here shown.



The No. 2 "Delaware" Electric Tail Lamp.

This lamp is adapted for electricity only, d is built to withstand considerable rain. The price of this lamp including lb, one red and one white glass is $3.50.

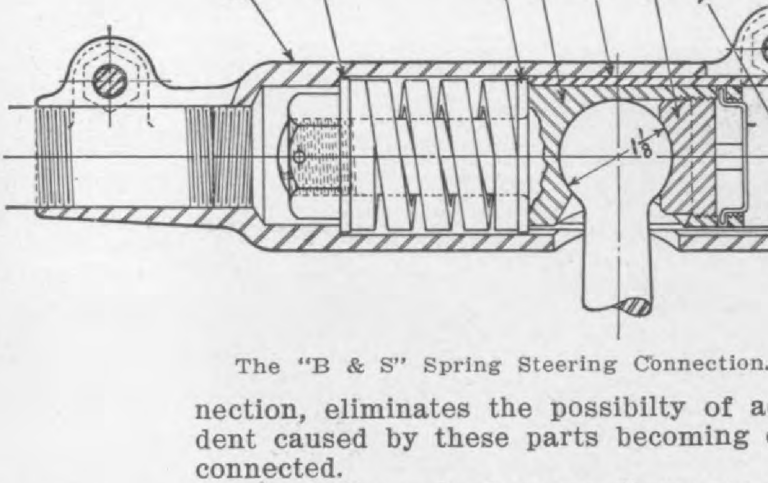
The "B. & S." Spring Steering Connection

The Billings & Spencer Co., 216 Lawnce street, Hartford, Conn., manufacrers of the well-known B & S steering nnections, are putting out a new spring eering connection of their own design, e purpose of which is to reduce the vibraon on the steering post arm to a minium, preventing crystalization. It also conins a simple looking device which effecvely secures the steering arm to the conction.

This connection is made-up of an outde case, A, surrounding a ball and socket int. B, to which it attached a lug ssing thru a spiral spring. Washers are aced at each end of this spring, and a t at the end of the lug binds these parts gether. This piece made up of the oresaid parts, is inserted into the end the base, A, after which the ball-arm is aced in position thru a hole in the side the case, and secured by castellated ug G. The slotted sleeve, E, is then serted in the end of the case as far as asher, D, surrounding the ball and cket. The whole is then secured by the stellated and threaded plug, F, which further secured by a cotter pin and nder lug.

tached from its socket should the plug become loosened or worn.

This feature, acting as a safety lock tween the steering post arm and the c



The "B & S" Spring Steering Connection.

nection, eliminates the possibilty of a dent caused by these parts becoming connected.

The Billings & Spencer Company now manufacturing this Spring Connect for 1⅛-inch ball. For the opposite of the side steering bar they recomm their C-1 Steering Connection which t are making for 1⅛-inch ball to match Spring Connection.

New Globe Stampt Parts

The Globe Machine & Stamping Co., Cleveland, Ohio, has been stea widening its usefulness in the automo field by producing an extensive line stampt parts for automobile constructi such as brake-bands, brake-drums, g cases, tool boxes, wrenches, etc. T company claims that altho stampi sometimes cost more than rough castin it is economical and expedient to use th for the saving in machine work and fin ing. Besides, they are usually produ more quickly than castings can be tained.

The Globe people are now making g cases for a well known electric veh manufacturer. The cases were form made of aluminum castings, which w hard to obtain on account of the diffic in running such thin castings. The m body pieces are drawn in the form of p and then split lengthwise. They are rive together in pairs and the halves clamped together with stampt clamps each end. All of the processes, exc riveting and tapping were done on pres These gear cases are about 22 inches l

In their sheet metal department concern is making tool boxes and batt

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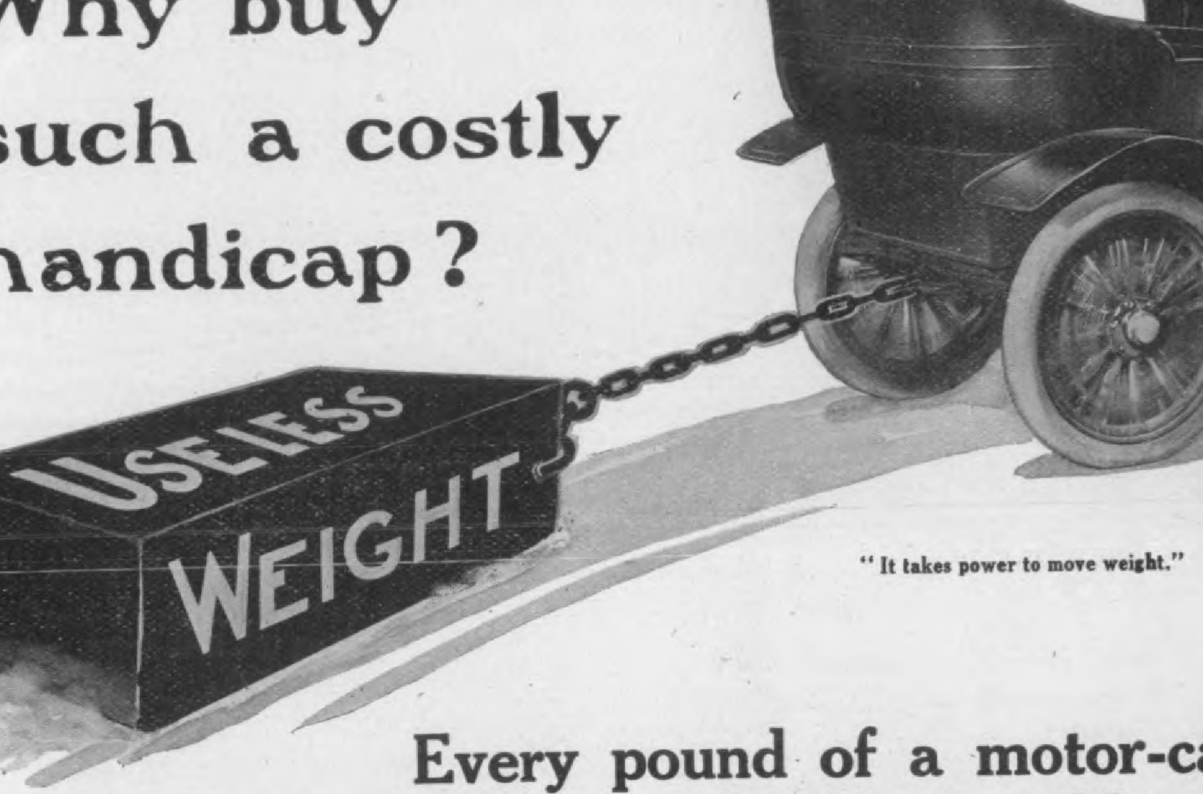
Why buy such a costly handicap?



"It takes power to move weight."

Every pound of a motor-ca costs money every time you move. Mon for gasoline, oil, repairs, and, above all, tire

What's the sense of buying useless weight? The light-weight Franklins give you everything ou can get in any heavy automobile except needss trouble and wasteful expense.

The air-cooled Franklin engine cuts out the eight, trouble and repair-expense of water-coolg apparatus, and at the same time gets more ower out of its fuel than any other gas engine er built.

The Franklin wood-frame is lighter than steel nd at the same time stronger. The aluminum ranklin bodies are lighter than wood but stronger. ranklin cast-aluminum parts are twice as strong the alloy commonly used, but no heavier, and all through.

This light-weight combined with ample strength increases speed and climbing power, makes Fr lins easy to handle, agile, safe and durable. And the usual operating expense down almost to

No motor-car but a Franklin ever ran 95 m on 2 gallons of gasoline; or from San Francisc New York in 15 days, 2 hours, 18 minutes; or Chicago to New York in 39 hours, 53 min Can any heavy machine show such efficiency, tained power and endurance? None ever did

What's the use of power that you can't What is the sense of paying big bills for the keep of a heavy complicated machine and ge no proportionate return?

The day of heavy automobiles is passing a Motorists have learned from experience the i ciency, wastefulness and danger of useless we

he strong light-weight high-power Franklin means ability that you use; trouble avoided; dollars saved.

The time to realize this is right now before you buy

Write today for our 1908 catalogue, No. 12.

5 h. p. Runabout	$1750	28 h. p. Touring-car or Runabout	$2850	Four-cylinder Landaulet	
5 h. p. Touring-car	$1850	42 h. p. Touring-car or Runabout	$4000	Six-cylinder Limousine	

Prices f. o. b. Syracuse.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y.

Member Association Licensed Automobile Manufacturers

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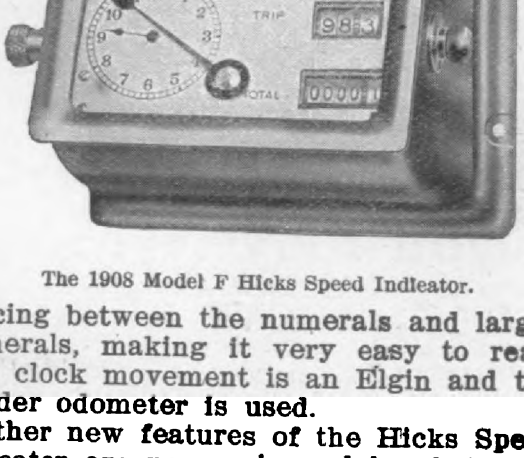
dicator for 1908 by the addition of an uminating attachment consisting of a nall electric bulb placed over the odo-eter readings. Over this bulb is a re-ctor which throws the light over the tire dial, the dial containing both speed ale and clock face. Two styles are ade for 1908, one with a scale reading 75 miles and the other reading to 60 les. Both scales are of the same size d the 60-mile scale has, therefore, wider



The 1908 Model F Hicks Speed Indicator.

cing between the numerals and larger nerals, making it very easy to read. e clock movement is an Elgin and the eder odometer is used.

Other new features of the Hicks Speed icator are new universal brackets and ew flexible tube, which is imported.

They also include in their 1908 line an unciator which is gotten up in the ne form as the speed indicator, but glass cover is dark red, except when nals are being given from the interior he car, in which case a light is thrown eath the particular word which indi-es the signal desired as "start," "stop," on," "home," "club," etc. These in-uments are, of course, sold separately, are also furnished attached to the e bracket when so desired.

"Hayes" Rumble Seat Metal Body, New Tire Case, Etc.

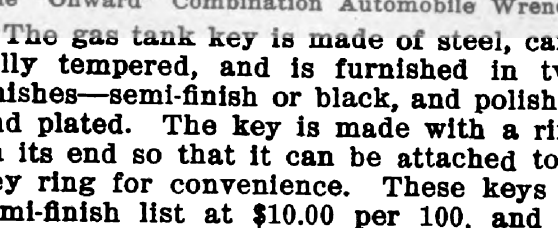
ayes Manufacturing Co., Maybury ave- and Grand Trunk Railway, Detroit, h., is putting out a smart looking sheet l body with rumble seat. This style lesigned for runabouts, and is inter-ngeable with the usual runabout wood es. The seat backs are stampt out of le pieces of metal, and all joints in the

metal formed to shape and riveted d the back, while the lid is prest from a gle piece of metal.

A sheet steel tire case is another product of this concern. This case c sists of three parts, the back portion be the shape of a tire split laterally, the ot two parts each correspond to a half of other half and are each hinged to the m part, opening in opposite directio When the tire is placed in the main p and the two hinged parts closed it is tirely enclosed and protected from weather. The main portion is held in very simple manner on the running boa the fastening consisting of a cross shap plain, malleable iron bracket, which bolted to the running board.

New "Onward" Key and Wrench

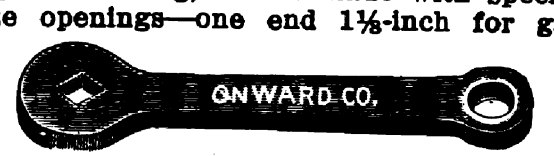
Two of the latest products offered t automobile trade by the Onward Compa 531-551 West Fifteenth street, Chicago, are a tempered steel gas tank key and combination automobile wrench.



The "Onward" Combination Automobile Wren

The gas tank key is made of steel, ca fully tempered, and is furnished in t finishes—semi-finish or black, and polish and plated. The key is made with a ri on its end so that it can be attached to key ring for convenience. These keys semi-finish list at $10.00 per 100, and nickel-plated finish at $20.00 per 100.

The combination automobile wrench 9½ inches long, and is made with speci size openings—one end 1⅛-inch for g



The "Onward" Tempered Steel Gas Tank Ke

tank union and the opposite end ⅞-inc for standard size spark plugs. The cent hole is 3-16-inch in diameter and is us as a gas tank key. The wrench is mad of standard steel carefully tempered a is guaranteed unbreakable. The wrenc is furnished in semi-finish at 51 cents lis in polished and steel finish at 68 cent and nickel-plated at 90 cents.

Consolidated Optical Co., 112 We

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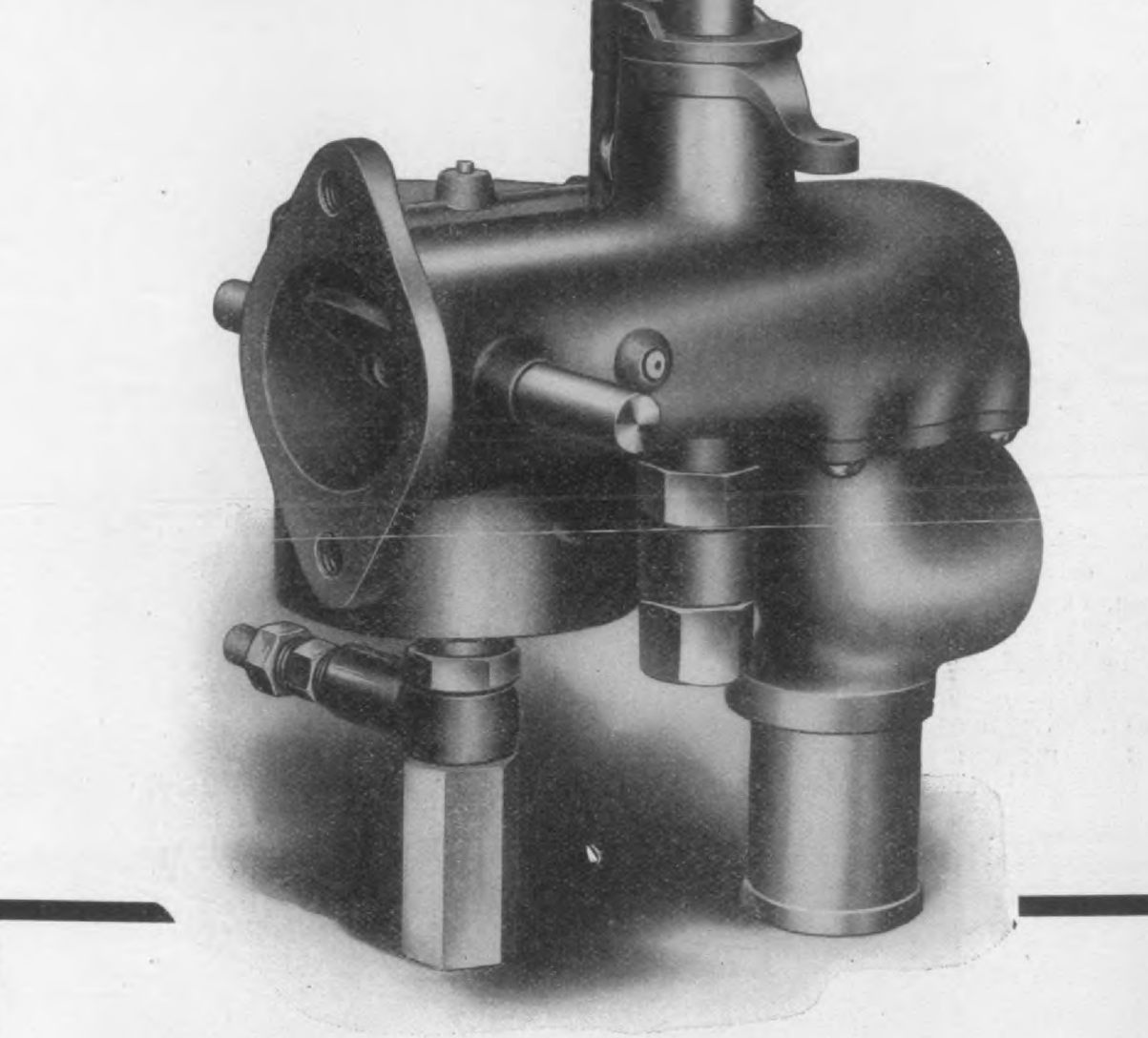

Having Carburetter Trouble?

You Always Will Have Until You

GET THE PETRE

because it is the only Carburetter built that does not have to be tinkered with. It gives a perfect mixture at all speeds of the engine. It simplifies control, gives added power, and is economical in gasoline consumption.

With the PETRE the steepest grades may be climbed on the high speed from a standing start. On 100 cold mornings out of 100 the PETRE will start on not later than the 5th quarter turn. If the PETRE CARBURETTER is not a better device than any other carburetter, you need not pay for it.

Send for booklet "A."

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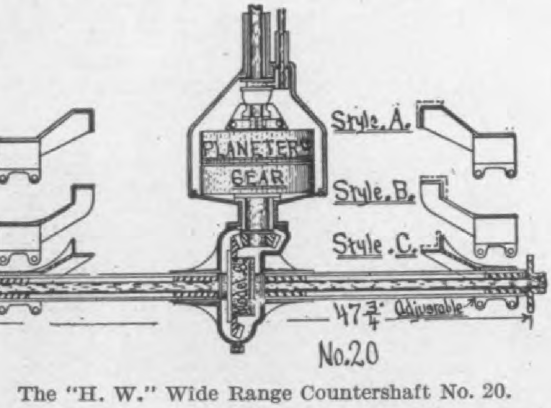
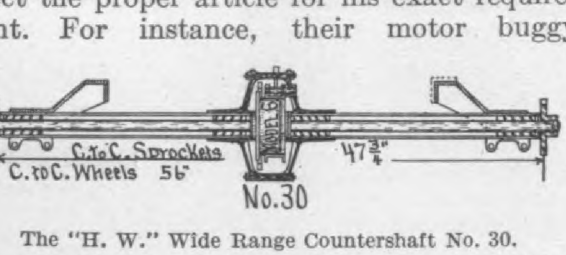
., claim to be the first to bring out a com-
e line of parts for building the regular
n wheel buggy type automobile. Its line
uld appeal especially to carriage builders,
t is well adapted for changing over into



The "H. W." Wide Range Countershaft No. 20.

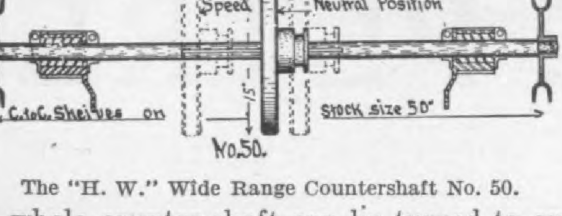
ver driven vehicles, the regular spring
gon, express wagon or any form of road
ggy.

A feature of the line is that a number of
les of the several parts needed are made
as to give the builder an opportunity to
ct the proper article for his exact require-
nt. For instance, their motor buggy



The "H. W." Wide Range Countershaft No. 30.

nter shaft is made in 12 styles, 3 of which
illustrated herewith as Nos. 20, 30, and 50.
The hangers that bolt to the necessary
le frame which supports the counter shaft
made adjustable, which greatly facili-
es the assembly, and will take a variation
width of frame from 18 to 32 inches. As
tubular housing is clamped by the hanger,

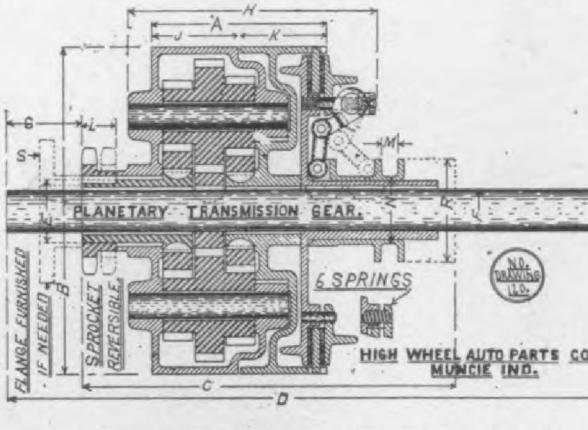


The "H. W." Wide Range Countershaft No. 50.

whole counter shaft can be turned to any
ired angle, and, furthermore the hangers
made in variety of styles as shown at A,
and C, any of which are interchangeable
h each other. Counter shaft No. 20 is
y desirable where the engine is to be placed
front, as a direct connection in this case is

mission gear direct to the counter shaft.

Counter shaft No. 50 is adapted only
cable drive to the wheel, in which case a sla
ing of the foot pedal which relieves the frict
wheel from driving engagement will also all



The "H. W." Planetary Transmission Gear.

the cables to slip enough to turn corn
without a differential mechanism. A frict
wheel is used on this counter shaft, and
hangers are arranged to bolt up under
frame, the left side being eccentric and so
ranged as to throw off from the fly-wh
about one-eight of an inch.

The "H. W." Wheel Steering Device with rack and pin

In the transmission gear, the gear case pro

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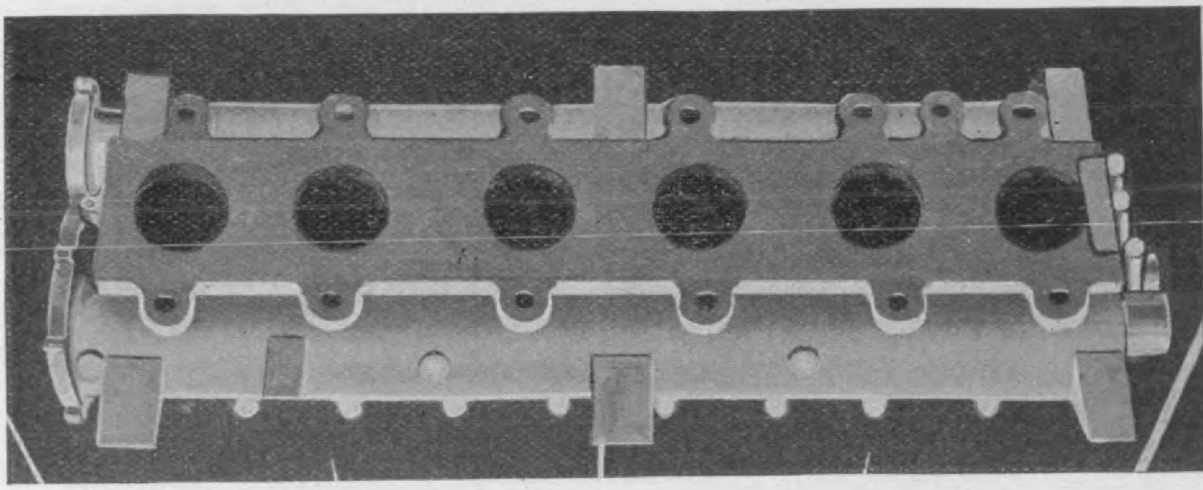
Automobile Brand

Aluminum Castings



AUTOMOBILE BRAND ALUMINUM CASTINGS will cut down your machine shop expenses and raise the efficiency of your product, as well as improve its appearance. They will help you make money and reputation. This has been the experience of many prominent manufacturers.

Automobile Brand

BRONZES

PLASTIC BRONZE is the best bearing metal for all purposes, under all conditions. It is hard enough to stand compression strains, yet plastic enough not to groove the shaft.

MANGANESE BRONZE takes the place of drop forgings; very strong and tough. Takes a fine polish, and does not oxidize readily.

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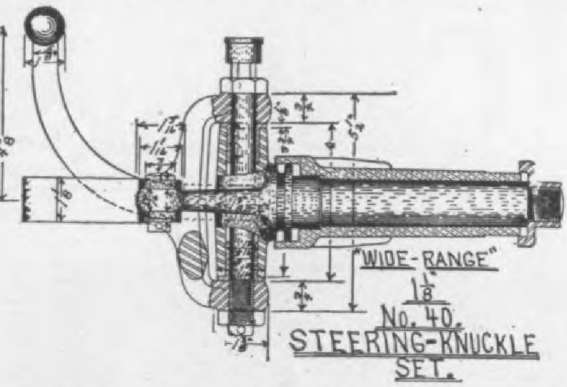
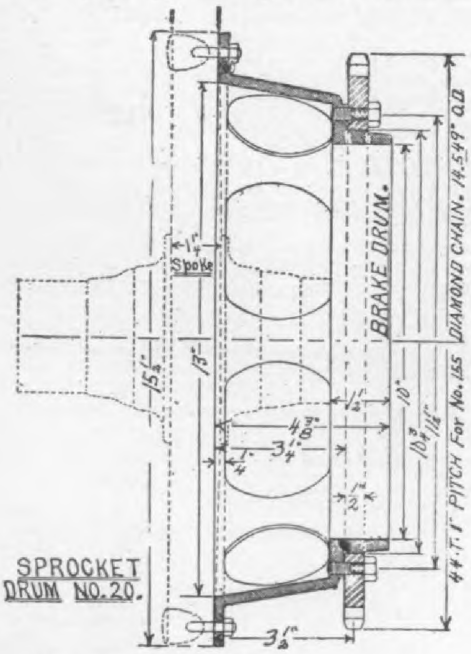
If you have never tried any of our products, **"Do It Now."**

utch to open about one-eighth of an inch
hen thrown out of engagement. The entire



The "H. W." Steering Knuckle, No. 40.

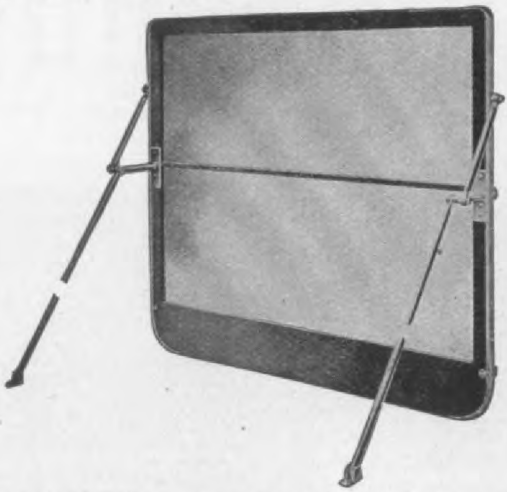
echanism is a separate article from the trans-
ssion proper and is well adapted to any
yle of fly-wheel or driving connection re-
iring a clutch mechanism. The company
selling the clutch separately for use in con-
ction with sliding gear transmissions.
The two wheel steering devices No. 1120 and
30 are offered together with two lever steer-
g devices No. 1140 and 1150, constituting
styles, which cover substantially all require-
ents in this line. The rear wheel sprockets
ve the teeth cast and filed to fit. No. 10
a better quality, having a surface for internal



The "H. W." Sprocket Drum, No. 20.

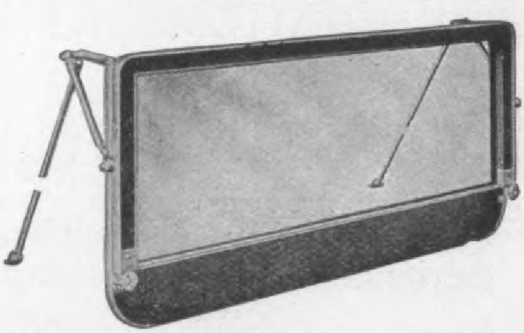
panding brake also, and the teeth are cut,
ile No. 20 is a steel sprocket, detachable
m the cast frame, which also has a surface
internal expanding brake. A noticeable
ture is that any of the three styles are inter-

rest. The shield can be raised or lowere
five seconds, the entire operation being d
from the seat of the car, and no adjustme
whatever, being required.



The "Ackerman" Parting Wind Shield, open posi

These shields are made in two regular si
42 and 45 inches wide, respectively.
regular shields a lower panel five inches
designed, which can be cut out to fit the sh
of the dash. On odd shaped dashes req



The "Ackerman" Parting Wind Shield, folded posit

ing a cut of greater proportions for fitti
special sashes are required. A limited quant
is carried in stock of the regular sash, wh
special sashes are made to order.
The "Auto" foot rest is made of a wood
bar, convex in shape, covered with rubb

The "Auto" Foot Rest

and bound neatly with brass. The board
arranged with an adjustment so it may
tilted to any desired angle to suit the

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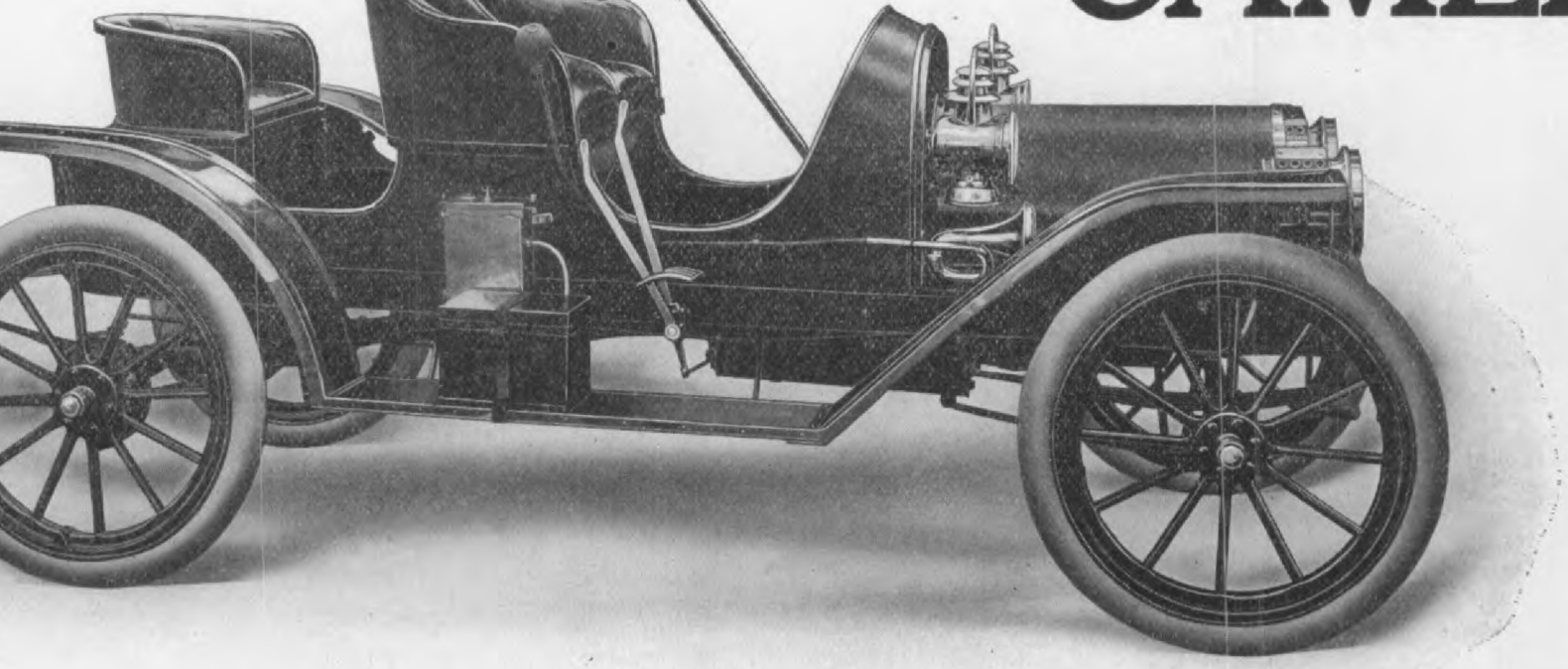

CAMERON

Light
Touri
Car

Model 8, Four-cylinder, 16 H. P., $1050

exclusive CAMERON features, high-class design and workmanship, place it in a class ahead of any other medium-pri
ket.

perfect air-cooled engine and our patented rolling selective type Transmission, three forward speeds, all direct, give ou
f control and ease of operation that will please the most critical buyer.

ve greatly increased our manufacturing facilities for 1908, and can offer live agents a complete line and discounts that wi

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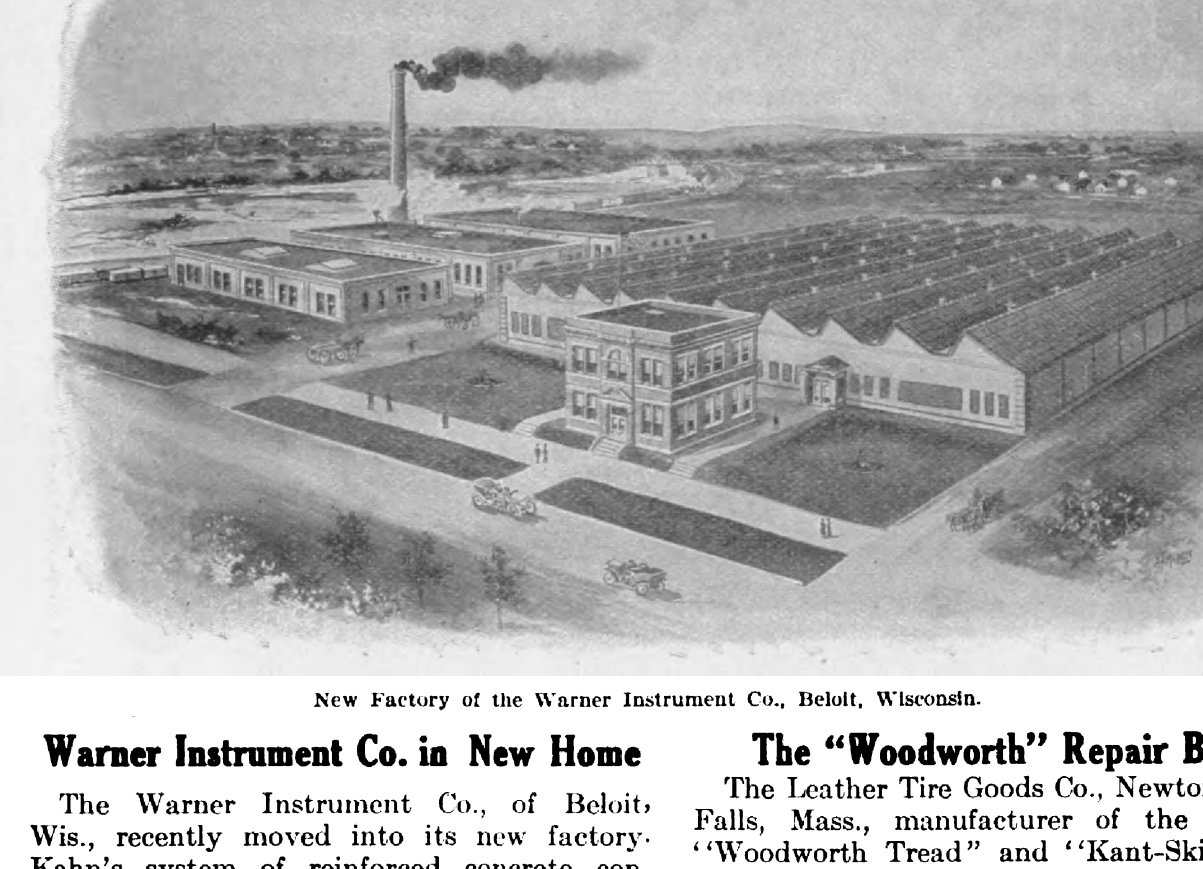


New Factory of the Warner Instrument Co., Beloit, Wisconsin.

Warner Instrument Co. in New Home

The Warner Instrument Co., of Beloit, Wis., recently moved into its new factory. Kahn's system of reinforced concrete construction is used thruout. The roof is of the saw-tooth type. The main shop is 100 x 200 feet. The interior walls and the slant of the saw-teeth are plastered with two coats of rock plaster, which is snow white. All exposed cement work is painted with a specially prepared snow white water paint. The entire shafting system, including pulleys, are also painted white, the object in view being to reflect every possible ray of light.

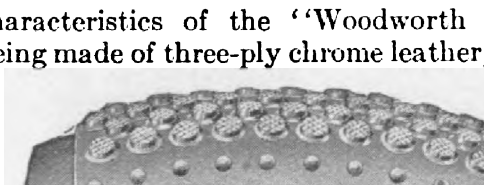
The heating and ventilating is done by the blast system, and every particle of air entering the building is washed. The utmost care has been exercised in providing for the comfort of the employes.

Special attention has been given the shafting system, which is mounted on channel iron beams fastened to special cast iron brackets which were set in proper position in the concrete during the construction of the building. A line shafting, running the full width of the building, is placed near the columns of every alternate bent. This permits of belting across two bents. All shafts are fitted with D. W. F. ball bearings.

Mr. E. V. Stratton, who has been for the

The "Woodworth" Repair B

The Leather Tire Goods Co., Newto Falls, Mass., manufacturer of the "Woodworth Tread" and "Kant-Ski recently put upon the market the worth Repair Boot," to be used as a ary outside covering for blowouts, cu in automobile tires. It has the wel characteristics of the "Woodworth being made of three-ply chrome leather



The "Woodworth" Repair Boot.

with strong burred headed steel rivet wearing surface, which makes it proof puncture and forms a perfect prote that part of the tire which it is desi shield. It is buckled to the tire by r a heavy strap lacing thru strong ring easy to adjust and can be put on in two

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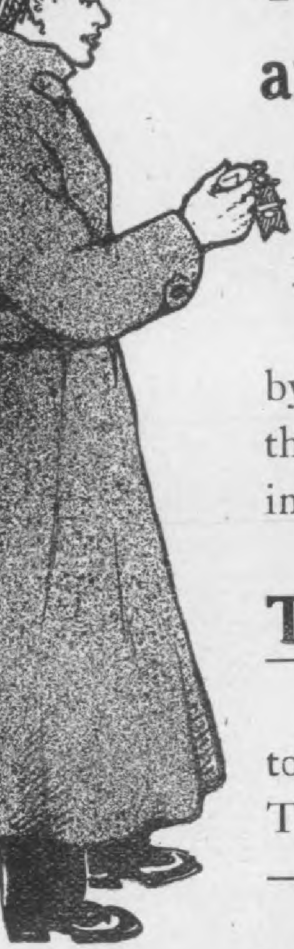
The New York Lubricating Oil Co. Broad St., N. Y., has been consolidat the Columbia Lubricants Co., of Ne who are taking over all of the former co

Google

and the Car Did the Work"



The Old Way

Laboriously attaching hand pump, and by sheer manual labor, in biting winter weather or under sweltering summer sun, inflating the heavy automobile tire.

The New Way

Thirty seconds to attach pump, a minute to fill the tire, thirty seconds to detach pump. Time consumed, two minutes—no exer ion —no time wasted—chauffeur happy.

The Rung
AUTOMATIC
Tire Pump

Quickly attached to any wheel hub, it utilizes the car's ower to inflate the tires. Can be operated at any speed.

Thirty Days' Free Trial

If the pump is not entirely satisfactory, the purchase rice will be refunded within thirty days.

Write for Attractive, Illustrated Booklet
TERMS TO AGENTS, TERRITORY, &c.

WHITMER & RUNG

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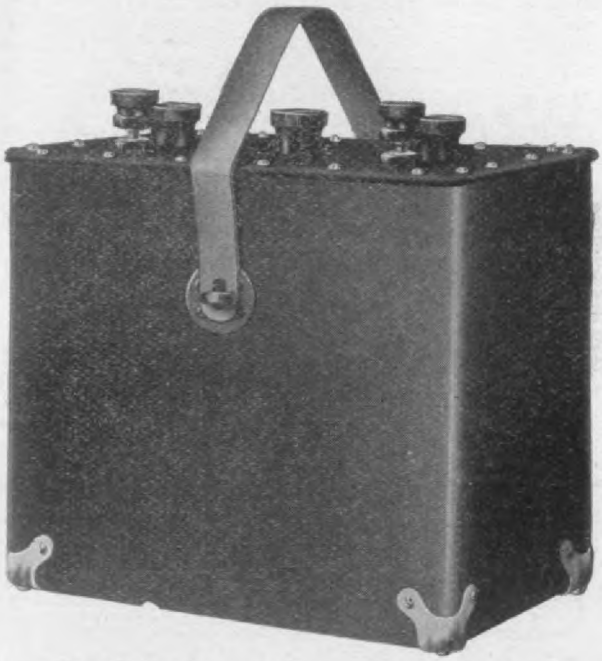
battery here illustrated. is manufactured by the Westinghouse Machine Co., East Pittsburg, Pa.

The outside containing case is of oak, with a cover of hard rubber, and an inner three-compartment hard rubber jar. This hard rubber jar is set in the wooden case in melted paraffine, which fills up the space between the rubber and wood, thereby holding the inner jar in position and serving as a lubricant if found it is necessary at any time to remove the hard rubber jar from the containing case, this being done by simply filling the compartments with hot water which softens the paraffine. In each compartment of the rubber

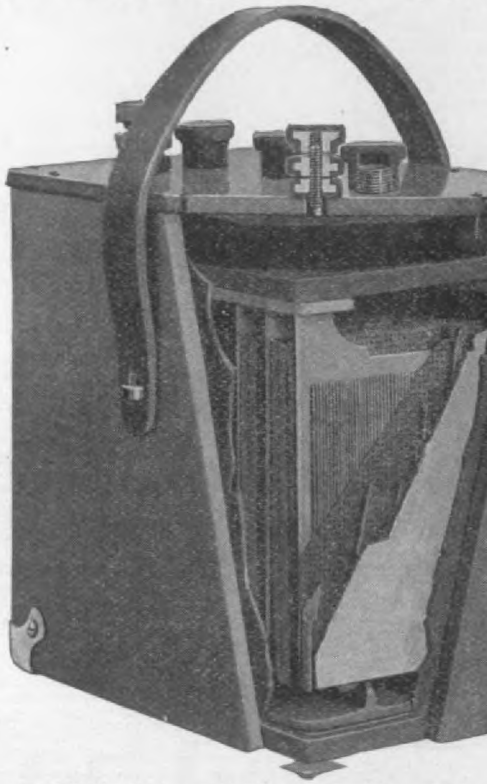


The "Westinghouse" Storage Ignition Battery.

jar, fitting snugly, is placed a storage battery element consisting of 7 type 'I' plates, separated by means of hard rubber ribbed, flanged and perforated separators. The elements rest upon a rubber bridge provided in the bottom of the cells. The bridge is about ¾ of an inch high, allowing that space in the bottom of jar for sediment. The mouth of each compartment is closed with a strong hard rubber cover fitting snugly around the terminals. The lead terminals of the three cells are then joined together by burning. The outside terminals of the two outside cells have brass terminals molded into same These studs are brought out thru the cover

Between the compartment covers and the master cover of the outside case is allowed a space of about 1¼ inches for sealing. After sealing the mouth of each compartment, the

metal is used as an alloy. The formed by the well known "Plante The plates are mechanically rigid strong, being suited to the very rou in automobile service. Each brass is provided with three rubber cove nuts. The first nut clamps tightly ag lead surrounding the brass stud, the



The "Westinghouse" Storage Ignition Batter view.

is a binding nut, and the outside nu is rubber covered on the exposed sur thumb-nut, provided as a check contact is made with wires runnin ignition system, the nuts cannot b There is no exposed brass, the studs being protected by a rubber cover. fastening is provided on two sides carrying case, and a rubber cover is attached.

The price of a 6-volt 70 ampere hou is $36.00, and for a 6-volt 45-ampere $27.00.

"Empire" Secondary and Primar

The Empire Automobile Tire Co., N. J., is manufacturing a new type of s and primary electric wire for au ignition work.

The Empire secondary cable is with a rubber stock designed to re voltage. This stock is covered wit

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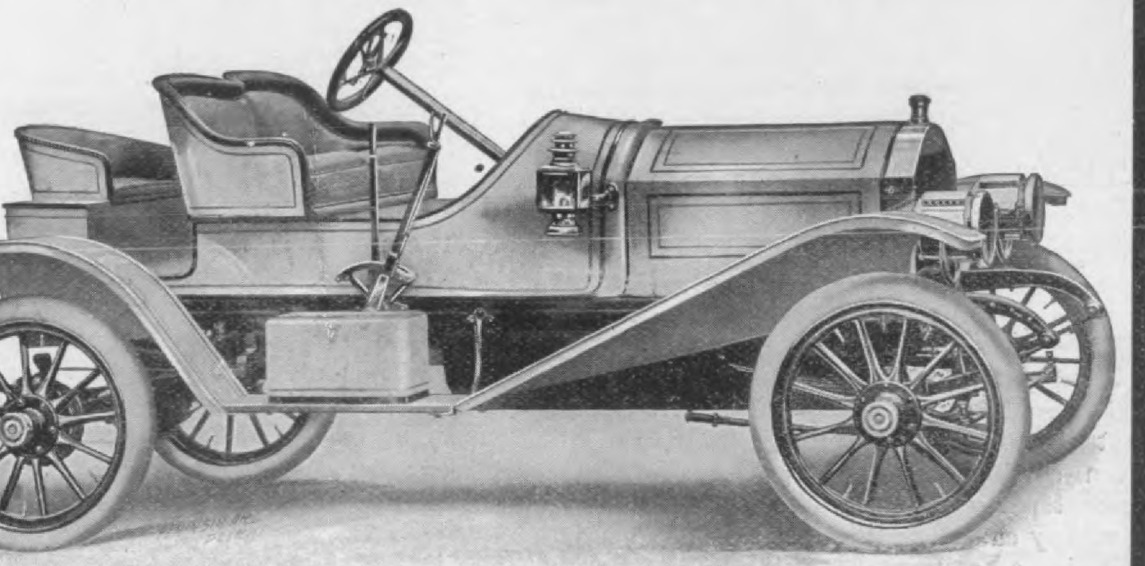
Blomstrom Thirty"

The Most for the Money Ever Offered



1908 Models Now Ready

ring Car, 5 passenger - - $2250

about, 3 passenger - - - $2250

(SAME CHASSIS AS TOURING CAR)

Specifications:

ch Wheel Base Tires—32 x 3½ in.

—4-cylinder, vertical, 4-cycle, water cooled, 30 B. H. P. at 1000 R. P.M. **Blomstrom's own design—latest and best.**

Clutch—**Blomstrom's own design.**

ve Sliding Gear on Hess-Bright Ball Bearings.

ered Nickel Steel Gearing.

Gear Drive. Front Wheels on Ball Bearings.

lete Equipment—Mats, Horn, Tools, 5 Lamps—ready for the road.

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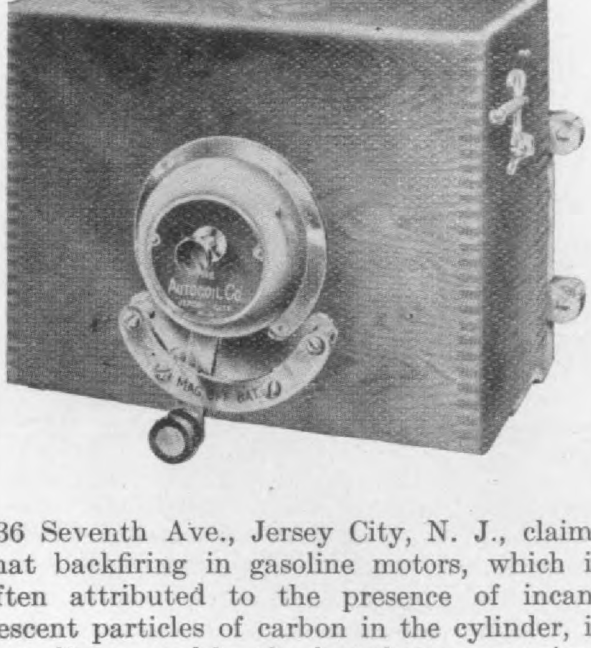
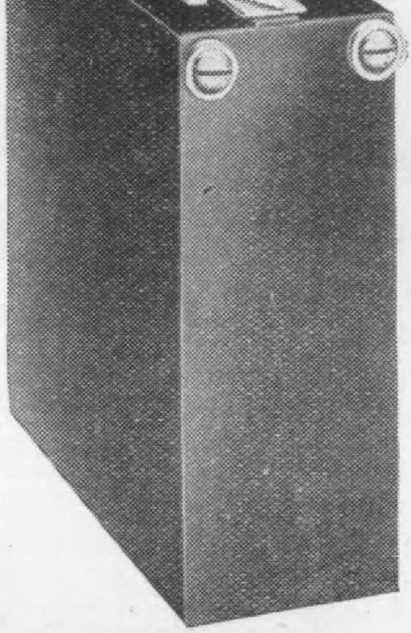
sentative wanted in unoccupied territory. IMMEDIATE DELIVERIES.

The two cuts herewith illustrate the 1908 "Autocoil" of the dashboard type and one of the "Buck Proof" units of the same. The manufacturer of these coils, The Autocoil Co.,



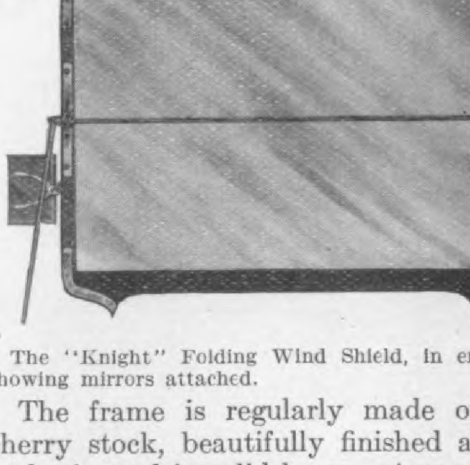
136 Seventh Ave., Jersey City, N. J., claims that backfiring in gasoline motors, which is often attributed to the presence of incandescent particles of carbon in the cylinder, is in reality caused by the fact that an energized unit in a coil often affects an adjacent unit causing preignition in the cylinder to which the affected unit is connected. To overcome this difficulty this "Buck Proof" unit, as the maker calls it, has been designed and has been so named because it is said to prevent back-firing or "bucking" of the motor.



"Buck Proof" unit of the 1908 dash type "Autocoil."

These "Buck Proof" units are fitted with a safety gap to save the secondary winding of the coil in case

windshield, the chief feature of w
simple locking device, which loc
when the shield is erect and, revers
when folded.



The "Knight" Folding Wind Shield, in e
showing mirrors attached.

The frame is regularly made o
cherry stock, beautifully finished a
and trimmed in solid brass. Any o
may be substituted on order. A
polished, plate glass is fitted. T
is also made with curved lower sash
dash boards. As seen in the cut,

The "Knight" Folding Wind Shield, f

is fitted with a pair of mirrors, whi
folded in when not in use. The s
at $70.00 complete, with all at
including mirrors; and at $45.00
with all attachments excepting mir
mirrors can be bought separately
per pair or $15.00 for one.

Small Truffault-Hartford S
Absorber

The Hartford Suspension Co., 67
New York, manufacturer of the
Hartford shock absorber, has broug
small model for runabout use whic
as the "Truffault-Hartford Junio
small model which has all the essenti
of the larger types (the only differe
in its size) has been brought out i
to a very evident demand for a runab
absorber of this kind. The price
The other two models, which are l
the Truffault-Hartford Junior, list r

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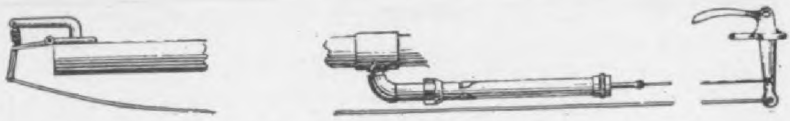
THE
Nightingale Whistle"

l melodiously demand the right of way over all ner warning signals. Its sound is a six-note thrill, t penetrates for miles and does not shock the ear



n be attached to any make of car by the chauffeur. A small standard thread w is all that is needed. When not sounding, the whistle remains closed, ing out all mud and dirt, and, in addition, it automatically cleanses itself after signal. The cap on the end of the exhaust pipe closes one second be- the whistle opens.

It operates from the dashboard with either a hand pull, lever or pedal.

Catalog No. 24 gives all particulars and price.

For sale at all supply houses.

THE
Tire Inflator Delpeuch"

e 11x5 inches. Guaranteed for 3 years.

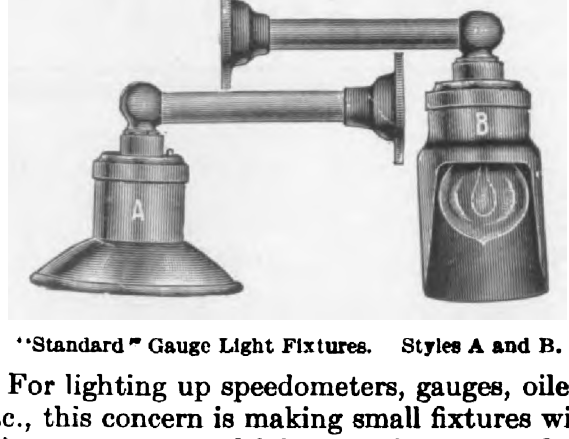
Made of Metal Throughout
No Leather Packing

Bored and fitted with a metal piston, just like a motor cylinder. It lasts for years. Automatic lubrication with grease cups. Attaches to any make of car by means of lit gear on driving shaft, and is operated by a sliding pinion. Control on nboard.

The "Tire Inflator Delpeuch" will inflate the largest tire in one minute, ng pressure up to 90 lbs. Catalogue No. 23 gives all particulars and price.

Hosted by Google

Manufacturing Co., Chicago, Ill., has recently brought out some new things, shown herewith:



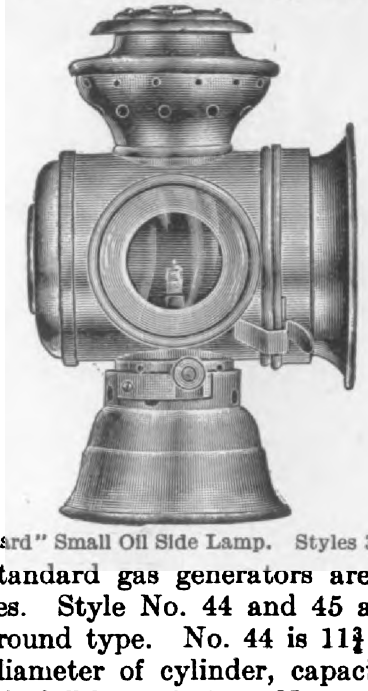
"Standard" Gauge Light Fixtures. Styles A and B.

For lighting up speedometers, gauges, oilers, etc., this concern is making small fixtures with minature or candelabra sockets attached. The fixtures are made in two styles, A and B. Style A is fitted with a 2½-inch reflector. The length of bracket is 3¼ inches. It lists at $1.35 in brass finish. Style B is fitted with a reflector 1⅜ inches in diameter by 2¼ inches in length. The bracket is 3¼ inches in length. Style B lists at $1.50. These prices include minature or candelabra socket only, bulbs and wire being extra. When gun metal finish is desired, 20% extra is charged.

"Standard" Electric Tail Lamp. Styles 164 and 65.

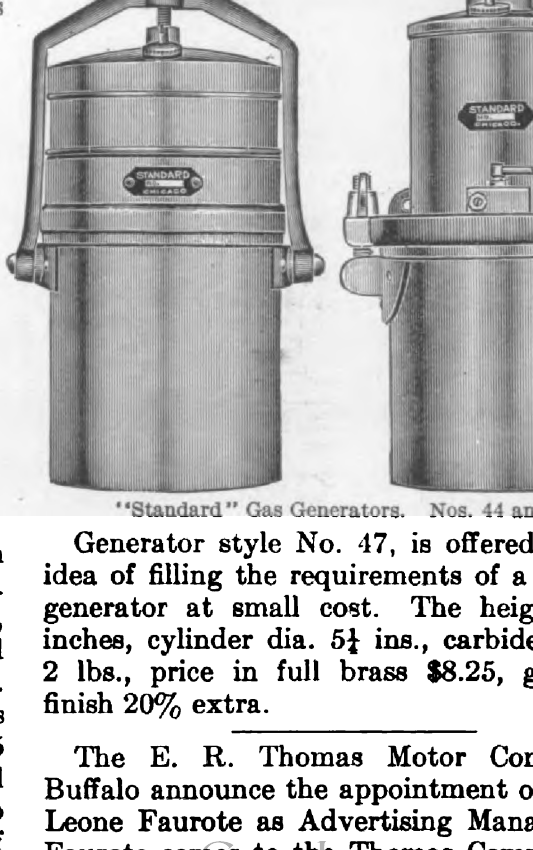
The "Standard" electric tail lamp is in two sizes, listing as follows: No. 164, 3½-in. dia. of body, 2-in. red lens, $3.75 in black, $4.05 in full brass, and $4.80 in gun metal finish. No. 65, 4½-in. dia. of body, 3-in. dia. of red lens; in black finish $4.50, full brass $4 95 and in gun metal finish $5.70. No. 65 is equipt with Edison socket at an additional charge of 45 cents. A brass bracket is also furnished at 45 cents extra. The prices of this lamp includes miniature or candelabra sockets.

4 for the rear of the buggy type car



"Standard" Small Oil Side Lamp. Styles

The Standard gas generators are two styles. Style No. 44 and 45 a popular round type. No. 44 is 11¾ 5¾ ins. diameter of cylinder, capac list price in full brass $9.75. No. 45 high, 6½ ins. diameter of cylinder, 3 lbs., list price in full brass $12.00



"Standard" Gas Generators. Nos. 44 an

Generator style No. 47, is offered idea of filling the requirements of a generator at small cost. The heig inches, cylinder dia. 5¼ ins., carbide 2 lbs., price in full brass $8.25, g finish 20% extra.

The E. R. Thomas Motor Cor Buffalo announce the appointment o Leone Faurote as Advertising Mana Faurote comes to the Thomas Comp five year's experience in the automo

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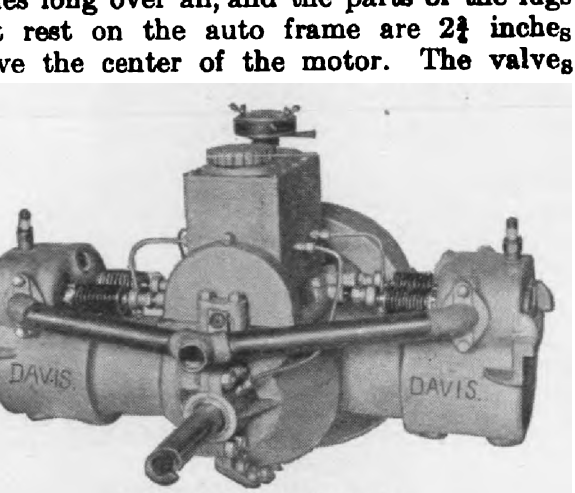
the 1908 season a line of opposed ors of the following cylinder dimensions: ch bore by 4½-inch stroke; 5½-inch bore 4½-inch stroke; 5-inch bore by 4 inch ke, and 4½-inch bore by 4-inch stroke. motors are all of the same general design he one here illustrated and described.

he cylinders are ground on a Heald cylinder der, and the pistons, rings, etc., are also und on special grinding machines. The k plugs are located immediately over and veen the valves. The 5x4 motor is 29 es long over all, and the parts of the lugs rest on the auto frame are 2¾ inches ve the center of the motor. The valves



Davis 1908 Opposed Motor.

2⅛ inches in diameter, 1⅞-inch opening. motor is furnished with a drain to cylinder tom, and the spark plugs being located trally above the bore of the cylinder and ¼-inch pipe tab immediately below, makes ossible to use a hook scraper to scrape the oon off the cylinder head and the piston hout removing any other parts of the or. Four cams on the cam-shaft operate valves. The motor is equipped with a spoke fly-wheel.

very simple and reliable valve motion is vided, which relieves the push rods of con- rable wear due to the cam thrust, as there swinging member between the cam and push rod. The push button on the end he push rod, which opens the valve, has a e disc comprest in the end of it and fast- l securely, thus doing away with the allic click that ordinarily accompanies a dly revolving motor. The spring holder he valve stem is secured with a little taper ning, which makes it easily removable, and he same time fastens the spring holder as rely to the valve stem as tho it was welded

rectangular in section, and the oil passes th the piston to the connecting rod boxes in the connecting rod, and thru the connecti rod to the piston pins. The crank shaft is inches in diameter, the back bearing 4¼ inch long and the front bearing 3½ inches long. T crank pins are 2⅜ inches long. The fly-whe is fastened by six bolts to a flange that forged onto the shaft. The cam shaft tool steel and ground. The cams are har ened and securely fastened with hardened pin

When desired, the motor is furnished wi inlet piping that brings the carburetor belo the crank shaft. The 4½x4, 5x4 and 5½x sizes are made, when required, with lugs the bottom for marine purposes. The equi ment consists of mechanical oiler, inlet pipin roller timer on top of oiler, and flanges ta for 1¼-inch piping on exhaust ports.

"Apstein" Puncture Closer for Inne Tubes

In addition to the cycle tire repair pl made by D. Apstein Co., Bridgeport, Con this company is now putting out a simil plug for permanently closing punctures inner tubes of automobile tires. The Apste inner tube puncture closer consists of tw disks each a combination of rubber and met One of these disks goes inside the tube and t other is screwed down tight on the outside a threaded stem provided for the purpose a permanently attached to the inner dis When the outer disk is screwed down tig the excess stem is cut off close, leaving smooth patch on the outside. Price of th plug is 15 cents each. The maker is endeave ing to secure new agents to handle this plu

"C & A" Tire Holder

Curry & Abeles, 229–231 Mulberry S Newark, N. J., manufacture a line of met specialties for the automobile trade includi mountings, windshield fixtures, tire holders a the like. The "C & A" tire holders are a justable and can be fitted to any car, as t rod can be bent if necessary. Besides bei well made these holders are well finished, t makers aiming at both durability and go appearance. These holders are handled most prominent supply houses and are givi general satisfaction. This concern makes bo strap and lock types of tire holders.

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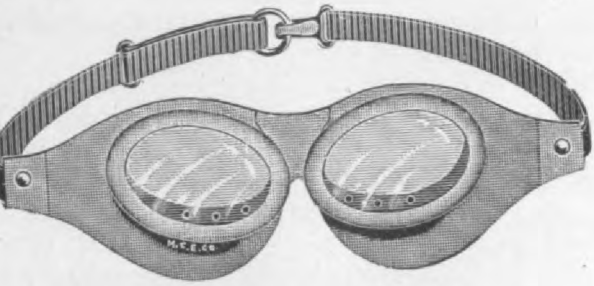
One of the most interesting and valual

arket a goggle made entirely of finest para ıbber.

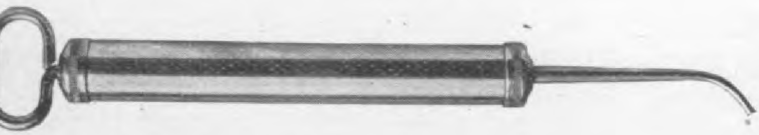


Motor Car Equipment Co's. Rubber Goggle.

This goggle will perfectly adjust itself to any face. The glasses can be removed ıd replaced in an instant. An extra pair glasses is furnished with each pair of goggles. hese goggles are rain proof and dust proof ıd sell at $2.00 per pair.

"Elkhart" Oil Guns

The oil gun here illustrated is made by he Elkhart Brass Mfg. Co., Elkhart, Ind. he "Elkhart" oil guns are made in three zes, 7, 8 and 10 inches in length respectively. he cylinder is made of 20-gage seamless steel ıd is 1⅛ inches in diameter. It is carefully olished and brass plated. The plunger con-



sts of two cupt leather washers and two ıpt steel washers. The handle and plunger ɔd are in one piece, formed from a ¼-inch eel rod which is polished and brass plated. ne "Elkhart" gun works in thick or thin l and is said to be made for hard service and ng wear.

Jerman and Baker, Manufacturers' Agents

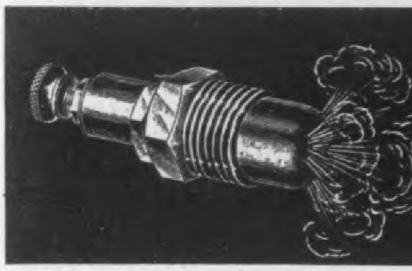
Jarman & Baker, 54th St. and Broadway, . Y. City, are acting as manufacturers' agents r a number of prominent concerns which anufacture spark plugs, lamps, generators, re repair material, vulcanizing outfits, license ıds, etc., and have established a very thoro stem for distributing their goods thru the ction which they cover, and which includes e entire country east of the Mississippi. ıey keep three men travelling, and sell these oducts the same as if sold direct from the

the goods they sell so as to be able to r immediate deliveries to customers who ar a hurry and who cannot wait for order come from the factory. This scheme proved very satisfactory, and is greatly preciated by their customers. In add to selling the goods mentioned, they also m facture a line of trunk racks, and a tire fork, a description of which we will pu in an early issue of the Journal.

The "Fire Fly" Spark Plug

The Automobile Specialties Mfg. Co., Germania St., Milwaukee, Wis., has rece placed on the market the Fire Fly spark the principal feature of which is its combus chamber. The aperatures in this char are smaller than the chamber itself and ignition takes place, the flames are fo thru these aperatures, thereby perfe cleaning the plug and preventing short cir ing from soot.

The ignition points are so constructed many firing points are presented—the pos



The "Fire Fly" Spark Plug.

pole being a meteor wire point while negative pole is threaded. The porce are of imported Dresden material. All m parts are heavy and are nickle plated. plug is manufactured in half-inch stan pipe thread, metric thread, and "Auto size ⅞ by 18-thread. Also Winton extra plugs and plugs for single cylinder Cadi The list price of the plug is $2.50.

The "SX"" and "OK" Dry Batteri

The Geo. A. Lutz Co., 223–231 East 1 St, New York City, manufacture "SX" "OK" dry batteries for automobile marine ignition work.

The ingredients used in these batteries cording to the Company's claims, are cr highest grade obtainable; the batteries carefully made by reliable workmen and cell is tested before it leaves the factory.

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TIRES TIRES TIRES

Greatest sale of Automobile tires ever offered to the trade and public.

We have purchased the entire stock of 1907 G & J tires. These tires are all fresh goods and all perfect, but owing to the low prices we are selling these goods the manufacturer has buffed the name, but we, "TIMES SQUARE AUTO CO." guarantee every tire to be perfect and free from any imperfection in workmanship and material.

Remember these goods are all of the highest quality Automobile tires built in this country, all wrapped tread, some flat tread, made for regular clincher and quick detachable rims.

At the low price we are selling these tires they will not last long, so mail your order at once, or call.

Remember every tire GUARANTEED PERFECT or MONEY REFUNDED.

Positively none sold other than C. O. D. or CASH WITH ORDER.

All C. O. D. orders must have sufficient money accompanying orders to pay transportation charges.

REGULAR WRAPPED FLAT TREAD CONSTRUCTION

Size	Regular Price	Our Price	Size	Regular Price	Our Price
28x2½	$22.50	$7.50	34x3½	$41.90	$16.80
30x2½	27.30	9.00	36x3½	44.85	14.00
26x3	25.95	8.25	30x4	45.95	17.50
28x3	25.95	10.00	32x4	48.60	18.00
30x3	28.25	12.00	34x4	51.70	21.50
32x3	30.55	9.00	36x4	55.20	22.50
34x3	33.80	9.75	32x4½	62.35	17.00
28x3½ guarantee to fit 28x3	31.35	12.00	34x4½	64.00	24.00
28x3½	35.05	9.00	36x4½	69.50	25.00
30x3½	36.70	14.00	34x5	72.60	25.00
32x3½	38.95	15.50	36x5	78.65	27.50

We can furnish you with Pennsylvania-make Tires in all of the sizes as above, at same prices, also

28x3 ..... $12.00 | 30x3½ $16.50

INNER TUBES

28x2½	$2.63	34x4	$7.00
28x3	3.05	30x4	5.95
30x3	3.35	34x4½	7.75
30x3½	4.40	36x4	7.05
32x4	6.25	Other sizes in proportion.	

TIMES SQUARE AUTOMOBILE CO.

LARGEST DEALERS OF NEW AND SECOND HAND AUTOMOBILES IN THE WORLD

Send for Lists of Auto Supply; also List of New and Second-hand Automobiles

1599-1601 BROADWAY, NEW YORK CITY

OR CHICAGO BRANCH

309-310-311 MICHIGAN AVENUE

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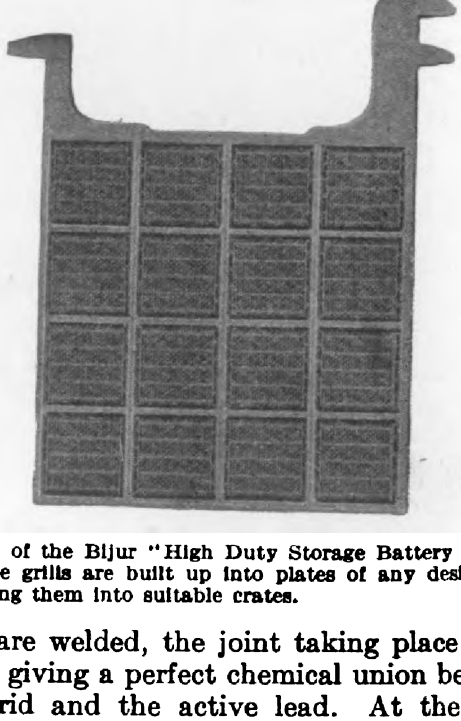
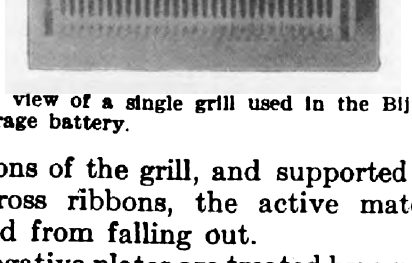
.., 42 Broadway, New York City.

Special attention has been paid to the design-
g of the battery plates which are made up
a number of grills as shown in the accom-
nying illustration. These grills are firmly
ld on both sides by the alloy frame to which



late of the Bijur "High Duty Storage Battery showing
the grills are built up into plates of any desired size
itting them into suitable crates.

y are welded, the joint taking place inter-
ly, giving a perfect chemical union between
grid and the active lead. At the same
e the strips are perfectly free to expand in
ry direction, recesses at the end being pro-
ed for elongation, while the spacing of the
ps accomodates the lateral expansion
oughout the whole life of the plate. On
ount of the active material being in very
all masses, held firmly in the spaces between



larged view of a single grill used in the Bijur "High
" storage battery.

ribbons of the grill, and supported by fre-
nt cross ribbons, the active material is
vented from falling out.

he negative plates are treated by a patented

Jefferson Ave., Detroit, Mich., has placed
the market for 1908 a new two bow top es
ially suited to runabouts with rumble se
It is so designed that there is no slanting
extending from the driver's seat to the fr
end of the top, therefore no obstruction in
way of persons mounting the seat. It is
arranged so that when folded back it is
in the way of the rumble seat occupant.

The Auto Accessories Mfg. Co's. 1908 two bow top
runabout.

The front of this top is extended forw
by means of a horizontal bow, the ends
which can be detached from the upper hol
and dropt to the eyes on the lower ends of
sockets, allowing the top to fold back wi
out sticking out in the way of the rear p
senger.

This construction is claimed to be v
rigid and the wedge shaped front is desig
to offer a minimum of resistance to the
thus increasing the speed possibilities of
car, over one fitted with a blunt front top

This type of top is also furnished for tour
cars.

Newton C. Gaunt of North Yakin
Washington, has purchased the plant of
Perfection Automobile Co., South Bend, In
and will manufacture the "Flying Dutchma
designed by him, a kind of convertible ho
car, having a sleeping room, kitchen, etc.

In the Buyers' Guide, which was includ
in our January number, the names of Jarm
& Baker, Broadway and 54th St., New Yo
City, was under the heading "Manufacture
Agents," but by a mistake in correcting
typographical error the names of the concer
that this firm represents, were shifted and a
peared in connection with the name of anoth
manufacturers' agent. Following are t
names of the manufacturers which Jarman
Baker represent: Riley Klotz Mfg. C

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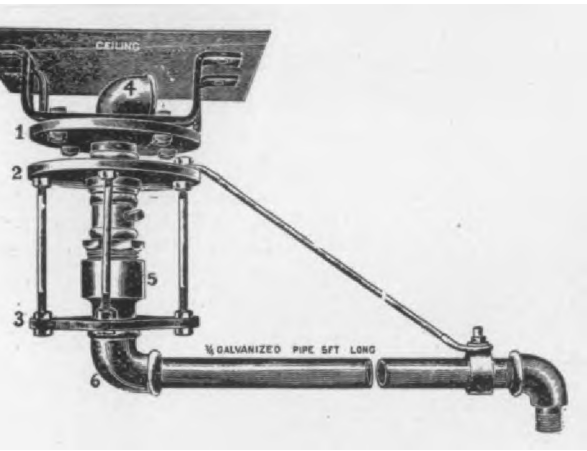
Y. City, are putting out two types of Over d Vehicle Washers, No. 1 shown herewith, No. 2 with electric light attachment, erwise similar to No. 1. Referring to the nbering on the illustration herewith, the er pipe runs along the ceiling and enters elbow (4) which is fastened to the tube ning down thru the center to stuffing box To this tube is made fast plate (1) ad- ing elbow (4), the plate being fastened to ceiling by brackets. Over the tube that s to the center of the washer a cone is ed up against plate (1). Plate (2) has rted in the center, two cups one on each , in which are steel ball bearings. One is placed against the cone which is forced



Irving overhead vehicle washer, no. 1.

against plate (1). Against the other cup orced another cone in a similar manner, is held in place by a collar which is forced r the center tube, and in turn held in place a set screw. Plate (3) is made fast to ow (6) and stuffing box (5) by a short nip- which runs thru plate (3). In the top of stuffing box (5) is a nut which, when tened down, forces the packing up against center tube. In this nut is fastened a containing steel ball bearings that come contact with the cone forced over the center e up against the lower part of the collar s making every movable point run on steel bearings, which are well packed with ase to prevent rusting. Plates (2) and (3) secured to each other by four $\frac{5}{16}$ inch rods ked tight with nuts on both sides of the tes. Plates (1), (2) and (3) are 6 inches diameter. To elbow (6) is fastened a $\frac{3}{4}$ n galvanized pipe 5 ft. long, on the end of ich is attached the hose used in washing car. A supporting rod (2) keeps the strain the revolving pipe. The distance between

of plate (1) and are insulated from the pla by four fibre cleats. In plate (2) two ho are drilled in line with the two brass rings plate (1) and in these holes carbon brush insulated from the plate, are fastened. The carbons are forced up against the brass rin of plate (1) by springs keeping a tight conta at all times and taking up the wear of t carbon brushes. On the revolving arms cluster of from 4 to 6 electric bulbs, back by a powerful reflector, are attached. Fro the lights an insulated pipe runs up to pla (2) carrying in it two wires which are co nected to the two carbons in plate (2).

The "Greenwald" Non-Skid Tread

A new non-skid tread has recently be placed on the market by the Empire St Tire Co., 200 Terrace, Buffa N. Y., in which a well kno mechanical principal is employ to prevent skidding.

The "Greenwald" Non-Skid Tread.

The tread is indented by co cal cavities so disposed that t suction produced is just suffici to arrest any tendency to sk At the same time as the s face is extensively broken these indentations, it affo many points of resistance to sudden lateral swerve.

The tread is made of tou serviceable rubber, especially n led for this purpose. It is ma in all sizes from 26"x2½" up 36"x5" and lists at $7.50, for t smallest size up to $21.75, the largest size.

Chesebro-Whitman Portable Building

Chesebro-Whitman Co., First Ave. & 64 Street, New York City, manufacture a compl line of portable buildings including mo car garages, boat houses, etc. All its hou are made of white pine, tongued, grooved a center beaded. The sections are held togetl by bolts and are easily put together or tak apart. The 10x15 ft. garage lists at $1 has large end double doors and two windo on each side.

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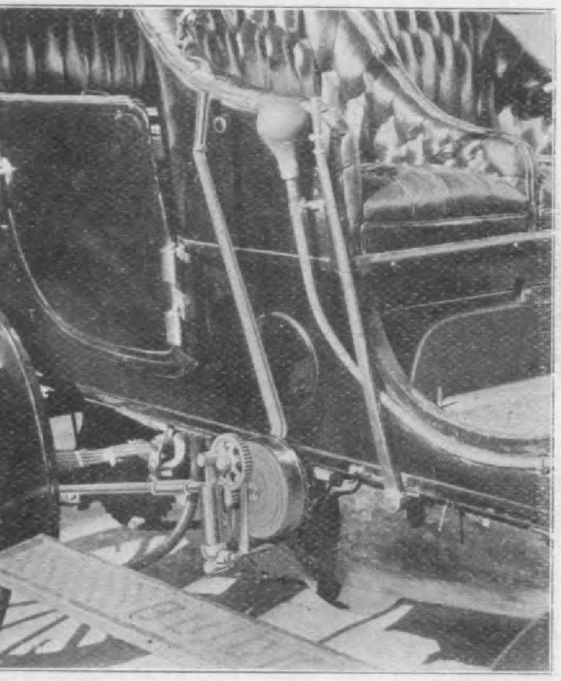
g. Co., 322–326 Dearborn St., Chicago, Ill. replaces the usual starting crank and can fitted to any gasoline automobile engine ether the same is started from the side or front of the car.

The plan on which this starter works is automatically imprison a charge of unprest gas when the engine stops and comss this charge by a forward movement of ever provided for the purpose when it is ired to start the motor again. Should the rk be advanced the lever will not kick back the tension releases instantly and allows shaft to run free backward.



e Souchet ' motor starter, with tire pump attached.

When placed on side crank cars this starter perated by a lever but on front crank cars starter is placed in front and is operated a pedal inside the car. Should the engine the imprisoned charge the charge can be laced by two forward sweeps of the lever pedal. The designer has aimed at strength, plicity and safety and the makers claim t it is impossible to be injured in starting notor with this device.

De Souchet Motor Appliance Co., also manuures a tire pump which can be attached he starter and thus operated by the motor. starter lists at $75 for the front crank e of car and $60 for the side crank type. tire pump is $15 extra.

used for the purpose of blowing dust a small obstacles from obscure places wh they may accumulate. It is made in following sizes: No. 1, 2½"x20", listing $2.75; No. 2, 2¾"x22⅜", $3.75; No. 3, 3"x24 $6.00; No. 4, 3⅓"x25⅛", $9.00 and No. 5, x32¼", $12.50. An adjustable curved mou piece of vulcanized rubber for the purpose better reaching obscure places is furnished $.90, $1.10, $1.10, $1.35 and $1.80 addition according to size.

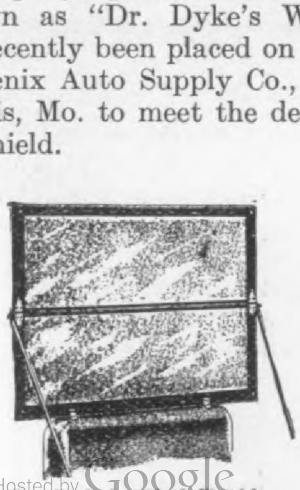
The electric automobile extension co meets the demand for a convenient meth of illuminating, when necessary, the worki parts of an electric car. The electric bulb one of the side lamps may be unscrewed a transferred to the portable socket. T portable plug may then be screwed in socket of the side lamp. The portable soc is made of polished hard rubber in which th is embedded a phosphor bronze shell. T plug is also of polished hard rubber over part of which is attached a phosphor bro screw shell. The flexible cord is 5 feet length. The list price of the device is $2.

The battery connector offered by this co cern consists of two copper lugs, one solde on each end of a 6-inch piece of No. 18 flexib insulated conductor. The list price hundred is $6.00.

The automobile cable lug is intended to used in connection with both primary a secondary cables. It is made so that insulation and braid of the cable are h firmly in place and the ends cannot break fray. The list price per hundred, is $5.00

New Wind Shield

The accompanying cut shows a new wi shield known as "Dr. Dyke's Windshiel which has recently been placed on the mar by the Phoenix Auto Supply Co., 3932 Ol St., St. Louis, Mo. to meet the demand fo low priced shield.



Dr. Dyke's Wind Shield.

The shield, stock size, is 32 inches high a

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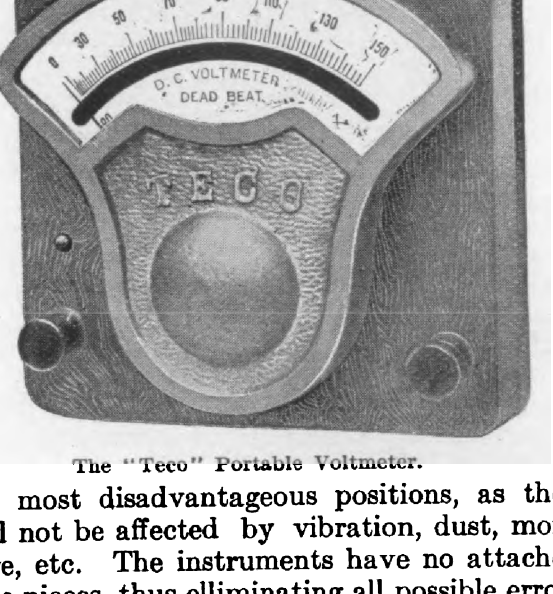
e Troy Electrical Co., 1924 Sixth St.,
, N. Y., manufactures a line of voltmeters
ammeters for both switchboard and
able use. The Switchboard instruments
of circular form, and both voltmeters and
meters are of the same general appearance.
y are made for both direct and alternating

The "Teco" Switchboard Voltmeter.

rents, and each is furnished in two sizes:
be 1, measuring 6½ inches in diameter, and
be 2, 7¾ inches. The portable instruments
ude voltmeters, ammeters, and volta-
ers of various capacities.

n these instruments no radical departures
n previous practice have been made, but
features which have proven good are incor-
ated. All the iron and stud parts are pro-
ed so that the instruments can be used in the



The "Teco" Portable Voltmeter.

most disadvantageous positions, as they
l not be affected by vibration, dust, mois-
re, etc. The instruments have no attached
pieces, thus eliminating all possible errors

increased "deadbeatness" and long life. A
difficult machine work has been eliminated
the design of these instruments, and the fe
parts used are of simple form, so that repai
if necessary, can be easily made.

Thermoid Brake Lining

This is a product of the Trenton Rubb
Mfg. Co., of Trenton, N. J., and was giv
brief mention in a recent issue of this Journ
Since that time, however, we have obtain
further details regarding the construction
this material, which we give herewith.

It has been the object of the manufactu
to produce a brake lining and clutch mater
which would not burn out from the heat pr
duced by friction, and would therefore be du
able. To obtain this result a combination
rubber, asbestos and fine brass wire are use
strands of which are interwoven with the a
bestos and special rubber. While the asbest
withstands heat it would deteriorate if e
posed to the weather, but by combining wi
it a special heat-resisting rubber the comp
sition is rendered both oil and water pro
The strands of brass wire add to the streng
and therefore increase the life of the materi
This brake lining material, which is, of cour
also suitable for clutch lining or any use whi
requires similar qualities, is furnished in
number of thicknesses and widths. Wh
this material is not cheap, it is recommend
by the manufacturer for its durability and
fectiveness as a braking material; and the c
of the amount necessary for equipping
brakes and clutches of an automobile is
small in comparison with the price of the car
to be disregarded from a cost point of vie
It is made in any length. Prices range fr
$0.65 per foot for the 1-in. wide by ⅛-in. th
material up to $4.12 per foot for the 4-in.
¼-in. These prices are list and discounts
given the trade.

The name of D. Apstein Co., Bridgepo
Conn., was unfortunately omitted from
list of makers of "Tire Repair Articles (Aut
in the annual buyers' guide in the Janu
number. This concern makes an inner t
repair plug for automobile tires and sho
have been included under this heading
well as under "Cycle Tire Repair Articles

The March number is worth the price o
year's subscription. In addition to the re
lar monthly features it will contain a comp

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Trade Printed Matter

The latest book on "Hartford" Solid Motor Tires, issued by the Hartford Rubber Works Co., Hartford, Conn., contains first an informal talk on the quality of these tires, then tells about a machine for mounting them in conjunction with a half dozen illustrations of how to use the same; gives price and size tables of the various types of Hartford solid tires and closes with a guarantee against defects. The cover illustration is a conventionalized factory view with a large motor truck in the foreground.

One of the most practical catalogs that has lately come to hand is the 1908 Reo catalog just issued by the general sales agents of the Reo Motor Car Co., R. M. Owen & Co., Lansing Mich., its most unusual and especially practical feature being a recital of the constructional changes that are exemplified in the 1908 Reo. These changes are listed on one of the pages in the front part of the book, detailed specifications and descriptive matter following. For the man already familiar with Reo construction the list of 1908 improvements and the illustrations give all the information he desires and it is surprising that this fact is not recognized by compilers of annual catalogs generally. In this respect the Reo catalog is an example worth following.

Trojan Hydro-Pneumatic Wheel Co., Watervliet, N. Y., has issued a new booklet describing the "Hydro-Pneumatic" system of vehicle body suspension. The device made by this concern takes the place of leaf springs and supports the vehicle body hydraulically and pneumatically, consisting as it does of a cylinder containing oil and air and a piston moving up and down in said piston. The maker claims for the device the advantages of both springs and shock absorbers.

The meritorious features of "Fedders" square tube radiators are clearly set forth in the new catalog and descriptive booklet just sent out by the maker of these radiators, Fedders Mfg. Co., 57-59 Tonawanda st., Buffalo, N. Y. The durability and ease of repair of these radiators and their efficiency even when damaged are all convincingly set forth and the booklet appeals at once to the car owner who appreciates all the contingencies to be provided against in making and designing a radiator.

Two thousand copies of a booklet entitled "The Man, the Horse, the Automobile and the Highways" are being distributed by Lima (Ohio) Automobile Club among horse and automobile owners. This booklet is designed to break down individual prejudices and bring about courteous behavior of all road users toward each other. There is so much common sense and generous good nature in this publication that one regrets the edition were not two million instead of two thousand so that its precepts could be more widely disseminated and more firmly established in the hearts of all road users and builders.

"Sta-Rite" spark plugs will be kept in the memory of the trade during 1908 by means of a handsome, brightly colored calendar sent out January 1, by the maker of these plugs, R. E. Hardy Co., 86 Watts street, New York city. It consists of a large hanger containing a fine lithographed portrait of "A Lady of Quality," and as the calendar pad is small and the advertisement is inconspicuous, the portrait can be framed after the usefulness of the calendar is ended by the close of the year.

High Wheel Auto Parts Co., Muncie, Ind., has issued a neat little booklet containing illustrations and specifications of various parts for high wheel, buggy type automobiles. As this company devotes its whole efforts to the production of this line of parts the booklet is of special interest to builders and assemblers of buggy type motor cars. Besides the stock parts shown in the catalog the company is prepared to build parts to any specifications.

The Philip Carey Co., Lockland, Station R. Cincinnati, Ohio, has issued a new descriptive catalog of Carey asbestos coverings including automobile and marine sheet packing made of asbestos, asbestos-metallic gaskets, etc. This book is of especial interest to manufacturers requiring steam pipe coverings and other goods of similar nature.

Merchant & Evans Co., 517 Arch street, Phila., have gotten out a special catalog on the various products they offer the motor car trade. This catalog contains forty 8x11 pages enclosed in a cream colored cover all of fine stock which shows up the illustrations and type matter clearly and effectively. This large, attractive catalog shows care in preparation and thoroness in execution, indicating the vigor with which this company has entered the automobile field as well as suggesting the success it intends to achieve in this field.

The 1908 "Exide Instruction Book" and the 1908 "Exide Sparking Battery Instruction Book," recently made their appearance, being compiled and issued by the maker of "Exide" vehicle and sparking batteries, Electric Storage Battery Co., 19th street and Allegheny ave., Phila., which will forward copies direct or from any of its sales offices. As was their predecessors, both these 1908 instruction books show great care in preparation and, representing as they do the very extended experience of this prominent company; they are valuable reference books for storage battery users.

Association of Licensed Automobile Manufacturers 7 E. 42nd St. N. Y. City, has just issued its annual handbook containing illustrations and specifications of all 1908 models made or imported by members of the association. The boo kcontains 132 pages in an elegantly decorated, mottled brown cover and is printed on the finest quality paper, the cuts showing up clearly and effectively. One hundred and fourteen models ranging in price from $600 to $8,000 are shown. A page is devoted to an explanation of the A. L. A. M. formula for computing horse power.

Kraeuter & Co., 571-579 Eighteenth Ave., Newark, N. J., who have been engaged in the manufacture of small tools for a half century, have just issued a new catalog in which are listed a large number of tools used extensively by automobile manufacturers and repairers. Interest in the catalog is excited by a statement on a circular enfolding it, to the effect that "you will find money in this new catalog." Special prominence is given their "Victor Universal Plier."

Tincher Motor Car Co., South Bend, Ind., has just issued its 1908 catalog of the Tincher 4-cylinder, gasoline car. Good, clear half-tone illustrations, large, readable type in brown and a good lay-out of the matter all combine to make and atractive but dignified catalog, and it impresses one as a suitable introduction to a high grade car.

The New York Sporting Goods Company, of 17 Warren street, New York, have issued their 1908 Catalogue of Bicycles and Supplies, and a copy will be sent to any dealer who writes upon his letter-head or encloses his business card. This book is attractively gotten up, and its small size, 5x7 inches, makes it convenient to carry in the pocket.

A unique, practical and attractive calendar has been sent out by The National-Acme Mfg. Co., of Cleveland, Ohio, maker of a line of screw machines. It consists of an easel slotted to admit a pack of 8x11 sheets, two rectangular portions of the top sheet showing thru openings in the front of the easel. A sheet is provided for each month, with the calendar on the lower half of the sheet, and an illustration of a machine or part on the upper half.

Acme Non-Freezing Solution

The Acme Auto Equipment Co., 1461 Michigan Ave., Chicago, Ill., are putting out a non-freezing solution called the "Acme," which it claims will not corrode or foul the water pipes, and will not freeze at temperatures down to 35 degrees below zero, the non-freezing qualities depending of course, upon the strength of the solution. It is also claimed that the Acme solution will not boil at 260 degrees, and prevents the cooling water from boiling or foaming. One gallon of sulution to one gallon of water is the strength recommended for zero weather. Price for a two-gallon can is $2.00, and for a 5 gallon can, $4.00.

Schubert Aluminum Bodies

The Schubert Brothers Gear Co., Oneida, N. Y., the well known body builders, are now making both aluminum and wood bodies, and since last March have been supplying seven well known manufacturers of American cars with aluminum bodies. They make a specialty of aluminum bodies, altho continuing to cater to the demand for wood bodies also. They employ two aluminum beaters, highly skilled in the art, fully experienced in beating aluminum with automatic hammers.

The frame work of Schubert aluminum bodies is constructed of ash and the panel work is made entirely of hammered aluminum, with aluminum moulding thruout, and attached to the body by concealed screws. The tires are 36x5 inches all around and are of the Fisk demountable variety, the driving tires being fitted with tire chain grips.

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e Keystone Motor Car Co., Philadelphia, Pa.

ıew building of the Keystone Motor agent fo the Packard and Buick cars, ently been completed at 216 N. Broad ladelphia, and was opened December 7. The handsome structure which as e building is in a class by itself. was at a cost including the land of $300,000. noving spirits of the company are Mr. Godschalk and his son, Clarence A. lk. The younger Mr. Godschalk in the Fall of 1903 at 238-240 N. St. as agent for the Rambler, Stearns

. General view of the show room of the Keystone Motor Car Co., North Broad St., Philadelphia., Pa., agent for and Packard cars. The new building is a fireproof structure of reinforced concrete. All the appointments are of atest type.

d cars and in 1904 took the Packard In 1905 all the cars were dropt ex- Packard and the Autocar was taken dition. In 1906 he became agent for ck in place of the Autocar having the Packard agency since 1904 and k since 1906.

age of 53 feet but at about half the depth the structure widens to 70 feet and has a total depth of 200 feet, affording ample room for the large garage, repair and storage departments as well as for the unique display room at the front, a handsome suite of offices, a ladies waiting room and what amounts to a complete Chauffeur's Club, comprising recreation and reading room with billiard tables, cafe, barber shop and shower bath.

GENERAL ARRANGEMENT.

The show room is illustrated herewith and gives an idea of the lofty ceiling with its 336 electric lights and its splendid day lighting by lofty windows on the front and one side. The floors are granolithic and the heating is by steam from a complete plant in the basement, No cars entrance or exit thru this show room at the front, the entrance to the garage being at the rear thru Carlyle St. to Race both being broad and affording uninterrupted access to the building for cars even

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mezzanine floor, upon which are located a cozy ladies waiting room, two handsomely

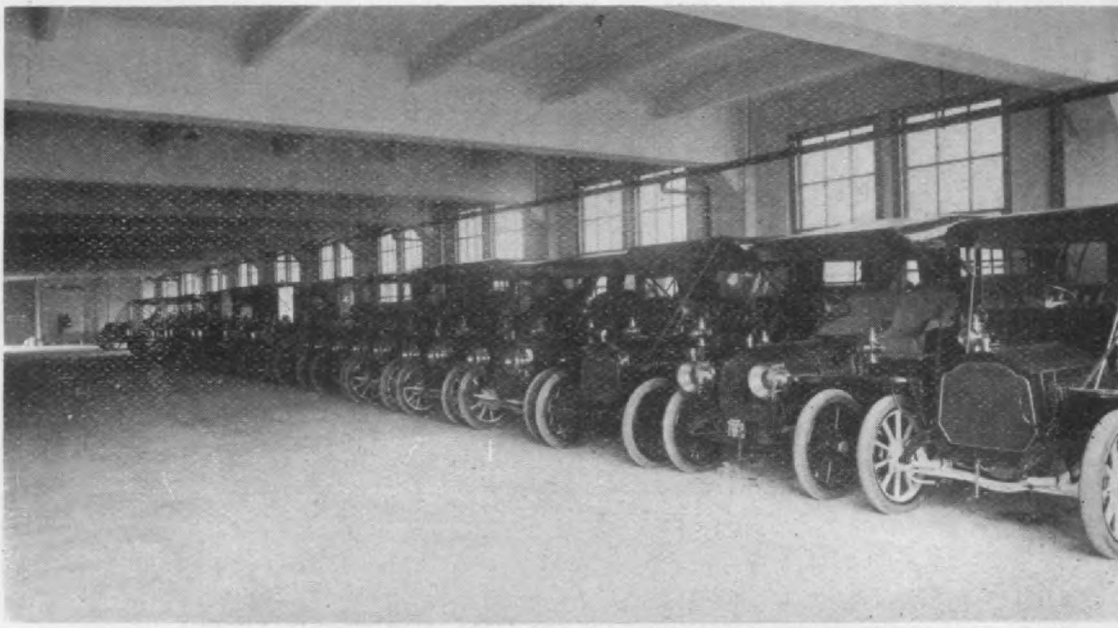

Fig. 2. Keystone Motor Car Co., Philadelphia. View of one side of one of the garage floors. Note the entire a pillars. The structure is claimed to be absolutely fire proof.

fitted private offices and along the right side with windows from floor to ceiling on one side and a line of smaller windows into the garage are the spacious general offices.

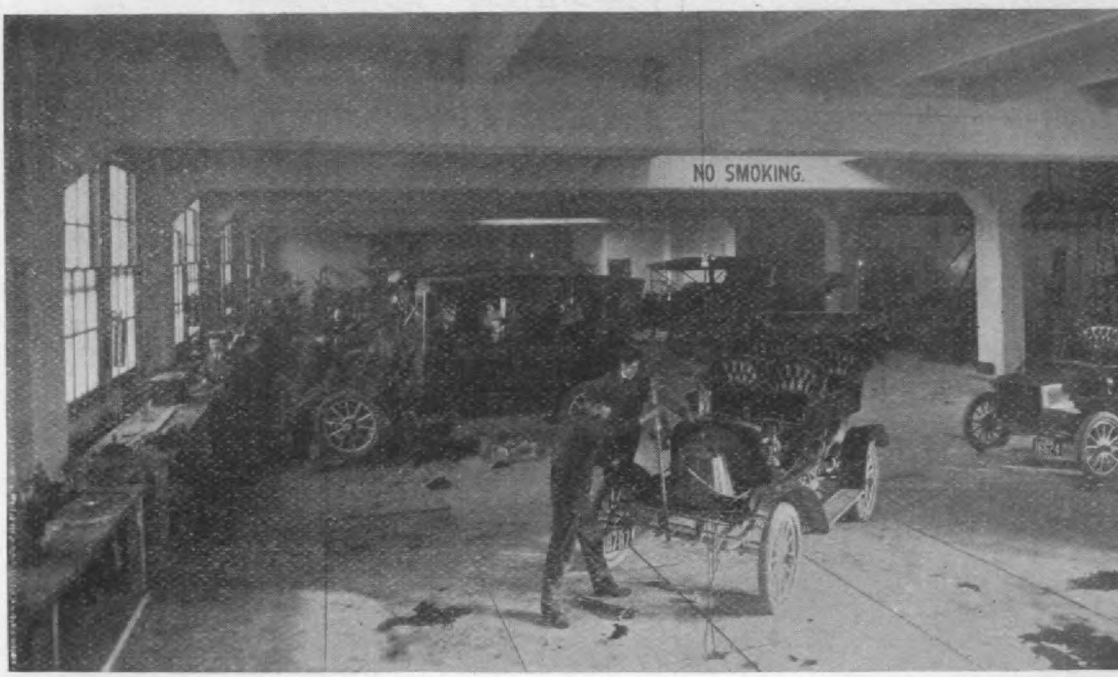

Fig. 3. Keystone Motor Car Co. View showing part of the repair department where 40 cars can be overhauled at o

CHAUFFEURS QUARTERS.

Back of their offices the floor narrows to a balcony on one side leaving the first floor

even to go out for meals or a shave
want has been supplied. The men a

always within telephone call, after r
for duty. A separate telephone exch
of course maintained in the building.

On the next floor is a very large

extending from the front to the r
unobstructed by posts the floors being o
and the ceiling of concrete beams.
foot electric elevator protected by

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ling in the usual fire proof vaults and mp rooms are provided on each floor ed with measuring pumps and also tank outfits. The fire escape instead on the outside consists of an entirely winding stairway of concrete.

e garage entrance is a small office for ker who keeps a strict account of the and outgoing of the cars and drivers, rds showing at all times which cars s are in or out.

REPAIR SHOP AND STOCK ROOM.

e top floor the entire rear end comprises ir department where all cars can be simultaneously if necessary. Along e under the windows are the hand and on the other side the small but ipt electrically driven machine shop, m and foreman's office are located.

Keystone Motor Car Co. The recreation and oom of the chauffeurs. At one side can be seen the quick lunch counter, where meals are served ble prices, and thru the arch the corner of the p is seen. Here the drivers spend their leisure hin telephone call.

e cranes and large and small arbor or resses are in evidence, in fact, every for handling the motors and parts are d.

ork on cars is done under the maker's of the car. This number must be used orders and requisitions. Every work- repair jobs is required to sign a slip who did the work so that blame can be located. A special inspector is ed who passes upon all work and a tester is also on hand whose duty it est out all cars after overhauling or

kept on cards upon one side of which goods received are recorded and upon the other side of which the data from the requisition blanks showing the outgo is posted daily. A dumb waiter leads directly to the parts department in the display room. This stock room is a model of system and is well lighted overhead as well as from the entire front and one side. When desired, owners goods can be stored in the stock room.

City Hall Garage Co.

SAN FRANCISCO, CAL.

Mr. C. M. Rolfe of the City Hall Garage Co., 54-72 Fulton St., San Francisco agents for the Dolson cars corroborates the opinions expressed from time to time in these columns by other agents, that the majority of car sales are directly due to personal work rather than to advertising in the daily papers. He states that the City Hall Garage Co. do very little newspaper advertising but follow up a prospect until he either buys or quits. This following up in mainly by personal call demonstrations, etc., and not so much by letter.

A well equipt garage is operated in conjunction with the sales room and a high class of trade is catered to, a stiff price being charged but such excellent service given in return that all are satisfied. Cars are never taken in simply to fill up the floor. A complete machine shop fully equipt with lathes, drill presses, shapers, milling machines and power saws is also maintained and also a blacksmith shop and complete bench equipment for hand work. Second hand cars are not taken unless absolutely necessary and then they are immediately hurried off to a second hand dealer for disposal and none but new cars are offered for sale in the show rooms.

Mr. Rolfe has found outside salesmen to be as a general rule, unsatisfactory, the majority of them simply looking for pay day when on salary. No special set of rules are laid down for the salesmen, all that is desired is results and if the sales are accomplished along honorable lines, that is sufficient and as expressed by Mr. Rolfe, "Vat ve vant is orders." These men are paid both salary and commission as the salary proposition alone has been found unsatisfoctory A set amount is allowed each month for expenses and then deducted from the commission.

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The agents condition could be sometimes

A Plea for Special Discounts to Legitimate Dealers

SPOTSWOOD N. J.

The gentleman from Missouri, Mr. Griep, in the December issue of your Journal, I trust has started the "ball a-rolling."

The demand, and the fact that manufacturers desire to introduce cars and accessories, has no doubt a lot to do with the present state of affairs among agents. But the day is coming when the manufacturers will have to look to those that are devoting their time and attention solely to the automobile business.

Recently, as an owner of a car, I received a price list from a house in New York city offering standard supplies at prices lower than, as a dealer, I can buy the same goods at wholesale, and if they bought $10.00 worth they will be delivered free at this cut-shop rate. These cards were sent out to those registered at the state capitol. How are we to meet such cutting of prices, and what excuse are we to offer our customers for asking more than they can buy the same goods for elsewhere.

These supplies are not the "no name" kind or the "just as good" kind but are standard well known products. The prices being in some cases lower than jobbers net prices and in others only a few cents above. The full line offered in fact are just the goods that we and the other dealers try to carry on hand to supply customers.

If the manufacturer has over produced, as in many cases they no doubt have, let them put the goods out under another brand or name, not kill the sale of something that the dealers have been advertising and working to introduce for them and maybe has a stock on hand that will be a loss. Does not this, in many cases prevent the smaller dealers from buying in larger lots?

Not alone is all of the trouble due to the manufacturer. The jobber is not particular as to whom he sells at wholesale. Any one that is agent for a car gets the regular trade discounts. This is not fair. Jones & Smith are agents for the "none such" cars, they got the agency so as to get their own cars at cost, sell a few to their friends at possibly a profit of $10.00 or $20.00 a car, no matter whether the customer is in their territory or not, and fit them up with what extras are needed at a small profit, because they are not dependent on these profits for an income thus doing the man that runs a supply and repair shop out of his legitimate profits.

If the manufacturer and jobber have to give every agent for a car trade discounts, why can't there be a distinction made, between the man that devotes his attention solely to the Automobile business and these "butcher, baker and candle stick" agents? Give the *legitimate* dealer a different discount so he can meet the price of these cut price agents.

Some time ago we made application for the agency for a certain car that we considered the best and were told that the makers did not care to place agencies with those that were in the repair business, as they thought their interest would not be so carefully looked after. After a little assurance as to the contary we secured the agency. Another manufacturer says in his catalogue "we do not allow discounts excepting to bona fide automobile dealers who are properly equipped to conduct their business successfully and serve the best interests of owners." One of these makers is selling cars as fast as they make them, the other ing and trying to force agents to take more cars than they can hope to sell, and takes Tom, Dick and Harry for agents.

How many of these T. D. &. H. agents have any facilities for looking after the cars they sell or know how? How many of them keep any extra parts on hand? They should only be allowed subagencies. If the manufacturer would stop this indiscriminate establishing of agencies and when he has a customer for a car in a certain territory, ascertain if there is a reliable dealer in that section and ask him to look the customer up and report, the condition of the agents would be improved. This of course applies only to the trade out of the cities. The manufacturers that are establishing their own agencies in the larger cities are to a certain extent helping this point.

DISCOUNTS ON PARTS REFUSED.

Some of the manufacturers go so far as to say, when parts are ordered to repair their cars, you are not agents for our cars we cannot allow you dealers discounts. Must we be agents for all the cars that come into the shop for repairs? We only wish the profits of the business would permit of it. One or two of these manufacturers, we have brought to time, by putting it to them thus, "if we can't get parts at dealers prices we will not repair your cars that come to the shop."

When there are two or three cars of one make in our section we at all times try to keep on hand a supply of such repairs as are generally needed.

These T. D. &. H. agents add to their regular business cards "agents for —Cars" and work the supply houses for trade prices, and get them.

We believe that, if the repair shop and dealers will take this matter up and stand together, the evils mentioned can be overcome, and the manufacturer of cars and supplies, also the jobbers made to see, that to us they must look for the sale of their goods.

Call the manufacturers and your jobbers attention to any cutting of prices and ask them to stop it. This and conserted action on our part will ultimately bring the trade to its proper channel. We hope others will join with us, and express their opinions.

A DEALER AND AGENT

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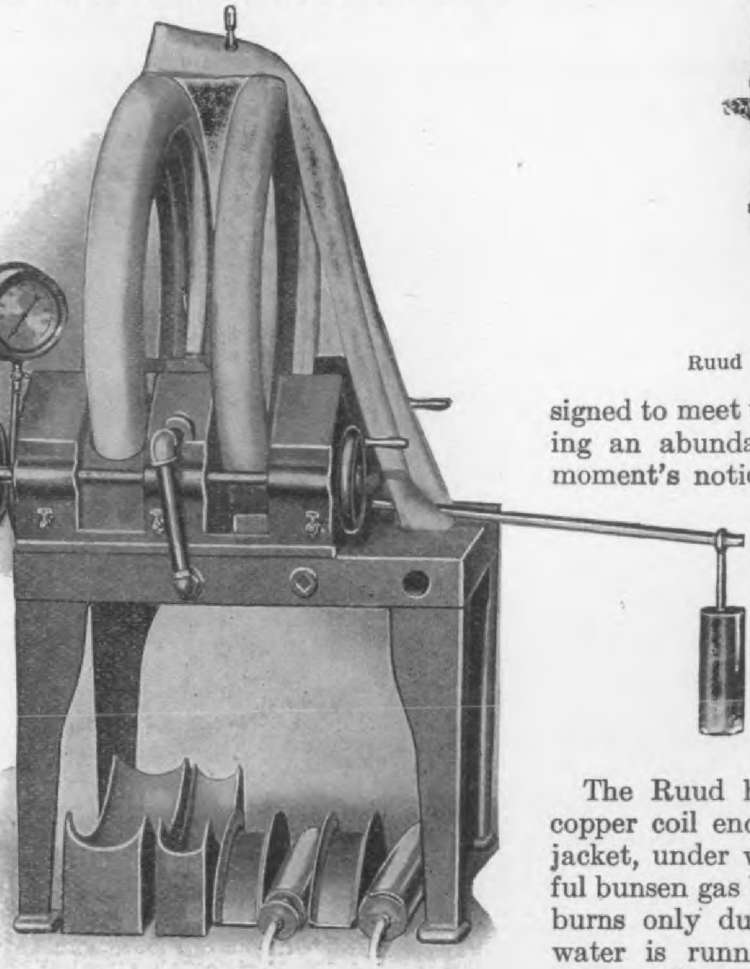
ek as a result of several meetings held
ne course of the show. The object of
nization is to promote the interests
connected with the automobile and
usiness.

ssociation has a charter membership
. The annual dues are but $2.00.

ting of the Executive Committee of
ciation was held at the Auditorium-
Chicago, Dec. 30th, at 1 o'clock P. M.,
time a considerable amount of gen-
iness was transacted, such as the
of a form of letter which is being sent
lealers, application blanks, member-
ds, etc. A contract was also let for
ing of a book which will contain the
ion and by-laws and a lot of general
ion regarding the object of the as-
.

"Empire" Sectional Repair Vulcanizer

Empire sectional repair vulcanizer,
shown, is manufactured by the
State Tire Co., 200 Terrace, Buffalo,



quides on the flat vulcanizer. Plenty of flat surface is also provided for inner tube vulcanizing and similar work. The cut shows the three different jobs, a clincher tire in position on the left, a single-tube tire in the center, and an inner tube to the right on the flat press. The vulcanizer can be furnished either for direct steam connection or to be operated by a gas burner. The price of the vulcanizer, when designed for steam connection is $200.00, and with dished bottom plate for gas burner, $275.00. Air bags and bead molds are charged for extra.

The "Ruud" Water Heater for Garages

The Ruud instantaneous automatic water heater built by the Ruud Manufacturing Co., 340–342 Second Ave., Pittsburg, Pa., is de-

Ruud Water Heater for Garages

signed to meet the requirements of places needing an abundant supply of hot water at a moment's notice. This heater should appeal especially to the garage owner, public and private, as an economical method of furnishing hot water for washing cars, etc; the claim made by the manufacturers being that twelve gallons of scalding hot water can be had for one cent.

The Ruud heater consists of a very long copper coil encased in an insulated cast iron jacket, under which is placed a set of powerful bunsen gas burners. The gas in this heater burns only during the actual time that the water is running, consequently there is no

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wrenches, Frank Mossberg Co., Attleboro, Mass., is placing on the market the wrench display stand shown herewith.

The stand is made entirely of metal and is capable of holding twenty different types and

sizes of wrenches. It is 17 ins. high with a 7-in. base in diameter, and is nickle plated and highly finished. When it is full of wrenches it makes a very attractive window or show case display. The stand is offered in conjunction with three different assortments. Price is $2.00, without wrenches. The Mossberg line includes 32 sizes and styles of wrenches ranging from 5 to 10 inches long.

Every Dealer Should Read the March Journal

Every dealer should be informed not only in regard to the cars he handles but, as far as possible, in regard to other makers as well. The 8th annual complete vehicle review, which will be a part of our March number, will enable dealers to inform themselves quickly and without labor of the main features, specifications and exterior appearance of all models of all makes of American motor cars as it will contain concise specifications and illustrations of every American car on the market. These specifications will be com-

models and different makers. If no
scriber commence your subscription
March number and be properly prep
the opening of the selling season.
per year. Cycle and Automobil
Journal, 49th and Market Sts., Phila.

Retail Notes

Bowman Automobile Co., Sidney B.,
York City, formerly handling the Chad
will hereafter have the agency for the
and the Clement Bayard.

Bernstein Brothers, of Marshaltown,
erect a garage at 12 N. First street, to c

Braley, A. L., is fitting up a garage
street, Fairhaven, Conn., which will
capacity for about forty cars.

Bergers Automobile Company, of Oma
will occupy the old First Christian ch
garage when alterations are completed.

Commercial Automobile Co., of M
Wis., will handle the Logan cars d
season of 1908.

Colliday Motor Car Company, of M
Wis., agents for Welch, Wayne and Ma
will build a two story garage 75x125 fe
will furnish nearly 20,000 square feet
space.

Cuyahoga Motor Car Co., will ere
story garage, 45x130 feet, at 10,457 Eucli
Cleveland, O.

Cox, Joseph F., manager of the Carlt
on St. Marks' place, Brooklyn, N. Y.,
appointed local agent for the Corbin.

Dunham, George J., 182 Columbus ave
ton, Mass., has been appointed agent
"Full Jeweled" Corbin cars, the local
the Corbin Company having been disco

Dupent Garage Company, 2020 M stre
Washington, D. C., agents for the Colu
Corbin cars, has taken the agency for
line of automobiles.

Fletcher Cowherd Automobile Com
Kansas City, Mo., has built a one story
garage, having a floor space of 10,0
feet, at Thirty-second and Troost.

Howell Company, The R. G., has be
porated under New York state laws, a
located at 1657 Broadway. The com
have the agency for the Northern car.

Newby Automobile Company is b
garage on West Broad street, Muncie,

Ogdeny, D., of Columbus, Ind., has
construction an automobile garage whic
opened about April 1, 1908. The buildi
fully equipt with complete repair shop
ber tire vulcanizing plant, and will have
floor space of 7,000 square feet with
and story above.

Roberts, O. G., of East Side. Colu
will erect a garage on the south sid
street, between Seventeenth and Miam
The garage will be 76 feet wide, 145
and will cost $6000.

Rambler Garage Company, of Milwau
has purchased the entire stock and
of the Milwaukee Motor Car Supply C

Rust, W. R., has opened a garage
Barbara, Cal., at the corner of West O
Chapala streets.

Ransom, C. S., formerly manager o
bany Garage Company, Albany, N. Y.
tained the agency for Albany for the
Stevens Duryea cars.

Russell, J. S., of New Orleans, La., h
the agency for the Glide cars in the
states.

Speare Automobile Company has open
on Exchange street, above Federal, Port
where the Ford cars will be handled.

Smythe, Robert, has opened a garage
room at 816-820 Eighteenth street, Roc

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Dealers' Spring Openings

The plan of the Chicago and New York automobile trade associations to hold a "carnival" opening week, at the beginning of the selling season, is a good one and might well be followed by dealers thruout the country in big cities and also little ones. It is especially advisable to hold special opening weeks this year in view of the fact that both national and local shows have been held early this season and many individual purchasers will have had a chance to forget before the actual selling season opens.

The "opening week" scheme gives these and other prospective purchasers another good chance to study the various makes of cars just before the opening season; it works up enthusiasm among those who might not think of buying just yet, but who would buy if interested; it excites plenty of newspaper comment and keeps the general public informed that the automobile trade is alive sowing seeds of future sale harvests and is altogether an excellent trade stimulant.

In the Chicago spring opening which commences March 28, decorations will be uniform in each of the salesrooms, and numerous attractions will be secured to make the event a success. Prizes will be awarded the three best decorated machines in a trio of auto parades to be given during the week.

Automobile manufacturers have spent a tremendous amount of money in exhibiting at national shows and a number of large local shows have been held, but a large part of the indirect benefit of these shows will be lost if the various dealers thruout the country do not get into touch with those whose interest may have been partly excited by these large shows and the "opening week" is the best method of getting hold of these partly interested persons.

Where there are no trade organizations some one dealer should get the other dealers together to decide upon the date and details of the spring opening week.

New York Automobile Trade Association to Hold an "Automobile Week"

The New York Automobile Trade Association held a special meeting at the Hotel Cumberland January 7, for discussion regarding an "Opening Week" or "Automobile Week" in the early spring, president Percy Owen presiding.

It was the sense of the meeting that such an "Automobile Week" be held in the early spring and upon request the chairman appointed a committee with Gen. Cutting as chairman to work out the details.

The next meeting was held January 15 in the same place and definite arrangements were completed. The carnival will be during the week of April 6, 1908.

"Rex" Chemical Engines for Garages

Rex Fire Extinguisher Co., 72-76 Cortlandt street, New York, are furnishing hand fire engines for use in garages and other places where a portable chemical fire extinguisher is of value. Two types are offered, one of 40-gallon capacity and the other of 30-gallon capacity. The list price of each is $200. These engines are easy to handle, being mounted on light wheels and are accepted by the New York Board of Underwriters.

Retail Notes

Temple Automobile Co., Ralph, of Chicago, Ill., has secured the agency for the Babcock electrics in that city.

Wallace Buggy Co., Chattanooga, Tenn., has secured the agency for the Motor Car Company's (Detroit) product.

Temple Auto Co., Ralph, of Chicago, Ill., has secured the agency for the product of the Rapid Motor Vehicle Company.

Worthing Automobile Company, of Fond du Lac, Wis., has secured the agency for the Jackson cars in the northern part of the state.

Walton, James A., of Atlanta, Ga., will hereafter handle the Babcock electrics in that vicinity.

Williamsburg Auto & Storage Company, of 159-161 Clymer street, Brooklyn, N. Y., has taken the agency for the Matheson car in addition to the Autocar Company.

West-Stillman Company, Broad and Race streets, Philadelphia, Pa., has taken the agency for the Pope Waverly electric.

Yarnell Auto Company, Minneapolis, Minn., agents for the Elmore car, has opened a salesroom at Second street, South, between Seventh and Eighth.

Roberts, Fred, owner of the Empire garage at Marysville, Cal., has purchased the garage formerly conducted by W. B. Grow. The acquisition will be consolidated with the Empire.

Southwestern Automobile & Motor Vehicle Company, of Muskogee, Ind., has taken the State agency for Pope Toledo cars.

Wayne Automobile Company has recently closed with the following as agencies: A. L. Standfield, Edgar, Ill.; J. L. Mott Co., Trenton, N. J., and T. S. Everitt Land Co., Redfield, S. D.

Young & Son, Charles, have filed plans for the erection of a garage 50x120 feet, southwest corner of Forty-second and Chestnut streets, Philadelphia, Pa.

Zamboni & Sons, C., Owatonna, Minn., are contemplating the erection of a first-class garage.

The Supplementary Spiral Spring Co., of St. Louis, Mo., has changed its agency in Chicago, and its product is now being handled by Messrs. Page & Palmer, 1712 Michigan avenue.

Your prospective customer will have informed himself of the good points of many cars, probably he will read the March Journal and learn the features of all American cars; can you afford to know less than he when he calls to inspect your line? Concise specifications and illustrations of all models of all American makes of cars will appear in the 8th annual complete vehicle review in the March Journal. A word to the wise dealer is sufficient. The subscription price of the Journal is $2.

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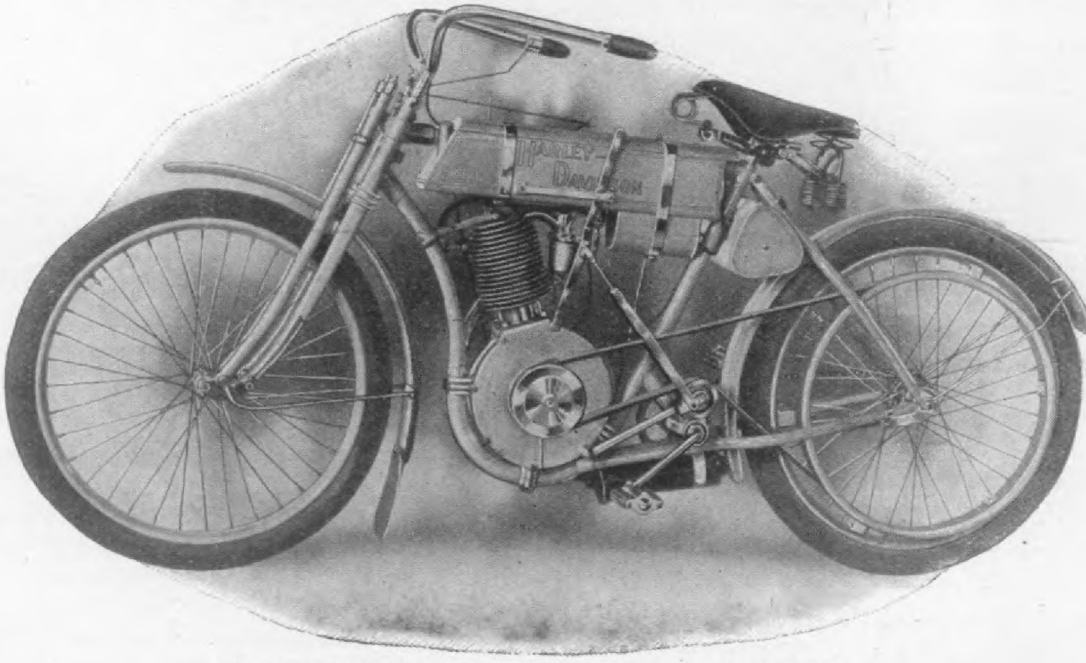
Harley-Davidson 1908 Motorcycles

Detail refinements designed to add to the comfort of the rider and the general efficiency of the machine, are the chief changes on the Harley-Davidson single cylinder motorcycle for 1908. This machine is the product of Harley-Davidson Motor Co., of Milwaukee, Wis., who also have a new 2-cylinder model. The twin cylinder motor has 3⅛x3½-inch cylinders, and develops 6 horse power. It is placed in the frame at an angle of 22 degrees. The gasoline tank holds 2 gallons. Two coils are used in conjunction with a single set of dry cells. This 2-cylinder model weighs 165 pounds and lists at $275.

The Harley-Davidson single cylinder motorcycle has been on the market over four years; the first model, which was not marketed, having been built in the summer of 1903. The following year the machine was offered the trade with a 3¼ H. P. motor, and since that time the entire efforts of the maker has been devoted to perfecting this model. Naturally, therefore, the 1908 improvements are not radical. The tanks now used are rounded and the filler holes are larger, the

muffler on the 1908 machine. Th that operates the belt idler now in a slot which is provided with ment stops so that the tension on can be held at any desired degre formerly the lever would only s full on or full off position. A p feature of the 1908 Machine is i mudguards which measure 3¾ across, and the front guard is fitt a leather flap depending from th end.

The same Harley-Davidson 3¼ motor is used and is controlled, f grips, the left grip controlling the and the right grip the throttle. $210. Friction clutch to allow a gine is furnished at $15 extra, an speed gear at $40 extra.



Harley-Davidson 1908 Single-Cylinder Motorcycle.

A Motorcycle Garage

F. B. Widmayer, the first dealer York to handle motorcycles, has se his salesroom and repair and stor partment. The former remaining Broadway, while the latter has bee lished at 2384 Broadway. The new lishment will be in charge of Georg will be equipt with power pumps, and drill presses and will be condu

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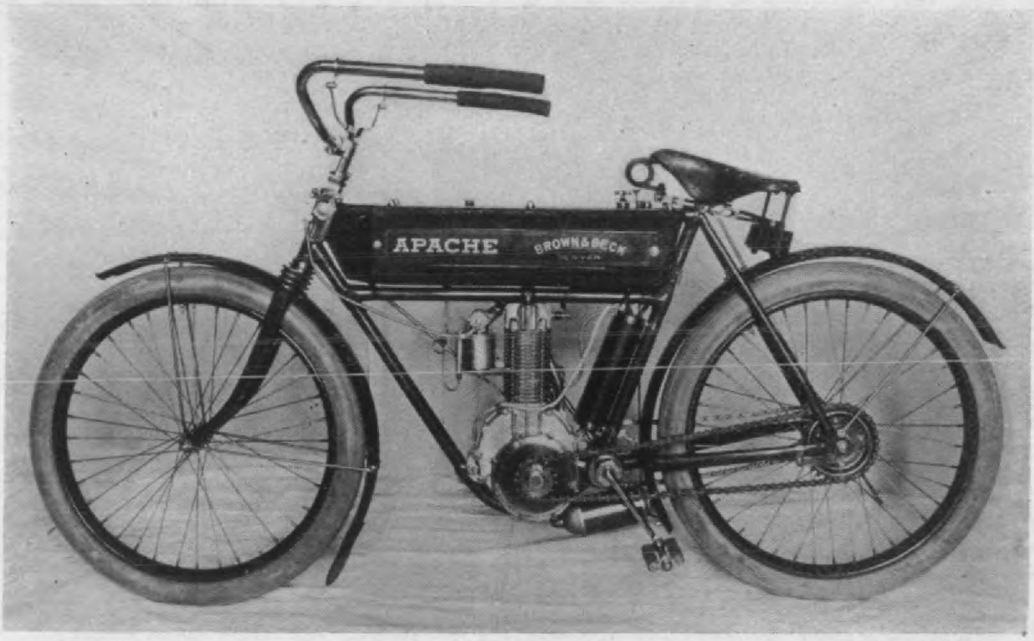
vn & Beck, 1737 Champa St., Denver, do, are ready with their 1908 Apache cycle of single cylinder type, which we erewith. They have also placed on the a Buggy Attachment for Motorcycles, body is of wood, is highly finished, and has an upholstered cushion seat. The dash is of leather. The seat will carry an average sized person and a child of about 10 years of age. The carrying capacity of the attachment is



1908 Apache motor cycle.

is also illustrated herewith. The 1098 e Motorcycle has a 3 H. P. Thor engine he Thor 1908 carburetor. The trans- n is thru internal gears, which do away he short chain previously used on Thor s, and a ¼-inch roller chain to a com- ing sprocket. The tank contains 2

Apache buggy attachment.

of gasoline, ½ gallon of lubricating oil, ree dry cells. Lubrication is by an

200 pounds, and with this weight in the buggy and a medium sized man on the machine, a speed it is claimed of 30 miles per hour can be attained. The manufacturers state that the power developed by the Apache motor is sufficient to carry such a load up all ordinary hills. They also state that the cost of operation of this little machine should not exceed one cent per mile. The finish is in dark blue, carefully hand rubbed. The price of the complete machine is $300.

The Philadelphia Sportsmen's Show Association recently incorporated in Philadelphia, headquarters at 216 Odd Fellows Bldg., will hold a sportsmen show in the First Regiment Armory the week of March 9 to 14. The show will include departments devoted to bicycles, motor boats and motorcycles.

The Hornecker Motor Mfg. Co., has removed from Whiting, Ind., to its new factory at Geneseo, Ill., which is now in full operation turning out 1908 models of "Torpedo" motor cycles. The Hornecker Company has better railroad facilities at the new location, and also has additional capital so that it is in fine shape to handle a large volume of business and make prompt deliveries. The new factory

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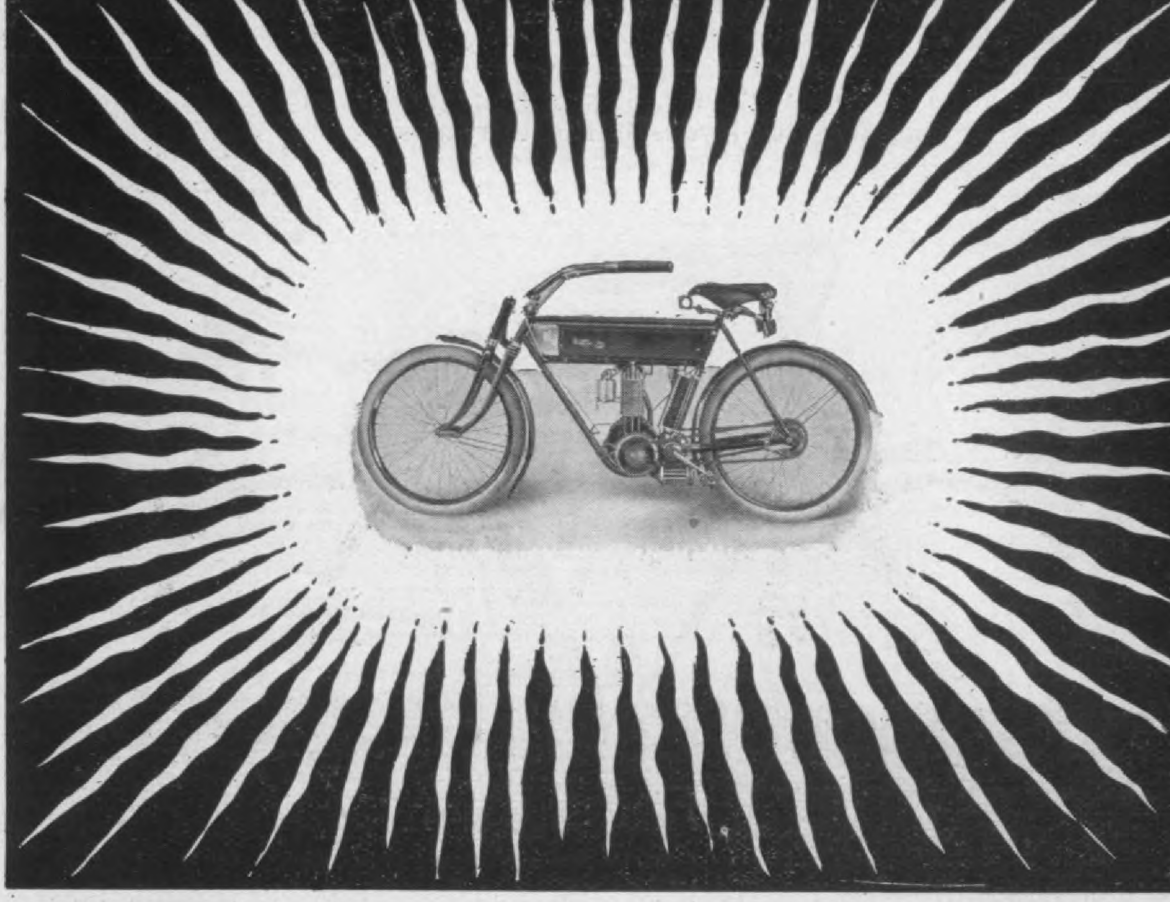

The LIGHT

THE GREATEST OF ALL MOTORCYCLES

LIGHT MFG & FOUNDRY CO.
POTTSTOWN, PA.

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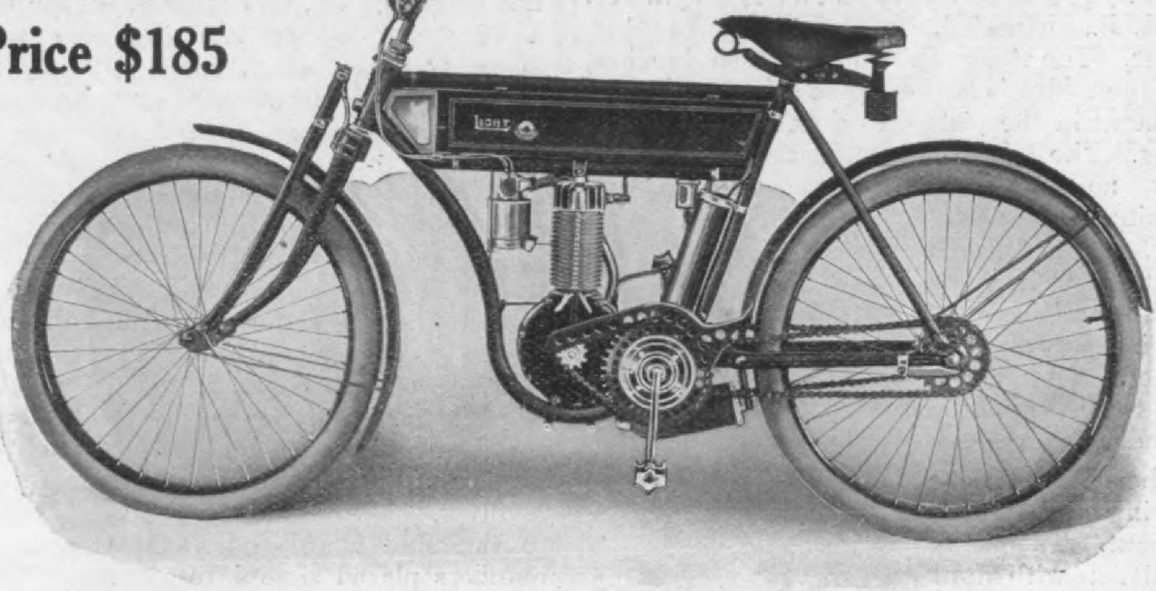


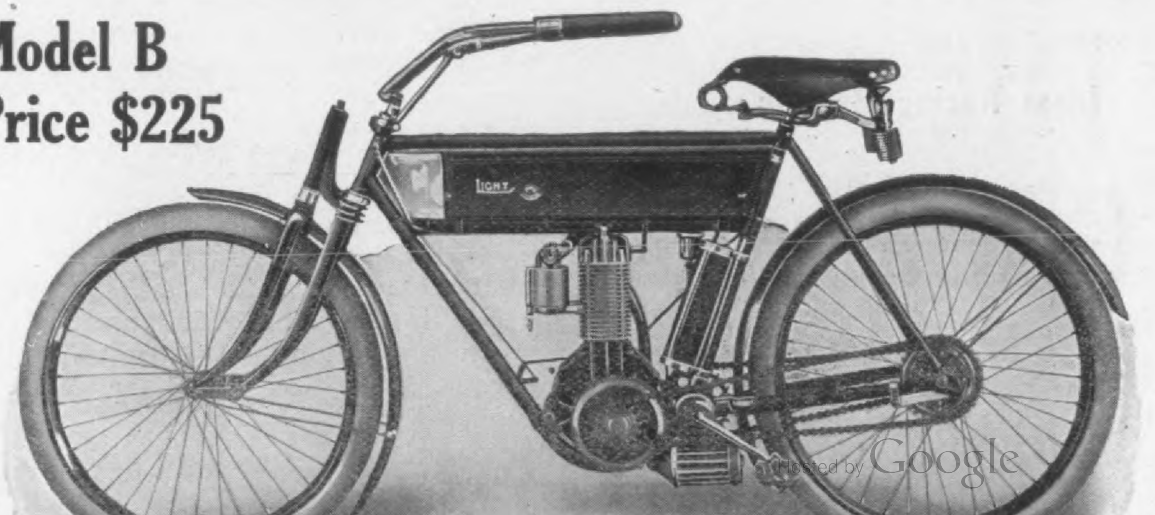
LIGHT MOTORCYCLES

Single and Twin Cylinder 2¼, 3 and 5 H. P. Chain and Gear Transmission. Up-to-date and practical features. Simplicity, Power, Speed, Durability. Price $185 to $300. Magneto extra. A post card will bring you full particulars of these wonderful machines. *Quality* is our watchword. We give the greatest values for the least money.

The LIGHT MFG. & FOUNDRY CO.

MOTOR DEPARTMENT

Hanover and 4th Streets :: Pottstown, Pennsylvania



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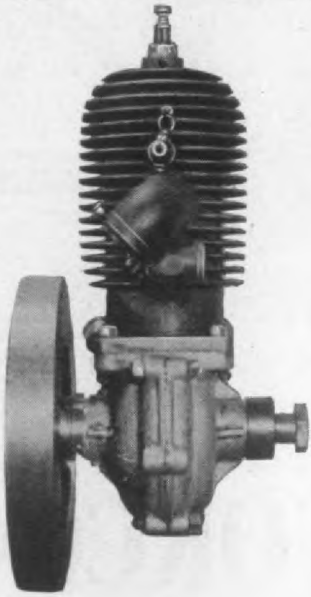
$2\frac{3}{4}$ H. P., air cooled, 2-cycle motor for motorcycles. The stroke and bore are each 3 inches, and the motor is of the 3 port type. One port is placed in the piston, to do away with back firing. The head and cylinder are in one so that no joints or packing are necessary. The finished motor weighs 38 pounds and measures $13\frac{1}{2}$ inches, from the bottom of the crank case to the top of the cylinder.

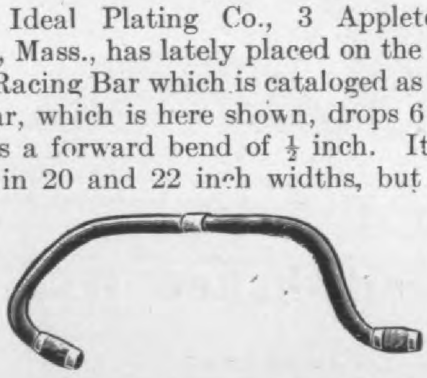


Phosphor bronze bearings are used thruout. The piston is fitted with four rings, three at the top and an oil ring at the bottom. The list price with aluminum crank case is $75. The manufacturers also sell complete castings with blue prints to those who desire to finish their own motors. The only parts of the machine requiring machine work are the piston and its rings, the cylinder, connecting rod, crank case, crank shaft, fly-wheel and pulley, and the whole motor can be finished on a lathe with a 10 inch swing excepting the connecting rod, which will require $13\frac{1}{2}$ inches swing. Blue prints for each part of the machine are furnished with each set of castings and the sets list at $15 with cast iron crank case or $18 with aluminum crank case.

The makers advise us that this motor has been thoroly tested during the past season, and found it to cool perfectly and give entire satisfaction.

Ideal Racing Bar No. 11

The Ideal Plating Co., 3 Appleton St., Boston, Mass., has lately placed on the market a new Racing Bar which is cataloged as No. 11. This bar, which is here shown, drops 6 inches, and has a forward bend of $\frac{1}{2}$ inch. It is furnished in 20 and 22 inch widths, but can be



Los Angeles, Cal., have placed on the
a very simple Speedometer for cycl
motorcycle use, which has been design
the purpose of meeting the requireme
all persons who desire a speed indicating
at a very moderate price. This devic
at $3 and is simple in the extreme. I
sists chiefly of a ball which slides up and
one of the spokes of the front wheel
restricted in its motion by a spiral sprin
end of which is attached to the ball an
end to the hub end of the spoke. As the
revolves, centrifugal force drives the bal
ward toward the rim of the wheel bu
spiral spring restricts this outward mot
proportion to the speed at which the
revolves. A gage or index plate is att
to the mud guard rod and is marked
numbers placed similar to the marking
thermometer, and as the ball on the sp
thrown outward by the revolution of the
a bright band on the ball looks like a str
light as the ball flashes past the scale a
number opposite this apparent strea
dicates the speed. The index registers
30 miles per hour.

A Novel Sales Department Compe

The American Motor Co., of Brockton,
manufacturer of the Marsh-Metz motor
has introduced a novel scheme for the pu
of increasing sales of their machine.
Sales Department of this company w
cently increased and a friendly compe
started between Mr. Marsh and Mr.
who are each in charge of separate an
tinct sales departments which both act
a common agreement, each using its
methods and endeavoring to beat the
in making sales. Each department estab
its own agents in localities unoccupied b
other. It will be interesting to see ho
scheme works out.

The Comanche whistle manufacture
the Comanche Whistle Co., 335 So. S
St., Los Angeles, Cal., is being made
smaller size for motor cycle use. The g
construction of the motor cycle whistle
is made in one size only is the same a
automobile whistle. The list price is

S. F. Heath, former sales and adver
manager for Wisconsin Wheel Works,

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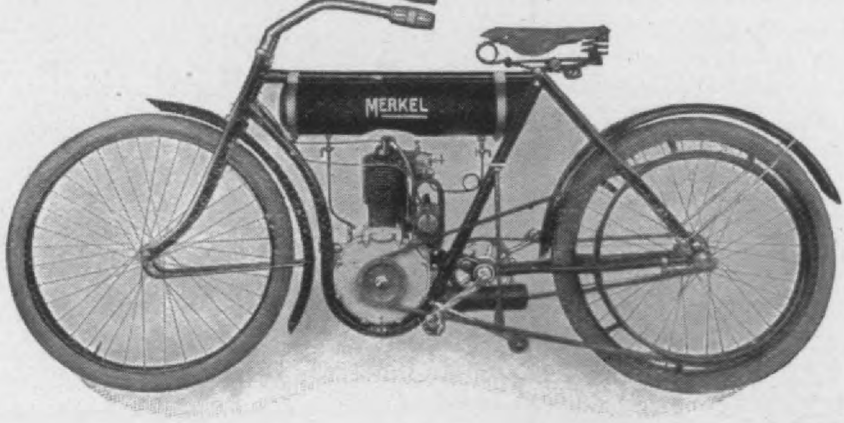

Your Customers Look to You.

If you sell a man a motorcycle and it does not give satisfaction, he lays the blame at your door

And, as your business success depends upon the satisfaction your customers get, you naturally want to sell the best all-around motorcycle on the market.

THE 1908 MERKEL

cannot be surpassed for comfort, durability and safety.

The Spring Frame, assisted in no small measure by the extra long wheel base, makes the Merkel as compared with other motorcycles about the same as a Pullman coach would compare with a freight car.

The wearing qualities of the Merkel are assured by our guarantee. We guarantee each machine to be flawless and honestly built.

In point of safety, the Double Grip Control places the Machine absolutely under the control of the rider at all times. The Triple Crown-Plate contruction with extended fork sides does away with all danger of breakage, while the double stems, telescoping into the extended sides, positively prevent twisting of the handle bars, a mishap which has caused many a cyclist a disastrous fall.

The Merkel is fitted with a 3 H. P. Ball Bearing Motor, and may be had with Magneto Ignition.

Agents wanted in all unoccupied territory.

Price, $210.00. With Spring Fork, $225.00.

Merkel Motor Co.

1098 26th Ave. Milwaukee, Wis.

REPRESENTATIVES:

Pacific Coast: Ollier & Worthington, 1030 S. Main St., Los Angeles, Cal.
New York, Jersey City and Long Island: E. J. Willig, Co., 8 Park Place, New York City

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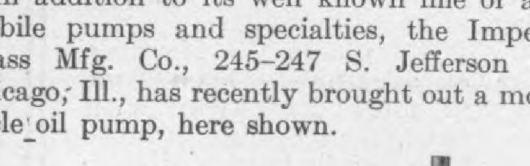
recorder has just placed on the market a Bulard speed-recorder for motor cycles. It can be attached to the handlebars, preferably on the left side, and is operated by the front wheel thru the medium of gearing and a flexible

haft. As the shaft is straight it is subjected to practically no wear. The illustration herewith shows the instrument as it appears to the rider and it will be observed that the position is such as to render easy reading. This instrument also possesses the advantages of compactness and neat appearance. It has few parts and is ball bearing thruout.

The "Imperial" Motor Car Oil Pump

In addition to its well known line of automobile pumps and specialties, the Imperial Brass Mfg. Co., 245–247 S. Jefferson St., Chicago, Ill., has recently brought out a motro cycle oil pump, here shown.



The "Imperial" Motor Cpcle Oil Pump.

The Imperial motor cycle pump is especially valuable on long tours or in races, as it is an improved method of oiling the motor. This pump has a double headed plunger end a two way valve. In operation the pump draws in a charge of oil on the up-stroke and discharges the oil to the motor on the down-stroke. After the charge is drawn into the barrel of the pump, simply turning the lever handle of the

referring to the celluloid barrels.

Motorcycles for the P. O. Depart

Motorcycle manufacturers will watch interest a test now being made by the office department, of the value of a tri-c a mail collecting vehicle. A machine h an enclosed front carrier is now being out in Washington, and it is stated tha fulfills all the claims made for it, a larger for machines will be placed. It would that the government is acting with its tomary caution. The fact that many free delivery mail carriers have al equipped themselves with machines at own expense, and that such carriers abundantly proved the efficiency of m cycles, does not appear to have counte very much, in official estimation. Th tensive use of bicycles and motorcycle post office departments abroad might furnished reassuring evidence to our department, as it certainly would have in the case of a private enterprise tha anxious to increase its facilities for the ling of business.

1908 Motorcycles

All models of all makes of 1908 motor c will be illustrated in the next issue o Journal and complete specifications of model given beneath the illustration. feature of the March Journal, appearin the opening of the selling season is of i mable value to motor cycle dealers, m and prospective buyers because the sp features of all makes are laid before the r in convenient form for quick reference the comparative information to be obt by a perusal of this section of the March Jo is useful to any one interested in motor c in any way.

A single copy of the March Journal ca obtained at the usual price, 20 cents extra charge being made for this valuabl ditional feature, but it is much safer to scribe by the year and much more profit If not a subscriber, send $2 now for a y subscription and get informed on the motor cycle situation before the season vances as well as insure getting all the m cycle information worth having during coming year.

Detroit's first motorcycle show will be in connection with the seventh annual ex

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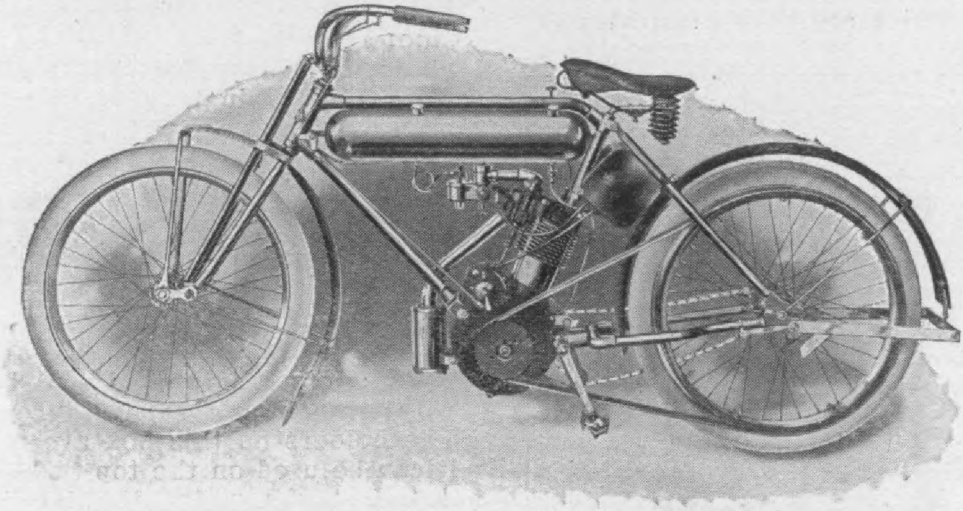

M. M. THE 1908 MACHINE

That attracted the largest crowds, the most favorable comment and considered by all who saw it, the neatest and most pleasing design of any Motorcycle at both the recent great shows of New York and Chicago.

WHY?

Because of its 26" wheels, its low saddle position, its special constructed frame, its patent Motorcycle stand attached to the rear of Frame, its newly designed cylinder and head, its priming device on tank in direct contact with cupped petcock in cylinder head. Its Chain idler device adding efficiency to its splendid belt transmission, its new battery box arrangement, its slightly more rakish build, thereby permitting of a longer wheel base, a decided improvement in Motorcycle construction.

BECAUSE

Of its real Spring forks, not an apology or a joke, but, the real thing, the only Spring fork used in Motorcycle construction. A very old principle, worked out to its highest point of efficiency in its application to Motorcycles. Found exclusively and only on the M. M. for 1908.

BEST

because, it has more new features, more real improvements, gives more real service, satisfaction, speed and endurance than any other Motorcycle built.

Write for details, catalogue and proposition.

AMERICAN MOTOR COMPANY,

715 CENTRE STREET

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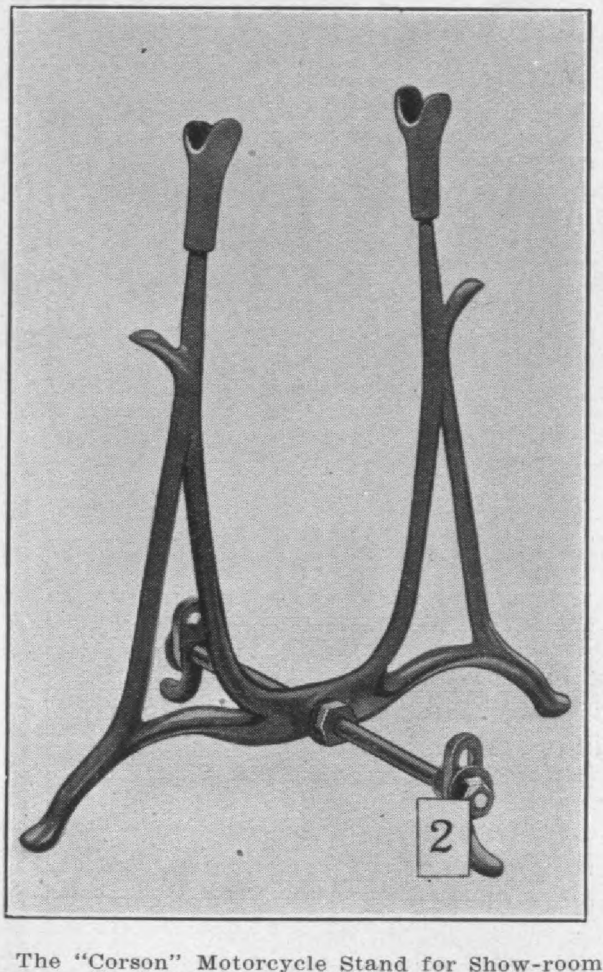
ties, all of which are here illustrated.



The "Corson" Motorcycle Stand for Show-room, Repair Shop and Individual Use.

One of this concern's leaders is the Corson Combination Stand and Luggage Carrier, which has a wide range of adjustment. It is guaranteed to hold the machine and rider with motor running. In addition to the equipment shown in the cut an attachment is furnished for holding a bundle of any reasonable size so that it can be taken

The "Corson" Improved Tool Box.

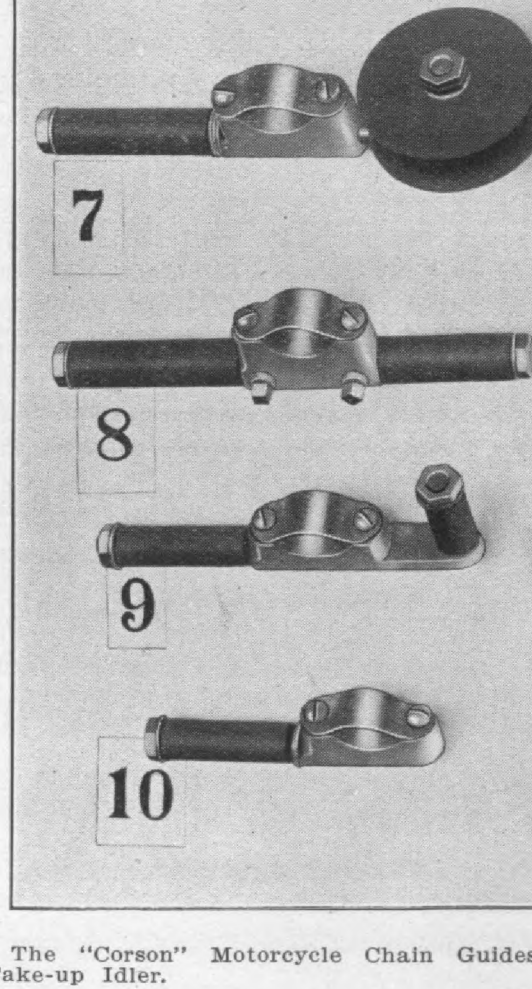
from the carrier without undoing, when it is desired to use the stand to hold the machine. Price of this carrier for machines with rear tanks is $6.00; for machines, all makes, without rear tanks $5.00.

The Corson motorcycle stand for show-

$2.50; No. 8 is a double guide for side; price is $1.00; No. 9 is a hold-u guide for pedal-drive side, price $1.0 No. 10 is a single guide for either price 75 cents.

The "Corson" Lamp Generator Bracke Repair Kit Holder.

The Corson improved tool box is with a lock and separate compartn The holders on this box are now ma it can be used on the top tube of mac having tanks under the tube, and tubes 1⅛ and 1¼ inches wide. The of this box, complete with lock separate compartments is $3.00; wi lock and compartments, $2.50.



The "Corson" Motorcycle Chain Guides Take-up Idler.

The Corson lamp bracket and repai holder can also be used for carrying li papers. This holder goes on the top f

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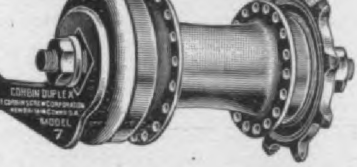
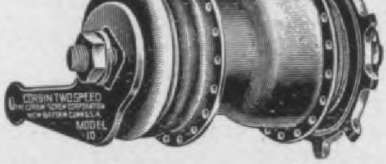
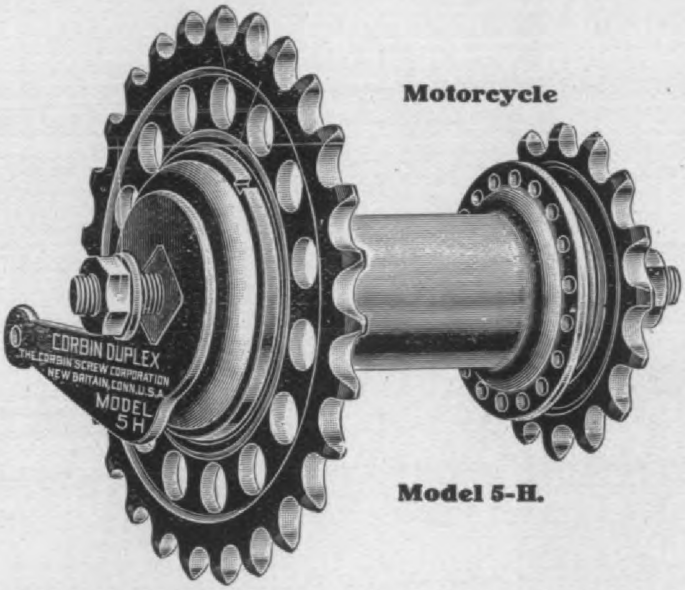


1908



Corbin's Duplex Brake. **Corbin's Two-Speed Brake.**

CORBIN HUBS



Motorcycle

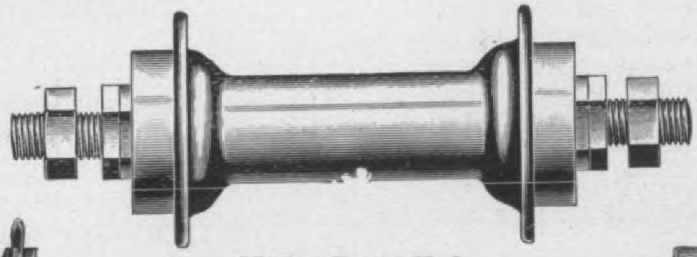
Model 5-H.

Any size Driving Sprocket ⅝ or 1 inch pitch Spoke Holes, button-holed on drive ide allowing the replacement of spokes without taking wheel from frame or emoving driving sprocket.

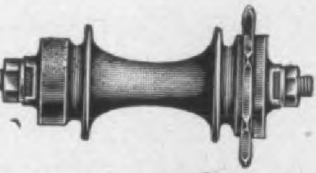
Driving Sprocket is fastened by six lugs that fit corresponding slots in hub shell.

NO STRIPPING OF THREADS

Made in Three Widths for either Belt or Chain Drive Motorcycles.
Heavy Front Hubs to match.



Motor Front Hub.



Front Hub.

Plain Rear Hub.

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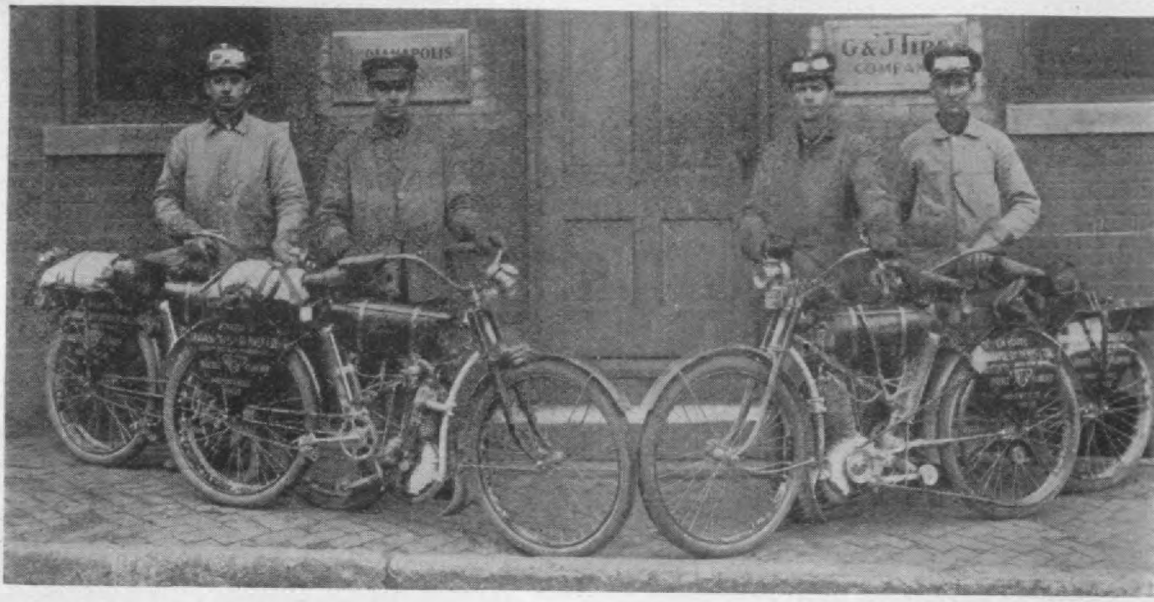
from Indianapolis, Ind., to Denver, Colo., by Jesse L. Arnold, Ed. W. Arnold, M. C. Kinzie and A. C. Kinzie, all of Milwaukee. They used Wagner, single cylinder 3 H. P. motorcycles, and Indianapolis Double Clincher G & J Tires. Altho the trip was not made for any particular test, the outcome showed the remarkable durability of the tires, which at the finish were very little cut up after having gone over all sorts of roads.

The roads were fine from Wichita except a few sand places, altho some roads were found as good as any race track in places. Thru Missouri and eastern Kansas terrible



Riders who made motorcycle trip from Indianapolis, Ind., to Denver, Colorado.

oads were met with, some so bad that it ook the party at one time the entire forenoon to make but 22 miles. Miles and niles were traveled thru Missouri over oads where no soil was in sight, nothing ut sharp gravel and rock. In Kansas our days of rain were met with, which nade riding extremely hard on account of the roads being badly cut up by horses and travel. The roads were composed of gumbo soil which when dry is like cement, and so strong the riders state that the veight of their machines would not even break the sharp points off the ground. For even miles in Missouri the party road on railroad ties, and also rode across the Gasconde river railroad bridge as well. The whole trip was made without any damage to the tires, with the exception of wo small surface cuts on one of the tires.

The "Manson" 3 H. P. Motorcycles

is built along the lines recommende the makers of the Thor outfit, exce that the front fork is straight and a spring fork attachment is used. A str horizontal bar runs across the frame below the tank acting as a binder t frame, and as a means of holding motor in place. The combination ta only 3½ inches wide but holds two ga of gasoline, two quarts of oil and dry cells.

The machine is equipt with Thor co brake hub, Thor compensating and yie sprocket on the rear hub, Pfanstiehl Thor carburetor, Persons motor double grip control, 2¼-inch G & J, flat tread motor tires, with new double clinch steel rims, long shock sorber grips, leather tool roll and tools is finished in any color.

This machine will sell for $225. weighs about 130 pounds, and is cap of speeds up to 55 miles per hour.

George V. Lyons of New York city, for the Wagner motorcycles has incorpo his business as the G. V. Lyons Motor Com and secured the American agency for Minerva, a Belgian made motorcycle.

"Mayo" 1908 Motor Cycles, Et

Mayo Damper Co., 355 Walnut st Pottstown, Pa., takes pride in the fact practically no important change has found necessary in its motor cycles, motors and carburetors for 1908. The motor cycle has longer and wider handl

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Torpedo Model C—$225

YOU don't need to insure your life when you mount a **Torpedo.** Torpedo exclusive features: Torpedo low loop frame and low saddle position; Torpedo patent spring fork; Torpedo 4-in-1 tank; Torpedo double muffler; Torpedo new handle-bar and grip control; Torpedo adopted 26-inch wheels first in United States.

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. E. Bradley Motor Co.

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Worcester, Mass.

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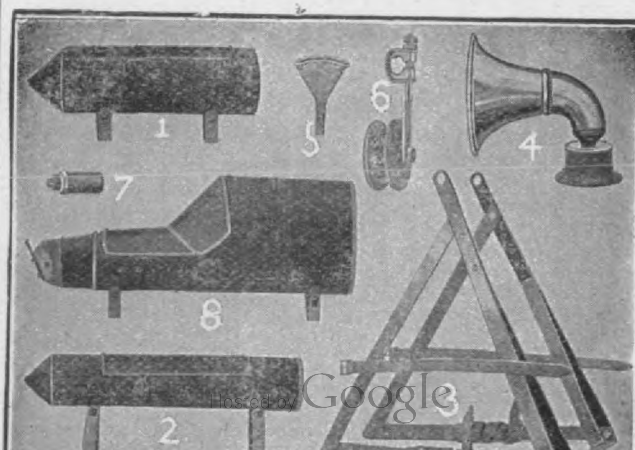
1908 ROYALS, Belt Driven.



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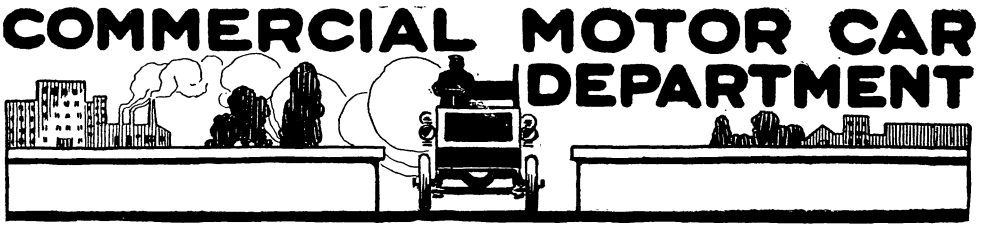

Experience of Commercial Motor Car Users

Using Electric Machines for Transporting Hotel Guests to and From Railroad Stations

The Galen Hall Co., of Atlantic City, N. J., is using two electric cars for transporting hotel guests to and from railroad stations. The cars were built by the Synnesfeldt Machine Co., of Pittsburg, Pa., and are rated at 6 H. P. each, and cost $3000 each. One motor is used on each car, located in each case midway under the body. The cars have been in use for the last 2½ years.

The cars make about 12 to 30 miles per day, averaging about a mile to each trip. The company estimates that about $25.00 per month is expended for repair work and repair parts outside of battery repairs and renewals. It stores its cars in its own garage. The drivers are paid $70 per month each, no helpers being employed. A set of tires lasts anywhere from 6 months to 2 years, and a new set costs approximately $200. No serious trouble has been experienced with drivers, only the usual experiences with labor.

The greatest troubles this concern is having lies mainly with the storage batteries and the inefficient work done on them by their own makers, such as wrong arrangement of plates in cells; charging cells in reverse (on test) and consequent damage to same. It costs from $35 to $50 each time for cleaning the batteries, which must be done three times a year—this is apart from renewals of plates when needed.

They have made an improvement in the drive by replacing the original chain drive with sprockets and chains made by the Link-Belt Co., of Philadelphia. The old chains stretched badly, and would not, then, feed evenly to both sprockets. Endless tires are being used, which altho of greater first cost have been found to be more satisfactory and less expensive in the long run than butt end tires.

This concern also states that a great improvement might be made in electric controllers for automobiles. Their controller has three speeds forward and one reverse. To get the control lever exactly at the proper notch is a matter of practice and judgment, and if not properly done the contacts burn or "arc." They believe the work could be done much better if there was less extended motion required, and control effected by a device more instantly at hand and more conveniently situated.

To fully meet the requirements of their business they state that the cars should have larger passenger capacity, more reliable batteries, and battery repairs should be obtainable at less expense.

More Load and More Trips With Motor Car

After one year's experience with the commercial motor car in its business, the Bently-Gray Dry Goods Co., of Tampa, Fla., finds the same to be less expensive to maintain than horse-drawn vehicles, and at the same time capable of performing twice as much work in a given time.

This concern is using a 2-cylinder opposed 22-24 horse power delivery wagon, listed at $1500. About 5 trips, 10 calls per trip, are made daily, averaging 12 to 15 miles per day. The average load carried is 2000 pounds. The average monthly expense for gasoline amounts to $12.00, and lubricating oil $1.00. Repair work and repair parts are figured at $5.00 per month. This concern stores its own car, having found this to be the best method after having tried both ways. The operator is paid $15 per week. The car is still using its first set of tires, which are said to be in good condition.

The car replaced two one-horse light drays, costing $250 each, the horses also costing $250 each. Harness cost them $25 per set. The average monthly cost of care and feed of each horse was $20 and shoeing $1.25. The drivers were each paid $40 per month. This concern reckons that a horse depreciates 10 per cent. in value in a year and a wagon 25 per cent.

Comparing the maintenance expenses of the motor car with that of the horse vehicle equipment it will be seen that the motor car expense is only about one-half that of the horse vehicle, in spite of the fact that the car does twice as much work. The most needed improvement in motor cars, as suggested by their experience, is to use better material in the construction of those parts most used, and to use brass

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instead of iron castings in the pump and other parts. They have not had any trouble lately with their drivers, but state that the worst trouble they formerly experienced was on account of drivers quitting without notice and their lack of interest in the care of the car. In order to fully meet the requirements of their business they state the car should be able to run thru sand and should always keep in order. They state their main trouble has been in defective parts due to lack of good material in construction.

Logan Car Demonstration in Milwaukee Shows Advantages of Commercial Motor Car Use

A recent demonstration made for Gimbel Brothers, of Milwaukee, Wis., by the Commercial Auto Co., dealers in Logan cars for Wisconsin, with a Logan truck, showed conclusively the superiority of the commercial motor car over the horse-drawn vehicle.

The car used was a 4-cylinder Logan Model R delivery wagon, listing at $1800, and the result was certainly such as to attract attention and awaken the liveliest interest among business men who are figuring on the cheapest and quickest way of getting goods to the purchaser.

A trip account of the four days is as follows: November 23, morning trip, 3 wagons displaced, 100 deliveries made in 1 hour and 20 minutes; afternoon trip, 2 wagons displaced, 110 deliveries made in 1 hour and 40 minutes; total gasoline consumption for the day 3 gallons, and oil 1½ pints. November 24, morning trip, 3 wagons displaced, 80 deliveries made in 2 hours and 30 minutes; afternoon trip, 3 wagons displaced, 75 stops made in 1 hour and 15 minutes; total consumption of gasoline and oil, 3½ gallons and 2 pints, respectively. November 25, morning trip, 4 wagons displaced, 160 deliveries in 2 hours and 30 minutes; afternoon trip, 4 wagons displaced, 186 deliveries made in 2 hours and 15 minutes; 4½ gallons gasoline and 2 pints oil consumed for the day. November 26, morning trip, 4 wagons displaced, 150 deliveries made in 4 hours and 45 minutes; afternoon trip, 4 wagons displaced, 120 deliveries made in 4 hours and 30 minutes; 9 gallons of gasoline and 2 pints of oil were consumed for the day. Gasoline at 11½ cents a gallon figures to $2.50, and oil at 50 cents a gallon figures to about 47 cents, or a total of $2.97.

As will be seen from the foregoing, nearly 1000 deliveries were made in less than 21 hours actual running time, with a consumption of 20 gallons of gasoline and 7½ pints of lubricating oil, costing together a total of $2.97.

The car displaced from three to four wagons, and drivers of the same. The Commercial Auto Company claims that the saving would more than pay for the cost of the car within a year, and a little figuring will show that under ordinary circumstances the car would pay for itself well within that time.

Waltham Car Makes Waltham-New York Round Trip

The Waltham Manufacturing Co., Waltham, Mass., recently made a trip from Waltham to New York and return with one of its 14 H. P. water-cooled parcel cars with paneled wood body, to show its efficiency in the commercial field.

The start of the trip was made from Waltham at 1.30 P. M., November 4. The load carried was 875 pounds, which included three passengers. Worcester was reached at 2.50 P. M., the running time being one hour and 20 minutes. From Worcester to Springfield the time consumed was 3 hours and 40 minutes; the total time so far was 5 hours for the 89 miles. The start from Springfield was made at 6.30, Tuesday morning, from where the car traveled over excellent roads via Hartford, New Haven, Bridgeport and Stamford. At 2.10 P. M. the car arrived at the New York Branch of the Waltham Manufacturing Co., Forty-ninth and Broadway, and a record was made of the time and odometer reading. The morning's run showed 155 miles, covering a total elapsed time of 7 hours and 40 minutes. The total running time for the entire distance of 244 miles was exactly 12 hours and 40 minutes. So far 15 gallons gasoline and 1 gallon of oil were used. During the New York Show week the car was kept constantly in demonstration service. After that the car was taken to Newark for further demonstration to various customers. On Wednesday morning the return trip from New York to Waltham was started. A stop was made at New Rochelle, N. Y., for one hour and a half to give several demonstrations. New Haven was reached at 6.10 P. M., a distance of 80 miles from New York, the total run, including demonstration, being nearly a hundred miles. At New Haven a new set of spark batteries was put in the car. At 8.30 P. M. the car left New Haven and proceeded by moonlight to Waterbury, arriving there at 9.50.

When leaving New Haven the car was driven over the road via Cheshire street, but after passing under the Meriden & Waterbury Railroad it was decided to give the car an unusual test to ascertain what it would do; therefore the car was driven over the old stage road to Waterbury over the mountain. This road is extremely rough and rocky and very steep. The wheels slipped repeatedly, and it was only by means of putting rocks under the wheels and jumping the car ahead a yard or so at a time that it was possible to get up the hill at all.

Thursday morning the car proceeded to Waterville, a suburb of Waterbury, and

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1 hour and 30 minutes. The fol-
ving morning the run from Spring-
ld to Waltham, 89 miles, was made in
hours and 10 minutes, including the
op for lunch. Arriving at the factory,
e car was weighed in, and was found to

ism was removed and opened up and
amined by the officials of the Walth
Company, and all parts were found int
with no perceptible evidence of wear.
broken parts were found and everyth
was in first-class condition.

"Thomas" Chassis in Fire Fighting

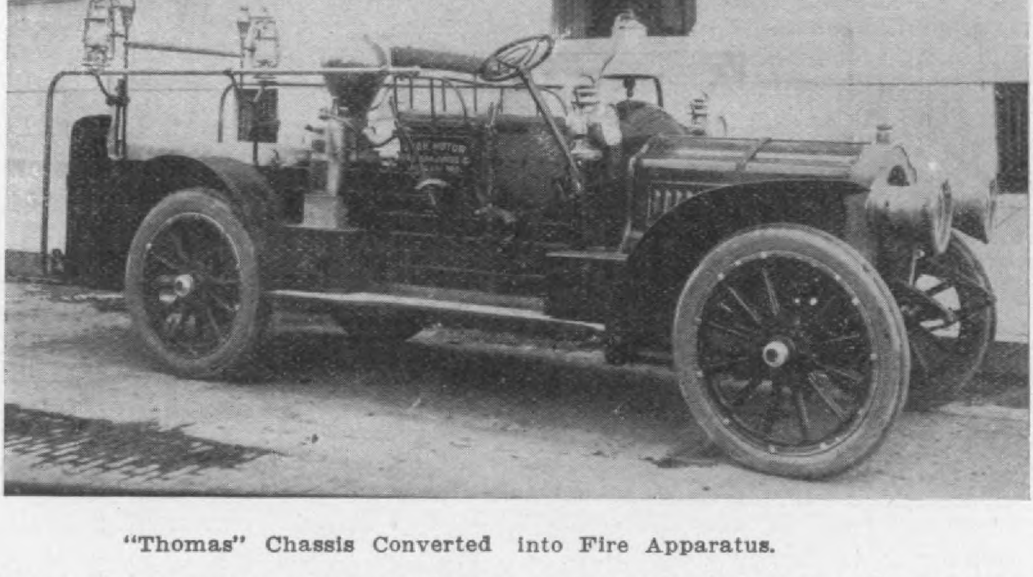
By a simple but ingenious arrangement,
C. Webb, the former automobile racing
an, who is now manufacturing motor fire
paratus in Joplin, Mo., has converted a
homas Flyer chassis made by E. R.
homas Motor Co., Buffalo, N. Y., into an
tomobile fire engine, repeated tests of
hich have shown excellent results.
Mr. Webb built his fire engine by placing
rotary pump on two cross frame mem-
rs in the rear of the transmission con-
cting the pump gear with the transmis-
on by a shaft running from one of the
xiliary shaft gears and controlled by a

Fire department witnessed these tests a
were enthusiastic over the results. W
a rotary pump smaller than the one now
use on the car, a stream of water w
thrown completely over one of the thr
story concrete and steel buildings.

Mr. Webb selected the Thomas, becau
of its combination of speed, strength,
liability and general construction. He h
contracted for a number of Thomas Fl
chassis and more of the new engines a
now in the course of construction.

A Maintenance Proposition

The Indianapolis Motor Car Company,
Indianapolis, Ind., which sells the Ra



"Thomas" Chassis Converted into Fire Apparatus.

er placed at the side of the driver's
t. This gear connecting with the pump
y be thrown into mesh and the rotary
mp started when the scene of the fire
reached. Incidentally, the shifting of
pump gear into commission auto-
tically cuts off the radiator from the
tor, water being supplied for the cyl-
ers from a separte feed from the rotary
mp. When this gear is again shifted
of mesh, the radiator is automatically
nected up with the motor and resumes
duties. It was thought necessary by
Webb to provide this auxiliary water

trucks, has adopted a special maintenan
contract whereby the company agrees
keep the cars in commission every d
provided the car at the close of ea
day is turned over to them in their g
age. The cars or trucks are cleaned,
spected and the necessary repairs ma
The drivers are instructed not to tamp
with the machinery in any way, and
trouble arises to notify the company
telephone, which will arrange at once
transferring the load to another vehicle

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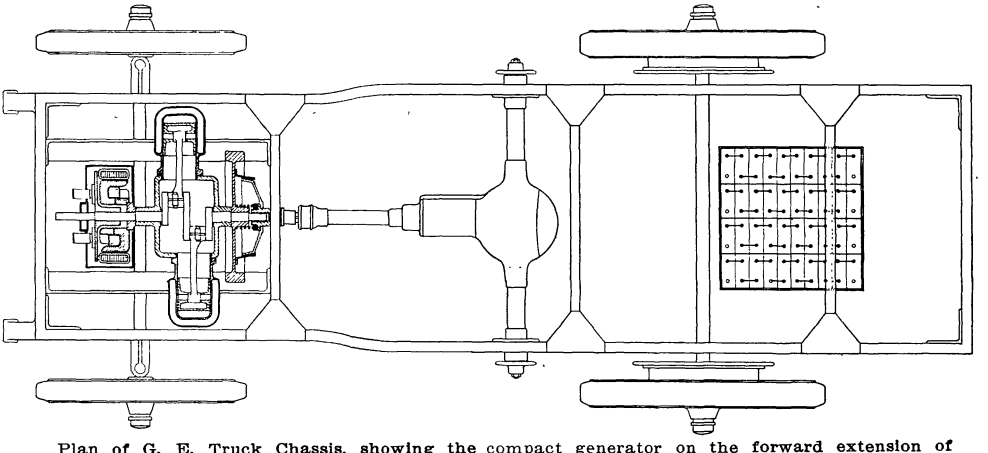
A 3-ton Lambert Truck, used in the

The Standard Gasoline and Electric Trucks

The Standard G. E. Power Co., Fiftieth and Lancaster ave., Philadelphia, Pa., are placing on the market a line of gasoline electric commercial vehicles, the first of which, a two-ton truck with stake body, was finished and on the road about the 1st of September, 1907, since which time it has been thoroly tried out. This machine, with slight modifications, fitted with a motor of the company's own manufacture of the two-cylinder opposed type, and made in one and two-ton sizes, will constitute the 1908 line. These machines are after designs by Mr. J. C. Speirs, engineer of the company and are built under his personal supervision.

The following is a brief description of the present truck, the principals of operation of which will be used in the construction of the new models. Altho a gasoline electric combination is used, it is entirely different from any previous system observed by the writer. The two-cylinder motor is disposed cross-wise under the floor boards, at the front, and a prolongation of its shaft carries a small shunt-wound generator with an 80 volt, 40 ampere hour battery floating on the line. This generator is so arranged that it automatically changes from a generator to a motor and vice versa, the changes being regulated by the engine speed. It is comparatively small, being but 2½ H. P., and is not, as is usual in combination systems, intended to drive the truck, but is to a large extent, a governor on the engine so arranged that when the engine speed drops below normal which with the present motor is 1000 R. P. M., the generator automatically becomes a motor, taking current from the storage battery and its torque tends to keep the engine up to its normal speed where it is capable of developing sufficient driving power. Of course, if road and load conditions are such that even at normal speed the motor is not sufficiently powerful to carry the truck, a gear shift would be required, but it has been found that all ordinary hills can be taken without difficulty as the motor is not allowed to drop below a speed at which its pulling power is very nearly a maximum. The advantages of this can be readily seen, as it is well known that the gasoline engine when slowed down below its best pulling speed very rapidly loses power, and its rate of revolution is much more quickly lowered under these conditions to a point where it has very little or no pulling power. With the engine running about its normal speed the genertor is charging the batteries, so that the cells are always well charged and ready for duty. It will thus be seen that the essential action of this small light weight generator is that of a governor on the engine, and is not intended to drive the truck except in cases of emergency when for example, for any cause, the engine might be completely disabled, the battery will supply sufficient current to carry the truck several miles.



Plan of G. E. Truck Chassis, showing the compact generator on the forward extension of the engine shaft, the arrangement of the two-cylinder opposed motor, clutch and combined change speed gear and jack shaft, by the Standard Roller Bearing Co., Philadelphia, Pa.. The battery consisting of four trays of 10 cells, each 41 Amp. Hrs., is spring suspended at the rear as shown. This Gasoline and Electric truck is peculiar in that the generator when automatically changes to a motor does not drive the truck, except in case of emergency, but simply acts as a governor on the engine to keep it up to its normal and effective working speed, as fully described in the text.

GENERAL ARRANGEMENT.

The present motor is 5½x6, and arranged as stated crosswise at the front under the high seat and is accessible by the removal of two large side panels. Its shaft is connected as usual by means of an ordinary leather faced cone clutch, about 16 inches in diameter by 2-inch face, to a three speed sliding gear the case of which is integral with the housing of the differential on the jack-shaft. This change speed and jack-shaft combination is, in fact, one of the Standard Roller Bearing Company's transmission rear axles for

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is change speed gives three forward eeds and one reverse, but this has been nd unnecessary and the new machines l probably be provided with simply a and high speed gear and reverse of same general type. The reduction in bevel gears is three to one, and the in reduction is four to one, with 42-inch r wheels which it will be noticed are y large, gives a maximum at normal gine speed, as about 10 miles per hour. e large chain is used in order that its gth of life may be great. Doubtless a aller chain would carry the load but uld wear and show stretch much more idly. Extremely large rear wheels are o fitted and carry sidewire solid tires four inches face, and it has been found m past experience altho the initial cost large wheels and tires was somewhat her, that in the long run, owing to ier riding qualities and greater tire face, the wear and replacement was ough less to more than offset the high tial cost.

or acting as a motor tending to keep engine up to a good working speed. T charging and discharging goes on entir automatically and the volt and amme on the foot board indicates to the driv the exact condition under which he is r ning. Upon encountering an exceptiona stiff grade, the controller handle is plac in the third notch which puts the batter in series only, giving 80 volts. Th nearly all ordinary hills can be taken w load on the high gear, but if necessa the low speeds are had as a reserve. T low gear is of course used for starting.

SELF-STARTING AND BRAKING.

It will be noticed that there is no nec sity for a starting crank on this truck a none is provided, as the engine is turn over when starting by the electric mot The usual gear shifting lever operating the selective principle is provided a comes up thru the floor boards in a c venient position for the driver. There a two pedals, one of which controls t mechanical brakes on the rear whee

The Standard G. E. Power Co.'s Gasoline Electric Truck. This new commercia hicle has many noteworthy features. Altho a combination sytem is used, as will be seen, th ttery is very small and comparatively light. The generator and two-cylinder opposed moto e under the floor boards and driver's seat and are accessible by removing the side pannels xtra large brakes and wheels are used. The new combination system is explained in the tex

CONTROL.

t the right of the driver's seat is a all controller handle similar to those d on electrics, there being three

These brakes are of liberal dimensio the drums being 18 inches in diameter 3-inch face. They are of the internal panding type, being actuated by a pow

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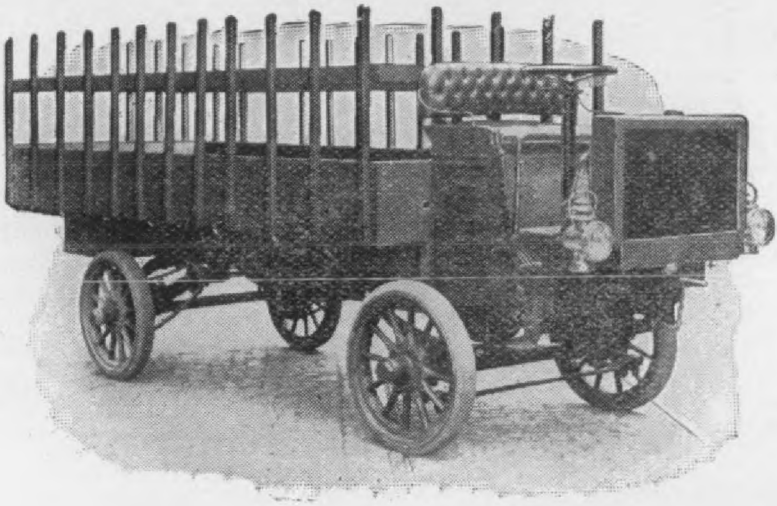
RELIANCE 1908 DETROIT



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RELIANCE MOTOR CAR CO.

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ing the foot plate. The size of these brakes is such that they are much more than sufficient to stop and hold the truck on any hill, the pressure in fact being so light, owing to the large area, that long wearing life is assured. The other pedal operates the clutch and is entirely independent of the brakes. Another feature which is peculiar to this type of gasoline electric combination is the fact that when the motor is throttled and the truck on a down grade is driving the generator, thus charging the batteries, a very decided braking effect is produced even on the high speed and when the intermediate or low speeds are thrown in, of course, the effect is largely increased, being so great in the low gear as to bring the machine to a stand and hold it on a very steep grade. This action is taken advantage of in driving to save the brakes, as all ordinary hills can be descended at a moderate speed with the loaded truck without applying the mechanical brakes at all. At the same time, this makes the total operation of the truck much more economical, as the batteries are, of course, being charged at this time. The spark and throttle levers are placed as usual in trucks, just below the hand wheel on the steering column.

The battery used is just as light and small as can possibly be carried, and consists of four trays of 10 cells, each 41 Amp. Hrs. It is slung in a helical-spring-suspended box at the rear, this arrangement taking the excessive jar from the battery. The battery weighs about 400 pounds, and the two-ton truck complete about 5,000.

FRAME SPRINGS AXLE.

The frame is composed of 5-inch channel iron well braced in the corners and with the spring hangers of special cast steel securely riveted to it. The average tensile strength of these steel castings as shown by recent tests, is between seventy-five and eighty thousand pounds per squarre inch. Semi-elliptic springs are used at front and rear, these being 3-inch wide and perched in each case on top of the axles. The rear spring block forms the brake support and also the fulcrum for the radius rod. The rear springs are not shackled at either end, but are free to slip in guides riveted to the under side of the frame side members, the chain distance being maintained by adjustable radius rods. The front springs are 44-inch in length, and the rear 48-inch, and are ample to carry considerable overload. The front springs fit into a steel casting forming a spring hook and secured to the under side of the frame cells, while their rear ends are shackled. The axles are solid steel of square section.

The truck is fitted throuout with roller or annular ball bearings. The front wheels are 36-inch in diameter and fitted with 3½-inch solid side wire tires. The rear wheels are exceptionally large, being 42-inch in diameter and carrying 4-inch tires of a similar kind, which is small for the loads carried, but owing to the increased size of the wheel these tires have given satisfaction. The platform is 10 feet 4 inches long and 5 feet 2 inches wide. The wheel base is 96-inch and gage 60. However, whenever desired the gage will be made to suit purchasers, as will also the width and length of the platform, or the style of body. This is often very convenient as in some western cities, it is very essential that the tread be such as to permit of driving on the street car tracks, as the roads in the outskirts are often otherwise impassible.

The new trucks will probaly have longer platforms, a longer wheel base and somewhat greater overhang at the rear. The seats are of the individual bucket automobile type, of such form that the driver never need pay any attention to keeping his seat when the machine side-lurches and can give his entire attention to the truck's manipulation. An 18 gallon gasoline tank is carried under the seat and the radiator is carried at the front, the filling cap protruding slightly above the forward upturned portion of the foot boards which serves in lieu of a dash. The side lamps and tail lamp are fitted with incandescent globes, current being supplied from the storage batteries.

The prices and equipment of these machines will be announced later.

The Studebaker Automobile Company's New York branch recently sold to the H. B. Claflin Company, of that city, the sixth Studebaker truck in their delivery equipment. In delivering this truck Studebakers hauled two horses in the truck with the replaced horse drawn truck trailing on behind, demonstrating to the people along Broadway the ability of the motor truck to entirely replace horse-drawn vehicles. The sight of horses being hauled in a motor truck with the horse-drawn truck trailing after naturally attracted much notice and called attention pointedly to the fact that the motor is rapidly replacing the horse for commercial vehicle propulsion.

About the middle of December the Logan Construction Co., of Chillicothe, Ohio, shipped fourteen 4-cylinder delivery wagons to the St. Louis Post Despatch, which inaugurated a motor delivery of its papers thruout the city of St. Louis and its suburbs. The cars are the regular Logan Model "R" delivery wagon type, equipt with a 20 H. P., 4-cylinder, air-cooled motor, and with a capacity of 1500 pounds paying load.

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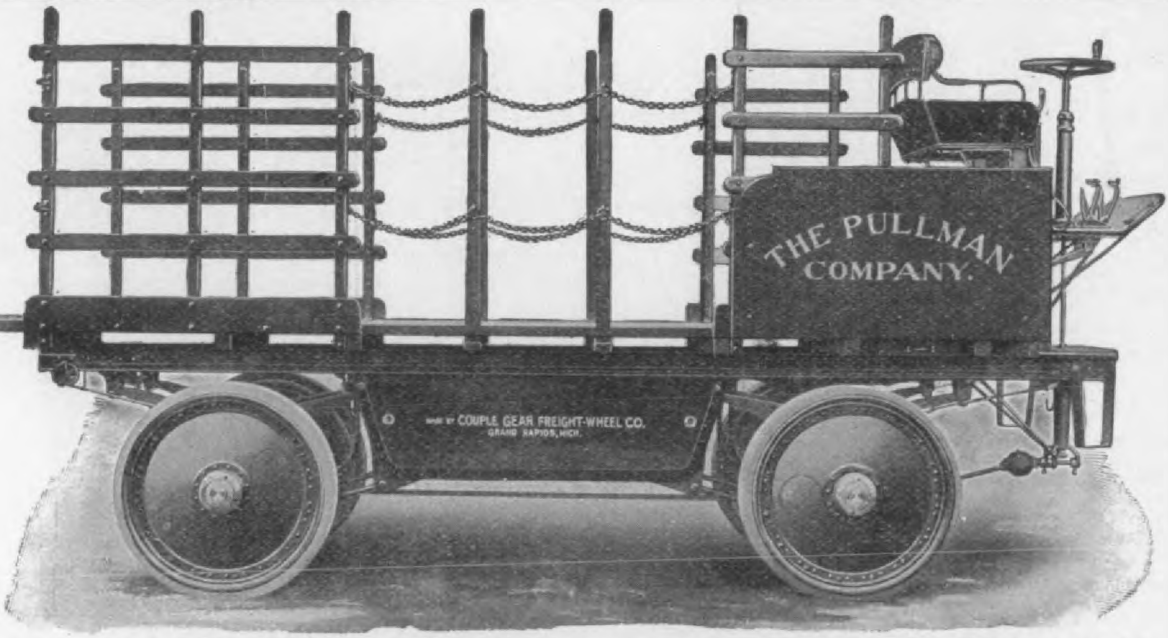
ONHEWITT TRUCK

CUSTOMERS ALL SATISFIED.

00-Pound Light Delivery. Simplest car Made. Best Record.

IEWITT MOTOR CO., 10 E. 31st St., New York City



HE "COUPLE-GEAR" ELECTRIC TRUCK

Motors Contained in the wheels. Power applied at both sides of the wheel directly to the wheel rim. Single reduction of 25 to 1. Transmission losses practically eliminated. Equipped with "Storage Battery" or with engine and generator.

FRONT-WHEEL DRIVE AND FRONT-WHEEL STEER.

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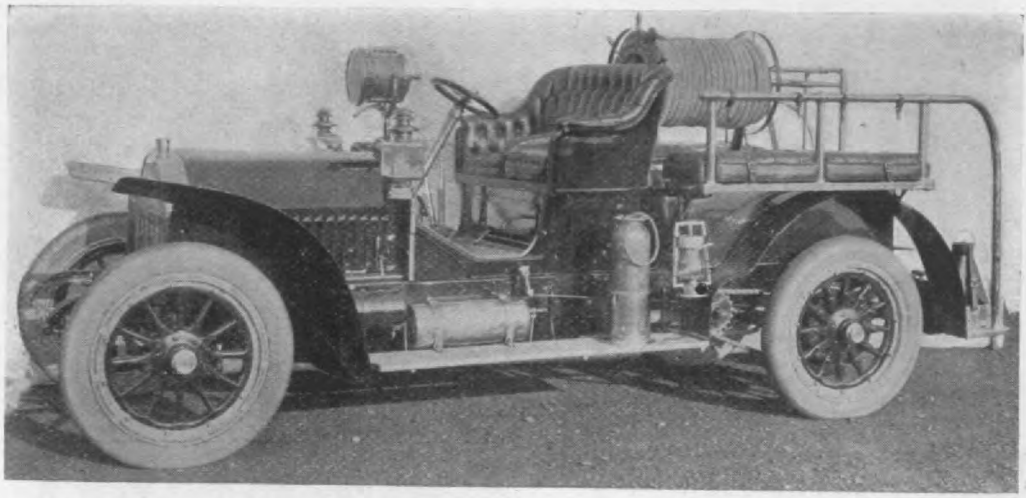
Bridgeport Fire Department a chemical wagon which has been specially designed all the way thru. The Locomobile Co. has been developing a large touring car for heavy work, and the strong construction which has resulted from this constitutes the essential elements of the new fire engine.

The car is in the direct charge attendants who have been studyi Locomobile car at the factory f months. A feature of the car is a trical apparatus which permits lighting of the big acetylene sear from the seat and without striking a The car is painted red with the



Locomobile Chemical Wagon, recently built by the Locomobile Co., of America, for the B port Fire department of Bridgeport, Conn.

The motor develops nearly 60 H. P. and on a trial run the car kept up a speed of 50 miles an hour. The transmission is 4-speed selective and the drive is by double side chains with solid front and rear axles.

B. F. D. on the radiator.

White Steam Patrol Wagon

The White Company, Cleveland,

Patrol wagon built by the White Company, of Cleveland, O., for the police force o Janeiro, Brazil.

The frame is of prest steel, material being of alloy steel heat treated. The car has a carrying capacity of eight men, two on the front seat, two each on the side seats and two standing at the rear, but if desir-

recently shipt three White steam wagons to Rio Janeiro, Brazil, for t of the police force in that city.

The bodies are built on the Whit pany's standard 30 H. P. chassis

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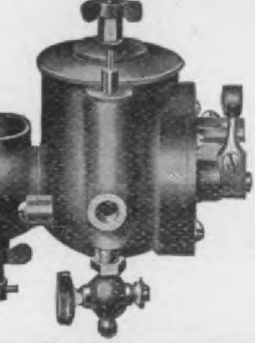


When the motor stops, the condensed gasoline within the piping collects at the base of the mixing chamber. This small amount of gasoline is used as a prime and will start the motor on the first crank, even in the coldest weather.

Palmbla Carburetor

THE NORTH CHICAGO MACHINE CO.

NORTH CHICAGO, ILL.

HE COMMERCIAL MOTORCAR CO.

INCORPORATED 1905

TIMES BUILDING - NEW YORK, N. Y.

We furnish Business Automobiles of all types and makes—machines tly suited to any class of service.

We especially call attention to the SAFIR Motor Truck manufactured urich, Switzerland. Descriptive circular and record of past perform- es mailed on request.

THE MEISELBACH TRUCKS

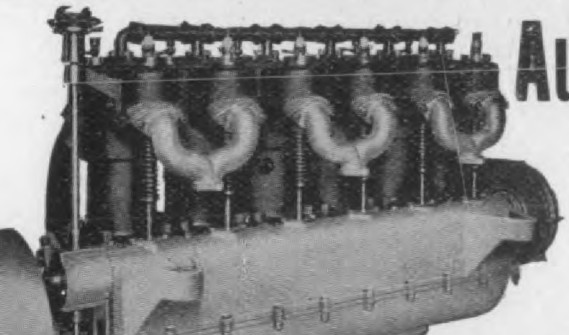
One, Two and Three Tons

Friction Drive, Perfectly Supported. All Wheels on Timken Rollers. Powerful Brakes. The Simplest and Easiest Controlled Trucks yet shown. Thirty Horse Power.

THE A. D. MEISELBACH MOTOR WAGON CO.

North Milwaukee, Wisconsin, U. S. A.

Agents wanted in unoccupied territory.



Automobile and Truck

MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

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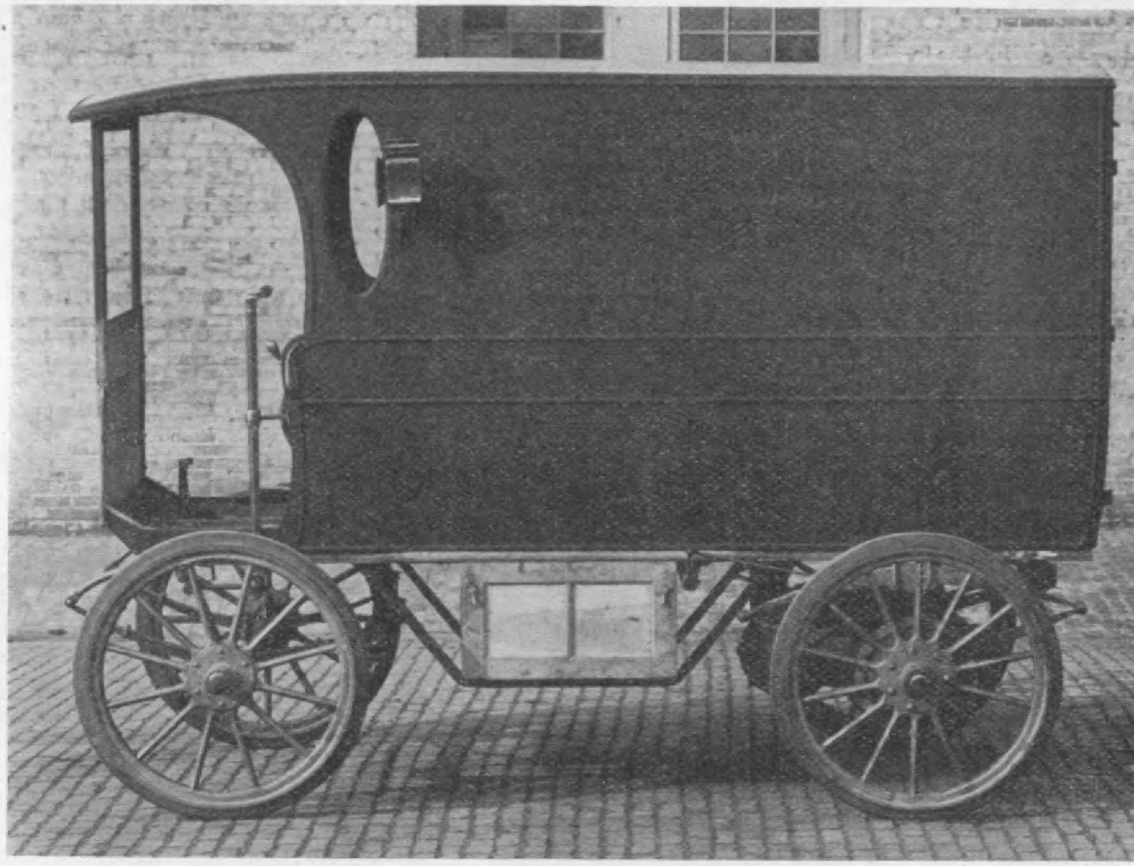
requirements of florists, laundries, light package delivery and similar service where bulky but light packages are handled. Bodies are built to order and painting and trimming are also done to order. The cubic capacity of the body here illustrated is large for a vehicle of this weight.

A single 40 volt, 24 ampere motor is used and current is taken from a 24 cell, 11 P. V. "Exide" battery with a mileage of 35 on one charge on good roads under average load. The motor is suspended from the frame and the battery on an under frame.

specifications of each car given. Thi
plete vehicle review" is a special fea
the March Journal, and this is the eigh
of the publication of this review, a
section of which is devoted to com
cars, all of which are conveniently
according to price, powers and makers'
so that a reader can easily turn to th
fications of the kind of car that would
him.

Every one interested in the use
mercial motor cars should read the
Journal and those not subscribers



New Studebaker Light Delivery; wheel base 84 inches; gage 59 inches, carrying space, 6 ft. 10 in. by
11¾ in.; by 4 ft. 8 in. especially suited for light, bulky delivery.

The wheel base is 84 inches and the gage 59 inches. Thirty-six inch wheels are used in front, 42-inch wheels in the rear, all four being fitted with 2½-inch solid rubber tires. The over all length of the vehicle is 10 ft. 8½ inches; the extreme width, 70 inches, while the interior dimensions of the clear carrying space are 6 ft. 10 ins., by 2 ft. 11¾ ins. by 4 ft. 8 ins. The floor is 34 inches above the ground, and the seat is 38½ inches wide. The chassis frame is of angle steel.

Appropriate side lamps and a tail

send $2 at once so as to insure the
receipt of this valuable number. Cy
Automobile Trade Journal, 49th and
Sts., Phila.

Orlando F Webber, well known
automobile dealer, has organized the
F. Webber Taxicab Company to op
line of those cabs in that city.

Business men interested in automob
commercial purposes can experiment i

That's Our Specialty

Prompt Delivery

We are pioneers in heavy and difficult stamping and drawing work for automobiles.

THE CROSBY COMPANY, Buffalo, N. Y.

The
tion Drive

Plymouth Cars

With Gasoline Motive Power

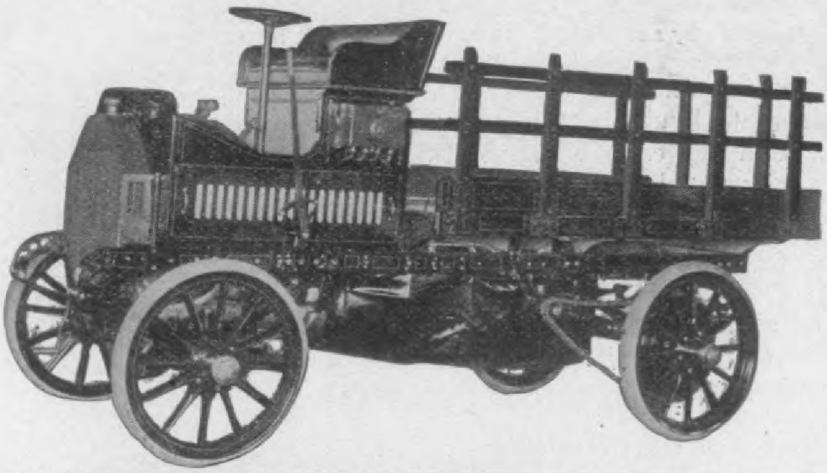
COMMERCIAL TRUCKS FROM 1000 TO 5000 POUNDS CAPACITY

SIGHT-SEEING VEHICLES FROM 12 TO 20 PASSENGERS

5-40 H. P., WATER COOLED, FOUR CYLINDER MOTOR. Double Friction Drive, direct indepen-
hain drive to each rear wheel, no differential gear being required.

HE PLYMOUTH CARS have stood the severest tests and proved our claims to having the
eliable and efficient commercial cars on the market.

Ve solicit your correspondence and invite inspection, believing that a comparative
nation is the quickest
o convince the prospec-
urchaser of the many
tages to be found in
PLYMOUTH.



OMMERCIAL
OR TRUCK CO.

PLYMOUTH
OHIO

e excel-
ed ter-
onsible
lity who

The Rapid Commercial Cars

We design speci
bodies for any kin
of commercial ca
required.

The Rapid Agent is making money. But what is more important, he is building a future in the automobile business that no other line permits of. How many cars would you sell next year if you could show each horse and wagon user that the purchase of your car meant over $1000 yearly saving to him? Think it

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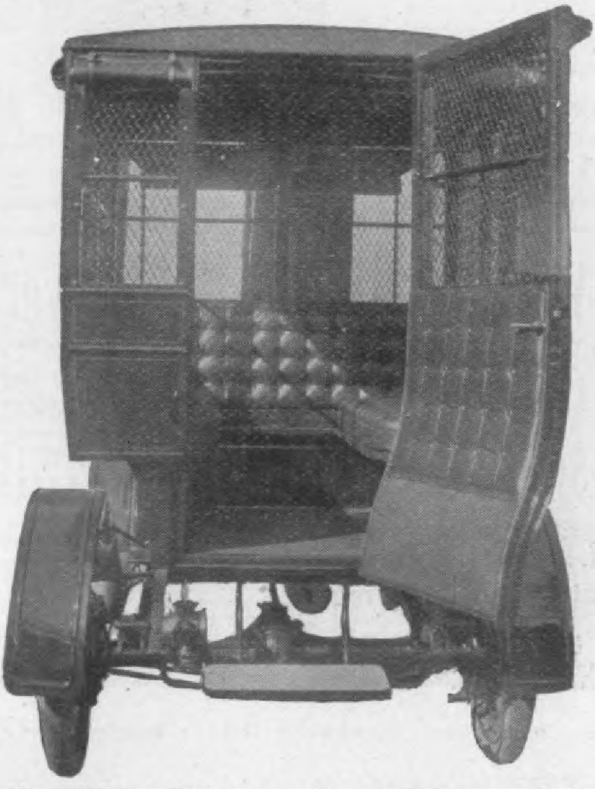
N. Y., recently built on special order for the General Electric Co., a combination mail and pay car, a rear view of which is here shown. The interior is so arranged that facilities are provided for carrying mail and for carrying



Maxwell Pay and Mail Car. Rear view showing interior arrangement.

a safe so that the car can be used conveniently either to haul mail to or from the post office or as a pay car for transporting large sums of money to where workmen are employed at a distance from an office.

"Mack" 22-Passenger Bus

Besides the numerous trucks, delivery wagons, sight seeing cars etc. that have previously been described in the Journal, Mack Bros. Motor Car. Co., Allentown, Pa. are including in their 1908 line a 22-passenger bus,

inches. Six-inch solid tires are use
front wheels and 4-inch twin tires on
ones. Two brakes act on the cour
and emergency brakes act on the re
Half elliptic springs are used.

Parson's White Brass bearings are
the crank shaft, taper roller bearing
wheels and annular ball bearings
transmission. A double ignition s
employed; current being obtained
high tension magneto and from d
The change speed gear is of the i
clutch, selective type and gives th
ward speed changes besides the
Drive is by side chains. The car
$6,500.

14 Logan Trucks to one Cust

The recent shipment of fourteen mot
to the St. Louis Post Dispatch by th
Construction Company of Chillicoth
marks an epoch in the motor truck
The Logan Company claims this to
largest shipment ever made to a si
tomer, and the Logan cars were sel
The Post Dispatch after an exhaus
for use in distributing its papers to
stands in St. Louis and suburbs.
make four trips daily, leaving The
patch Office at one, three, five an
o'clock, P. M., the trips varying in len
four to fifteen miles. They replac
times their number of horse drawn
and make the deliveries more prom
more satisfactorily than has hitherto
sible. The Post Dispatch is the fir
paper in the world to undertake the
of it papers exclusively by motor wa
the experiment will no doubt be watc
interest by every other big newspaper
ment.

Bernard J. McConnell, fire chief of
N. Y. has used a Pierce Great Arrow
a long time and commends the use of
mobile in the fire service. Besides
one half the time necessary in form
he has also saved the day on many a
distinct alarm system has been ado
that the Buffaloians have become acc
to the rushing auto which it is sta
through the streets often at a mile a
clip when necessary.

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automobile between Bridgeton and Salem. ips per day are being made. The car rom in front of Schiller's cigar store at the morning, and 1.30 in the afternoon. ng the car leaves Salem at 10.30 and The fare charged is 25 cents to Shiloh, to Quinton and 25 cents to Salem, mak- 0 for the round trip.

postal department in Los Angeles, Cal., ely been making experiments with motor- for light collections from boxes. Each e is fitted with a large collecting sack. the three months trial two such vehicles, riven by one man, have done the work e men and three one-horse wagons.

utomobile ambulance has recently been in service in Houston, Tex., by C. J. & Company, which conducts an under- establishment in that city.

Automobile Livery Company, of Indian- Ind., has purchased four Premier touring use in its livery business.

R. Beeson & Company, of Conners- nd., has purchased a 22-passenger Rapid car of the Wagonette type to be used be- the depots, hotels and residents in com- with the street-car service.

Fire Department, of St. Paul, Minn., is plating the purchase of a steam-propelled ine.

city of Cincinnati, Ohio, has contracted purchase of four five-ton trucks for use Street Cleaning Deparament in hauling nd other refuse.

t Boker & Company, of Mexico City, is employing a large 5,500 pound elec- udebaker delivery truck for heavy hauling oid delivery in the city.

rge passenger motor car has been put in on on the stage line, between Liberty tson, near Beaumont, Tex., replacing the mobile tires and to work for the improvement of city streets.

A 16 horse power bus has been placed in operation in the automobile passenger service between Carson and Leeville, La.

A motor stage route will be established between San Diego and Ensenada in lower California.

The Auto Transit Company, of Philadelphia, operating double deck omnibuses on Broad street this city, has extended its line about twelve squares more, now running south on Broad street to Wharton.

The Delmonico Co., grocer, 1110 Broughton street, W. Savannah, Ga., is now using a 22 horse power Buick car, fitted with a special body. This machine has a capacity of 2000 pounds.

The Bridgeport, Conn., Fire Department, has added a Locomobile chemical engine to its equipment.

H. B. Claflin Company, of New York City, has recently added three more Studebaker electric trucks to its delivery equipment, making a total of six such vehicles in use. Before the trucks were turned over to the company they were paraded thru New York streets, each one carrying two large dray horses and drawing the dray in the rear which the truck had replaced.

Two motor bus routes lead out of Big Springs, Tex., one carrying mail and express to Sterling City, a distance of forty-five miles, and the other to Lamesa, about fifty-three miles distance.

The Crawfordsville Casket Company, of Crawfordsville, Ind., has purchased an automobile for the use of its traveling representatives.

The General Electric Company, of Schenectady, N. J., has recently purchased from the Maxwell Briscoe Motor Company a car fitted with a specially built body which it will use as a combination pay and mail car. The car will be used in carrying the mail from the works to the postoffice, and for paying off the employees.

Shock is Great Enough to Break or Buckle

lestructible Steel Wheels

You need them on your car.

Write and ask about them to the

estructible Steel Wheel Co.

1301 Michigan Ave., Chicago

Henry W. Brooks, Jr., & Co.

Public Accountants and Auditors

SPECIALISTS:

AUTOMOBILE BUSINESS SYSTEMATIZERS

COST SYSTEMS—AUDITS

15 Wall Street New York

The Hubbard Patent Tire

ONLY PRACTICAL TIRE FOR THE COMMERCIAL VEHICLE.

Wears like iron—Rides like rubber.

Correspondence solicited from manufacturers and users of commercial vehicles to whom we can guarantee greater tire satisfaction than they have had heretofore.

ARTHUR H. MIDDLETON

2821 N. Broad St., Phila., Pa

PEUGEOT FRANCE

Peugeot Chains—"Strongest in the World."

296 BROADWAY, - NEW YORK.

OGAN 1908

odel T One Ton Truck

uck equipped with a four cylinder air cooled . P. Motor, built for service and fitted to y its load day in and day out under all con- ns. For detailed description address

E LOGAN CONSTRUCTION CO.

CHILLICOTHE, OHIO

The Car of Quality

The SOULES LIGHT DELIVERY CAR, 22 H. P., two 5¼ x 5 horizontal opposed cylinders, sliding gear transmission, bevel gear drive. THE CAR THAT HAS BEEN TRIED AND FOUND NOT WANTING. Agents wanted. Correspondence solicited.

Soules Motor Car Co.

Sales Dept., 736-740 WOODWARD AVE., Detroit, Mich.

CRAMP

Parsons' Manganese Bronze Axles

Stronger than steel.

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twenty-five passengers each.

A motor on a regular schedule is being conducted between Picture Rocks and Montgomery, Pa., a distance of twenty miles, with Muncy as the intermediate point. The cars used are twenty-passenger Mack gasoline machines.

A motor car stage line is now in operation between Rodgers and Springtown, Ark., a distance of 21 miles. Forty minutes is the schedule time for the trip.

The city of Oshkosh, Wis., has decided after careful consideration to purchase a high powered runabout for the use of its fire chief.

The Schruggs, Vanderbilt & Barney Company, of St. Louis, Mo., operating a department store have received and placed in four new Model R Logan motor delivery wagons.

Minot Motor Line Company is the name of the new company recently organized at Minot, N. D., with a capital stock of $50,000.

Frederick Loeser & Company, of Brooklyn, N. Y., has added another motor delivery car to its service.

Three Atlas trucks recently purchased by the Mutual Transfer Company, of Hackensack, N. J., will be used in moving furniture.

Fire Chief Ball, of Oakland, Cal., is asking the city council for $2750 for the purchase of an automobile.

In order to extend commercial relations with surrounding towns, the business men of Girard, Ga., are endeavoring to establish a motor freight and passenger line between Girard, Telfairville, Shell Bluff, Waynesboro, Alexander and Sardis.

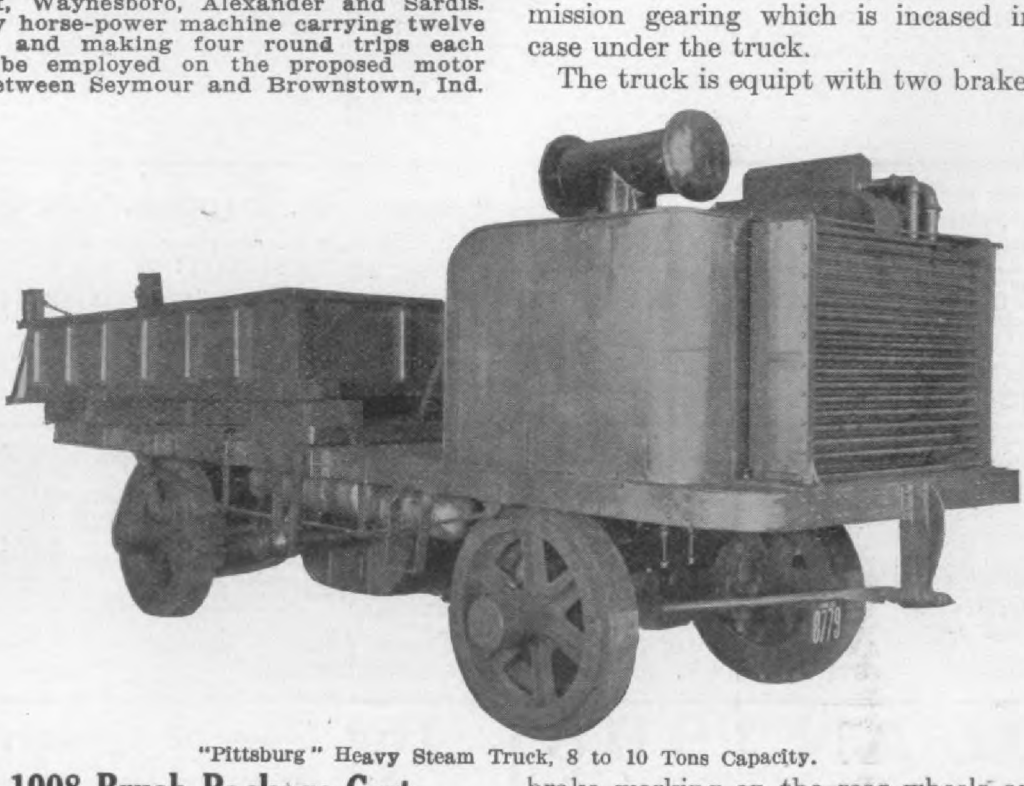
A twenty horse-power machine carrying twelve passengers and making four round trips each day, will be employed on the proposed motor bus line between Seymour and Brownstown, Ind.

springs also reliev[illegible] the road sho[illegible] to the use of solid tires, thus prol[illegible] the life of the engine and other m[illegible] ism. The car is geared and the [illegible] governed in such a way that it is im[illegible] ble to drive much more than 15 mi[illegible] hour. The body is of the ordinar[illegible] vas covered delivery type, painted t[illegible] the purchaser. The driving seat is [illegible] lid of a compartment, and when raise[illegible] closes a box containing batteries, o[illegible] spare tubes.

"Pittsburg" Heavy Steam Tru[illegible]

Pittsburg Machine Tool Co., Alle[illegible] Penna., has just placed on the market a [illegible] steam truck which is here shown fitte[illegible] a dumping body suitable for hauling [illegible] The capacity of this truck is from ei[illegible] ten tons. The power plant is a three c[illegible] single acting engine and fire tube [illegible] Transmission is by gear and chain, the [illegible] being direct connected by shaft to the [illegible] mission gearing which is incased in [illegible] case under the truck.

The truck is equipt with two brakes, [illegible]



"Pittsburg" Heavy Steam Truck, 8 to 10 Tons Capacity.

The 1908 Brush Package Cart

The Brush Runabout Company, of Detroit, Mich., in addition to its pleasure vehicles, manufactures a light package delivery wagon, the base of which is the single cylinder chassis described in December 1907, page 75. This little commercial vehicle has been designed for the economical delivery of light goods, and will carry a steady average load of 500 pounds. The driver sits well forward over the dash in order

brake working on the rear wheels and [illegible] brake working on the brake drum on t[illegible] ferential. Transmission provides one [illegible] and one slow speed. The wagon is fitte[illegible] condensor and necessary air pumps, [illegible] etc. The wheels are steel castings fur[illegible] with wooden tires. There is a steam [illegible] winding drum which is keyed to the sha[illegible] jecting beyond the side of the truck [illegible] is intended for hoisting etc. The fra[illegible]

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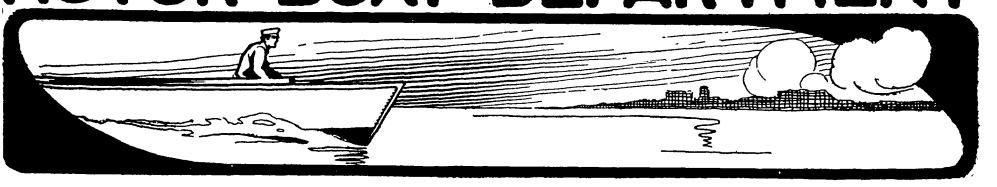
MOTOR BOAT DEPARTMENT



Marine Coming Events

February 3-8—Power Boat and Sportsman's Show, Convention Hall, Buffalo, N. Y.

February 20-March 7—New York City, Madison Square Garden, Fourteenth Annual Motor Boat and Sportsmen's Show.

March 9-14—Sportsmen's Show. J. H Beck, Mgr. Philadelphia, Pa.

March 16—Fourth Annual Motor Boat Carnival at Palm Beach, Fla.

April 6-11—Buffalo, Convention Hall, Motor Boat and Sportsmen's Show. D. H. Lewis, Mgr.

The Chicago Motor Boat Show

During the first week of January the second annual motor boat show under the auspices of the American Association of Engine and Boat Manufacturers was held in the Coliseum at Chicago, under the direct management of Chester I. Campbell. The building was tastefully decorated with flags and bunting, flags of all nations hanging from the ceiling. The attendance was very much larger than at last year's show and every thing was in readiness when the show opened on New Year's Day. Altogether the results showed that every preliminary detail, necessary to a successful show, had been attended to, and the great success of this show was founded on thoro preparation; plenty of publicity and commonsense methods as well as on the growing and very live interest in motor boating that exists in the west. The same woman's orchestra that furnished the music at the New York Show also officiated at Chicago.

The display of complete craft was very comprehensive, the smallest boat shown being an 8-ft. dingy and the largest a 40-ft. cruiser. One of the most attractive exhibits in the boat line was a 40-ft. speed launch, shown by Chas. L. Seabury Co., with teakwood planking. A 27-ft. boat exhibited by Madison Boat Co., also attracted more than oridnary attention. It is finished in quartered oak and has electric headlights. The exhibit of Pope Boat Co. included a fine mahogany boat 24 ft. long and fittingly named the "Pope Superba." In this craft a 2-cylinder opposed motor is used and is entirely hidden from view under large, upholstered seats. The upholstery is in red leather and in conjunction with the solid mahogany finish makes a specially elegant appearance. An 8-ft. dingy was shown by The Weckler Boat Co. This craft has a 4-ft. beam and will carry five men. Odd names were not lacking, the limit in this respect being, perhaps, the "Lemon," the name of a fast, trim boat shown by the Detroit Boat Co. It measures 28 ft. in length and is equipt with a 40 H. P. Rex engine. The finish is in bright lemon color, whence the craft gets its name.

Besides the concerns named, other prominent boat makers at the show were; Hankscraft Co., Pierce Engine Co., Truscott Boat Mfg. Co., Inland Lakes Co., Hunter-Weckler Boat Co., Matthews Boat Co., Racine Boat Mfg. Co., Outing Boat Co. and Reliance Boat and Machine Co.

Like the complete boat exhibits, the exhibts of motors was also all comprehensive, two and four cycle motors of all sizes and types being shown. Many of the exhibits were the same as at the New York show, but there were not as many exhibits as at New York. The most extreme novelty in the motor exhibits was a two cylinder motor in one of the cylinders of which the suction and compression of the charge takes place while in the other the expansion and exhaust are performed. There is no clearance above the piston, so that thoro scavenging of the cylinder is assured. Motors were exhibited by Ferro Machine & Foundry Co., Rothburn Lacy Co., Cushman Motor Co., Auto Parts Co., Gray Motor Co., Pierce Engine Co., Sterling Engine Co., Standard Motor Construction Co., F. A. Brownell Co., Buffalo Gasoline Engine Co., Racine Boat Mfg. Co., Vim Motor Mfg. Co., Truscott Boat Mfg. Co., Termaat & Monohan, Waterman Marine Motor Co., Detroit Engine Wks., Hankscraft Co., H. C. Dornan Co., Continental Motor Mfg. Co., Gas Engine Power Co., Milwaukee Auto Engine & Supply Co., Comet Motor Wks., Phillips Gasoline Engine & Supply Co., Lamb Boat & Engine Co., Goshen Motor Wks., and Sterling Engine Co.

Among the new accessories exhibited was the "Paragon" reverse gear, shown by Evans Stamping and Plating Co., the "Auto-Marine" separable spark plug, made by Legvard Bros. and a line of force feed lubricators shown by Baker-Churchill Co. The exhibit of the Duplex Coil Co. attracted much attention on account of a battery of 32 spark plugs, which kept sparking thru the medium of a quad coil and an 8-point distributor.

A motor boat club at Appleton, Wis., has been organized with an initial membership of 100. It will erect a club house on the Fox River near Appleton. Forty boats of all description are owned by members of the club.

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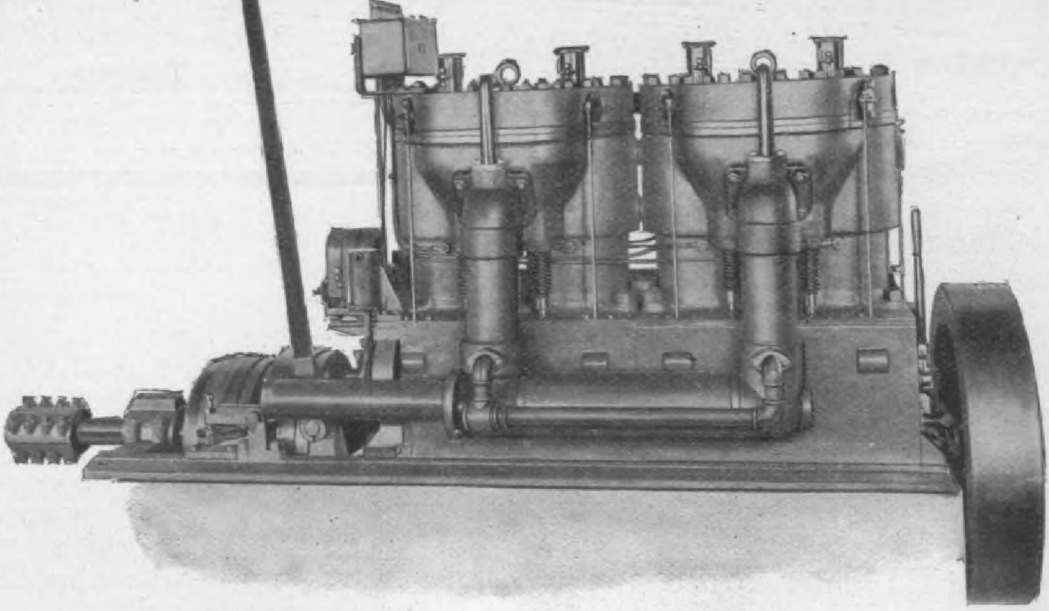


50 H. P. "20th Century" 4-cylinder Marine Motor.

New 50 H. P. "20th Century" Marine Motor

New York Launch, Yacht & Engine Co., Morris Heights, New York City, has added to its line of "20th Century" marine motors a 4-cylinder model of 50 horse power. The cylinders are 9x10 inches and have large pockets on the side so as to allow exceptionally large inlet and exhaust valves. Priming cups are provided. Ignition is of the make and break type, current being furnished by a low tension magneto. Oiling is done by a mechanical lubricator.

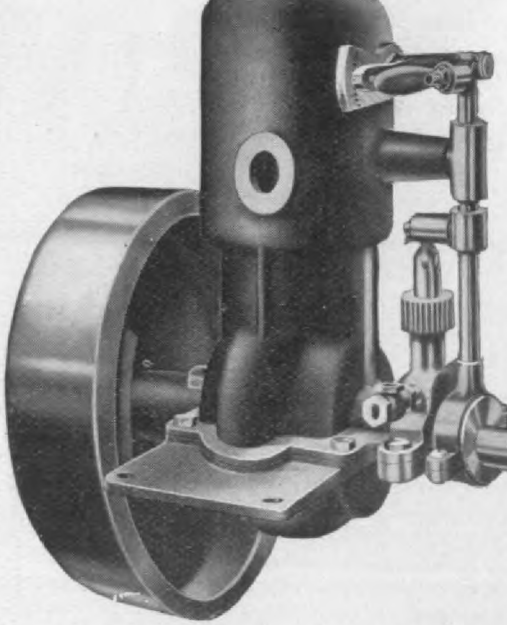
All the 1908 "20th Century" motors are fitted with hot water jacketed throttles of the piston type believed to be a big improvement over the butterfly and shutter valves heretofore used both from a mechanical point of view and because of their economy of fuel. The 1908 line includes 2, 3, 4, and 6-cylinder models, ranging from 10 to 105 horse power.

The "Skipper" Marine Motor

Gray-Hawley Mfg. Co., Detroit, Mich., bought out the entire machinery, stock etc. of the Saint Clair Motor Co., at receiver's sale and has installed the same in its own factory where it is continuing the manufacture of Skipper marine motors formerly made by the St. Clair Co. Gray-Hawley Mfg. Co., has improved the motor but has made no radical changes in the motor which is here illustrated. Five sizes of this motor are made, 3 single cylinder motors of 2, 4 and 6 H. P. respectively

and is operated by an eccentric.

The gas is not admitted to the cran but is admitted to the passage above the case and only pure air admitted to th mixing with the fuel as it passes from th to the cylinder. Ignition is by jump and the plug is placed centrally in the Engine speed can be controlled on eith spark or throttle. End thrust of th peller shaft is taken by a ball bearing



The Latest "Skipper" Marine Motor.

the crank case where it gets thoroly lubr an automatic lubricator feeding the c

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To escape the Dangers of the Dead Engine and the Innumerable Hazardous Situations in which the Motor Boatman may find himself, there is Positive Need that every Motor Boat Should be Equipped with

the ROPER Safety Propeller

With the Roper Safety Propeller the engine never goes dead and never races. The boat is always under absolute and perfect control. You can start, stop, slow up or run at any speed desired, ahead or astern, without jerk, jolt or jar to engine, boat or boatman. One lever, one motion, does it all. The *only* propellor that can accomplish such results. The *only* Safety Propeller made.

"IT IS SIMPLY IMMENSE—TOO MUCH CANNOT BE SAID IN ITS FAVOR"

"I am glad to report perfect success and satisfaction with the new speed-controlling and reversing propellor you put on my launch a few weeks ago. It is simply immense. It eliminates all the unpleasant features connected with running naphtha launches with the old-style propellers. I can now control my launch as well as I can my horse, can go fast or slow, forward or backward, or stand still, at will. I can run very slowly over rocks or bad places without any danger, which was absolutely impossible to do with my old propellor. Too much cannot be said in its favor."

—J. G. ROWELL, Sunapee, N. H., District Manager U. S. Hame Co., Buffalo, N. Y.

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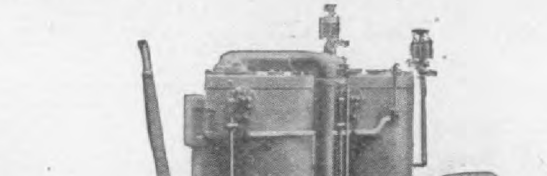
The Automatic Machine Co., Bridgeport, Conn., has been confined to heavy duty marine motors for use in oystering and freight boats, but for 1908 this company is offering in response to an insistent call from its customers, medium weight motors suitable for motor boats or as an auxiliary power in sail boats. The company's experience in building motors that must stand the hardest kind of use and abuse has been of great advantage in designing this new medium weight line, and it is to be naturally expected that the "Automatic" medium weight motors will stand up under severe service. The necessity for simplicity in operation in their oyster boat motors has been the cause of similar simplicity on designing the new line. Hence two very valuable qualities in a marine motor have had their due attention from the start in the design and construction of the "Automatic" medium weight motors,, which are made in 1, 2, 3 and 4-cylinder forms, cylinders 5½x7, 7½ x9 or 10x14.



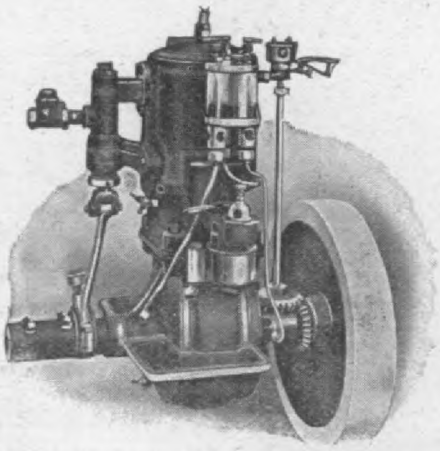
The 1908 "Automatic" 2-cylinder Marine Motor.

Several distinctive features are noted in the new "Automatic," one of which is the contained reverse gear. An extra heavy thrust bearing is provided. The balance wheel has a split hub. Separate cam gears are provided for each cylinder. The exhaust outlet pipe is water jacketed. The ignitor is attached without the use of a gasket. The intake valve seats are entirely separate from the cylinders. Separate eccentrics operate the air and water pumps. All the piping, valves and valve seats are easily dis-assembled.

All these motors are designed for pilot house control. An option is given on Schebler, Kingston or Holley carburetor. All parts are made interchangeable. The motor here illustrated weighs 310 pounds, is 69½ inches long over all and has a base 24 inches wide. The height from the center of the shaft is 32 inches. Speed

H. P. triple cylinder motors.

The 2, 2½ and 3 H. P. single cylind gines will remain practically unch



1908 "Caille Perfection" 5 H. P. Marine

in design from 1907, except for refinements, any "Perfection" mot furnished with an elevated gear c timer, or with timer on the shaft.

The 5 H. P. engine embodies man tinct improvements. It combines a range of speed and power with suff weight to withstand any strain it m put to, and it has the handsome finish is given all "Perfection" motors.

This 5 H. P. engine is supplied w large multiple sight-feed oiler which cates every working part. The cyli are cast from a specially prepared, t strain, resisting mixture of iron, an tested under hydraulic pressure b being machined. They are ground the pistons perfectly, insuring high pression and maximum power, and surrounded by a water jacket of proportions for proper cooling with e at highest or lowest speed.

The piston is ground to a mirror and fits the cylinder perfectly. It c three rings pinned in position. Conn rods are made from extra quality b casting and babbitted at the crank end. Bronze is used in preferen steel. All bearings are babbitted wi highest grade babbitt obtainable, and tam Ball Thrust Bearings are used out. The crank-shaft is a drop fo machined and ground to 1-1000-incl tapering crank-shaft is used, and th wheel is keyed and securely lock place with a large lock nut.

Ignition is by the jump spark sy

The engine is equipped with the P tion double muffler system.

The following are the condensed s

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For Cleaning Auto Bodies

It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO

Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

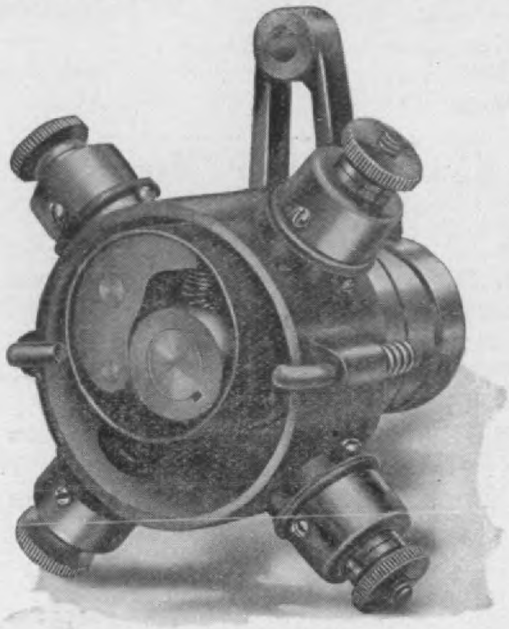
Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

WILLIAM GILMORE
Automobile Supplies
BROAD AND VINE STREETS
PHILADELPHIA, PA.

and at all good automobile supply stores in all leading cities.

Send for our Mobo booklet —*"How to Clean Well Varnish and Paint on an Automobile."* It's free.

Roller Timer



THE new Wico Ring and Roller Timer is more simple and accessible; more compact and durable; has larger conducting and wearing surfaces; is smoother running and more economical than any other timer.

The Ring, when rolled upon a contact point, acts as a direct conductor for the electric current into the case proper, bridging a gap of about one-quarter of an inch, reducing the resistance to practically nothing. It, furthermore, distributes the action of the arc made when the contact is broken over its entire periphery. This loose ring consequently takes practically all mechanical wear from the roller inside and the action of the current outside over an area much greater than the combined areas of similar surfaces on a number of the ordinary types of roller timers.

Write for Booklet No. 23

Witherbee Igniter Company

THREE FACTORIES:

NEW YORK, 541 West 43d Street

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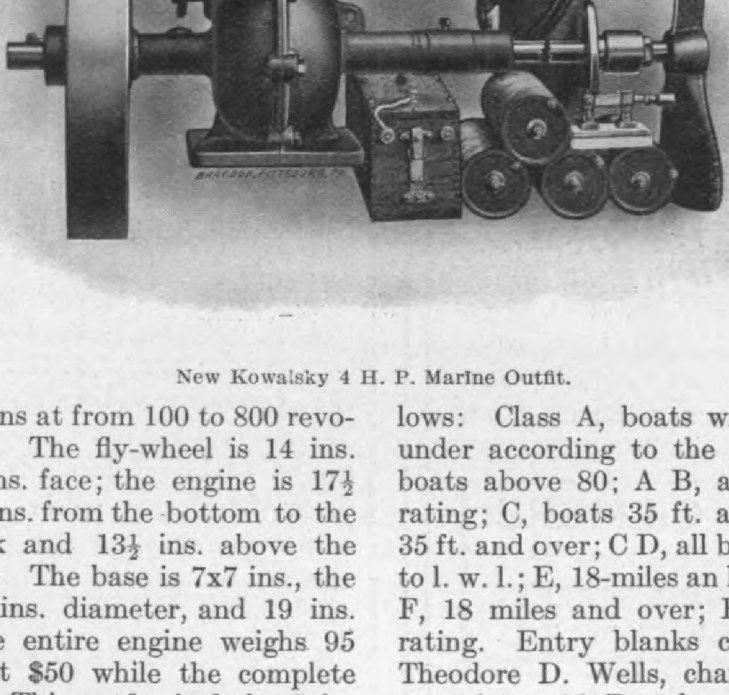
ow ¾-inch; weight of engine complete 75 pounds; revolutions per minute 800; ropeller 15-inch, 2 blade 24 pitch. Price, omplete engine, $85.00; with full boat quipment, $95.00.

New Kowalsky 4 H. P. Marine Outfit

The Waterman Marine Motor Co., 1506-1512 ort St., W., Detroit, Mich., recently bought it the J. Kowalsky Engine Co's. business eviously located at Verona, Pa., and the aterman Company is continuing the manucture of Kowalsky engines, which have been proved.

One of the latest types of this line is the 4 . P. single cylinder outfit here shown. The otor of this outfit has a 4 inch bore, and a



New Kowalsky 4 H. P. Marine Outfit.

nch stroke and runs at from 100 to 800 revoions per minute. The fly-wheel is 14 ins. diameter by 2¼ ins. face; the engine is 17½ . over all being 4 ins. from the bottom to the nter of the crank and 13½ ins. above the nter of the crank. The base is 7x7 ins., the ank shaft is 1 ins. diameter, and 19 ins. g over all. The entire engine weighs 95 unds and lists at $50 while the complete tfit lists at $75. This outfit includes ⅞ in. aft and 14-in. propellor as well as the various cessories shown in the cut. The cylinder d head is in one piece and is held in place by ans of four bolts removing of which allows pection of the piston, connecting rod, and

spark the vibrator coil being used. The cr shaft is a drop forging of carefully sele steel carefully machined and hardened. engine can be reversed and runs equally in either direction. The main bearings fitted with compression grease cups and a s feed oiler of liberal size lubricates cylinder. Between the couplings and bearing of the engine a ball thrust bearin provided.

Palm Beach Events

The program arranged for the fourth an motor boat carnival to be held March 16 20, on Lake Worth, Palm Beach, Fla., div the competing boats into nine classes as lows: Class A, boats with a rating of 80 under according to the A. P. B. A. rule; boats above 80; A B, all boats A. P. B. rating; C, boats 35 ft. and under l. w. l.; 35 ft. and over; C D, all boats, rating accord to l. w. l.; E, 18-miles an hour boats and un F, 18 miles and over; E F, all boats, sp rating. Entry blanks can be obtained fr Theodore D. Wells, chairman of the rega committee, 32 Broadway, N. Y. City.

The Bay City Boat Manufacturing Co., B City, Mich., is a boat and engine builder a designer, and furnishes patterns for amat boat builders as well as knocked-down fram

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Western Distributors of **CONTINENTAL TIRES** Best by Every Test

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Excelsior Supply Co.

Send for Catalogue "AA"

Established 1876 CHICAGO, ILL.

233-235-237 RANDOLPH ST.

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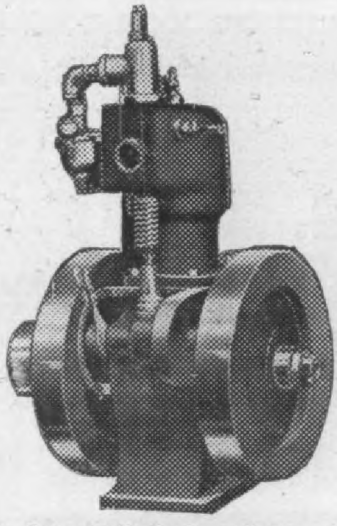
a line of 4-cycle marine engines, under the trade name "Little Sampson." The "Little Sampson" engine is light, compact and powerful. The working parts are enclosed in the crank case, but are readily accessible and are lubricated by splash. The cylinder head and valve chambers are thoroly water jacketed. All parts are interchangeable and it has been the aim of the designer to simplify the construction at every point, so that persons unfamiliar with gas engines can operate the Little Sampson successfully.

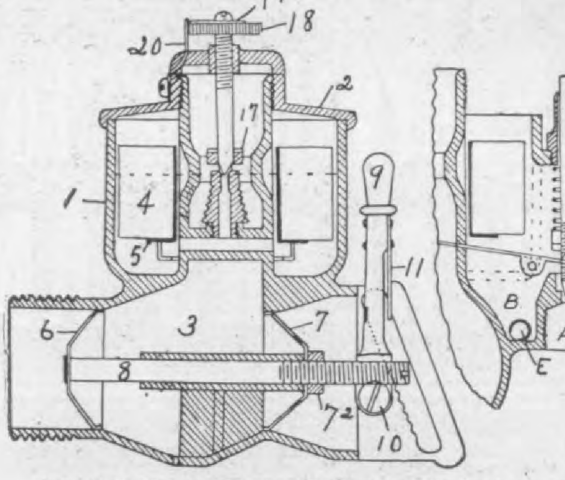


The "Little Sampson" single cylinder, 4-cycle marine engine.

A close grained hard iron is used in the cylinder, and the valves which are of the poppet type, are made from the best nickle steel. The valves are of generous proportions and are easily accessible. The cams are of the cone type, accurately machined and hardened. The connecting rods are of phosphor bronze and the crank shaft is forged from a solid billet of 40% carbon steel. The correct balance is obtained by fastening counter weights to the crank arms. All gears are enclosed and run in oil. Bearings are of Parson's white bronze. Jump spark ignition is employed a storage battery furnishing the current.

Heitger Marine Carburetor

The Heitger Carburetor Co., of 205½–207½ W. South St., Indianapolis, Ind., have brought out a marine type of the Heitger Carburetor known as model B. This marine Heitger carburetor is here illustrated in section and the various parts are designated by letters and numbers explained in the caption beneath the cut. This carburetor has no moving air valves or springs actuated by suction. The

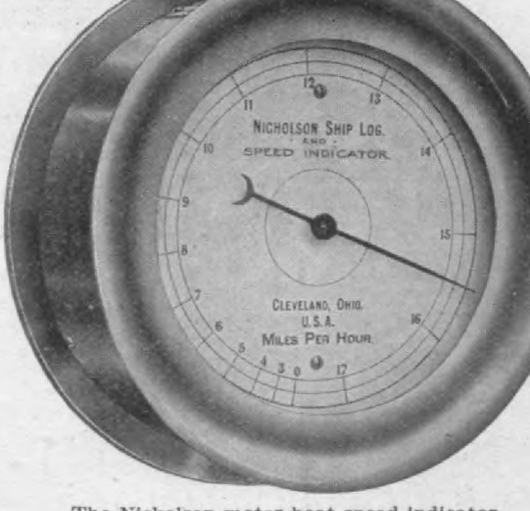


Model B Heitger Marine Carburetor; 1, float cham float chamber lid; 3, mixing chamber; 4, float; 5, flo or lining; 6, throttle disc; 7, air disc; 7-2 air disc lock throttle stem; 9, throttle lever; 10, throttle lever scr throttle lever spring; 12, float valve; 13, float valve 14, float valve lock nut; 15, float valve spring; 16, floa guide; 17, spray nozzle; 18, gasoline adjusting ste gasoline adjusting stem pointer; 20, gasoline adjustin pointer spring clip; A, gasoline connection; B, se chamber; C, drain hole.

for the 1½ in. size. This model B He carburetor is especially adapted for three 2-cycle engines.

Nicholson Boat Speed Indicator

The Nickolson Ship Log Co., of Cleve Ohio, manufacture a speed indicator for r boats. This indicator can be placed in cockpit or cabin of any boat, and the sea nection is a ⅜ in. brass pipe projecting t ¾ in. sea cock about ½ in. thru the shell o boat. This pipe has a plug in the bottom hole in the pipe facing forward forces the



The Nickolson motor boat speed indicator

into the float pipe causing the float to ris operate the indicating mechanism. The

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In every contest in which the *Studebaker* was entered during the past year it abundantly proved itself to be a car of more than usual endurance and freedom from mechanical defects. In the first road contest, in 1908, the two days' endurance run at Philadelphia, the *Studebaker* again demonstrated its superiority by finishing with a perfect score, and, to decide a tie, made the circuit of the course a second time and again finished with a perfect score.

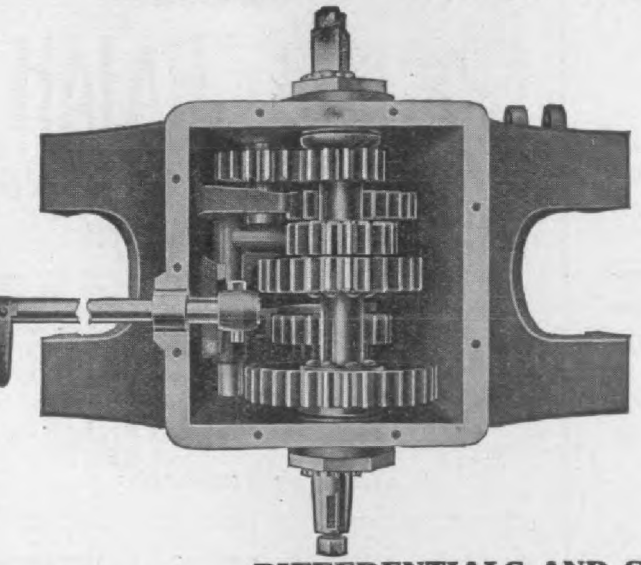
SOME CARS MAKE GOOD SOMETIMES
THE STUDEBAKER MAKES GOOD EVERY TIME

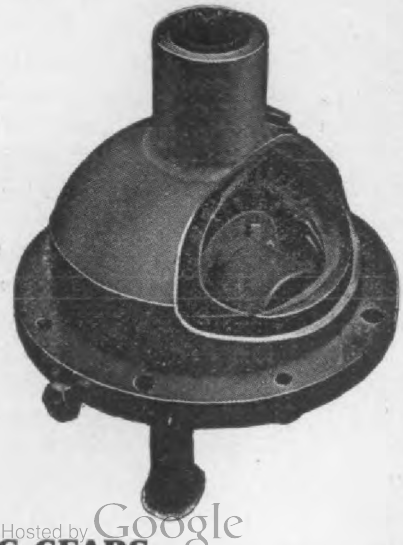
Studebaker

South Bend, Indiana
GENERAL OFFICE, CLEVELAND, OHIO

BROWN-LIPE GEARS

SELECTIVE AND PROGRESSIVE SLIDING GEAR TRANSMISSIONS





DIFFERENTIALS AND STEERING GEARS

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SHOOTING OILER

RECORD GETTER

IRENE } **Established International World's record—One Mile Winner International World's Championship.**

EQUIPPED WITH **HILL PRECISION OILERS**

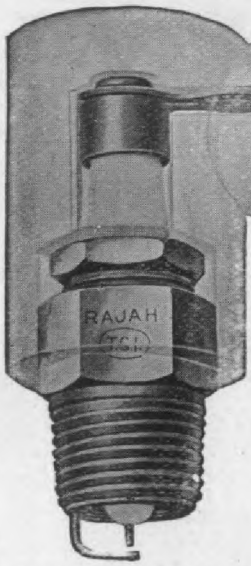
Are you particular about your Boat—Then insist on having the HILL PRECISION OILER—It's on the record holders.

PRECISION APPLIANCE COMPANY,
833 Austin Avenue, Chicago, U. S. A.
(SEE LATER ADS FOR OTHER WINNERS

Producer Gas Motor Boat

Stephen A. Hasbrouck, M. E. of the Hasbrouck Motor Mfg. Co., New London, Conn., said to have successfully operated a motor boat on producer gas and that his company prepared to furnish producer gas outfits r motor boat use. A demonstration of his s producer was made in the "Gloria." a -ft. craft driven by a 25 H. P., 4-cylinder, cycle Hasbrouck motor, and the cost of erating the motor on producer gas was o thirds of a cent per mile. The "Gloria" s an 11-ft. beam, is 5 ft. deep and draws ft. of water. She is a heavily built converted steam yacht.

The plant takes up very much less space an steam and weighs much less. It needs ry little attention and requires charging ly every three to five hours. The gas is ade from hard coal of nut or No. 1 buckheat size. The coal is fed through a hopper the top of the producer into the fire pot ere it is burned. Air is drawn through this rning bed of coal and by chemical action rms a gas. This gas is passed through a ubber and then out to an ordinary gas



The Rajah Spark Plug Hood

"RAJAH

Ignition Absolutel Sure.

Have stood the te for three years wit out any change construction, non being found nece sary.

No other Spark Plug made can show suc a record.

QUALITY IS OUR MOTTO

RAJAH AUTO-SUPPLY COMPANY

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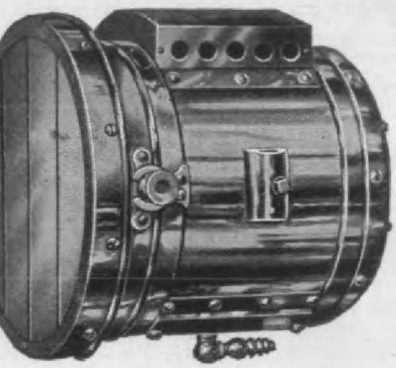
THE CHOICE
F THE AUTOMOBILIST WHO HAS TRIED THEM ALL

ED
OP
OLUMBIA
GNITOR
RY CELL

ATIONAL CARBON CO., CLEVELAND, OHIO

Phoebus Lamps and Generators

esigned for the automobilist who wants the best. They are constructed on attractive lines of excellent materials and finest finish.



/ brass body, reinforced with extra nds 1/8" thick. Full size usch & Lomb Mirror, Adjustable cus.

Double Generator, Heavy Gauge brass, Automatic cut-off Valve; water jacket cast base.

Very handsome square lamp, heavy gauge brass, silver reflector, perfect draught; will stay lit.

We can meet all competition in **Price, Quality and Prompt Delivery.**

Get Our 1908 Booklet

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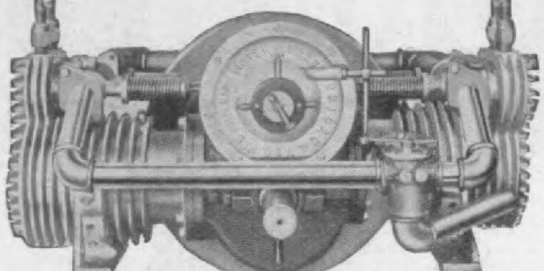


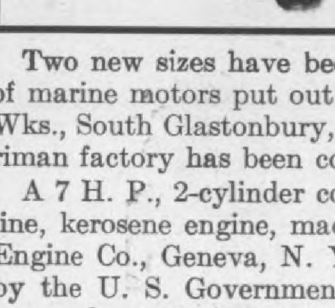
Phillips Motor Co., 133 Franklin & Indiana Sts.
CHICAGO, ILLINOIS

E. H. KELLOGG & CO.
OILS.
243 South Street, N. Y.

Putnam Motors for 1908

Air and Water Cooled Types. For Auto., Launch and Motorcycle. Also Full Sets of Castings. 1½ to 40 H. P. One to Eight Cylinders. Putnam Carburetors, 4 sizes.

PUTNAM MOTOR MFG. CO.
57 Lebanon Street Springfield, Mass.



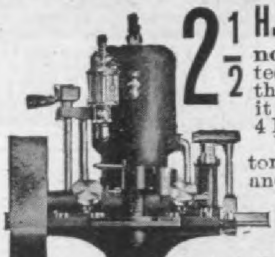
High Grade Marine and Auto Engines, 2 and 4 Cycle, 2 to 20 H. P. Best material and FULLY GUARANTEED, also sells castings with drawings. State your want, and send for catalogue.
A. J. HOULE MOTOR WORKS
580 S. East St., Holyoke, Mass.

Two new sizes have been added to the line of marine motors put out by Harriman Motor Wks., South Glastonbury, Conn., and the Harriman factory has been considerably enlarged.

A 7 H. P., 2-cylinder convertible type gasoline, kerosene engine, made by Fay & Bowen Engine Co., Geneva, N. Y., has been ordered by the U. S. Government for use in a coast survey boat, 25 ft. long by 6½ ft. beam.

The Comanche Whistle Co., 335 So. Spring St., Los Angeles, Cal., is making its Comanche whistle for motor boat use. The motor boat type is the same in every respect as the auto whistle excepting that it is operated with the hand instead of by a foot-lever. The prices are $5.75, $7.25 and $9.25 according to size.

Stamford Motor Co., Stamford, Conn., has established a New York salesroom in the



2½ H.P. Complete Outfit $
not bare—and guaranteed to develop more than 3 1-2 H.P.—in fact, it is as powerful as most 4 H.P. engines.
We built and equipped a tory last winter—the most and up-to-date plant in the voted exclusively to marine engines. We moving into another larger plant—5 stories (3 large). This shows the enormous de Gray Motors. Write today for the story o mile long distance race on Lake Erie, also
Engines 2½ to 40 H.P. GRAY MOTOR CO., 28 Leib St., De

JOE'S REVERSING GEA
and
ONE WA
Clutch

Send
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MARIN
SPECIALT
SNOW & PETRELLI MFG. CO., New Haven,

The Cushman Motor

Has surmounted the difficulties of past in the manufacture of two cycle engi
It establishes a new standard of ex lence in marine motor construction.
Its new features are striking and t practicability is at once apparent to one is looking for a superior machine.
Address Cushman Motor Co., 2018 N St., Lincoln

Perfection

MARINE MOTORS
Speedy. Powerful. Simple Reversible. No cranking. Bes finished engine sold.
2½ H P. $55.00 complete
Drop forged crank-shaft; groun pistons an cylinders; elevate timer; multipl sight-feed oile
5 H P $95

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CYCLE AND

AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 9. PHILADELPHIA MARCH 1, 1908

February Edition 20,600

15,463	Copies mailed.
5,202	Copies Delivered to News Company.
1,048	Copies to Philadelphia and foreign, etc., under stamps.
900	Copies to the Providence Show.
500	Copies held in reserve.
23,113	
2,513	Back numbers sent out.
20,600	Total copies February edition.
	Of these.
12,671	Were paid subscriptions.
5,202	Delivered to News Company.
17,873	
1,140	Returned to News Company, to February 15, '08.
16,733	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the February issue was 20,600.

Of these, 18,362 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 19 ounces, representing 15,463 copies, and 2,513 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the abov. figures at any time to any one interested.

Coming Events

March 2-7—Ormond-Daytona, (Fla.) Annual Race Meet, under management of A. C. A.

March 7-14—Sixth Annual Auto Show at Mechanics' Building, Boston, Mass., Boston Automobile Dealers' Association, Chester I. Campbell, Mgr., 5 Park Square, Boston.

March 9-14—Sixth Annual Automobile Show, Convention Hall, Buffalo, N. Y., Automobile Club of Buffalo, Dai H. Lewis, Manager.

March 11—First Quarterly Meeting, Society of Automobile Engineers, Boston, Bay State Auto Association Clubhouse.

March 15-April 1—Automobile Show at Auditorium, Omaha, Neb.

March 16-21—Automobile Show, Race and Hill-climbing Contest at Indianapolis, Ind.

May 18-19—Savannah Race Carnival, Savannah, Ga.

March 18-20—Automobile Show, Second Regiment Armory, New Haven, Conn., under the auspices of the automobile dealers of that city.

March 18-25—Rochester, N. Y., New Convention Hall, First Annual Show, Automobile Dealers' Association and Rochester Automobile Club, Bert Van Tuyle, manager.

March 21-28—Automobile Show, St. Lawrence Arena, Toronto, Canada, R. M. Jaffray, manager.

March 21-28—Annual Cordingly Show, London, England.

March 22-31—Nice Annual Automobile Week, Nice Automobile Club, Nice, France.

March 25—Contest of Elegance at Monte Carlo.

March 26-April 24—Second Annual International Commercial Vehicle and Motor Boat Show, Olympia, London, Society Motor Manufacturers and Traders.

March 28-April 2—Opening Week Carnival by Chicago Automobile Dealers under management of Chicago Auto Trade Association.

April 4-11—Pittsburg, Pa., Automobile Show, Duquesne Garden, Automobile Dealers' Association of Pittsburg.

April 5-12—Third Annual Automobile and Sportsmen's Show, Montreal, Canada, Arena, R. M. Jaffray, manager.

April 6-8—Annual Automobile Show, Mammoth Rink, Denver, Colo., G. A. Wahlgreen, manager.

April 6-11—Carnival Opening Week of New York City Automobile Dealers, General Cutting, of N. Y. Auto. Dealers' Association, chairman of committee in charge.

April 24—Stock car road competition for the "Briarcliff" trophy, Westchester County, N. Y., Robert L. Morrell, chairman committee in charge.

April 25-May 25—Industrial Motor Car Competition, A. C. of F., Paris, France.

April 26—Automobile race in Lyons, France (Automobile Club of Rhone).

May 4-5—150 Mile Endurance Run, Harrisburg to Philadelphia and return, Motor Club of Harrisburg.

May 6-20—International Automobile Exposition, Moscow, Russia, Automobile Club of Moscow.

May 10—Targa Florio Contest, Sicily, Automobile Club of Italy.

May 15—Algonquin Hill Climb, up Phillips and Perry Hills, Chicago Motor Club, C. P. Root, chairman contest committee.

May 17-June 2—International Automobile Exposition, Moscow, Russia, Automobile Club of Moscow.

May 30—Hill Climbing Contest at Sport Hill, Easton, Conn., under direction of the Automobile Club of Bridgeport.

June 1-8—Pleasure Car Reliability Trials, Automobile Club of Great Britain, London, England.

June 9-17—Touring Competition for Prince Henry of Prussia, Germany, Imperial Automobile Club of Germany.

June 20-26—McClure Cup Contest in conjunction with annual run of the Albany, N. Y., Automobile Club, John Randerson, chairman of committee in charge.

June 24-27—1200-mile Reliability Run, Chicago to outlying points and return, Chicago Motor Club, C. P. Root, chairman contest committee.

July 13-17—International Race Meet, Ostend, Belgium, Automobile Club of Ostend.

December .. —Annual Automobile Show, undet auspices of Automobile Club of America. (Exacr date to be nanounced.)

1909.

January 18-23—Annual Automobile Show in Madison Square Garden, under auspices of Association of Licensed Automobile Manufacturers, 7 E. 42nd St., N. Y. City.

February 1-6—Chicago National Automobile Show; National Association Automobile Manufacturers, N. Y, City, S. A. Miles, Manager.

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A. A. A. Executive Committee Meeting

At the February meeting of the A. A. A. Executive Committee held on the 6th ult. several additional directors were elected. As new clubs and state associations are admitted, additional directors representing these clubs and associations will be elected; as it is the policy of the A. A. A. to have all state associations and all unfederated clubs represented on the board of directors. After the March meeting which is scheduled for the third instant, the Board of Directors and the Executive Committee will endeavor to hold meetings in other cities than New York so that more directors will be able to attend. At the February meeting the following racing board was appointed: Jefferson De Mont Thompson, (Chairman), Frank G. Webb, (Vice-President), Frederick H. Elliott (Secretary), W. K. Vanderbilt, Jr., Ira M. Cobe, Asa Paine, Benjamin Briscoe, Dave H. Morris, J. J. Mann, A. B. Lambert, George L. Weiss, Harry W. Knights, Harold H. Knowles, Rossiter Worthington, Henry Ford, H. A. Bonnell, Charles J. Swain, Lewis R. Speare, A. R. Pardington, Thomas Henderson, R. Lippitt, A. L. Riker, Percy Owen, S. A. Miles, Alfred Reeves, A. G. Bachelder, Geo. G. Greenberg, E. R. Thomas (Buffalo), S. M. Butler, S. L. Haynes and H. L. Bowden. The new technical board will take the place of the technical advisers formerly appointed.

Definition of Amateur

A special committee of the A. A. A. was recently appointed to prepare new racing rules and on Feb. 19 prepared a report which was submitted to the Racing Board on Feb. 24. One of the most interesting features of the new rules recommended by the committee is the definition of an amateur, which is as follows: "A man who has never driven or raced a motor car for pay, either in cash or any other valuable consideration; or competed for a cash prize; who does not make his livelihood or any part of it, as a result of racing or driving, either as a demonstrator, tester, or chaffeur; who has not otherwise received financial reward for engaging in competition; who has never been declared a professional by any sport-governing body or who, having been so declared, has been reinstated either by such body or by the Racing Board of the A. A. A."

Budlong Leaves A. L. A. M. to Join Packard

An addition to the administrative staff of the Packard Motor Car Company, of Detroit, brings to it, as assistant general manager, Mr. Milton J. Budlong, manager of the Association of Licensed Automobile Manufacturers. He left the association to join the Packard forces March 1, to assist Mr. Henry B. Joy and Mr. S. D. Waldon in executive affairs.

A. M. C. M. A. Annual Meeting

The annual meeting of the American Motor Car Manufacturers' Association was held on Saturday, February 8, at Detroit, Mich., at which election of officers took place. Benjamin Briscoe was re-elected chairman of the Committee of Management, and the following other officers were also re-elected: R. E. Olds, vice-chairman; H. O. Smith, treasurer; W. H. Van Dervoort, auditor; Charles E. Lewis, director. William Mitchell Lewis was elected secretary; B. F. Everitt and C. G. Stoddard directors.

All the reports showed prosperity during the past year and promise of a prosperous year to come. The Show Committee reported having been able to rebate 25 per cent. to exhibitors at the Grand Central Palace show. The secretary's report showed that 15 new members had been admitted during the year. Five thousand dollars were appropriated for the use of the Good Roads Committee. The invitation of the A. A. A. to co-operate with it in the promotion of contests was accepted, and a committee, consisting of H. O. Smith, Walter C. Marmon and A. C. Newby, was appointed to take charge of the matter.

Annual Meeting of Automobile Trade Credit Association

At the annual meeting of the Automobile Trade Credit Association, held at the offices of its secretary and attorney, Franz Neilson, 80 Wall street, New York, all of the old officers were re-elected, as follows:

President, W. B. Lasher, Weed Chain Tire Grip Co.; vice-president, Carl Kaufman; treasurer, M. J. Martin, George Haws Co.; secretary, Franz Neilson. These gentlemen, with E. S. Fretz, Light Mfg. & Foundry Co.; George L. Holmes, Jones Speedometer Co.; F. S. Wilson, Trenton Rubber Mfg. Co., and H. B. Mirick, National Electric Supply Co., constitute the board of directors.

During last year it was reported that the association had been able to collect 75 per cent. of the old and doubtful accounts of its members. The total number of accounts handled was 863, of which 805 were collected, the total amount being $75,341, of which $56,801 was collected.

Among the new members recently enrolled are: Anderson & Wilkens, Firestone Tire & Rubber Co., Universal Elec. Storage Battery Co., Chicago Battery Co., Nathan Novelty Mfg. Co., Western Electric Co., The Wm. Cramp & Sons Ship & Engine Bldg. Co., Dow Tire Co., Rajah Auto Supply Co., Stevens-Duryea Co., Wheeler & Schebler.

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1,200-Mile Reliability Run

The new contest committee of the Chicago Motor Club has planned the longest reliability run ever proposed 1,200 miles for June 24, 25, 26 and 27. Each car will be required to do 300 miles a day, the "hub and spoke" plan being adopted so the cars will finish in Chicago each day. The season for 1908 will be opened in May instead of two months later. A novelty discussed, was a three or four day reliability test of high-wheel buggy autos.

1908 Grand Prix Regulations

The 1908 Grand Prix race is scheduled to take place sometime during the first two weeks in July. The distance will be between 440 and 500 miles. The entrance fee for one car is 5,000 francs, two cars 9,000 francs, and three cars 12,000 francs. Entries at ordinary fees close at 6 P. M. on Feb. 15, and at double fees at 6 P. M. on June 1. The Ostend Conference Rules will be used. The cylinders maximum bore must be 155 millimeters for four cylinders, and the minimum weight, without passengers, gasoline, water or spare parts, 1,100 kilogrammes.

Rules and Regulations of the Prince Henry Endurance Contest

Complete rules and conditions for the Prince Henry endurance contest have been submitted by the joint technical committee of the Imperial A. C. and the German Automobile Mfgrs. Asso., to Prince Henry for his approval. An average of 200 miles will be run per day, with a total of 1514 miles for the 7 days. The competition is limited to four and six cylinder cars, with cylinder bores of 3.4 to 5.8 inches or motors of 16 to 70 H. P.

According to the official definition of the American Automobile Association, a "national race is a race where the entrants are respectively named by and represent any two or more of the automobile clubs affiliated with the American Automobile Association," while an "international race is a race where the entrants are respectively named by and represent any two or more of the recognized national affiliated automobile clubs of the world."

N. A. A. M. has fixt on February 6-13, 1909, as the dates for the next Chicago show, which will be held in the Coliseum and First Regiment Armory.

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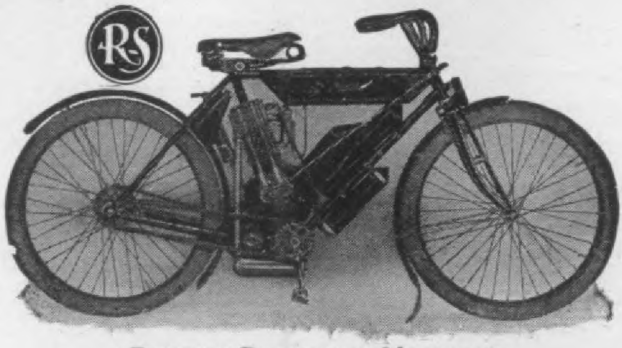

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Reading Standard Company
READING, PA.

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CYCLE AND
AUTOMOBILE
TRADE JOURNAL

ENTERED AT THE PHILADELPHIA POST OFFICE

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Change of advertising copy must reach this office not later than the 10th of each month. New advertisements will be accepted as late as the 20th.

Philadelphia, March 1st, 1908

A National Automobile Show Desired

In our January issue an editorial "The Demoralizing Effect of the Shows" was published, in which some of the disadvantages of the present system of automobile shows, were set forth. In the February issue a very few of the large number of letters in answer to this editorial were published. Anyone could not read these letters which are from representative firms of the automobile and parts manufacturers without being struck by the unanimity of opinion in regard to the necessity for a radical change in the automobile show situation. Considerable diversity of opinion was expressed as to the best method of dealing with the Show situation, but practically all agreed that the time had come for a change of some kind, as the industry has unquestionably passed the "educational" period, as one automobile maker put it, and the results are not in proportion to the enormous expenditures entailed.

Many suggestions were offered varying from an open-air carnival to two stupendous national shows to be held in probably New York and Chicago. Some advocated a type of nomad show which should be held each year in a different locality, and point out the advantages to be gained by making possible a large attendance of those living in different parts of the country who might not be able to attend a show held at either extreme of the continent. They also argue that other advantages would be gained, as such a method would stimulate a friendly rivalry between the different cities which might be candidates for the event. But in every case the general idea prevailed that there should be but one or two shows each year, and that these be truly representative and national in character in which licensed and unlicensed should participate alike and on an equal footing.

The combination of an outdoor meet, in connection with an automobile indoor exhibition seems to have many advocates, and of course necessitates the holding of the show at some other than the midwinter period. At such a convention, as it might well be, all of the manufacturers and agents could meet each other and friendly contests be engaged in before an appreciative public, and in this way the features of the different cars could be brought out in a practical way that is impossible with simply an indoor show.

The usefulness of the automobile shows as now held as a means of placing agencies is also questioned by many of the makers, who claim that conditions are such at these exhibits that it is very nearly impossible to do business with those who have not really previously made up their minds very definitely as to the type and price car or cars which they wish to handle, and outside of this feature, the only other strong talking point for the shows as now held is the opportunity which is given the purchasing public to investigate details of construction and compare one make with another. Nearly all agree that there has been much unnecessary expense connected with the shows which might very well have been placed in improving the cars themselves, and the fact is also pointed out that this expense in the long run must be paid by the car purchasers without receiving in return this money value in improved constructions. Some even go so far as to claim, and justly claim, that the present system of shows "restrict the engineering development of automobiles to given calendar dates instead of encouraging the making of improvements wherever required by circumstances and experiences," and thus interfere with the most rapid development. Some who might be called extremists have already cut out the shows and claim that the money can be spent in other ways which bring them much larger returns. However, for new concerns or those placing on the market new devices, it is generally conceded that the publicity obtained by exhibiting at an annual automobile show is extremely profitable.

This discussion does not, of course, take into account the development of the commercial vehicle which is an entirely sep-

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arate matter and must be dealt with individually.

In conclusion it may be said that with few exceptions the consensus of opinion seems to be that a change should be made tending toward a single, or at most, two national shows each year, in which all American cars, parts and cycles, can have representation, and it is hoped that the matter may not be dropped before some satisfactory arrangement is determined upon.

Commercial Vehicle Abuses

The use of commercial vehicles is now increasing rapidly and the fearless companies who did the pioneering are to-day recognized in their communities as the most progressive business concerns. Although this pioneering doubtless cost heavily, a large part of the expense was charged to advertising and the advertising evidently paid.

There are now many commercial vehicles of moderate capacity and not a few large trucks which have been thoroughly tried out in many lines of business and are known to be satisfactory. Yet the service obtained by different users of the same make of vehicle differs so widely that one is forced to attribute the variations to other causes than poor materials or design of the machines. Investigation shows that by far the largest part of the trouble encountered is due to abuse and the inexperience or carelessness of the operators.

It is probably safe to say that 90 per cent. of the commercial vehicles now in use are daily overloaded and called upon to do by far more than their designers ever intended them to do. There seems but one way to prevent this very prevalent cause of a multitude of commercial car ailments, and that is, to so limit the size of the carrying platform that it is unprofitable with ordinary goods to overload the machines. Tires are usually the first to suffer from overloading and then follow in succession nearly every form of trouble that can befall a self-propelled vehicle. Of course, the tire and truck makers are blamed if the machine fails at a critical moment after several months of such abuse.

Inexperienced and careless operators are another sure cause of disaster regardless of the make of vehicle used. Unfortunately short-sighted views on economy have led many otherwise good business men to employ very cheap but in reality very expensive drivers. This is certainly a mistake at this stage of development, not of the truck but of the truck driver. The time will come when more of our boys have grown up in the company of motor-driven trucks and good competent drivers can be had at low figures, but this state is far from being realized at present. However, the higher grade chauffeur's clubs and schools are now paving the way to this end.

A very common cause of dissatisfaction when inexperienced help is employed is the result of neglecting minor details which should have had immediate attention before they grew into serious troubles. Small protecting shield and dust cap screws are lost, the caps come off and the parts are left to run exposed, motors are sometimes allowed to run dry, because of some slight stoppage which could have been easily removed if attended to at once. Loose parts are not promptly adjusted, etc., but perhaps the greatest evil and one of the hardest with which to deal, is often done by experienced drivers, many of them direct from the factory of the makers of the truck. We refer to fast driving, to which unquestionably much trouble can be traced. Very often a factory operator is sent to instruct a purchaser in the use of a truck and perhaps attempt to convert in a few days one of the horse drivers into a chauffeur. Usually the factory man is a tester, and as most of his driving has been at top speed in an apparent endeavor to see how much damage can be done to the truck before it is turned over to some luckless purchaser, he naturally demonstrates in the same way. The maximum load is put on and a flying trip out and return is made at a speed that would absolutely ruin the truck in less than six months. The purchaser is delighted with the amount of goods delivered in such a short time, and, of course, the converted horse driver emulates the example of his expert instructor and also drives at top speed as long as the engine runs and the machine holds together. There can be but one result,—disaster, and who is to blame; surely not the owner, for he knows no better, not the truck, for it may really be well constructed. The truck manufacturers are the guilty parties, for they surely ought to know better.

There are two methods of correcting this evil. One lies with the purchaser if he is sufficiently informed to use it and consists simply of placing a locked recording speed device upon each machine and discharging the driver if definite speed limits are exceeded. The other lies with the maker, who can gear down the truck so that its speed cannot be excessive, but even in this case, trouble is likely to follow, as the drivers will continually race the engine in a vain attempt to go faster.

Although the present commercial vehicles are not perfect, yet what is now needed is not so much improvement in the trucks themselves as in the methods of their handling, and we look forward to the time when truck makers will see the folly of demonstrating how very rapidly their trucks can deliver goods and will also see the wisdom of equipping their machines with some form of speed recording device.

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Careless Use of Form Letters

Lax methods of conducting business are always more or less fatal in any line of endeavor, and are none the less so in the automobile and motor cycle industry. It would appear from the letters sent out by some firms and purporting to be answers to inquiries from possible purchasers that lax business methods are rather increasing than decreasing among both manufacturers and dealers. We have particular reference to the abuse of stock forms and letters which are, when rightly used, one of the best modern methods of reducing the excessive labor in connection with correspondence.

No recent innovation in office methods has reduced the labor of correspondence more than stock letters and forms and methods of reproducing these in quantities, and their proper employment ought to increase rather than decrease the sales of any properly conducted company. Nevertheless, there is a growing tendency apparent, to abuse the use of such forms in order to avoid legitimate letter-writing. For example, it is very common for an inquirer to ask for definite specific information in regard to certain manufactured products, prices, etc. Such a letter cannot be satisfactorily answered by carelessly mailing to the probable purchaser a couple of circulars and a form letter which may or may not remotely hit the case. This method of doing business can usually be traced to the careless reading of mail and the fact that it is so very easy to turn the matter over to some of the stenographers with a note to send circulars and letter A, B, C or D, instead of giving personal attention to the matter and answering definitely the particular inquiries made. The receipt of such a letter by an inquirer usually disgusts him to such a point that his business will be transacted with some other firm who do pay closer attention to the details of their correspondence, or if the particular firm in question is practically the only one from whom the said goods can be purchased, it necessitates further correspondence on the matter. In many cases even a second letter receives the same general superficial treatment as the first and it needs must be a persistent purchaser who will follow up the matter with a third letter in order to obtain the necessary information before purchasing.

The legitimate use of circulars, stock forms and letters is a decided advantage, and it seems a pity that in so many cases it is found so easy to fall back on this simple method of disposing of a mass of communications rather than giving them the earnest, personal attention which they should receive, if prospective purchasers are to become permanent patrons.

A warning is given at this time as the use of such forms is now very general, and we feel that the incorrect use of them so rapidly leads to disadvantageous results that the attention of employees should be particularly called to the correct and incorrect methods of using such form letters.

New York-Paris Race in Progress

On Wednesday, February 12, the participants in the New York to Paris race started from in front of the Times Building, at 42d and Broadway, New York City, each carrying an American flag presented by President Hoyt, of the A. C. A. the night before at a farewell banquet given by the club in honor of the contestants. Jefferson De Mont Thompson, chairman of the A. A. A. Racing Board, announced that he would give $1000 in gold to the first driver presenting his flag to the president of the Automobile Club of France.

Three French, one Italian, one German and one Americen car (a Thomas) made the start, and up to this writing are making fair progress across the continent. Besides these official starters, Eugene Le Louvier, with a Werner car, is covering a different route, bound for the same goal. He is the originator of the proposition to run a New York to Paris race, but altho **Le Matin**, a French newspaper, pushed the project, the route Le Louvier suggested was not adopted. Hence, he has started on his own hook to cover his own route unofficially. He left New York City Tuesday, February 11, and will go by way of Philadelphia, Cincinnati, Kansas City, St. Louis, Cheyenne, Portland and Tacoma, while the official racers are taking the northern route by way of Albany, Rochester, Buffalo, Cleveland, Toledo and Chicago.

Harry E. Fields, of the Hartford Works Company, has been advanced from sales manager to vice-president, and will hereafter make his headquarters in New York City.

The Brennan Motor and Manufacturing Co., of Syracuse, N. Y., has purchased the Phoenix Machine Co's. plant and will use the same as an addition to its regular plant for the manufacture of gasoline engines and automobile parts.

At the annual meeting of stockholders of The Pittsburgh Automatic Vise & Tool Co., held in the general offices of the Company in Pittsburgh, Pa., Monday Jan. 13, '08, the old Board of Directors were all re-elected for the ensueing year. At the annual directors meeting following, the old management was unanimously re-elected with the following appointments: G. P. Blackiston, Pres. and Gen. Mgr., A. H. Blackiston, Vice-Pres., and H. T. Kehew, Sec'y. and Treas.

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A. A. A. to Test Tire Chain Ordinance

Any member of the American Automobile Association arrested for alleged violation of the recently re-enacted ordinance by the Park Board, of the City of New York, prohibiting automobiles wearing tire chains, from entering the parks, upon due notification to the office of the Association, 437 Fifth Avenue, or to Charles Thaddeus Terry, Counsel for the A. A. A., by person so arrested, the Association will be willing to defend the person or persons so arrested without expense to him or them, in such a number of cases as may be adequate to test the validity and frugality of the ordinance.

Sixth Annual Boston Automobile Show

On March 7, the sixth annual Boston Automobile Show, in Mechanics Building, will open its doors to the public. The exhibits will be on view until Saturday evening, March 14. Special exhibits of Motorcycles and Commercial Vehicles are features. Signs and decorations will be uniform and artistic. From the already large list of exhibitors the show, which is as usual under the able guidance of Chester I. Campbell, promises to surpass any of the previous Boston exhibits.

A. M. C. M. A. Detroit Meeting

Following the most prosperous year in its history, the American Motor Car Manufacturers' Association at its recent annual meeting in Detroit, re-elected the full Committee of Management, which comprises Benjamin Briscoe, Chairman; R. E. Olds, Vice-Chairman; H. O. Smith, Treasurer; Wm. Mitchell Lewis, Secretary; and W. H. Van Dervoort, Auditor. It was decided to distribute a 25 per cent. rebate to all the members who exhibited at the Grand Central Palace Show. The financial report indicated that the Association was in the best financial condition of its history. It was voted to turn over $5,000 to the Good Roads Committee, to be expended during the current year at its discretion.

There was a long discussion regarding automobile shows at New York and Chicago, and after making certain recommendations, the show matter was placed in the hands of the Show Committee.

George N. Pierce, who has not been taking an active part in the business of the George N. Pierce Co., of Buffalo, N. Y., has formally retired from the concern, and G. K. Birge has been elected president in his stead. Other officers are Henry May, vice-president; Charles Clifton, treasurer; L. H. Gardner, secretary. The board of directors includes the above officers and W. H. Hoyt.

Transportation Department for N. A. A. M.

At a recent meeting of the National Association of Automobile Manufacturers, the Executive Committee decided to organize a transportation department. Mr. J. S. Marvin, who has been in charge of the traffic department of the A. L. A. M., will be asked to head the department, and it is expected that work will begin at once.

Eighteen Briarcliffe Race Entries

Eighteen entries are now in hand for the Briarcliff Trophy race, scheduled to take place on the West Chester course on April 24th. The entries include 1 Austrian, 2 French, 5 Italian, and 10 American cars.

Marcus L. Brock has resigned as associate manager of the A. L. A. M. and his work is to be taken up by other members of the staff.

Joseph Bennett, formerly in charge of the Philadelphia Fisk Rubber Co's Branch recently joined the sales department of the Babcock Electric Carriage Company.

Orrin S. Werntz, Treasurer of the National Acme Manufacturing Company, since its organization, died February 6th, 1908, age 32. He was born in Canal, Fulton, Ohio.

The Badger Brass Manufacturing Co. has practically abandoned the Kenosha, Wis., plant so far as the manufacture of Solar automobile lamps is concerned. Officials of the company have formally announced that this end of the business has been transferred to New York City, and all parts that were made at Kenosha have been sent to the branch in that city.

Additional machinery has been installed in the factory of the Detroit Seamless Steel Tubes Co., of Detroit, Mich., which enables the company to produce larger sizes of "Detroit" cold drawn seamless tubing, and also permits a much larger output of regular sizes. The demand for "Detroit" tubing has grown to such large proportions that the addition to the company's manufacturing facilities was urgently needed.

The Appellate division of the New York Supreme Court has affirmed the ruling of Judge O'Gorman in the lower court in the case of the Searchmont Automobile Company against the A. L. A. M. The action was brought to compel a division of the profits of the A. L. A. M. on the ground that it is a partnership. The decision is to the effect that the Searchmont Company had forfeited its license by failing to pay its royalties and that the A. L. A. M. had a right to cancel the license.

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eview of Complete Motor Cars

Comprising all 1908 Models of all American Motor Car Manufacturers

SEE CLASSIFIED INDEX, PAGES 131, 131a, 131b, 132

Motor Cycle Review will be Found Page 216

Gasoline Pleasure Vehicles

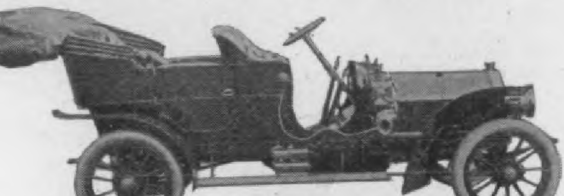
Premier Gasoline Cars.

by the Premier Motor Mfg. Co., Indianapolis, Ind.

mier Model 30 Touring Car, with 5-passenger, ght line body; 4-cylinder, water-cooled, 4½x4½, H. P. motor, under the hood, on sub-frame; s mechanically operated, on opposite sides; Par- white brass crank shaft bearings, phosphor e cam shaft bearings; double ignition, make- break and jump spark from storage battery and n low tension magneto; force feed lubrication, Bleeder test; multiple disc clutch; 3-speed and 1 se, selective, sliding change speed gear, on Hess- ht bearings, direct on the high; shaft drive to h-driven semi-floating type rear axle; I-section forged front axle without weld; 108½-inch wheel 34-inch wheels, on Hess-Bright ball-bearings;

REMIER MODEL 30 TOURING CAR, $2600.

h tires; channel section prest steel frame and frame; semi-elliptic front springs, 40x2¼ inches, aves; full elliptic rear springs, 40x2¼ inches, 6 es; screw and nut steering gear; internal expand- cork-inserted brakes and external contracting cam- hair lined brakes on the rear wheels; spark and ttle control on steering wheel; 18-gallon gasoline , on the front seat; passenger capacity, 5; car ght, 2550 lbs.; equipment, gas and oil lamps, rator, horn, repair and tire tools; price, $2600, er as a touring car or runabout. The same chassis itted with a limousine body. Special features: tion, rear axle construction and brakes.



PREMIER MODEL 24, $2250.

remier Model 24; tulip body; passenger capacity, 4-cylinder, water-cooled, 4¼x4¼, 24-28 H. P. mo- under the hood, on the frame; mechanical valves, opposite sides; Parson's white brass crank shaft rings, phosphor bronze cam shaft bearings; jump rk ignition from storage battery or 4 dry cells; ed sight feed lubrication; multiple disc clutch; 3- ed and reverse, selective, sliding change gear, Hess-Bright bearings, direct on the high; shaft ve to divided live rear axle; I-section drop-forged nt axle without weld; 108½-inch wheel base; 32- h wheels, with cup and cone ball-bearings; 4-inch es; channel section prest steel frame; tubular sub- me; full elliptic springs front and rear, 40x2¼ hes, 5 leaves; screw and nut steering gear; con- cting and expanding brakes on rear wheel drums; throttle control on steering wheel; 11-gallon

bearings, phosphor bronze cam shaft bearings; doub ignition, make-and-break, jump spark, from stora battery and Bosch low tension magneto; force fe lubrication; multiple disc clutch; 3-speed and 1 r verse, selective, sliding change gear, on Hess-Brig bearings, direct on high; shaft drive to semi-floati rear axle; I-section drop-forged front axle witho weld; 124-inch wheel base; 34-inch wheels, on Hes Bright bearings; 4-inch front and 4½-inch rear tire channel section prest steel frame and sub-frame; sen

PREMIER MODEL 45 TOURING CAR, $3750

elliptic front springs, 40x2¼ inches, 10 leaves; f elliptic rear springs, 40x2¼ inches, 7 leaves; screw a nut steering gear; internal expanding, cork-insert and external contracting camel's-hair lined brakes the rear wheels; spark and throttle control on steering wheel; 22-gallon gasoline tank, on the fr seat; passenger capacity, 7; weight complete, 3 lbs.; same equipment as the other models, $37 fitted as a runabout, $3500. Same special featu as the other models. Described January, 1908, p 112.

Matheson Gasoline Cars.

Made by the Matheson Motor Car Co., Wilkes-Ba Pa.

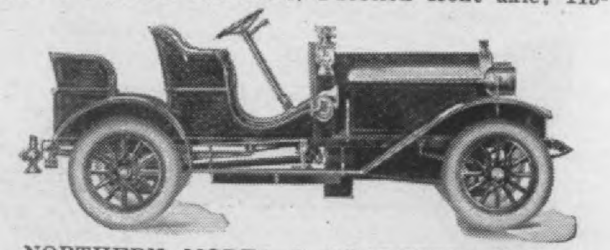
Matheson Touring Car, price $5500. Aluminum bo 4-cylinder, 4-cycle, verticle, water cooled, 5-inch b by 6-inch stroke; 50 H. P. motor, set in front un hood; overhead mechanical valve action; bro crank and cam shaft bearings; make-and-break i tion with Bosch magneto; lubrication, fo auxiliary splash and wick; multiple disc clut selective type change speed gear; 4 speeds ward and 1 reverse, direct on fourth, opers by hand lever and mounted in H. B. ball b ings; side chain drive; I-beam front and rear a tires 36 by 4 inches in front, 36 by 5 inches r H. B. ball wheel bearings; wheel base 128 incl prest nickel steel frame; half elliptic springs front

MATHESON TOURING CAR, $5500.

rear, 35 by 2 inches; 14 leaves in front and 52 2 inches; 15 leaves in the rear; worm and sector s ing gear; 4 brakes, 2 asbestos band on sprocket sh 2-expanding clutch, bronze shoes on rear wheel b spark and throttle control on top of steering

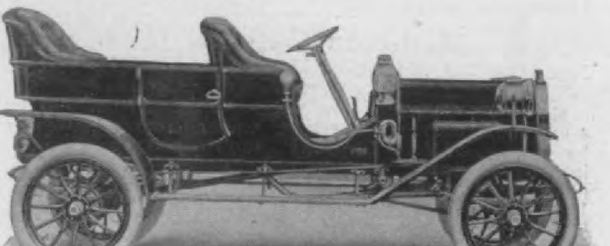
NORTHERN MODEL L. $3500.

Northern Model L tonneau car; seating capacity, 7; -cylinder, vertical, water-cooled, 5x5, 40 H. P. mo- or, under the hood, supported by an aluminum crank ase web to the frame; valves in the head, operated y rocker shafts; crank shaft and cam shaft bearings f babbitt; jump spark ignition from storage and ry cells and also magneto; force feed lubrication by il pumps; cone clutch; 4-speed sliding change speed ear, on Timken roller bearings, direct on the high; haft drive; live rear axle, I-section front axle; 119-



NORTHERN MODEL L ROADSTER. $3500.

ch wheel base; 34-inch wheels, on Timken bear- gs, and fitted with 4½-inch tires; angle steel frame, sub-frame; semi-elliptic front springs, 48x2½ inch- s, 7 leaves; platform rear springs, 60x2½ inches, 7 aves; Northern worm gear steering; double set of rakes, internal and external on rear hubs; control, ark and throttle on steering post; side levers; 20- llon gasoline tank, under the front seat; passenger pacity, 7; weight complete car, 3000 lbs.; equip- ent, 5 lamps, horn and tools; price, $3500. This assis also furnished with roadster body at the same ice.



NORTHERN MODEL C TONNEAU CAR. $1600.

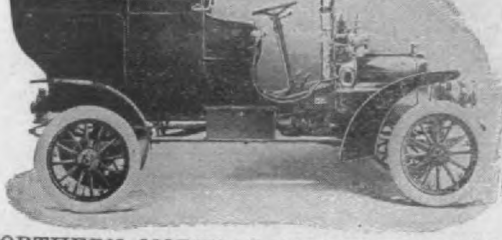
Northern Model C 5-passenger tonneau car; 2-cylin- r, horizontal, opposed, water-cooled motor, 5½x5¼. H. P., crosswise, under the hood, supported at 3 ints; valves in pockets and operated mechanically; ank shaft bearings, babbitt, cam shaft bearings,

NORTHERN MODEL C COUPE. $2000.

hood, transmission in crank case, no strut or rods, propeller shaft housed. Northern 1908 described in our December, 1907, issue, page 1

NORTHERN MODEL C ROADSTER. $1600

Northern Model C Roadster; price, $1600; single or double seat; 32x3½-in. tires; weight, lbs.; 15-gal. gasoline tank under front seat; ment: 5 lamps, horn and tools; other specific same as for the Model C limousine. Model C price, $2000; 100-in. wheel base; weight, 2600 seats 3; equipment: 5 lamps, horn, tools and e light; other specifications same as Model C sine. 1908 Northern cars described December, page 182.



NORTHERN MODEL C LIMOUSINE. $2800.

Northern Model C limousine; price, $2800; 2- der, horizontal, 4-cycle, water-cooled, 5½-in. 5¼-in. stroke, 24 H. P. motor in front under on 3-point suspension; mechanically operated va babbitt crank shaft bearings and bronze cam bearings; jump spark ignition by storage and cells; force feed lubrication; metal expanding cl planetary change speed gear, 3 speeds forward rect on high, operated by lever under steering w shaft drive; tubular front and rear axle; 34 tires; Timken wheel bearings; 106-in. wheel angle steel frame; ¾ elliptic springs, 36x2 in leaves, in front, and full elliptic, 36x2, 7 leave rear; bevel gear steering gear; external contra brakes; control details all on steering column; 7; 10-gal. gasoline tank on the front seat; we 2700 lbs.; equipment: 5 lamps, horn, tools, glass and curtains, electric light, speaking ash tray, toilet case and watch.

NORTHERN MODEL B RUNABOUT. $650.

Northern Model B Runabout; single, horizontal c der, water-cooled motor, 7 H. P., 4¾x6 inches, log under the body, on 3-point suspension, on top of frame; mechanically operated valves in the crank shaft and cam shaft bearings of babbitt; spark ignition from dry cells; gravity, sight feed brication; leather-faced disc clutch; planetary ch

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STURTEVANT TOURING CAR, $6000.

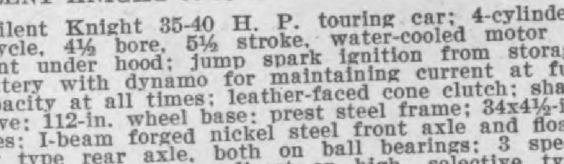
tevant Automatic Touring Car; price, $6000; 7; 4-cylinder, vertical, water-cooled, 4-cycle, inch, 40-50 H. P. motor, set under bonnet, on point suspension; mechanically-operated valves, posite sides of cylinder; bronze cam shaft and shaft bearings; jump spark ignition, from e battery and Simms-Bosch magneto; force feed ation; automatic Sturtevant clutch; automatic change gear by individual multiple disc clutch e fly wheels, gears always in mesh, 3 speeds rd, direct on high; cardan shaft drive; bevel rear axle; 4½-inch tires; 120-inch wheel base; steel frame; half-elliptic springs, front and 42x2½ inches in front and 54x2½ inches in rear; steering gear; Sturtevant brakes; control de- throttle controls car in advancing, lever for re- ; 12-gallon gasoline tank, under front seat; stand- equipment; weight, 3500 lbs. Special features: matic control; double carbureters.

TURTEVANT FLYING ROADSTER, $4000.

rtevant Automatic Flying Roadster; runabout ; 4-cylinder, 4-cycle, vertical, water-cooled, 4x4½. H. P. motor, under hood, on three-point suspen- valves on top of head; Hess-Bright ball-bearings rank shaft and cam shaft; jump spark ignition, by ge and dry cells; force feed lubrication, 2 ds and reverse, automatic change speed gear by idual multiple disc clutch in the fly wheel, s always in mesh, mounted on Hess-Bright ball- ings; shaft drive to bevel gear rear axle; 4-inch ; ball wheel bearings; 100-inch wheel base; prest frame; half-elliptic springs front and rear, 42x2 es in front and 48x2 inches in rear; worm steering : control details; throttle controls car in advanc- lever for reverse; seats 2; weight, 2400 lbs.; 10- n gasoline tank, under seat. Special features: matic control; automatic lubrication; double car- tor.

Silent Knight Gasoline Car.

le by Knight & Kilborne, 1238 Michigan Ave., Chicago, Ill.



ENT KNIGHT 35-50 H. P. TOURING CAR, $3650.

ilent Knight 35-40 H. P. touring car; 4-cylinder, cycle, 4½ bore, 5½ stroke, water-cooled motor in nt under hood; jump spark ignition from storage tery with dynamo for maintaining current at full acity at all times; leather-faced cone clutch; shaft ve; 112-in. wheel base; prest steel frame; 34x4½-in. es; I-beam forged nickel steel front axle and float- type rear axle, both on ball bearings; 3 speed

spark ignition, storage battery, dry cells in reserve 5-disc clutch; 3 speed and reverse sliding gear, selec tive transmission on Hess-Bright ball bearings, oper ated by lever; bevel gear to full floating rear axles half-elliptic springs, 40 ins. by 2 ins., 7 leaves i

CORNISH-FRIEDBERG 5-PASSENGER TOURIN CAR, $2250.

front, 50x2 ins., 10 leaves in rear; worm and wor sector steering; spark and throttle control on t steering wheel; hand lever disengages clutch a applies emergency brake; external brakes foot lev applied; wheel base, 114 ins.; tires, 32x4 ins.; weigh 2400 lbs.; price, $2250, including 5 lamps, mats, ho and tools. Cape top, unlined, $100 extra; lined, $12

CORNISH-FRIEDBERG ROADSTER, WITH THRE SEATS, $2250; WITH FOUR, $2265.

Cornish-Friedberg Roadster, tires, 34x3½ ins.; oth wise, same specifications as the touring car; weig about 2200 lbs.; fitted with three seats, $2250; w four seats, $2265.

Duer Air-Cooled 2-Cycle Gasoline Ca

Made by the Chicago Coach and Carriage Co., 12 1231 Michigan Ave., Chicago, Ill.

DUER MODEL A RUNABOUT, $750.

Duer Model A runabout; price, $750; 2-cylinder cycle, air-cooled, 4-inch bore and stroke, 12 H. motor, under hood in front, on three-point suspens mechanically operated valves; white metal crank cam shaft bearings; jump spark ignition from age and dry cells; force feed lubrication; 3-s forward, selective type change gear, operated lever and mounted on Timken roller bearings; drive; roller bearings on front and rear axles; inch solid tires; roller wheel bearings; 76-inch w

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SUCCESS MODEL B AUTO-BUGGY. $250.

Success Model B Auto-Buggy; single cylinder, air-ooled, 3½-in. bore by 3-in. stroke, 4 H. P. motor, upported on the right side outside of piano box ype of body by a strap beneath the crank-case; chain rive; 2 speed and 1 reverse planetary transmission; hand brakes on transmission; 1-in. axles; springs, leaves in front and 4 in rear; 40-in. front and 44-in. ar wheels; steel tires; solid rubber tires, $25 xtra; steering by hand wheel; ignition by jump spark om dry cells; 1½-gal. gasoline tank; weight, 450 s.; price, $250; tops, $25 extra. Described Feb-ary, 1908, page 94.

SUCCESS MODEL C AUTO-BUGGY. $400.

uccess Model C; 2-cylinder opposed, air-cooled by wheel in fan; motor set lengthwise under the y; drive to countershaft with differential and netary gear and drives to each rear wheel sprockets side chains; 12 H. P. motor, 4⅛-in. bore, 4-in. oke; 1¼-in. square solid axles; weight, complete, lbs.; seats 2; extra long bodies with two wide ts, seating 4 to 6 persons, either surrey or wagon e, are furnished at $100 extra. Price of car, 0; rubber tires, $25 extra; ball-bearing wheels, $25 ra; tops, $25 extra. Described February, 1908, e 94.

Hines 2-cycle Gasoline Cars.

le by the National Screw & Tack Co., Cleve-land, Ohio.

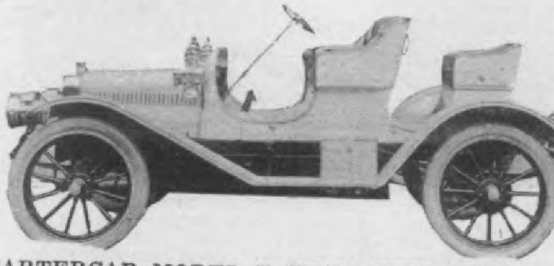
page 47.

Cartercar Gasoline Cars.

Made by the Motorcar Co., Detroit, Mich.

CARTERCAR MODEL A 5-PASSENGER TOU CAR. $1350.

Cartercar Model A 5-passenger touring car; $1350; 2-cylinder, horizontal opposed, water-c 25 H. P. motor in front under hood; 5½-in. bore in. stroke; Lavigne lubrication; 30x3½-in. tires; wheel base; 15-gal. gasoline tank; Cartercar fr transmission, operated by one side lever; front of the tubular type, rear axle tubular divided with Brown-Lipe differential, mounted on Hyatt bearings; prest steel frame; springs, semi-ell 40 ins. long in front, 48 in rear; equipment: lamps, tube, horn, mats, tire repair kit, battery of prest steel with tray for small tools on ru board.



CARTERCAR MODEL D RUNABOUT. $1250.

Model D runabout; seats 2; same specification for touring car; price, $1250; Model A chassi also fitted with Model E Artz folding tonneau; p $1350; also with Model F detachable tonneau; p $1400; chassis specifications same in all cases.

1908 Cartercars described in our December, 1 issue, page 174.

De Schaum Air-Cooled Gasoline Car

Made by the De Schaum Automobile Co., 119 Grant St., Buffalo, N. Y.

DE SCHAUM MODEL W STANHOPE. $600.

De Schaum Model W Stanhope; 2-cylinder oppos air-cooled, 4⅛-in. bore, 4-in. stroke, 16 H. P.

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REAT CHADWICK SIX TOURABOUT, $5500.

it Chadwick six tourabout, 6-cylinder, vertical, -cooled, 4-cycle, 5x6, 50 H. P. engine forward hood; valves on opposite sides of motor, 2 cam ; plastic bronze crank shaft bearings; cam bearings same; jump spark ignition by dry and magneto; mechanical force feed lubrication; to metal cone clutch with cork inserts; semi-ive sliding clash change gear on D. W. F. im- bearings; 4 speeds, direct on high; double d chain drive; one piece chrome nickel steel xle; front axle same; wheels on D. W. F. im- bearings, 36x5 in. tires rear, 34x4 front; wheel 124 ins.; chrome nickel prest steel frame; no

AT CHADWICK SIX TOURING CAR, $5500.

ame; semi-elliptic springs front, 40 ins. long, wide, 8 leaves; platform springs rear, side, . long rear, 46¼ ins. long, 2¼ ins. wide, 10 : special Gemmer type steering gear; expanding on rear wheels, contracting brakes on coun- ft; throttle controled by lever on top of steer- heel and foot pedal, spark by lever on top steer- heel; passenger capacity, 5; weight, 3000 lbs.; l. gasoline in two tanks, one rear and one seat; equipment, lamps, horn, jack and tools; $5500. Special features: enclosed chains in oil- guard; copper water jackets, special automobile etor. Detachable tonneau seating 3 persons, umble seat, comprises standard body equipment urabout.

REAT CHADWICK SIX RUNABOUT, $5500.

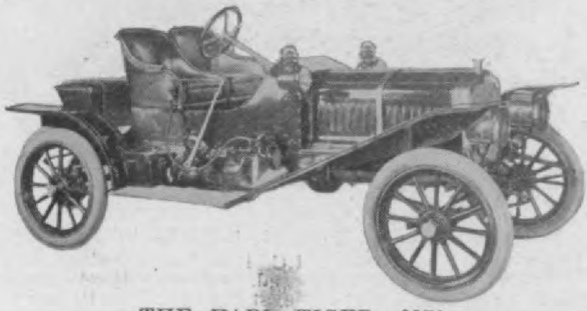
t Chadwick Six Touring Car; same chassis as ourabout; carrying capacity, 7; weight, 3250 gasoline capacity, 26 gals.; price, $5500. De- l June, 1907, page 102.

t Chadwick Six Runabout; same chassis as the out, $5500.

Earl Gasoline Cars.

le by the Earl Motor Car Co., Kenosha, Wis.

spark and throttle on steering column below wheel; 1 on each side; 10-gallon gasoline tank, under th front seat; passenger capacity, 3; weight complete 1700 lbs.; equipment, lamp, horn and tools; price $985.



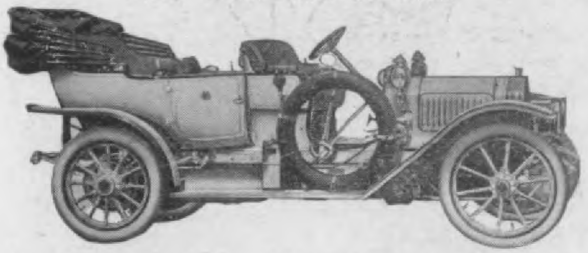
THE EARL TIGER, $950.

The Earl Tiger; 2-cylinder, 4-cycle, horizontal, op- posed, water-cooled motor, 5⅛x4½, 18 H. P., unde the hood; mechanically operated valves; jump spar ignition from dry cells; force feed lubrication; self contained clutch; friction change speed, giving speeds ahead and 1 reverse, operated by side leve and clutch pedal; double chain drive to the rea wheels; solid square section rear axle; tubular fron axle; 100-inch wheel base; 30-inch wheels, on ball bearings; 3-inch tires; white oak frame, steel-ar mored; full elliptic springs front and rear, 34x1½ inches, 5 leaves, in front, 4 in rear; rack and pinio steering gear; Raymond rear hub and transmissio brake; spark and throttle on steering column, belov wheel; 9-gallon gasoline tank, under seat; passenge capacity, 3; weight complete, 1500 lbs.; price, $950

This same chassis is fitted with light delivery body 30x3½-inch tires, with steel armor, geared for 1 miles per hour, and carrying a paying load of 1000 lbs

De Luxe Gasoline Cars.

Made by the De Luxe Motor Car Co., Clark Ave. an River Road, Detroit, Mich.



DE LUXE 1908 MODEL B TOURING CAR, $5000

De Luxe Model B Touring Car; straight line body 4-cylinder, vertical, water-cooled, 4-cycle, 5x5¼, 50 H P. motor, under hood, on sub-frame; mechanically operated valves in head, operated by single can shaft; crank shafts on D. W. F. ball-bearings; plai cam shaft bearings; ignition by Eisemann magnet and storage battery; lubrication, splash and pump metal-to-metal cone clutch; selective, 4-speed chang gear, direct on third speed, on D. W. F. ball-bear ings; shaft drive; solid I-beam front and rear axles 36-inch wheels, on D. W. F. ball-bearings; 4-inch tire front, 5-inch rear; 121-inch wheel base; U-sectio chrome steel frame and sub-frame; semi-ellipti

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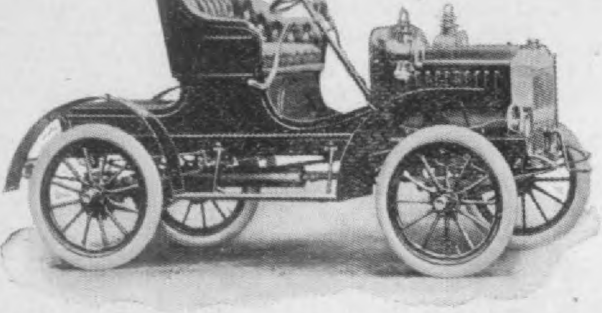
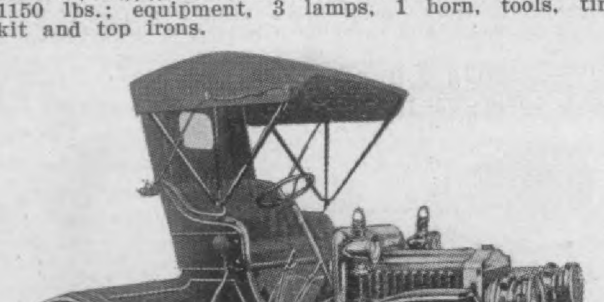
DE LUXE LIMOUSINE-LANDAULETTE.



MAXWELL-BRISCOE MODEL LC RUNABOUT, $825.

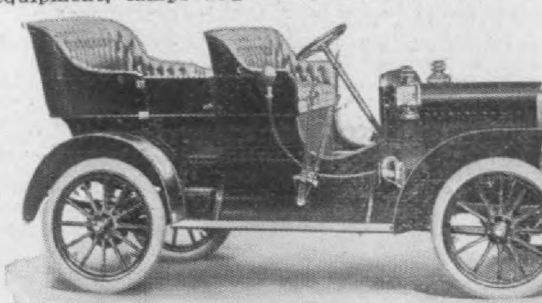
Maxwell-Briscoe Model LC Runabout; price, $825; 2-cylinder, horizontal, opposed, 4-cycle, 4½x4, water-cooled by thermo-syphon system, 14 H. P. motor, located in front, under hood, on three-point suspension; mechanically-operated valves; bronze and babbitt crank shaft bearings; cast iron cam shaft bearings; jump spark ignition, by dry cells; magneto extra; compression force feed lubrication; multiple steel and bronze disc clutch; planetary change speed gear, 2 speeds forward and reverse, direct on high, operated by one hand lever and mounted in bronze bearings; shaft drive; live rear axle; drawn steel tubing front axle; 28x3-inch tires; ball wheel bearings in front and roller in rear; 72-inch wheel base; prest steel frame; semi-elliptic springs front and rear, 34 5-16x1¾ inches, 4 leaves, in front, and 38 3-16x1¾ inches, 5 leaves, in rear; segment and pinion steering gear; external brakes on drums on rear wheels, operated by foot pedal; control details: throttle controlled by foot lever, spark and throttle control on steering post; seats 2; 10¾-gallon gasoline tank, under seat; weight, 1150 lbs.; equipment, 3 lamps, 1 horn, tools, tire kit and top irons.



MAXWELL-BRISCOE RUNABOUT. MODEL HC, $1450.

Maxwell-Briscoe Model HC Runabout; price, $1450; 2-cylinder, horizontal, opposed, water-cooled by thermo-syphon system, 4-cycle, 5-inch bore and stroke, 18-20 H. P. motor, set in front, under hood, on three-point suspension; adjustable bronze crank shaft bearings and cast iron cam shaft bearings; tires, 30x3½ inches; wheel base, 90 inches; semi-elliptic springs front and rear, 36⅛x1¾ inches, 5 leaves, in front, and 45¾x1¾ inches, 5 leaves, in rear; segment and pinion steering gear; 14-gallon gasoline tank, under front seat; equipment, lamps, generator, tools and top; all other specifications same as for Model M. Also furnished with touring body.

speeds and reverse, direct on high, operated by lever and mounted by Hyatt roller bearings; drive; live rear axle; drawn steel tubing front 34x4-inch tires; ball wheel bearings in fron roller in rear; 14-inch wheel base; prest steel semi-elliptic springs front and rear, 37x2 incl leaves, in front, and 47x2 inches, 7 leaves, in worm and segment steering gear; external a ternal brakes on drum on rear wheel; spar throttle control on steering post, foot accelerato pacity, 5; 17-gallon gasoline tank, under front equipment, lamps and tools, etc.



MAXWELL-BRISCOE TOURING CAR, MODE $1750.

MAXWELL-BRISCOE RUNABOUT, MODE $1750.

Maxwell-Briscoe Touring Car; price, $1750; cylinder, vertical, 4-cycle, water-cooled by syphon system, 4½-inch bore and stroke, 20-22 motor, set in front, on three-point suspension; inch tires; 97¼-inch wheel base; semi-elliptic front and rear; 36⅛x1¾ inches in front and 4 inches in rear; 15½-gallon gasoline tank, unde seat; seats 5; weight, 1700 lbs.; all other sp tions same as for Model M. Model D is also fu with a runabout body, with rumble seat, kn Model K, and listing at $1750.

Maxwell-Briscoe 1908 models described De 1907, page 192.

Jenkins Gasoline Cars.

Made by the Jenkins Motor Car Co., 10 Har Rochester, N. Y.

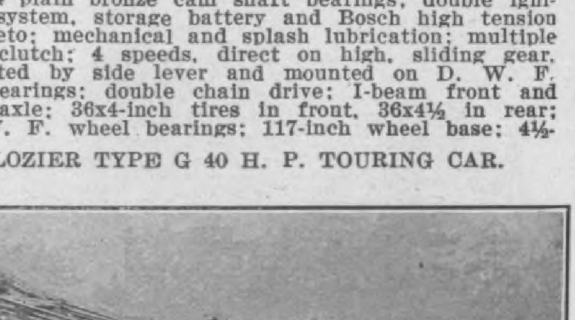
JENKINS SPECIAL TOURING CAR, $30

Jenkins Special touring car, 5 passengers; 4-c horizontal, water-cooled, 4-cycle, 4 13-16x5½, 4 H. P. engine under hood on nickel steel fra crank shaft bearings; jump spark ignition, by

LOZIER TYPE G 40 H. P. LIMOUSINE.

ler Type G 40 H. P. Touring Car; 4-cylinder. al, water-cooled, 4-cycle, 4⅝ bore, 5½ stroke , under bonnet, on four arms, bolted to side ; mechanically operated valves on opposite sides otor; 3 plain white brass crank shaft bearings plain bronze cam shaft bearings; double igni- system, storage battery and Bosch high tension eto; mechanical and splash lubrication; multiple clutch; 4 speeds, direct on high, sliding gear, ted by side lever and mounted on D. W. F. earings; double chain drive; I-beam front and axle; 36x4-inch tires in front, 36x4½ in rear; . F. wheel bearings; 117-inch wheel base; 4½-

LOZIER TYPE G 40 H. P. TOURING CAR.



frame, offset in front; semi-elliptic springs, 38x nches, 7 leaves, in front, and platform springs inches, 9 leaves, on side, and 40x2 inches, 8 , across, in rear; nut and screw irreversible ng gear; brakes, 2 on rear hubs and 2 on jack- spark and throttle levers on steering column; 7; weight, 3000 lbs.; 27-gallon tank, in back of axle; equipment, 2 headlights, generator, 2 dash amps, tool kit, French horn, complete set of water bucket, jack and tire repair outfit. This s is also furnished with runabout and limousine, ranging from $4000 to $5000.

Bosch high tension magneto; splash and mechanic lubrication; 33 discs, steel on steel, hardened a ground clutch; sliding change speed gear, 4 spee forward, direct on third, operated by side leve mounted on D. W. F. ball-bearings; shaft driv floating rear axle; I-beam nickel steel forged fro axle; 34x4-inch tires front, 36x4½ rear; D. W. wheel bearings; 131-inch wheel base; 5-inch dro frame at rear, offset in front; semi-elliptic spring 40x2 inches, 11 leaves, in front, and platform re springs, 51x2¼ inches, 11 leaves, sides, and 50x2 inches, 9 leaves, cross; worm and gear irreversib steering; 2 pairs double acting brakes on rear hub stationary spark and throttle levers on steering co umn, foot accelerator; seats 7; 30-gallon gasoli tank, back of rear axle; weight, 3400 lbs.; equi ment, 2 headlights, generator, 2 dash oil lamps, to kit, French horn and complete kit of regular a special tools, water bucket, jack and tire repair ou fit. Made also with limousine and runabout bodie ranging in price from $6000 to $7000.

LOZIER TYPE H 45 H. P. TOURING CAR.

Lozier Type H Touring Car; 4-cylinder, vertica water-cooled, 4-cycle, 5¼ bore and stroke, 45 H. (A. L. A. M.) motor, under bonnet, on 4 arms, bolte to side frame; 3 D. W. F. bearings on crank shaf

LOZIER TYPE H 45 H. P. LIMOUSINE.

124-inch wheel base; seats 7; all other specificatio same as for Model I. Made with limousine and ru about bodies, listing from $5000 to $6000.

Sterns Gasoline Cars.

Made by the F. B. Stearns Co., Cleveland, Ohio.

Stearns 7-passenger, Pullman body, touring ca price, $4750; 4-cylinder, vertical, water-cooled, 4-cycl 5¾ bore, 5⅞ stroke, 30-60 H. P. motor under hoo mechanically operated valves on left side of cyli ders; D. W. F. ball bearings on crank and ca shafts; jump spark ignition, from dry cells a Simms-Bosch magneto; splash and force feed lubr cation; expanding clutch in fly-wheel; 4 speeds fo ward and reverse, selective change speed gear, dire on high, operated by lever and mounted on D.

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STEARNS 7-PASSENGER PULLMAN CAR, $4750.

ear of chassis; equipment: 5 lamps, full kit of ools, jack, pump, tire repair kit, etc.; this chassis s mounted with several different styles of bodies, s follows: 4-passenger light touring roadster, $4600; -passenger standard touring body, $4600; 7-passenger imousine, $5750; 7-passenger landaulette, $5750. These odies are also mounted on 6-cylinder chasses; bore nd stroke the same as for the 4-cylinder motor.

Garford Gasoline Cars.

Iade by the Garford Motor Car Co., 1540 Broadway, New York City.

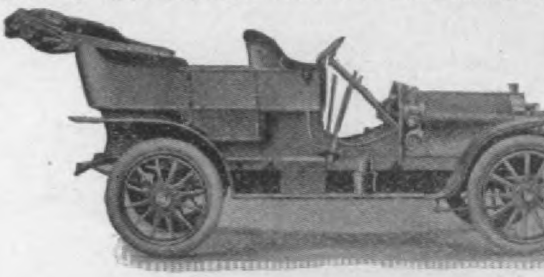
Garford Model A Touring Car; price, $4000; 4-cylinder, vertical, water-cooled, 4-cycle, 4¾ bore, 5½ troke, 40 H. P. motor, under hood, on sub-frame; nechanically operated valves on opposite sides of he cylinders; white metal crank shaft bearings and ronze cam shaft bearings; low tension ignition sys-em by Simms-Bosch magneto; pressure feed lubri-ator; leather-faced cone clutch, with cork inserts; elective, 4 speeds forward and 1 reverse, direct on hird, change speed gear, operated by side lever and

GARFORD MODEL B TOURING CAR, $4000.

nounted on annular ball-bearings; shaft drive; hub lutch type rear axle and I-beam front axle; 34x4½ nch front and rear tires; annular ball wheel bear-ngs; 114-inch wheel base; channel section, main and ub-frame; semi-elliptic springs, 44x2½ inches, 6 eaves, in front, and semi-platform, 54x2½ inches, 6 eaves, in rear; irreversible nut and sector type steer-ng gear; external contracting and internal expand-ng brakes on rear hubs; spark and throttle lever n steering wheel; foot accelerator; seats 7; weight, 750 lbs.; 20-gallon gasoline tank, on the front seat; quipment, full lamp, gas tank, tire irons, robe rail, oot rest, etc.; price, $4000. Also furnished with unabout, limousine and landaulette bodies. De-cribed November, 1907, issue, page 166.

Kisselkar Gasoline Cars.

Made by the Kisselkar Motor Car Co., Hartford



KISSELKAR MODEL D, $2000.

Kisselkar Model D, 5-passenger car; 4-cylind cycle, 4¾x4¾, 40 H. P. motor, in front; P white metal crank shaft and cam shaft bea jump spark ignition, storage and dry cells, m if desired; mechanical oiler; cone clutch; se type, 3-speed change gear, on Timken bearing rect on high gear, operated by lever; shaft dr floating type rear axle; I-beam front axle; whe Timken roller bearings; 3½-inch tires front, rear; 108-inch wheel base; prest steel fram sub-frame; semi-elliptic springs, 36 inches l inches wide, 6 leaves, front; 52 inches long, 2 wide, 8 leaves, rear; irreversible steering gear;

KISSELKAR ROADSTER, MODEL D.

nal and external brakes on rear wheels; pa capacity, 5; weight, 2350 lbs.; 19-gallon g tank, under front seat; equipment, 2 side oil tail lamp, horn and tools; price, $2000.

This chassis is used also for their roadster, operated limousine and one-ton truck.

1908 Kisselkar cars described in our October issue, page 164.

Auto Car Gasoline Cars.

Made by the Autocar Equipment Co., 77 Edwa Buffalo, N. Y.

AUTO CAR 10-PASSENGER LIMOUSINE. $

Auto Car 10-Passenger Limousine, price $65 cylinder; 60 H. P., 4-cycle; vertical, water-cool tor, located in front, on three-point suspension; ders 4 11-16-inch bore by 5½-inch stroke; mec valve action; crank shaft and cam shaft beari Parsons white brass; jump spark ignition by and dry cells; mechanical lubrication; cone sliding selective change speed gear on Timken bearings, three speeds forward, direct on high, ed by lever; double chain drive; 2½-inch dea

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EN-KINGSTON MODEL E LIMOUSINE. $5000.

len-Kingston Model E Limousine; 4-cylinder, ve-, water-cooled motor, square tube radiator; bore troke 5¾, 40-45 H. P., located under the hood; hanical valves on one side; Parson's white bronze k shaft bearings; bronze bearing metal cam t bearings; jump spark ignition from storage bat- and Bosch magneto; force feed lubrication from p in engine case; 4-speed and 1 reverse selective. ng change speed gear, on F. & S. annular bear- direct on the fourth speed; shaft drive to float- rear axle; drop-forged I-section front axle; 126- wheel base; 34-inch wheels, on F. & S. annular bearings; 3½-inch front tires, 4½-inch rear tires; nickel steel frame, channel section; semi-elliptic and rear springs; front, 40x2¼ inches, and rear, ¼ inches; 12-inch x 3 transmission brake and band es on rear wheels; spark and throttle on the ing wheel, also foot throttle; passenger capacity, eight, complete, 3600 lbs.; gasoline capacity, 20 ns, tank under seat; equipment, full set of 5 s, gas tank, tire holder, tools and spare parts; , $5000.

EN-KINGSTON MODEL C TOURING CAR. $4000.

len-Kingston Model C Touring Car; same general sis specifications as Model E; complete weight, lbs.; wheel base, 126 inches; price, $4000; pas- er capacity, 7.

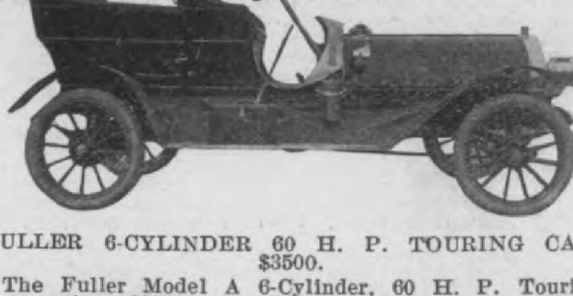
EN-KINGSTON MODEL D RUNABOUT. $3900.

len-Kingston Model D runabout; general specifica- same as Model E; wheel base, 121 inches; ht, 2600 lbs.; 20-gallon gasoline tank, in the passenger capacity, 4; price, $3900. Allen- ston 1908 cars described in our January, 1908, , page 176.

Fuller Gasoline Cars.

e by the Angus Automobile Co., Angus, Neb.

ller Model A 5-Passenger Touring Car; price,); 4-cylinder, Rutenber, vertical, water-cooled, le, 5½-inch bore, 5-inch stroke, 35-40 H. P. r, under hood, on sub-frame; mechanically op- d valves on one side; Parson's white brass crank cam shaft bearings; jump spark ignition, dry , regular equipment, storage, magneto or dynamo ; force feed lubrication; multiple disc clutch; etary change speed gear, 2 speeds ahead and re- , direct on high, operated by side lever, mounted



FULLER 6-CYLINDER 60 H. P. TOURING CA $3500.

The Fuller Model A 6-Cylinder, 60 H. P. Tour Car; price, $3500; wheel base, 118 inches; weig about 2350 lbs.; all other specifications same as Model A.

Fuller Gentleman's Roadster; price, $2500; se 3; all other specifications same as for Model A.

Fuller Model C Runabout; seats 2; price, $1500; cylinder, vertical, water-cooled, 4-cycle, 4-inch b and stroke, 22-26 H. P. motor, under hood, on s frame; mechanically operated valves; Parson's wh brass crank and cam shaft bearings; jump spark nition, by dry cells, regular equipment, storage b tery, dynamo or magneto optional; force feed lub cation; multiple disc clutch; planetary, 2-speed f ward and reverse, direct on high, change speed ge operated by side lever, mounted on ball Hyatt a roller bearings; tires, 30x3 inches; Timken rol wheel bearings; 96-inch wheel base; prest steel fran main and sub-frame; half-elliptic springs front a full elliptic rear, 40x1¾ inches, 5 leaves; ball-beari worm and sector steering gear; throttle and sps control on top of wheel; internal expanding brak on rear hubs and reverse speed used as brake; se 2; weight, 1300 lbs.; 15-gallon gasoline tank, un front seat; equipment, searchlight, side oil ligh tail light, horn and tools. This model, with tour car body, lists at $1800.

Duryea Gasoline Vehicles.

Made by Charles E. Duryea, Reading, Pa.

DURYEA FOLDING REAR PHAETON. $1500.

Duryea folding rear phaeton, furnished with fo ing rear seat; price $1500; 3-cylinder, 4-cycle, inclin water cooled, 15 H. P. motor under seat, suspended body; cylinders, 4½-inch bore and stroke; automa inlet valves both in front and on upper side; wh brass crank shaft bearings and bronze cam sh bearings; make-and-break ignition by dry cells a magneto; Duryea pressure feed oiler and splash s tem of lubrication; bronze to iron double cone clut planetary change speed gear, 2 speeds forward a reverse, direct on high, operated by steering han and runs in oilless metaline bearings; chain dri 1 piece round axle in rear, tubular front axle; tir 30 by 3-inch in front, and 36 by 3½-inch in re ball bearings in front wheels, and plain bearings rear wheels; wheel base, 80-inch; armored wo frame; springs ¼ elliptic, 27 by 1½-inch, 5 leaves, front, and half elliptic, 45 by 1¾-inch, 5 leaves, rear; single vertical lever steering gear; one br in rear sprocket; control details: a single verti lever at center of seat steers, throttles and s clutches; capacity, four adults and two children; g oline capacity, 8 gallons, tank under front flo weight, 1175 lbs.; equipment: 2 oil lamps; spec features; one lever control. This chassis is also

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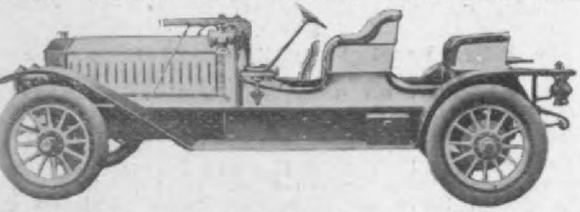
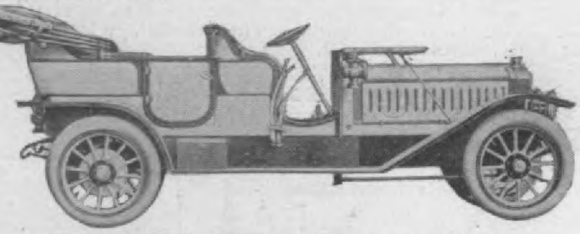
al, offset, water-cooled, 4-cycle, 5½x5½, 90 H. P. tor, in front, under hood, attached direct to side frame; mechanical valves, inlet directly over exust; 7 Parson's white brass crank shaft bearings; rson's white brass cam shaft bearings; two separ- ignition systems, dry cells and magneto; mechan- l lubrication; multiple disc clutch; selective, slid- change speed gear, on annular ball-bearings, 4 eds forward, 1 reverse, direct on high speed, op- ted by side levers; shaft drive; floating type rear e; I-beam front axle; 36-inch wheels, on Timken rings; 4½-inch tires; 134-inch wheel base; prest



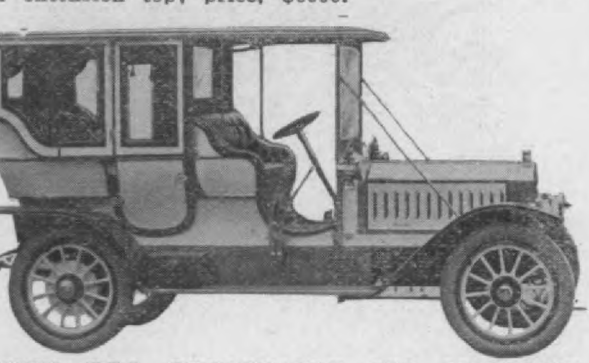
STIN XC-R COMBINATION ROADSTER. $6000.

el frame; semi-elliptic springs front, 38 inches g, 2 inches wide, 8 leaves; three-quarters-elliptic ings rear, 49 inches long, 2 inches wide, 9 leaves; ering gear, worm and nut, rack and segment; two kes, one internal expanding and one external con- cting; side lever control; passenger capacity as ring car, 5; as runabout, 3; weight, 3600 lbs.; gallon gasoline tank, under seat; equipment, fold- glass front, 2 gas lamps and generator, 3 oil ps, extra spark plugs, single top and double top; pump, repair kit and full set of tools; price, 00. Special features: combination runabout and ring car body.



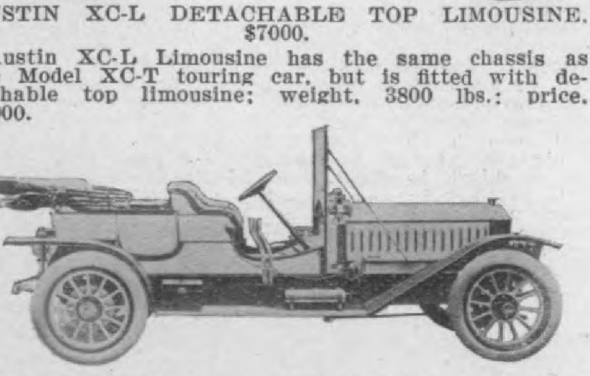
AUSTIN XC-T TOURING CAR. $6000.

ustin XC-T Touring Car; same power equipment l general specifications as Model XC-R combination dster; 7 passengers; weight, 3800 lbs.; fitted with l extension top; price, $6000.

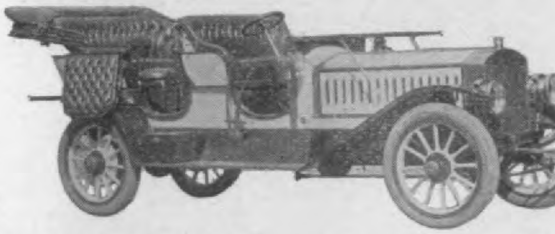


STIN XC-L DETACHABLE TOP LIMOUSINE. $7000.

ustin XC-L Limousine has the same chassis as Model XC-T touring car, but is fitted with de- hable top limousine; weight, 3800 lbs.; price, 00.



inches long, 2 inches wide, 8 leaves; three-qua elliptic rear, 49 inches long, 2 inches wide, 9 lea steering gear, worm and nut, rack and segment; brakes, one internal expanding and one external tracting; side lever control; passenger capacity, touring car, 5; as roadster, 3; weight, 3400 gasoline tank under seat, holding 16 gallons; eq ment, folding glass front, 2 gas lamps and genera 3 oil lamps, single top and double top, extra s plugs, air pump, repair kit and full set of to price, $4500. Special feature: combination tou and **runabout body.**



AUSTIN MODEL LX-T TOURING CAR. $45

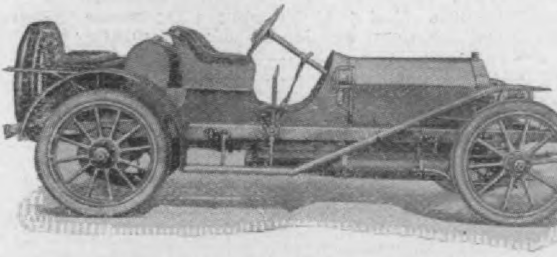
Austin Model LX-T Touring Car; same chassi Model LX-R roadster; 7 passengers, weight, lbs.; full extension top; price, $4500.

AUSTIN MODEL LX-L DETACHABLE TOP LIM SINE. $5500.

Austin Model LX-L Limousine; same car as M LX-T touring car, fitted with detachable top li sine; weight, 3800 lbs.; price, $5500.

Diamond T Motor Cars.

Made by the Diamond T Motor Car Co., Chicago,



DIAMOND T ROADSTER. $3500.

Diamond T roadster, $3500; 2 or 4 passengers cylinder, 4-cycle, vertical, water-cooled, 5-inch and stroke, 50 H. P. motor, located in front on frame; mechanically operated valves, all on side; die cast white metal crank shaft beari bronze cam shaft bearings; double ignition sy by storage battery and magneto; automatic lub tion; cone clutch; 3 forward speed sliding ch gear, mounted on Timken roller bearings; shaft d to live rear axle and 1⅝-inch I-beam forged axle; 36 by 3½-inch front and 36 by 4-inch

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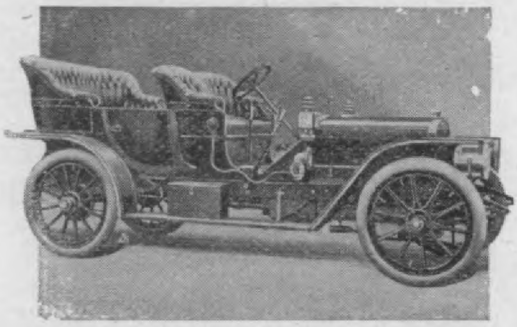
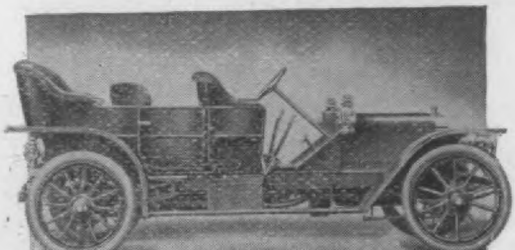


AMERICAN TOURIST 40, $3250.

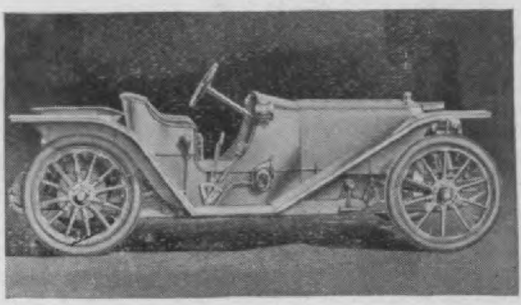
merican Tourist 40; wood body; 4-cylinder, ver-al, water-cooled, 4-cycle, 5x5, 40-50 H. P. motor, ated forward, under hood, on main frame; babbitt nk shaft bearings, bronze cam shaft bearings; ig-ion by Bosch magneto, coil and storage battery; chanical force feed lubrication; fan blade cone tch; sliding, 3-speed, change gear, direct on high eed, on annular ball-bearings, operated by lever side; shaft drive; floating type rear axle; I-section nt axle; 36-inch wheels, on ball bearings; 4-inch es; 116-inch wheel base; steel frame, dropt; half-iptic front springs, 42 inches long, 2 inches wide, leaves; platform springs rear; screw and nut type ering gear; foot brake rear of transmission; hand ake, expanding within drum, on wheels; spark and rottle control levers on stationary quadrant on eel; passenger capacity, 5; weight, 2600 lbs.; 18-llon gasoline tank, under seat; equipment, 2 gas, 3 lamps, generator and complete tool kit; price, 250. Special features: three-point spring suspen-n, simple control.

AMERICAN ROADSTER 40, $3250.

The American Roadster has the same power, equip-ent and general specifications as the Tourist 40, t the motor is placed on a raised auxiliary frame; echanical valves on one side; crank shaft bearings, ckel babbitt; frame prest steel; springs, semi-ellip-e front and rear; 42 inches long, 1¾ inches wide, leaves, front; 48 inches long, 1¾ inches wide, aves, rear; 3½-inch tires front, 4-inch rear; 2 passen-rs; weight, 2300 lbs.; 22-gallon gasoline tank, at ar of frame; equipment, 2 gas, 1 oil lamp, genera-r and complete set of tools. Special feature: Un-rslung frame.



on ball-bearings; 4-inch tires front, 5-inch rear; inch wheel base; dropt steel frame; half-ell springs front, 40 inches long, 2 inches wide leaves; platform springs rear; thread and nut steering gear; double internal expanding brakes, by side, and applying within drum on wheel; sp and throttle control levers on stationary quad in wheel; passenger capacity, 7; weight, 2800 19-gallon gasoline tank, under front seat; equipm 5 lamps and full equipment of tools; price, $4 Special features: simple control and spring sus sion.



AMERICAN ROADSTER 50, $3750.

The American Roadster 50 has the same po equipment and general specifications as Amer Tourist 50; engine is placed on raised auxi frame; wheel base, 110 inches; prest steel fra 3½-inch tires front, 4-inch rear; half-elliptic spr front and rear; 40 inches long, 1¾ inches wid leaves, front; 48 inches long, 2 inches wide leaves, rear; 2 passengers; weight, 2500 lbs.; gallon gasoline tank; equipment, 2 gas lamps generator, oil tail light and complete kit of t price, $3750. Special feature: underslung frame.

American cars described in our February, 1 issue, page 77.

Royal Gasoline Cars.

Made by the Royal Motor Car Co., Cleveland, O

ROYAL TOURING CAR, $4000.

Royal Tourist Touring Car; seats 7; price, $4 straight line body; 4-cylinder, 4-cycle, vertical, w cooled, 5⅛-inch bore, 5½-inch stroke, 45 H. P. m located under hood, on sub-frame, and mechanic operated valves on opposite sides of cylinders; n babbitt crank and cam shaft bearings; jump spar nition, by storage battery and high tension mag force feed oiler and splash lubrication; cone lea face clutch; 4-speed progressive chain speed direct on high, operated by hand lever and mounte Hess-Bright ball bearings; shaft drive to bevel floating type axle and tubular front axle; 36x4½

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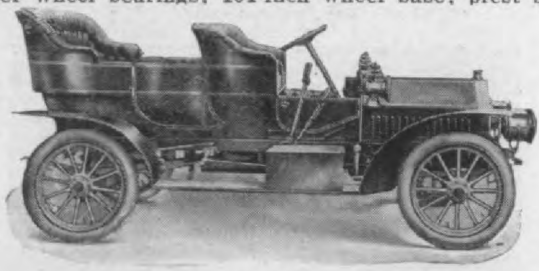
P., vertical, water cooled motor under hood, on r-point suspension; cylinders, 4-inch bore, 4½-inch oke; mechanical inlet valves; crank and cam shaft rings of Parsons white metal; jump spark ignition storage batteries and dry cells; force feed lubrica- n; cone leather faced clutch; progressive sliding nge speed gear, three speeds forward and one re- se; direct on high, operated by side lever, runs in nze bearings; bevel gear shaft drive; floating rear es and tubular front axle; tires, 32 by 3½; Timken er wheel bearings; 104-inch wheel base; prest steel



DRAGON TOURING CAR. $2100.

n and sub-frame; semi-elliptic springs, 44⅜ by 2-inch aves in front, full elliptic, 39¼ by 2-inch, 5 leaves, rear; worm and segment irreversible steering gear; brakes, two external contracting and two internal anding on rear wheels; sector spark and throttle trol on steering wheel; seats 5; 18-gallon gasoline k under front seat; weight, 1950 lbs.; equipment udes top, 2 gas lamps and generator, 2 side oil ps and tail oil lamp, full set of tools and tire re- kit; this chassis is also furnished as a town car landaulet body, same specifications at $2100. n car seats 2 in body and 2 in driver's seat.

DRAGON ROADSTER. $1850.

agon roadster, price $1850; 4-cylinder motor; 4½- bore and stroke; 35 H. P.; annular ball trans- sion bearings; I-beam front axles; 96-inch wheel ; ball wheel bearings; springs semi-elliptic front rear; 35¾ by 1¾-inch, 5 leaves, in front, and by 2-inch, 5 leaves, in rear; weight, 1900 lbs.; s 2; 20-gallon gasoline tank on rear of car; all r specifications are the same as for the Dragon 0 Touring Car.

Bay State 40 Gasoline Cars.

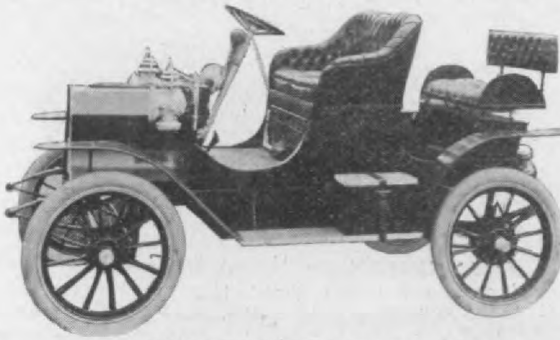
e by the Bay State Auto Co., 112 Norway St., Boston, Mass.

BAY STATE 40 TOURING CAR. $3750.

y State 40, 7-passenger, touring car; price, $3750; inder, 4-cycle, water-cooled, vertical, 4¾-inch by 5-inch stroke, 40 H. P. motor, set in front r hood on 3-point suspension; mechanically op- d valves; 3-crank shaft and 3-cam shaft bear- jump spark ignition by storage battery; 8 dry and magneto; mechanical lubrication; multiple clutch with cork insert; 4 forward speeds, direct rd, progressive sliding change speed gear, mounted all bearings; shaft drive; floating rear axle and m front axle; tires, 34 by 4-inch front and 34 by

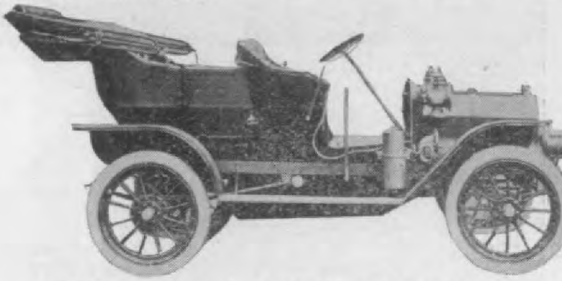
Reo Gasoline Cars.

Made by the Reo Motor Car Co., Lansing, Mic



REO MODEL B RUNABOUT. $650.

Reo Model B single-seated runabout; single-cy der, horizontal, water-cooled, 4-cycle, 4¾x6, 8-10 P. engine under hood on 3-point suspension; mech cal valves; babbitt crank shaft bearings; br cam shaft bearings; jump spark ignition from cells; sight feed lubrication; multiple disc clu 3 speed and reverse change gear, direct on two spe operated by hand lever; reverse by foot lever; di single chain drive; tubular axles front rear; 28 in. wheels on Timken bearings; 3 in. ti 78 in. wheel base; angle iron frame; no sub-fra ¾ elliptic front springs; 34 ins. long, 1¾ ins. wid leaves, full elliptic springs rear, 33 ins. long, 1¾ wide, 3 upper and 3 lower leaves; irreversible w and segment steering by wheel; 2 double ac brakes on hubs; passenger capacity 2, on emerge 4; weight, 1275 lbs.; 6 gal. gasoline tank under h price, $650, including side oil and tail lamps, h and full tool outfit.



REO MODEL A TOURING CAR. $1250.

Reo Model A, 5-passenger touring car; 2-cylin horizontal, water-cooled, 4-cycle, 4¾x6 in., 18-20 P. engine under body on 3-point suspension; mecha cal valves; metal babbitt crank shaft bearin bronze cam shaft bearings; jump spark ignition dry cells; automatic lubrication; multiple disc clut 3 speed and reverse change gear, direct on two spee operated by hand lever, reverse by foot lever; dir single chain drive; tubular rear axle; tubular fr axle wheels on Timken roller bearings; 32x3½ tires; wheel base, 94 ins.; prest steel frame; pr steel sub-frame; half elliptic springs front, 39½ i long, 2 ins. wide, 5 leaves, full elliptic springs re 36 ins. long, 2 ins. wide, 5 upper and 5 lo leaves; irreversible worm and segment steering wheel; three double acting sprocket and hub brak spark and throttle control on steering post; also f accelerator; 5 passengers; weight, 1900 lbs.; 12 g gasoline tank under hood; equipment, 2 gas, 2 s oil and tail lamps, triple turn horn and full tool o fit; price, $1250.

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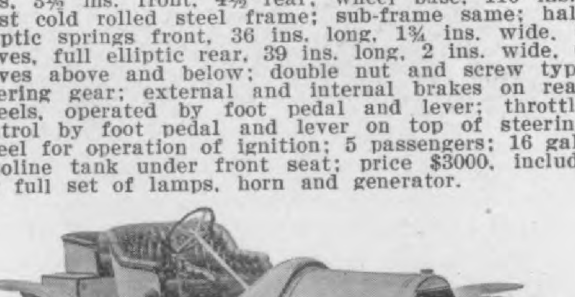
body and load desired; side post steering gear frame with cross lever; brake from grooved shoes ring on large roller rings; control details: pedal ke, one pedal to shift rollers, side lever to engage ers, cross lever to steer, twist handle to throttle lift button on post for spark; seats 2 or 4; 6-gallon oline tank under seat; weight, 800 to 900 lbs.

Hol-Tan Gasoline Cars.

Iade by the Hol-Tan Co., 244-250 West 49th St., Y. City.

THE HOL-TAN STANDARD, $3000.

he Hol-Tan Standard touring car; 4-cylinder, verti , water-cooled, 4-cycle, 4½x4½, 25 H. P. engine front on 4-point suspension on sub-frame; valve ion by single rocker arm actuated by single cam top cylinder; special white bronze crank shaft rings; cam shaft bearings same; ignition by high sion Bosch magneto; force feed lubrication; mul- le disc clutch; selective sliding gear transmission special white bronze bearings, 4 speeds, direct on rth speed, operated by single lever; shaft drive; oer's full floating type rear axle; front axle, solid p forging; 34 in. wheels on adjustable ball bear- s, 3½ ins. front, 4½ rear; wheel base, 110 ins.; st cold rolled steel frame; sub-frame same; half ptic springs front, 36 ins. long, 1¾ ins. wide, 6 ves, full elliptic rear, 39 ins. long, 2 ins. wide, 6 ves above and below; double nut and screw type ering gear; external and internal brakes on rear eels, operated by foot pedal and lever; throttle trol by foot pedal and lever on top of steering eel for operation of ignition; 5 passengers; 16 gal. oline tank under front seat; price $3000, includ- full set of lamps, horn and generator.



THE HOL-TAN ROADSTER, $3000.

'he Hol-Tan Roadster, same chassis as The Hol- n Standard; 2 or 4 passengers; price $3000. With ne specifications as The Hol-Tan Special, $3750.

SNYDER NO. 5 MOTOR-BUGGY.

Snyder No. 5 Motor-Buggy; piano box body; do opposed, horizontal, air-cooled, 4-cycle, 4x4, 10-12 P. motor, under seat, on four-point suspension; va in cages at sides of cylinder; bronze crank and shaft bearings; jump spark ignition, dry cells; s feed compression lubrication; planetary change s gear, 2 speeds forward and one reverse, direct high, operated by pedals and lever; chain drive; s front and rear axles; 1⅛-inch solid rubber tires; elliptic springs front and rear; wheel or tiller st ing; 2 brakes on rear wheels; 5-gallon gasoline-t under seat; weight, 800 lbs.; fitted also with su and delivery wagon bodies.

Eureka Air-Cooled Gasoline Cars.

Made by Eureka Motor Buggy Co., Taylor Ave. Morgan St., St. Louis, Mo.

EUREKA 1908 RUNABOUT, $650.

Eureka Model 1908 runabout; price, $650; 2-c der, horizontal, air-cooled, 4-cycle, 4-in. bore stroke, 10-12 H. P. motor located in center of fr on hot riveted sub-frame; mechanically operated va on top; Parson's white bronze crank and cam s bearings; jump spark ignition by 6 dry cells; com sion oiler; 2 speed forward and reverse, direct high, planetary change speed gear, operated by l and mounted on bronze bearings; double chain dr dead rear axle and tubular front axle; 36x1⅛-in. in front and 40x1⅛ in rear; plain or Timken r wheel bearings; 64 to 80-in. wheel base; angle s main and sub-frame; special Concord side springs, ins. wide, 7 leaves; rack and pinion steering g external contracting brakes; spark and throttle trol on steering post; seats 2; weight, 1000 lbs. gal. gasoline tank under seat; equipment: full lea top, storm shield, fenders, lamps and horn; r with several interchangeable bodies.

Victor Gasoline Cars.

Made by the Victor Automobile Mfg. Co., 171 Ca St., St. Louis, Mo.

VICTOR MODEL A, HIGH-WHEEL CAR, $4

Victor Model A High-Wheeled buggy type car; p $450; 1-cylinder, 4x4, 2-cycle, water-cooled moto H. P.; forged steel crank shafts; jump spark

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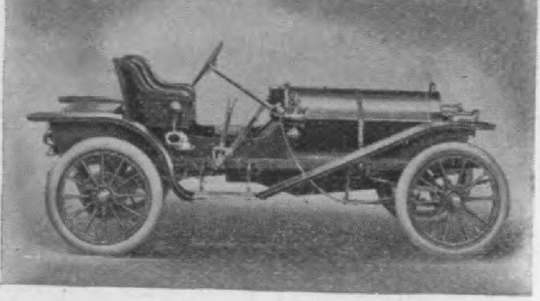
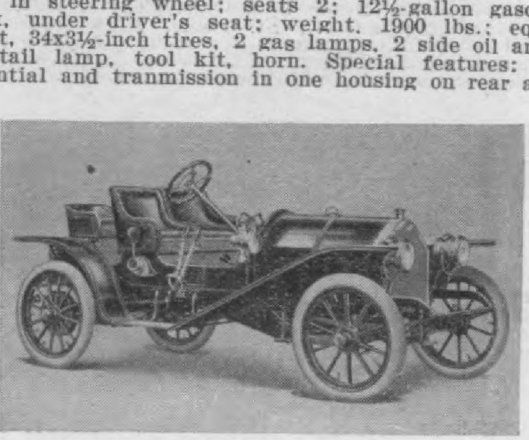


MARION MODEL 9 ROADSTER. $2750.

arion Model 9 Roadster; 6-cylinder, vertical, water-ed, 3¾-inch bore and stroke, 30-35 H. P. motor, forward, under hood, on side members of main ne; mechanically operated valves on right side motor; bronze babbitt-lined crank shaft bearings bronze cam shaft bearings; double ignition sys- by storage battery and magneto; force feed lu- ation; multiple disc clutch in fly wheel; sliding nge speed gear, 2 speeds forward and reverse, ct on high, operated by side lever and mounted Hess-Bright ball bearings; shaft drive; tubular t and rear axles; 34x3½-inch front and rear tires; wheel bearings; 104-inch wheel base; prest steel ne; semi-elliptic springs, 40 inches, in front, and scroll elliptic springs, 36 inches, in rear; worm nent irreversible steering gear; internal and ex- al brakes on rear wheels; spark and throttle con- in steering wheel; seats 2; 12½-gallon gasoline , under driver's seat; weight, 1900 lbs.; equip- t, 34x3½-inch tires, 2 gas lamps, 2 side oil and 1 tail lamp, tool kit, horn. Special features: dif- ntial and tranmission in one housing on rear axle.



MARION MODEL 8 ROADSTER. $2250.

rion Model 8 Roadster; 4-cylinder, vertical, water- ed, 4-cycle, 4-inch bore and stroke, 22-24 H. P. r, set forward, under hood, on side members of frame; mechanically operated valves, from two shafts on opposite sides of cylinder; die cast crank shaft and cam shaft bearings; 32x3½-inch front and rear; seats, 2, 3 and 4 persons; ht, 1850 lbs.; equipment; 2 gas lamps, 2 side amps, 1 tail lamp, tool kit, steamer trunks, single louble rumble seat and horn; price, $2250; all specifications same as for Model 9.
8 Marion cars described in our December, 1907. , page 124.

Klink Gasoline Cars.

e by the Klink Motor Car Mfg. Co., Dansville, N. Y.

steel main and sub-frame; semi-elliptic springs and rear, 36x2 inches, 6 leaves, in front, and inches, 7 leaves, in rear; screw and nut steering g 4 brakes on rear hubs; spark and throttle con on steering wheel and foot accelerator; seats weight, 2100 lbs.; 20-gallon gasoline tank, under f seat; weight, 2100 lbs.; equipment, gas and oil lam generator, horn, tools, pump and tire repair outfit.

KLINK ROADSTER. $2000.

Klink Roadster; price, $2000; same specifications for the touring car, with the exception of the se ing capacity, which is 4; the weight, 1900 lbs., an 15-gallon tank, under front seat.
1908 Klink models described October, 1907, p 142.

Adams-Farwell Air-Cooled Gasoline Ca

Made by The Adams Company, Dubuque, Iowa
Adams-Farwell Model 9 touring car; 5-cylinder, cycle, horizontal revolving; air-cooled, 5½x5, 50 H. motor under rear seat; valves in cylinder, heads chanically operated; 1 bronze crank shaft beari jump spark ignition, from storage battery; mechani force feed lubrication; cone clutch; selective slidi change speed gear, on H. B. bearings, 3 speeds ward; 1 reverse; direct on high, single chain dri live tubular rear axle; front axle, square steel, 36-i tires on Timken roller bearings, 4½-inch tires; wh

ADAMS-FARWELL MODEL 9 TOURING CAR. $35

base, 120 inches; trussed angle steel frame, se elliptic springs; 44 inches long, 2 inches wide, leaves front, 48 inches long, 2½ inches wide, 9 leav rear; Gemmer steering gear; internal expanding s external contracting brakes on rear hubs; control, v iable compression and spark advance; passenger pacity, 7; weight, 2700 pounds; 18 gallon gasol tank under body; equipment, 2 oil side lamps, 2 headlights, tail lamp, pump, jack, tools, etc. Pri $3500.
ADAMS-FARWELL MODEL NINE ROADSTER, $3
Adams-Farwell Model 9 roadster; same general ch sis specifications as Model 9 touring car; four p sengers; weight, 2200 pounds; price, $3000.

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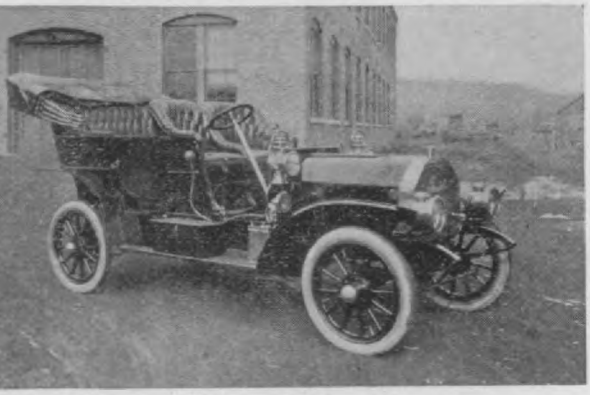


GROUT 1908 TOURING CAR. $2500.

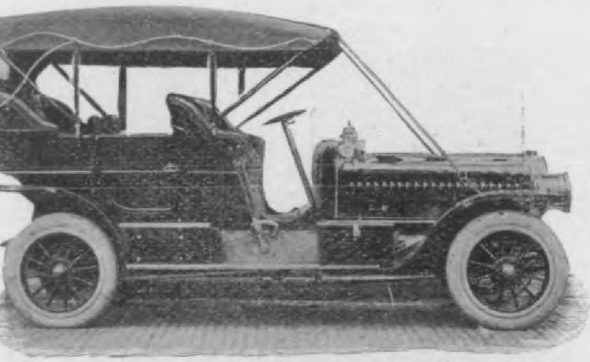
rout 1908 touring car, price, $2500; 4-cylinder, 4-
e, vertical, water-cooled, 4½-inch bore by 5-inch
ke, 35 H. P. motor, set forward under hood on
frame; mechanically operated valves; hammered
bitt crank shaft bearings; white bronze cam shaft
rings; jump spark ignition by dry cells; force-
l lubrication; cone clutch; 3 speeds and reverse,
ct on high, selective sliding change gear, mounted

GROUT 1908 ROADSTER. $2400.

Timken roller bearings; double side chain drive;
ome steel (dead) rear axle and chrome nickel front
e; semi-elliptic front and rear springs, 39 by 2-
the rear; worm and sector steering gear; 2 brakes
each rear wheel; stationary control on top of
ering wheel; seats 5; 15-gallon gasoline tank under
nt seat; weight, 2450 lbs.; equipment: top, side
tains, head lights, side lights, generator. With
dster body, seating 4, price is $2400.

Lambert Gasoline Cars.

Made by the Buckeye Mfg. Co., Anderson, Ind.



LAMBERT FRICTION-DRIVE MODEL R. $2500.

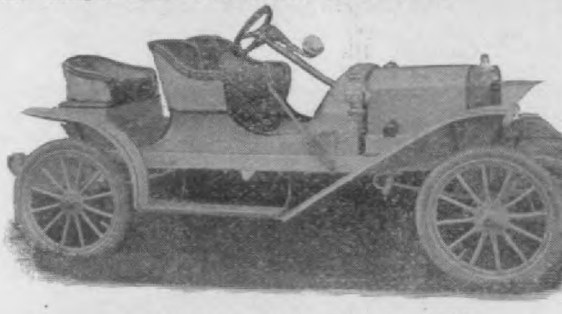
Lambert friction drive Model R, 7-passenger touring

LAMBERT MODEL M SHAFT-DRIVEN CAR. $20

Lambert Model M, 5-passenger touring car; 4-cy
der Rutenber, 35-40 H. P. motor, friction drive
shaft to divided rear axle; all speeds forward
reverse; jump spark ignition; lubrication positive fo
feed; 32-inch wheels on Timken roller bearin
wheel base, 105 inches; internal expanding brakes
rear wheels; 20-gallon gasoline tank; full ellip
rear springs; semi-elliptic front springs; screw
nut steering; complete car weighs 1900 lbs.; equ
ment; cape extension top, 2 gas lamps with ge
ator, 2 oil lamps, tail lamp, horn, tool boxes
running board and full tool equipment; price $20

LAMBERT 5-PASSSENGER TOURING CAR MOD
S. $1275.

Lambert Model S, 5-passenger touring car; 2-
inder, horizontal, opposed, water-cooled, 24 H.
motor; 6-inch bore, 4½-inch stroke; friction cha
speed from 1 to 25 miles per hour; jump spark
nition; direct chain drive to each rear wheel; w
base, 94 inches; wheels, 30 inches on Timken ro
bearings, fitted with 3½-inch tires; 12-gallon gaso
tank; detachable tonneau; complete weight, 1800
foot rachet brake on differential, internal and
panding brakes in rear hub drums; equipment: 2
side lamps, horn and tools; price $1275.



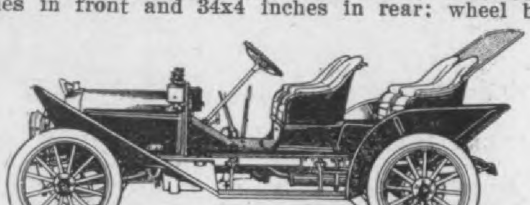
LAMBERT MODEL 18. $800.

Lambert 3-passenger Model 18; motor, 2-cylinder,
posed, water-cooled, 18 H. P.; friction change s
gear; jump spark ignition; drive, single chain to
axle; wheel base, 95 inches, 30-inch wheels on H
roller bearings; 3-inch clincher tires; 10-gallon
oline tank; external brakes on rear wheel dr
complete weight, 1350 lbs.; equipment: 2 oil la
horn and full set of tools, $800.

Corbin Air-cooled Gasoline Cars.

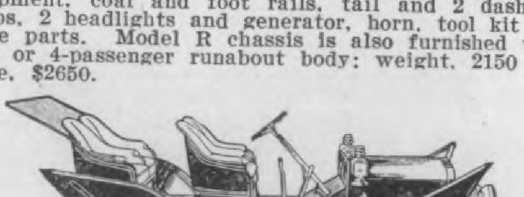
Made by the Corbin Motor Vehicle Corporation,
Britain, Conn.

y cells, or Bosch high-tension magneto; lubrication, ght feed oiler and splash; leather-faced cone clutch; lective change speed gear, 3 forward speeds and 1 verse, direct on high, on F. & S. ball-bearings, oper-ed by side lever; shaft drive; semi-floating rear les; I-section drop-forged front axle; tires 34x3½ ches in front and 34x4 inches in rear; wheel bear-



RBIN MODEL S, 2, 3 OR 4-PASSENGER RUN-ABOUT, $2650.

s F. & S. ball thruout; wheel base, 108 inches; annel prest steel frame; springs semi-elliptic front d rear, 50x2¼ inches, 8 leaves, in front, and 40x2 hes, 6 leaves, in rear; worm and sector irreversi-steering gear; 4 enclosed internal expanding brakes rear wheels; gasoline capacity, 15 gallons, tank ated under seat; gravity feed; weight, 2300 lbs.; uipment, coal and foot rails, tail and 2 dash oil nps, 2 headlights and generator, horn, tool kit and re parts. Model R chassis is also furnished with 3 or 4-passenger runabout body; weight, 2150 lbs. ce, $2650.



RBIN MODEL O, 2, 3 OR 4-PASSENGER RUN-ABOUT $2500.

orbin Model K touring car; price, $2500 all other cifications are the same as for Model R Touring . Model K Touring Car is also furnished with a 3 or 4-passenger runabout body for the same price the touring car.

orbin, 1908, cars described in our January, 1908, ue, page 187.

Staver Gasoline Cars.

ade by the Staver Carriage Co., 76th and Wal-e Sts., Chicago, Ill.

STAVER MODEL D STANHOPE, $1000.

aver Model D Stanhope, 2-cylinder, horizontal, er-cooled, 2-cycle, 5x5, 18 to 20 H. P. engine r seat, suspended on sub-frame; valves at ends cylinders operated by push rods; Parson's white s crank shaft bearings; cam shaft bearings e; jump spark ignition by dry cells; six feed hanical oiler; multiple disc clutch; planetary

Bendix Gasoline Cars.

Made by the Bendix Company, Cragin Stat Chicago, Ill.

DUPLEX MODEL NO. 1, $650.

Duplex Model No. 1 Stanhope; 2-cylinder, 4-c 4⅛x4, 12 H. P. engine under hood on sub-fra mechanical valves; jump spark ignition from cells; force feed lubrication; no clutch; double tion change gear on Hyatt Roller bearings, number of speeds, operated by side lever; double chain drive; 1⅛-in. axles; wheels on Timken r bearings; 1⅛-in. Firestone solid side wire tires; elliptic springs, 1½ ins. wide, 3 leaves; lever s ing; internal expanding brakes; throttle and s control on steering column; passenger capacity, weight, complete, 800 lbs.; 6 gal. gasoline tank u seat; equipment, tools, lamps, horn, extra plug, can, etc.; price, $650. Special features: absolu gearless car, no differential, any speed, double tion drive.

BENDIX MODEL NO. 4, $1250.

Bendix Model No. 4 Gentleman's Roadster, beetle back deck; 4-cylinder, vertical, air-cooled cycle, 4x4, 20-24 H. P. engine under hood on frame; mechanical valves; brass crank shaft beari brass cam shaft bearings; jump spark ignition dry cells; force feed lubrication; no clutch; do friction change gear, on bronze bearings, operated side lever, any number of speeds; double side c drive, 1¼-in. axles; wheels on Timken roller b ings; 1½ in. tires; wheel base, 103 ins.; angle s frame and sub-frame; full elliptic springs, 36 long, 1½ ins. wide, 5 leaves; irreversible wheel st ing; internal expanding brakes; spark and thro control on steering column; passenger capacity, weight, 1500 lbs.; 12 gal. gasoline tank under s equipment, tools, lamps, horn, extra plug, oil etc. Price, $1250. Special features: double fric drive, any speed ratio, no differential.

BENDIX MODEL NO. 5, $1350.

Bendix Model No. 5 Surrey; same specifications Model No. 4 Roadster; passenger capacity, 5; wei 1600 lbs.; price, $1350.

Overland Gasoline Cars.

Made by the Overland Automobile Co., Indianap Ind.

OVERLAND MODEL 24 RUNABOUT, $1250.

Overland Runabout, Model 24; 4-cylinder, verti water-cooled, 4-cycle, 3½x4½, 20-22 H. P. mo located in front, under hood, on three-point sus sion; nickel babbitt crank shaft bearings and bro

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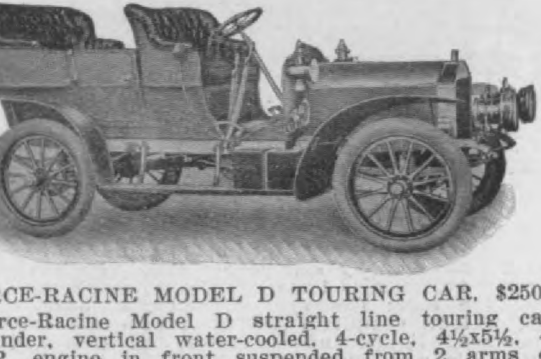
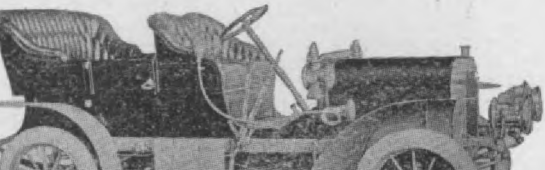


CE-RACINE MODEL D TOURING CAR, $2500.

rce-Racine Model D straight line touring car; nder, vertical water-cooled, 4-cycle, 4½x5½, 40 P. engine in front suspended from 2 arms on side; valves on opposite sides of cylinders; nickel tt crank shaft bearings; bronze cam shaft bear- jump spark ignition by storage battery and dry force feed lubrication; leather faced cone clutch; g change speed gear on ball bearings, 3 speeds rd, direct on high, operated by side lever; gear drive; floating rear axle; tubular front 34 in. wheels on ball bearings; 4½ in. tires; l base, 106 ins.; frame, 149 ins.; sub-frame, s.; half elliptic springs, 44 ins. long front, 2 ins. 8 leaves, 50 ins. long rear, 2 ins. wide, 9 s; sliding nut steering gear; 2 pair brakes on wheels; passenger capacity, 5; weight complete, lbs.; 24 gal. gasoline tank under front seat; ment, 2 side lights, 1 tail light, 2 head lights generator; price, $2500.



CE-RACINE MODEL E TOURING CAR, $2000.

rce-Racine Model E straight line touring car; 5 ngers; 4-cylinder, vertical, water-cooled, 4-cycle, 30 H. P. engine, in front suspended from two on each side; valves on opposite sides of cylin- nickel babbitt crank shaft bearings; bronze cam bearings; jump spark ignition from storage ry and dry cells; force feed lubrication; leather cone clutch; 3 speed sliding change gear, on bearings, direct on high, operated by side lever; gear drive; tubular front axle; 32 in. wheels on bearings; 4 in tires; wheel base, 104 ins.; e 149 ins., sub-frame 72 ins.; half elliptic gs, 42 ins. long, 1¾ ins. wide, 7 leaves 48 ins. long, 1¾ ins. wide, 8 leaves Barnes steering gear; 2 pair brakes on wheels; weight, 2400 lbs.; 19 gal. gasoline under front seat; equipment, side lights; price, ; 1908 models described February, 1908, page

Columbia Gasoline Cars.

by the Electric Vehicle Co., Hartford, Conn.

tires; prest steel frame and sub-frame; semi-ellip springs front and rear, 2 inches wide; front, 5 leave and rear, 6 leaves; irreversible worm and sector stee ing gear; 2 emergency brakes, hand-operated; foo operated brake on rear hub drums; spark and throtl on steering wheels, also accelerator pedal; 17-gall gasoline tank, under front seat; passenger capacity, persons; equipment, 5 lamps, horn, tools, etc.; pric $3000.

COLUMBIA MARK 663 GASOLINE CAR, $6500 T $9000.

Columbia Mark 663, with touring, landaulette touring bodies; 4-cylinder, vertical, water-cooled, 5½ 5½ motor, 48 H. P. (A. L. A. M.), mounted on fo legs, under the bonnet; mechanically-operated valve one over the other, in off-set chambers; white bra crank shaft bearings; bronze cam shaft bearing high tension ignition from storage battery, with d tributer and Gianoli magneto; splash and mechanic lubrication; clutch, special electric generator; chan speed gear, electrically controlled, on Hess-Brig bearings, giving 5 speeds ahead and 3 reverse, dire on the high, operated by a single lever; shaft dri to live rear axle; front axle I-section; 124-inch whe base; 36-inch wheels, on Timken roller bearings; 4-in front and 5-inch rear tires; U-section prest ste frame, trussed; semi-elliptic springs front and rea irreversible worm and sector steering; 2 mechanic brakes, 1 electrical brake; control by spark a throttle on steering wheel, also foot accelerator; 2 gallon gasoline tank, under front seat; capacity, persons; equipment, oil, gas and tail lights, hor tools, self-starting device; price, from $6500 to $90 according to bodies. 1908 Columbia models describ in our November, 1907, issue, page 70.

Maryland Gasoline Cars.

Made by the Sinclair-Scott Co., of Baltimore, M

MARYLAND ROADSTER, PRICE, $2500.

Maryland roadster, with a seating capacity of 2, or 4 persons; 4-cylinder, vertical, water-cooled, 4 4, 36 H. P. motor, under the hood on cross m members; mechanically operated valves in cylin heads by overhead cam shaft; Parson's white br crank shaft bearings and bronze cam shaft bearin jump spark ignition from storage battery; force-f lubrication through sight feeds; leather-faced c clutch with cork inserts; 3-speed forward and 1 verse sliding change gear on Parson's white br bearings, direct on the high, and progressively op ated; shaft drive to semi-floating rear axle; I-sect drop forged front axle; 106-inch wheel base; 32-i wheels on Maryland conical rollers; 3½-inch ti prest steel frame; semi-elliptic front springs; f elliptic rear springs, 38 by 1¾, 7 leaves in the fro 6 in each half of the rear; Gemmer steering ge internal expanding and external contracting b brakes on the rear wheels; spark and throttle lev on steering wheel; 15-gallon gasoline tank under fr

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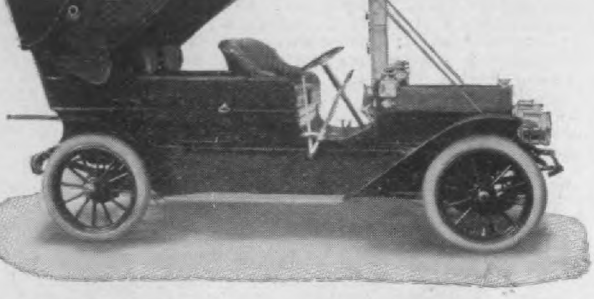
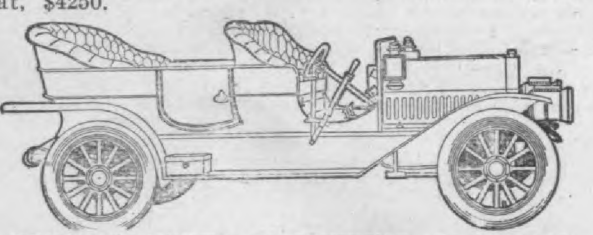


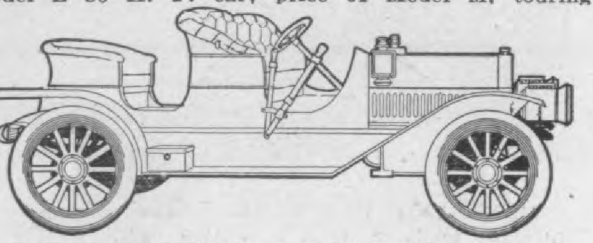
ORRAINE MODEL L 7-PASSENGER TOURING CAR, $4500.

Lorraine Model L 50-55 H. P. touring car; seats price, $4500; 4-cylinder, 4-cycle, water-cooled, 5-in. re and stroke, motor under hood in front; mechanilly operated valves; motor is self-starting by obbs-Renault self-starter; splash lubrication; also by echanical oiler; jump spark ignition; cone clutch; lective or progressive type sliding gear, 3 speeds rward and reverse, direct on high and mounted Hess-Bright bearings; I-beam chrome nickel steel ont axle and chrome nickel steel bevel gear floatg type rear axle, mounted on Hess-Bright ball arings, 3 to 1 reduction; emergency and foot brakes th on rear wheels; cold prest steel frame; 36x4½-in. heels front and rear, mounted on ball bearings; 36x ½-in. tires, Goodyear or any other standard Ameri-n make; springs, 38 ins. front and 50 ins. rear; heel base, 124 ins.; 25-gal. gasoline tank; equipent: full leather cape or Victoria top, glass front, mps, Stewart speedometer, clock, tire holder, comete kit of tools, siren, reed or bulb horn, floor vering, foot rest and 2 hassocks. Model L touring r, 7 passengers, with extra limousine body, $5500. odel L touring car, limousine body only, $5000. odel L Gentleman's roadster, 2 passenger and tiger at, $4250.



LORRAINE MODEL M TOURING CAR, $3000.

Lorraine Model M touring car; price, $3000; 4-cylinr, 4-cycle, water-cooled, 4¼ ins. by 4½ ins., 25-30 P. motor, in front under hood; mechanically opered valves; 34x4-in. wheels; 36-in. springs in front d 34 ins. in rear; 110-in. wheel base; 21-gal. gasoe tank; seats 5; other specifications same as for odel L 50 H. P. car; price of Model M, touring



LORRAINE MODEL N ROADSTER, $3000.

body, $3000; Model M, with extra limousine body, 00; Model M, with limousine body only, $3750; del N Gentleman's Roadster; seats 3; 36-in. eels; 3½-in. tires in front, 4 ins. in rear; price, 00; all other specifications same as for Model M ring car. 1908 Lorraine cars described in our uary, 1908, issue, page 79.

E. R. Thomas Detroit Gasoline Cars.

de by the E. R. Thomas Detroit Co., Detroit, Mich.

. R. Thomas Detroit Model D runabout; 4 cylinders t in pairs, vertical, water-cooled by centrifugal mp, bore 5, stroke 5¾, 40 H. P., A. L. A. M. rat-, located under the hood on sub-frame; valves the right side and mechanically operated; die t babbitt bearings on crank shaft, annular ball

E. R. THOMAS DETROIT MODEL D. $275

rear, 53 inches by 2¼ inches, 7 leaves; worm nut steering gear; external contracting transmi brake, internal expanding hub brake, 12 by 2 in spark and throttle control on steering wheel; brakes controlled by side lever; clutch by pedal celerator button also furnished; 19-gallon gasoline under the seat; passenger capacity, 2, 3 or 4 sons; weight, complete, 2260 lbs.; equipment: 2 ylene head lights and generator, oil side and light, tools and jack; price, $2750.

E. R. THOMAS DETROIT TOURING CAR, MO D. $2750.

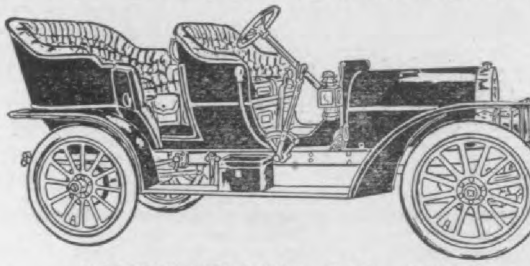
Thomas Detroit touring car, Model D; ge specifications the same as Model D runabout; se capacity, 5; gasoline capacity, 18 gallons, under front seat; weight, complete, 2530 lbs.; with si equipment to Model D. $2750.

THOMAS DETROIT LIMOUSINE, MODEL D. $

Thomas Detroit limousine, Model D; same ge specifications as the runabout and touring car the chassis; limousine bodies and landaulette b are fitted to this chassis. Wheels are 34-inch, 4-inch front and 4½-inch rear tires; 18-gallon gas tank under front seat; complete weight, about lbs.; price, $3750. 1908 Thomas Detroit cars scribed October, 1907, page 86.

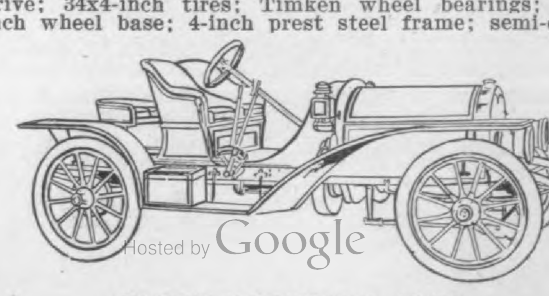
Bailey Two-Cycle Gasoline Cars.

Made by the Bailey Automobile Co., Springfield, I



BAILEY TOURING CAR, $2500.

Bailey touring car; aluminum body; 4-cylinder, tical, water-cooled, 2-cycle, 4½x5, 35 H. P. m under bonnet, from extended arms to frame; matic valve action; bronze crank shaft bear jump spark ignition, current furnished by st battery and magneto; force feed lubrication; mul disc clutch; selective, sliding gear transmissio speeds forward, direct on high, operated by side and mounted on Timken roller bearings; bevel drive; 34x4-inch tires; Timken wheel bearings; inch wheel base; 4-inch prest steel frame; semi-



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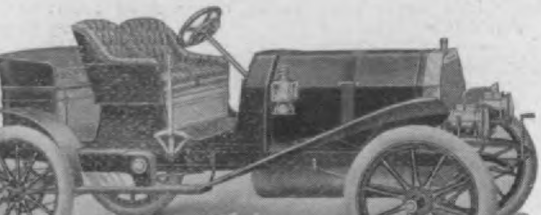


PLICITY 3-PASSENGER ROADSTER. $2500.
olicity 3-passenger roadster; price, $2500; 4-cylin-
vertical, water-cooled, 4-cycle, 4¾ bore by 5¾
, 28-30 H. P. motor in front under hood on 3-
suspension; mechanically operated valves; white
crank and cam shaft bearings; jump spark igni-
by storage batteries; lubrication by splash sys-
nd McCord oiler; friction transmission, mounted
ller bearings; side chain drive; 34x4-in. tires
and rear; ball wheel bearings; 105-in. wheel
prest steel frame; semi-elliptic springs, 43x2
7 leaves in front, and 54x2 ins., 8 leaves, rear;
3; brakes, band and reverse friction; 19-gal.
ne tank at rear; weight, 1800 lbs.; full equip-
also furnished with touring car and limousine
; described in full, November, 1907, issue, page

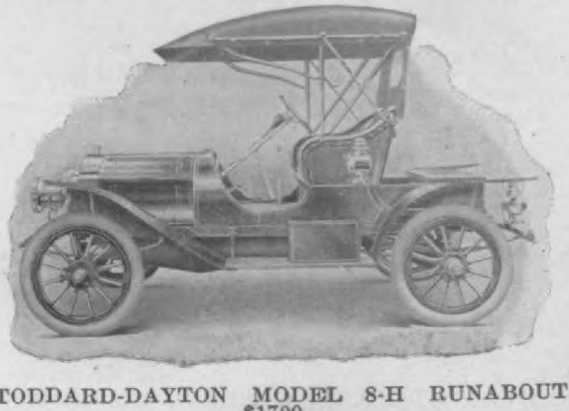
Stoddard-Dayton Gasoline Cars.

by the Dayton Motor Car Co., Dayton, Ohio.

DDARD-DAYTON MODEL 8-G TOURING CAR.
$4500.
ddard-Dayton Model 8-G Touring Car; 6-cylinder,
al, water-cooled, 4-cycle, 4⅝x5, 50-60 H. P.
e, under hood, on frame; mechanical valves on
ite sides; Hess-Bright crank shaft and cam
bearings; jump spark ignition, storage battery
Bosch magneto; Kinwood mechanical lubrica-
cone clutch; sective change speed gear, on
bearings, 3 speeds, direct on high, operated by
in H slot; shaft drive; floating rear axle; I-
front axle; 36-inch wheels on roller bearings;
tires rear, 4-inch front; wheel base, 128 inches;
elliptic springs front and rear; worm and nut
ng gear; internal and external brakes on rear
s, also on transmission; seats 7; 20-gallon gaso-
ank and 3-gallon reserve tank, under front seat;
ment, 2 gas lamps front, 2 oil side lamps, 1 oil
lamp, generator, robe rail, tools, tire repair kit;
t, 3500 lbs. This chassis is also furnished with
sine and roadster bodies.

DDARD-DAYTON MODEL 8-F TOURING CAR.
$2500.
ddard-Dayton Model 8-F Touring Car; 2-cylinder,
cal, 4-cycle, water-cooled, 4¾x5-inch, 40-45 H. P.
, under hood, on frame; valves in head; nickel
tt crank and cam shaft bearings; jump spark
on, from storage battery; positive gear-driven

STODDARD-DAYTON MODEL 8-K ROADSTER.
$2550.
Stoddard-Dayton Model 8-K Roadster, equipped wit
baby tonneau, mounted on same chassis as Model
touring car; price, including 5 lamps, generator, hor
tools, tire repair kit, $2550. Top, $125 extra.



STODDARD-DAYTON MODEL 8-H RUNABOUT
$1700.
Stoddard-Dayton Model 8-H Runabout; special d
sign of body, with removable deck; price, $170
4-cylinder, vertical, 4-cycle, water-cooled motor, 3
bore, 3¾-inch stroke, 18 H. P., under hood,
frame; nickel babbitt cam and crank shaft bearing
jump spark ignition, from storage batteries; Kinwo
mechanical pressure feed lubrication; cone clutc
3-speed, direct on high, selective, change spe
gear, operated by side lever in H slot, mounted
roller bearings; 30x3½-inch tires; roller wheel bea
ings; shaft drive; floating rear axle; I-beam fro
axle; 92-inch wheel base; semi-elliptic springs fro
and rear; worm and nut steering gear, foot a
emergency brakes on rear wheels; seats 2 or 4; 1
gallon gasoline tank, under front seat; equipment,
gas, 2 side and 1 tail lamp, horn, generator and tool
weight, 1400 lbs. Also furnished with 8-H Cou
and 8-N bodies.

Pontiac Gasoline Cars.

Made by the Pontiac Spring and Wagon Work
Pontiac, Mich.

PONTIAC MODEL D NO. 8 SALESMEN'S CA
$600.
Pontiac Model D No. 8 high-wheel car, fitted w
compartment at rear for carrying sample cases, et
price, $600 without top; top, $50 extra; 2-cylind

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DUROCAR MODEL L TOURING CAR. $1600.

Durocar Model L Touring Car; price, $1600; 2-ylinder, opposed, 5½ bore, 5-inch stroke, 26 H. P., orizontal motor, set in front, under hood; 3-speed orward and reverse, selective sliding gear transmis-lon, mounted on Timken roller bearings; mechanical orce feed lubrication; Timken roller bearings on ear and front axles; reinforced steel frame; semi-

DUROCAR MODEL K RUNABOUT. $1550.

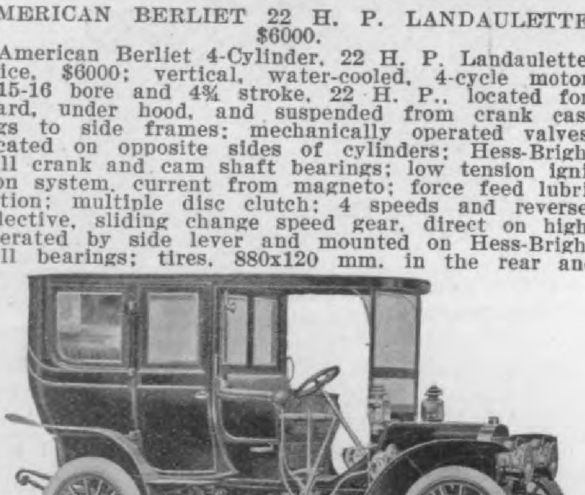
lliptic springs front, full elliptic in rear; shaft drive, ith large bevel gear; jump spark ignition; internal nd external brakes on rear hubs; tires, 32x3½ inch-s; cone clutch; wheel base, 102 inches; 15-gallon asoline tank; equipment, 5 lamps, horn, pump, tire ıtfit and tool kit; weight, 1820 lbs.; with runabout ody, seating 3, price is $1550.

American Berliet Gasoline Cars.

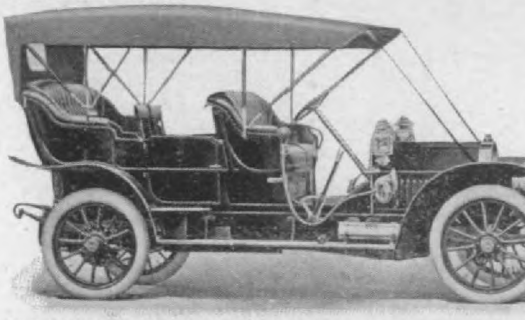
ade by the American Locomotive Automobile Co., 1886 Broadway, New Year City.

MERICAN BERLIET 22 H. P. LANDAULETTE. $6000.

American Berliet 4-Cylinder, 22 H. P. Landaulette; ice, $6000; vertical, water-cooled, 4-cycle motor, 15-16 bore and 4¾ stroke, 22 H. P., located for-ard, under hood, and suspended from crank case gs to side frames; mechanically operated valves, cated on opposite sides of cylinders; Hess-Bright ll crank and cam shaft bearings; low tension igni-on system, current from magneto; force feed lubri-tion; multiple disc clutch; 4 speeds and reverse, lective, sliding change speed gear, direct on high, erated by side lever and mounted on Hess-Bright ll bearings; tires, 880x120 mm. in the rear and

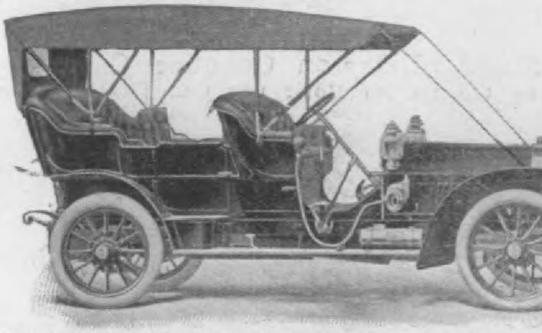


rack, foot rest, coat rack, etc. Also furnishe a limousine body.



AMERICAN BERLIET 4-CYLINDER TOURING $6500.

American Berliet 4-Cylinder, 40 H. P. T Car; price, $6500; motor, vertical, water-cool cycle, 4¾-inch bore, 5½-inch stroke, located fo under hood, and suspended from crank case le side of frame; sliding, selective, 4 speeds fo and 1 reverse, change speed gear, direct on thir fourth speeds; front tires, 36x4 inches, and rear 36x4¾ inches; double chain drive; seats 7; w 3250 lbs.; other specifications same as for t cylinder, 22 H. P. landaulette.

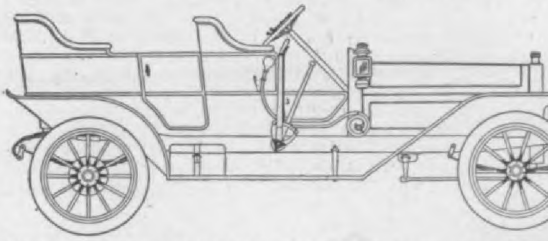


AMERICAN BERLIET 6-CYLINDER TOURING $7500.

America Berliet 6-Cylinder, 60 H. P. Touring price, $7500; 6-cylinder, vertical, water-cooled, inch bore, 5½-inch stroke, suspended in front, crank case legs to side frames; weight, 3600 lbs other specifications same as for the 40 H. P. to car.

The Rider Lewis Gasoline Cars.

Made by the Rider Lewis Motor Car Co., Muncie



RIDER LEWIS TYPE VIII TOURING CAR. $2

The Rider Lewis Type VIII 6-cylinder, 40 H touring car; motor, water-cooled; valves operate overhead cam shaft; 3 speed selective sliding ch speed gear on rear axle; shaft drive; I-section axle; 34-in. wheels; 4-in. tires; internal and ternal brakes on rear hubs; high tension ignition storage battery; semi-elliptic springs front, ¾ el springs rear; 122-in. wheel base; shaft drive; 1 gasoline tank; weight, 2375 lbs.; price, with two headlights, 2 oil lamps, 1 tail light, horn and $2500; also furnished with limousine and landau bodies.

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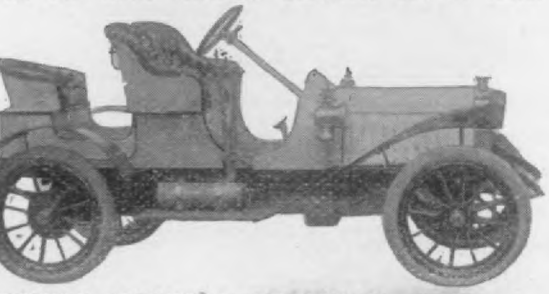
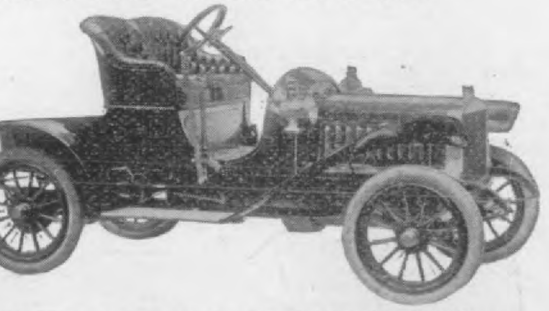
TCHELL MODEL I TOURING CAR. $2000.

chell Model I, 5-passenger touring car; price
0; 4-cylinder, 4-cycle, vertical, water cooled,
ch bore by 5-inch stroke, 35 H. P. motor, set
ront under hood on sub-frame; mechanically op-
d valves; five babbitt bearings on crank shaft,
2 brass and 1 babbitt bearing on cam shaft;
spark ignition, by dry cells; mechanical oiler
hood; cone clutch; progressive type change speed
3 speeds forward and 1 reverse, direct on high,
ted by side lever, and mounted in babbitt bear-
shaft drive; I-beam front axle; tires 32 by 4
s; wheel bearings, Hyatt roller in rear and ball
ng in front; wheel base 112 inches; prest steel
and sub-frames; half elliptic springs front and
40-inch in front and 48-inch in rear; external
acting and internal expanding brakes on rear
ls; spark and throttle levers on steering post; 15-
n gasoline tank under front seat; weight 2500
equipment: headlight brackets, oil light brack-
nd tail light bracket. Complete set of tools.



TCHELL MODEL G RUNABOUT. $1250.

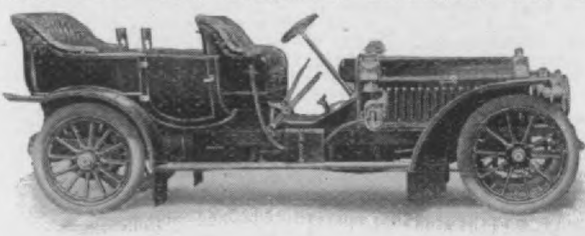
chell Model G, 3-passenger runabout, price $1250;
nder, 4-cycle, vertical, water-cooled, 4x4-inch, 20
power motor, set in front under hood on sub-
e; mechanically operated valves; 5 babbitt crank
bearings; 2 brass and 1 babbitt cam shaft bear-
jump spark ignition by dry cells; mechanical
under hood; cone clutch; progressive speed change
3 speeds forward and 1 reverse, direct on high,
ted by side hand lever, and mounted in babbitt
ngs; bevel gear shaft drive; I-beam front axle;
32 by 3½-inch; ball wheel bearings in front, Hy-
oller bearings in rear; 92-inch wheel base; prest
main and sub-frames; half elliptic springs front
rear, 40-inch in front, 44-inch in rear; internal
nding and external contracting brakes on rear
s, operated by hand lever and foot lever; spark
hrottle levers on steering post; 16-gallon gasoline
under front seat; weight 1650 lbs.; equipment,
table headlight brackets, oil light brackets and
ight brackets, complete set of tools.



CHELL MODEL H RUNABOUT. $1000.

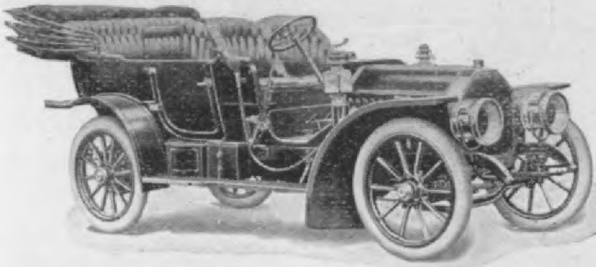
chell Model H, 2-passenger runabout, price $1000;
3½-inch tires front and rear; all other specifi-
s same as for Model G runabout. 1908 models
bed in our November, 1907, issue, page 108.

Peerless Gasoline Cars.



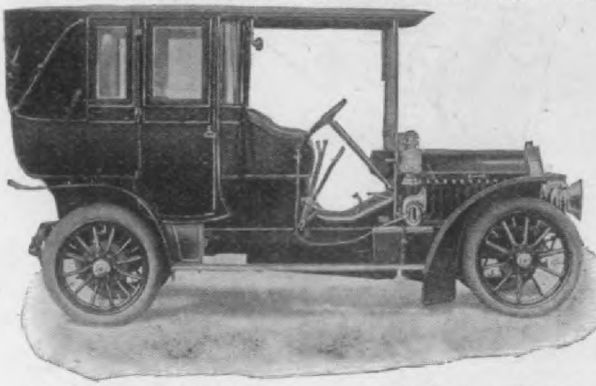
PEERLESS TWENTY-TOURING CAR. $6000.

tail lights, generators, tools; price, $6000. Peerle
Roadster, $6000. Peerless Limousine, $7000. Pe
less Landaulette, $5800. Peerless Roadster, $4300—
having the same general chassis specifications as t
Peerless Twenty-Touring Car.



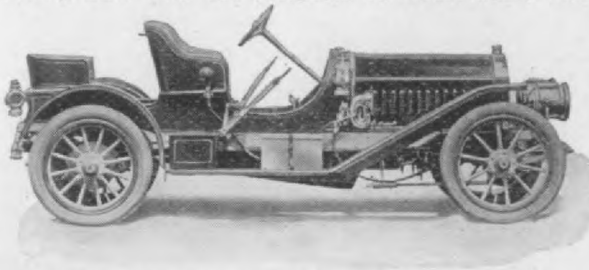
PEERLESS EIGHTEEN-TOURING CAR. $4300.

Peerless Eighteen-Touring Car; motor same as
Peerless Twenty-Touring Car; 4⅞ bore, 5½ strok



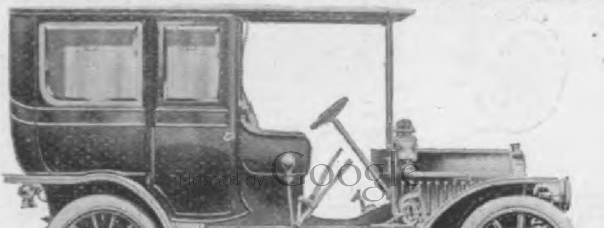
PEERLESS EIGHTEEN LANDAULETTE. $5800.

general chassis specifications same as Model Twent
Touring Car, with the exception of wheel base, whic



PEERLESS EIGHTEEN ROADSTER. $4300.

is 118 inches, and the frame, which is 155½ inches
passenger capacity, 7. On the same chassis is



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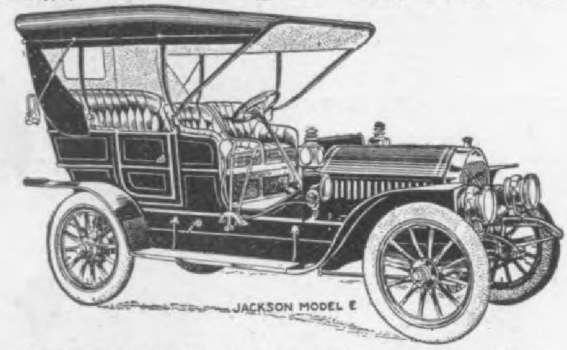
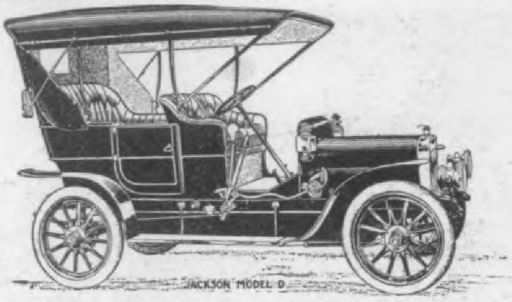
re 4½, stroke 4¾, 35 H. P., mechanically operated lves in the head; cam shaft and crank shaft bear-gs of babbitt; jump spark ignition from storage ttery; force feed lubrication; multiple disc clutch; lective sliding change speed gear on roller bear-gs, 3 speeds forward and 1 reverse, operated by e lever; bevel gear drive, live rear axle, tubular ont axle; 111-inch wheel base; 34-inch wheels on ball arings, fitted with 3½-inch tires; channel section



JACKSON MODEL E TOURING CAR. $2000.

est steel frame; semi-elliptic springs in front, 45 ches by 1¾, 7 leaves; full elliptic rear, 40 inches 2 inches, 5 leaves; screw steering gear, internal d external hub brakes; spark and throttle levers on eering wheel; 20-gallon tank under front seat; ice, with full set of gas lamps, oil lamps, horn, ols, etc., $2000. Complete weight, 2700 lbs.

Jackson Model E gentleman's roadster; general assis specifications similar to Model E touring car; ice, fully equipped, $2000.

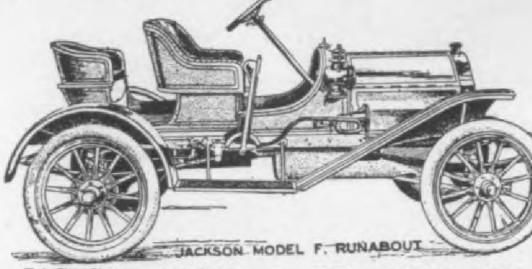


JACKSON MODEL D 5-PASSENGER TOURING CAR. $1500.

Jackson Model D, 5-passenger touring car; 2-cylin-r, opposed, 5¼ by 5-inch motor, 24 H. P., under e hood on three-point suspension, water-cooled ther-al circulation; mechanically operated valves in the ad; crank shaft and cam shaft bearings of bab-tt; jump spark from storage batteries; force-feed brication; multiple disc clutch; selective type slid-g gear on roller bearings, giving 3 forward speeds d 1 reverse, operated by one lever; bevel gear ive; live rear axle, tubular front axle; 106-inch heel base; 32-inch wheels on ball bearings, fitted th 3½-inch tires; prest steel frame; semi-elliptic ont springs, 35 inches by 1¾, 7 leaves; full ellip-c rear springs, 40 inches by 2 inches, 5 leaves; rew steering gear; external and internal hub brakes; ark and throttle lever on steering wheel; 18-gallon soline tank under front seat; complete weight, 00 lbs.; price, with full set of gas lamps, oil mps, horn and tools, $1500.

JACKSON MODEL C TOURING CAR. $1250.

Jackson Model C, 5-passenger touring car; 2-cylinder,



JACKSON MODEL F RUNABOUT. $850.

Jackson Model F runabout, 2-cylinder, opposed tor, 5 by 4, 16 H. P., under the hood on 3-point pension, water-cooled thermal circulation; mec cally operated valve in the heads; jump spark ign from dry cells; mechanical force-feed lubrication; tiple disc clutch; planetary change speed gear, g two forward and one reverse speed, operated by lever and pedal; bevel gear drive; live rear axl roller bearings, front axle tubular; 90-inch base; 30-inch wheels on ball bearings; 3-inch prest steel frame; semi-elliptic front springs, 45 i by 1¾, 5 leaves; rear springs, full elliptic, 36 b inches, 4 leaves; worm steering gear; contracting brakes; spark and throttle control on steering carrying capacity, 3 persons; 12-gallon gasoline under the seat; weight, complete, 1600 lbs.; with oil lamps, horn and full set of tools. $850.

Jackson 1908 cars described November, 1907, 83A.

Monarch Gasoline Cars.

Made by the Monarch Motor Car Co., Chicago Hei Illinois.

Monarch Model G touring car; seats 5; price $ 4-cylinder, 4-cycle, vertical, water cooled, also 40 H. P. motor, hung on 3-point suspension, hood; cylinders, 4¾-inch bore by 5-inch stroke; chanical valves; Parsons white brass crank bearings and bronze cam shaft bearings; ignition rent from storage battery and Bosch magneto;

MONARCH MODEL G TOURING CAR. $2500

chanical lubrication; multiple disc clutch; 3- and reverse selective type transmission, operate hand lever and mounted in Timkin roller bear shaft drive; tubular front axle and floating type axle; tires 36 by 4-inch front and rear; Timkin wheel bearings; wheel base, 112 inches; prest sub-frame; half elliptic spring front and rear, 4 2½-inch, 7 leaves, in front, and 56 by 2½-inc leaves, in the rear; irreversible steering gear; tracting brake on transmission operated by foot

MONARCH MODEL F GENTLEMAN'S ROADS

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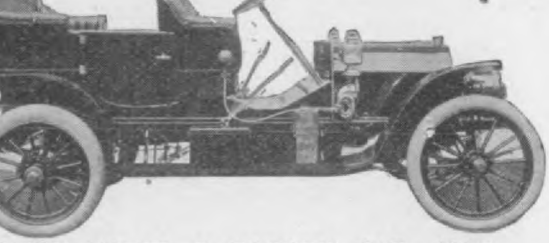
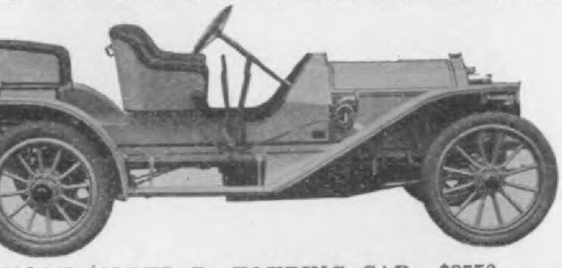


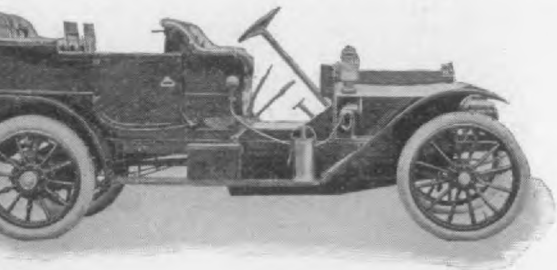
MOON MODEL C, TOURING CAR. $3000.

on Model C, 5-passenger touring car; price $3000; nder, 4-cycle, vertical, water cooled, 30-35 horse r motor, set under bonnet on sub-frame; mechan- operated valves; overhead cam shaft; babbitt and cam shaft bearings; jump spark ignition torage battery and S. B. magneto; force feed multiple disc clutch; 4-speed and reverse, se- e type change speed gear, operated by hand and mounted in babbitt bearings; shaft drive; ng rear axle and I-beam front axle; 34 by 3½-



MOON MODEL D, TOURING CAR. $3750.

tires in front and 34 by 4½-inch tires in the ball wheel bearings; 110-inch wheel base; prest main and sub-frames; half elliptic springs 36 ¼-inch, 6 leaves in front and full elliptic springs, 2-inch, 7 leaves, in rear; Gemmer steering gear; nal and external brakes on rear hubs; spark and tle control on wheel; also foot accelerator; seats eight 2600 lbs.; 18-gallon gasoline tank under seat; equipment: 5 lamps, horn, generator and Also furnished with roadster body for the same



MOON MODEL C, ROADSTER. $3000.

on Model D, 7-passenger touring car; price $3750; 36 by 3½-inch front, and 36 by 4½-inch rear; l base 121 inches; semi-elliptic springs, 36 by h, 6 leaves in front and full elliptic, 40 by 2-inch, ves, in the rear; weight 2950 lbs.; all other spec- ions the same as for Model C, 5-passenger, touring 1908 models described in our November, 1907, , page 178.

Ford Gasoline Cars.

Made by the Ford Motor Co., Detroit, Mich.

rd Model K touring car, price $2800; 6-cylinder, cal, water cooled, 4-cycle, 40 H. P. motor in ; cylinders, 4½-inch bore by 5-inch stroke; me- ically operated valves; babbitt crank shaft bear- and bronze cam shaft bearings; 2 systems of ion; jump spark by storage battery and mag-

brakes on hubs and transmission; seats 5 or 7; 20 gallon gasoline tank under seat; equipment: six oil lamps and horn; fitted also with runabout body.

FORD MODEL S RUNABOUT. $700.

Ford Model S runabout, $700; 4-cylinder, 4-cycl water cooled, 15 H. P. motor; 3¾-inch bore, 3¾ inch stroke, located in front on three-point suspe sion; babbitt crank shaft bearings and bronze ca shaft bearings; jump spark ignition with storag battery; mechanical lubrication; multiple disc clutc planetary change speed gear, 2 speeds forward, d rect on high, operated by lever; shaft drive; roll bearing rear axle, I-beam front axle; tires, 28 by inch; ball bearings in front wheels, roller bearin in rear; 84-inch wheel base; prest steel frame; ha elliptic springs in front, full elliptic in rear; plan tary irreversible steering gear; brakes on hubs a transmission; seats 2; weight, 1100 lbs.; gasoli capacity, 8 gallons; tank located under seat; equi ment: side oil lamp, tail lamp and horn.

FORD MODEL N RUNABOUT. $600.

Ford Model N runabout, price $600; weight, 10 lbs.; all other specifications same as for Model S.

Meteor Gasoline Cars.

Made by the Meteor Motor Car Co., Bettendorf, Iow

Meteor, Model C, Touring Car; price $3000; 4-cyl der, 4-cycle, vertical, water cooled, 50 H. P. mot 5-inch bore by 5½-inch stroke, set under hood double 3-point suspension; mechanically operat valves; babbitt crank shaft bearings; bronze cra shaft bearings; force feed lubrication; disc cluto positive clutch; selective type change speed ge 3 speeds forward, and 1 reverse, direct on high, op ated by side lever and mounted in babbitt bearin drive shaft; floating rear axles and I-beam front ax tires 34 by 4-inch; ball wheel bearings in front a roller in the rear; wheel base 120-inch; prest st

METEOR, MODEL C, TOURING CAR. $3000.

main frame, and seamless steel tubing sub-fram

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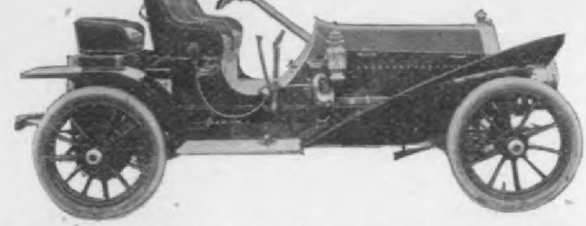
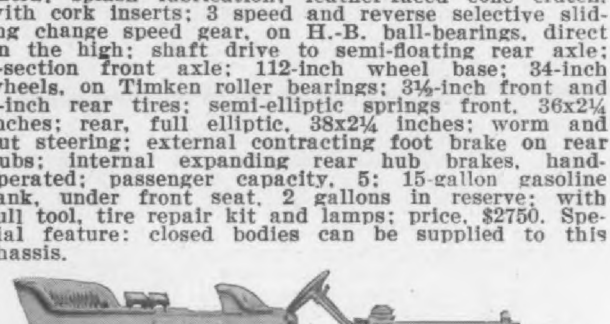


OLDSMOBILE MODEL M R RUNABOUT. $2750.

Oldsmobile Model M R Runabout; 4-cylinder, ver-
ical, water-cooled motor, 4¾x4¾, 36 H. P., under
he hood in front; mechanical valves, operated by
ush rods on the left side; crank shaft bearings white
ronze; cam shaft bearings phosphor bronze; jump
park ignition from storage battery and dry cells;
plash lubrication; inverted cone clutch, with leather
over and cork inserts; selective sliding change speed
ear, 3 speeds forward and 1 reverse, mounted on
H.-B. ball-bearings, direct on high; shaft drive to
emi-floating rear axle; front axle I-section; 106-inch
heel base; 34-inch wheels, on Timken roller bearings;
ront tires 3½, rear 4; semi-elliptic springs front and
ear; front, 36x2¼ inches, and rear, 52x2¼ inches;
teering gear, worm and nut, on phosphor bronze
earings; external foot brakes on rear hubs, internal
and brakes on rear hubs; 15-gallon gasoline tank,
nder the seat, with 2 gallons reserve; equipment,
ull tool kit, mats and tire repair outfit; price, $2750.
pecial feature: double rumble seat.

LDSMOBILE MODEL M TOURING CAR. $2750.

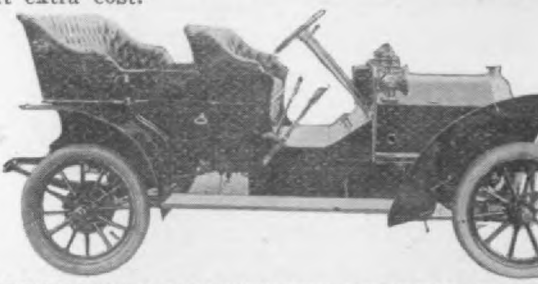
Oldsmobile Model M 5-passenger touring car; 4-cylin-
er, vertical, water-cooled motor, 4¾x4¾, 36 H. P.,
. L. A. M. rating, mounted under the hood; valves
n one side, mechanically operated; crank shaft bear-
ng white bronze; cam shaft bearings bronze; jump
park ignition from storage and dry cells, magneto
xtra; splash lubrication; leather-faced cone clutch,
ith cork inserts; 3 speed and reverse selective slid-
ng change speed gear, on H.-B. ball-bearings, direct
n the high; shaft drive to semi-floating rear axle;
-section front axle; 112-inch wheel base; 34-inch
heels, on Timken roller bearings; 3½-inch front and
-inch rear tires; semi-elliptic springs front, 36x2¼
nches; rear, full elliptic, 38x2¼ inches; worm and
ut steering; external contracting foot brake on rear
ubs; internal expanding rear hub brakes, hand-
perated; passenger capacity, 5; 15-gallon gasoline
ank, under front seat, 2 gallons in reserve; with
ull tool, tire repair kit and lamps; price, $2750. Spe-
ial feature: closed bodies can be supplied to this
hassis.



LDSMOBILE MODEL Z 7-PASSENGER CAR. $4200.

Oldsmobile Model Z 7-passenger touring car; 6-cylin-
er, vertical, water-cooled motor, 4½x4¾, 48 H. P.
. L. A. M.), under the hood; mechanically operated
alves on one side; Hess-Bright annular ball-bearings
n crank shaft and cam shaft; jump spark ignition

tank, tools and tire repair kit; price, $4200.
can be furnished with runabout and limousine
at extra cost.



OLDSMOBILE 5-PASSENGER TOURING CAR.

Oldsmobile 5-passenger touring car; 4-cylinder,
cooled, 4½x4¾, 32 H. P. motor, under the hood
chanical valves on one side; white bronze crank
bearings, phosphor bronze cam shaft bearings; 3
and reverse selective sliding change speed ge
white bronze bearings, direct on the high; shaft
to semi-floating rear axle; tubular front axle
inch wheel base; 32-inch wheels, on Timken
bearings; 3½-inch front and 4-inch rear tires;
elliptic springs front and rear; front, 36x2¼
and rear, 52x2¼ inches; worm and nut steering
transmission brake, foot-operated; internal exp
hub brakes, hand-operated; passenger capacity,
sons; 14-gallon gasoline tank, under the front
equipment, 2 oil and tail lamps, tools and t
pair kit; price, $1900. Special feature: can
this chassis as a town car or taxicab. 1908 O
bile cars described in our November, 1907,
page 90.

Imperial Gasoline Cars.

Made by the Imperial Motor Car Co., Willian
Pa.

Imperial roadster, fitted with 4-bucket sea
cylinder, vertical, water-cooled motor, 4½ by 5
35 H. P., under the hood, mounted on the frame
is of special dropt design; mechanical valves
one side; Parson's white bronze crank shaf
cam shaft bearings; double ignition system,
Eisemann magneto and dry cells; forced lubri
from pump in oil reservoir in engine crank
metal to metal 5-ring clutch with cork insert
lective sliding change speed gear, mounted on

IMPERIAL ROADSTER. $2650.

bearings, giving 3 speeds forward and 1 re
direct on the high; shaft drive to full floating
axles; front axle solid hand forged; 108-inch
base; 36-inch ball bearing wheels with 3½-inch
special double dropt prest steel frame; semi-e
springs front and rear, front 36 by 2, 6 leaves;
48 by 2, 8 leaves; irreversible and adjustable
mer type steering gear; external camel's hair fib
internal expanding brakes, metal to metal, o
wheels; spark and throttle on wheel; nothing o
but 2-way switch; seating capacity, 1, 2, 3 or

IMPERIAL ROADSTER RUNABOUT. $250
sons; 18-gallon tank at the rear of the frame; w
complete, 2475 lbs.; price, with Solar gas

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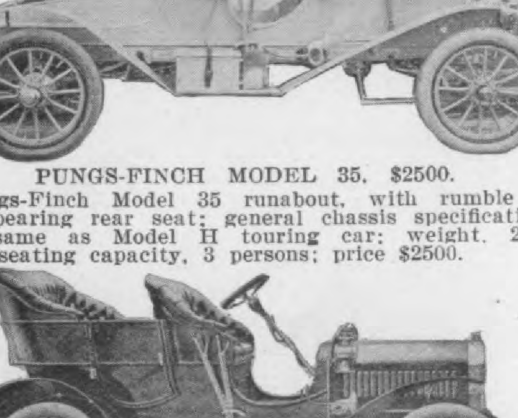
ers cast in pairs, 4¾x5, 40 H. P., under the on sub-frame; valves on opposite sides, mechan- operated; crank shaft bearings bronze; cam bearings special metal; jump spark ignition storage and dry cells; mechanical lubrication; le disc clutch; 3-speed and reverse, selective, change speed gear, on Hess-Bright ball-bear- direct on the high; shaft drive to floating rear

S-FINCH MODEL H TOURING CAR, $2500.

I-section front axle; 106-inch wheel base; 32- ball-bearing wheels, with 4-inch tires; prest steel and sub-frame; semi-elliptic springs front and front, 38x2 inches, 6 leaves, and rear, 46½x2 , 8 leaves; foot brakes, external on rear hubs; emergency brakes, internal on rear hubs; pas- capacity, 5; 19-gallon gasoline tank, under seat; weight complete, 2400 lbs.; equipment, 3 amps, 2 gas lamps, generator, horn, storage y and tools; price, $2500.

PUNGS-FINCH MODEL 35, $2500.

gs-Finch Model 35 runabout, with rumble or earing rear seat; general chassis specifications ame as Model H touring car; weight, 2200 seating capacity, 3 persons; price $2500.



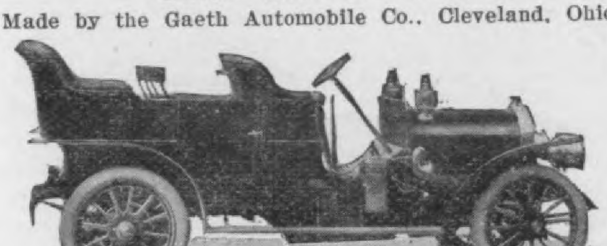
S-FINCH MODEL F TOURING CAR, $2000.

gs-Finch Model F Touring Car; passenger ca- , 5; 4-cylinder, water-cooled, 4x4½, 22 H. P. , under the hood, on sub-frame; mechanical , all on one side; jump spark ignition from dry positive mechanical lubrication; leather-faced clutch; 3-speed and reverse, sliding change speed on babbitt bearings, direct on the high; shaft to live rear axle; tubular front axle; 98-inch base; 32-inch wheels, on ball-bearings, 3½-inch prest steel frame and sub-frame; semi-elliptic s front and rear; front, 36x2 inches, and rear, inches; worm and sector steering gear; emergen- nd-operated brakes on rear wheels, foot-operated nission brake; passenger capacity, 5; 18-gallon ne tank, on the front seat; weight complete, lbs.; price complete, with 2 oil lamps, tail lamp, and tools, $2000.

drive to floating rear axle; I-section front axl 116-inch wheel base; 34-inch ball-bearing wheels; 4 inch tires; prest steel frame and sub-frame; semi elliptic front and rear springs; front, 38x2 inches, leaves, and rear, 48x2 inches, 8 leaves; worm and sec tor steering gear; internal expanding emergenc brakes, hand-operated on rear hubs; external con tracting service brakes, foot-operated, on rear hubs 19-gallon gasoline tank, on the front seat; passenge capacity, 7 persons; weight complete car, 3000 lbs. price, with 3 oil lamps, 2 gas lamps, generator, horn storage battery, magneto, top and tools, $3500. Fitte with Model H., F. or No. 35 touring or runabout bod as desired.

Gaeth Gasoline Cars.

Made by the Gaeth Automobile Co., Cleveland, Ohio

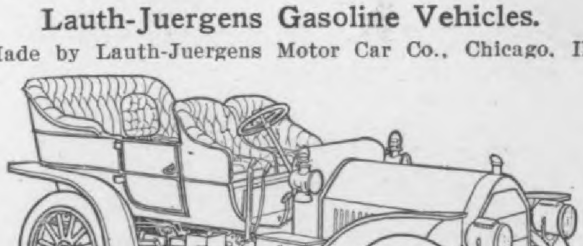


GAETH TYPE XV, $3500.

Gaeth Type XV, to be fitted with touring, roadste or limousine bodies; motor, 4 cylinders, water-coole 4-cycle, thermal circulation, bore 4⅞-inch, stroke 5¼ inch, 35-40 H. P., located under the bonnet, on three-point suspension; valves mechanically operate on opposite sides of cylinders; cam shaft and cran shaft bearings of special Babbitt; low tension ign tion from dry cells or Simms-Bosch magneto; lubric tion by gear-driven pump; Gaeth contracting ban clutch; sliding change speed gear on special Babbi bearings, giving 3 forward speeds and 1 reverse, dire on high, operated by hand lever; shaft drive to floa ing type ball-bearing rear axle, I-section front axl 112-inch wheel base; 34-inch wheels, mounted on bal bearings and fitted with 4-inch tires; prest steel fram semi-elliptic springs front and rear; front 44x2 inche 9 leaves; rear, 50x2 inches, 10 leaves; steering gea interlocking ball-bearing type; double set of brake internal and external, on separate drums on the re wheel; control of spark and throttle by levers steering wheel; 20-gallon gasoline tank under fro seat; weight complete, 2750 lbs.; passenger capacit 7 persons; equipment, complete set of lamps, ho and tools. Price, $3500. Special features: low te sion ignition system, Gaeth clutch and thermal circ lation. Described November, 1907, page 87.

Lauth-Juergens Gasoline Vehicles.

Made by Lauth-Juergens Motor Car Co., Chicago, I



LAUTH-JUERGENS MODEL D TOURING CAR, $3250.

Lauth-Juergens Model D Touring Car; motor, 4-cy inders, vertical, water-cooled, 5 by 5½, 45 H. P., u der hood on sub-frame; valves on opposite side nickel babbitt crank shaft and phosphor bronze ca shaft bearings; jump spark ignition from 6-volt, 6 ampere storage batteries; splash lubrication; 3-ri friction clutch; 3-speed and one reverse selecti sliding change speed gear on nickeled babbitt bea ings, direct on the high, operated by one leve shaft drive to floating rear axle; front action I-se tion; 118-inch wheel base; 36-inch roller beari wheels with 4½-inch tires; prest steel frame; and

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CADILLAC MODEL T. TOURING CAR. $1000.

Cadillac Model T touring car, furnished with either straight line Victoria or coupe body; 1-cylinder, orizontal, water-cooled, 10 H. P. motor, located un-er body, bolted to cross members of frame; cylinders, -inch bore and stroke; vertical, mechanically operated alves; Babbitt with bronze backing cam shaft bear-ngs; jump spark ignition, dry cells; force feed lubri-ator; disc clutch; planetary change speed gear; bronze earings; 2 speeds forward and reverse, direct on igh, operated by side lever; chain drive; tubular xles front and rear; tires 30x3½ inches; ball wheel

CADILLAC MODEL T. COUPE. $1350.

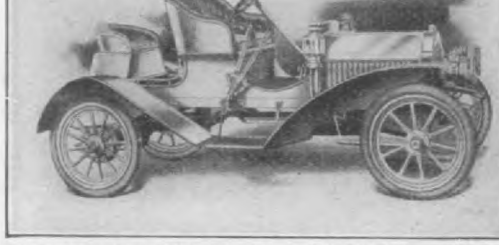
earings; wheel base, 82 inches; prest steel frame; prings, semi-elliptic, 35x1¾ inches, 7 leaves, in front, nd semi-elliptic, 42¼x1¾ inches, 7 leaves, in rear; ack and pinion steering gear; constricting brakes n differential; spark and throttle levers on steering ost; high speed and reverse controlled by hand lever; ow speed and brakes by foot levers; gasoline capacity, gallons, located under front seat; seating capacity, persons; equipment includes 3 oil lamps and horn. rice, $1000.

CADILLAC MODEL S. RUNABOUT. $850.

Cadillac Model S runabout, price $850; seating ca-acity, 2; tires, 30x3 inches; all other specifications re the same as for the Model 5 touring car.

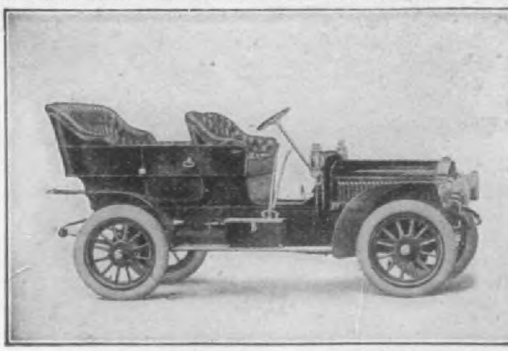
CADILLAC MODEL G. TOURING CAR. $20

lever; annual ball-bearings; shaft drive; tubular and rear axles; tires, 32x3½ inches; wheel be ball in front and roller in rear; wheel base inches; prest steel frame; semi-elliptic springs, inches, 6 leaves, in front, and full elliptic, inches, 6 leaves, in rear; worm and sector st gear; internal expanding and external contr brakes on rear hub drums; spark and throttle on steering wheel; gear changes controlled by lever, brake by foot lever, emergency brake by



CADILLAC MODEL G. ROADSTER. $2000

lever and clutch by foot lever; seats 5; gasoline c ty, 16 gallons, tank located under front seat; ment, oil lamps and horn. This Model G chas also furnished with a roadster and limousine the roadster seats 3; tires 32x3½ inches; 5 leav rear springs; price, $2000. The limousine, 34x tires; 7 leaves in rear springs; price, $3000. All specifications for roadster and limousine are the as for the Model G touring car chassis.



CADILLAC MODEL H. TOURING CAR. $25

Cadillac Model H Touring Car; price, $2500; 4-der, 4-cycle, water-cooled, 30 H. P. motor, lo in front, under hood, on sub-frame; cylinders 4¾

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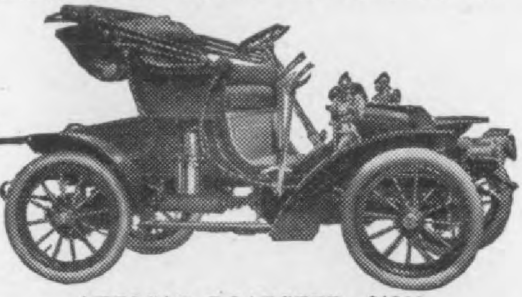
on high, Hess-Bright ball-bearings, operated by lever; shaft drive; tubular front axles. Cadillac al rear axles; tires. 34x4 inches; Hess-Bright l bearings; wheel base, 102 inches; prest steel e; tubular sub-frame; springs semi-elliptic, 44x2 s, 10 leaves, in front, and ¾-elliptic, 48x2 inches, ves, in rear; worm and nut steering gear; inter- xpanding and external constricting brakes on the wheel hub drums; spark and throttle at steering l; speed changes by side lever, brake by foot , emergency brake by side lever, clutch by foot : 18-gallon gasoline tank, located under front equipment, 3 oil lamps and horn. Furnished a limousine body, 43x4½-inch tires, $3600. 8 Cadillac cars described in our November issue, 88.

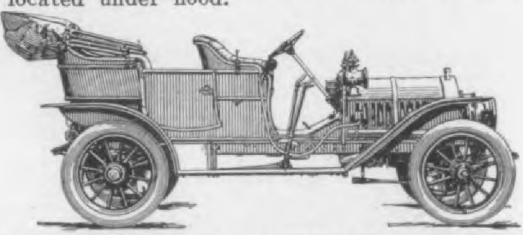
Autocar Gasoline Cars.

Made by the Autocar Co., Ardmore, Pa.



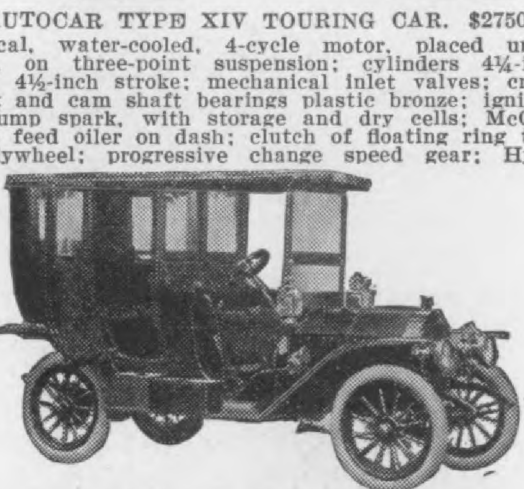
AUTOCAR ROADSTER, $1200.

tocar Roadster, type XV; price $1200; seats 3; I. P., 4-cylinder, horizontal, water-cooled motor, ed under hood, on three-point suspension; bore stroke 4-inch; automatic inlet valves; crank and shaft bearings of plastic bronze; jump spark ion, by storage and dry cells; automatic oil and h lubrication; clutch of floating ring type in fly- l; progressive type, sliding change speed gear, speeds forward and one reverse, direct on Hyatt roller bearings in transmission; shaft ; change speed gears, controlled by side lever; rear axles and seamless tubing front axle; tires inch front and rear; ball-bearings in front wheels; l base 80 inches; frame of 25 per cent. carbon hot steel; springs semi-elliptic, 35x1¾-inch, 5 leaves ont, and full elliptic scroll end springs, 36x1¾- 5 leaves, in rear; pinion and sector steering internal and external brakes on each rear wheel; and throttle control by grips on hand wheel; ht 1450 pounds; gasoline capacity 10 gallons, located under hood.



UTOCAR TYPE XIV TOURING CAR. $2750.

cal, water-cooled, 4-cycle motor, placed under on three-point suspension; cylinders 4¼-inch 4½-inch stroke; mechanical inlet valves; crank and cam shaft bearings plastic bronze; ignition ump spark, with storage and dry cells; McCord feed oiler on dash; clutch of floating ring type ywheel; progressive change speed gear; Hyatt

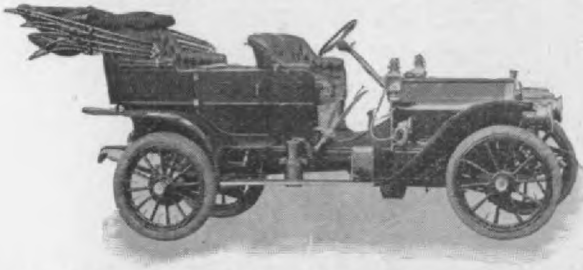


AUTOCAR TYPE XIV ROADSTER. $2750.

and throttle grip in hand wheel; capacity 5 person gasoline capacity 16 gallons, tank located under sea weight, 2600 lbs.; price $2750, including gas and side lamps and full line of tools; special feature: r serve gasoline tank. This Type XIV chassis is al furnished with a roadster body, seating three pe sons, at $2750; weight, 2250 lbs. 1908 Autocars d scribed in our November, 1907, issue, page 156.

Wayne Gasoline Cars.

Made by the Wayne Automobile Co., Detroit, Mic



WAYNE MODEL 30 TOURING CAR. $2500.

Wayne Model 30, 5-passenger touring car; pric $2500; 4-cylinders, 4-cycle, vertical, water-cooled, 4 in, bore by 5¼-in. stroke; 35 H. P. motor, set und hood on main frame; Parsons bronze crank shaft bea ings; phosphor bronze cam shaft bearings; jump spar with storage battery, magneto extra splash lubricatio internal expanding clutch; 3 speeds and reverse; s lective sliding change speed gear, direct on hig operated by hand lever, mounted in Parsons bra

WAYNE MODEL 30 ROADSTER, $2500.

bearings; bevel gear drive; 34x3½ front tires a 34x4 rear tires; ball wheel bearings, 106-inch whe base; prest steel frame; semi-elliptic springs, fro and rear; 38x2¼-inch, 6 leaves front, and 50x2¼-inc 8 leaves in rear; screw and nut steering gear, e ternal and internal brakes on hubs; throttle a spark levers on steering post under steering whe capacity, 5; 18-gallon gasoline tank under fro seat; equipment, 5 lamps, top and tools.

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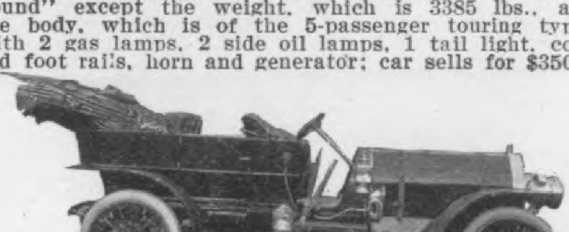
anical valves on the right side, with a single cam haft; Parsons white brass cam shaft and crank haft bearings; dual jump spark ignition, using storze battery and magneto; mechanical force feed lubriation; internal ring clutch; Gearless friction change peed gear, mounted on ball-bearings and giving 2 peeds forward and 1 reverse, direct on the high peed, operated by pedals; shaft drive to semi-floating ar axle; front axles, I-section; 126-inch wheel base; 6-inch wheels, front on ball-bearings and fitted with

GEARLESS SIXTY "GREYHOUND," $3500.

inch tires, rear on roller bearings and fitted with ½-inch tires; nickel steel frame and sub-frame; semiliptic springs front and rear; front, 39x2 inches, 7 aves, and rear, 50x2 inches, 8 leaves; steering by orm and trunnion nut; 16-inch hand wheel; 5 brakes, e on the transmission, 4 rear hub brakes, operated a side lever; spark and throttle levers on steering heel; 34-gallon gasoline tank, hung at the rear of e frame; passenger capacity, 3 or 4 persons; weight complete car, 3000 pounds; equipment: 2 gas lamps, side oil lamps, 1 tail lamp, horn and generator. rice, $3500. Special features: "Gearless" transmison.

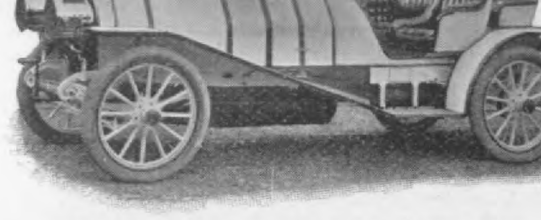
GEARLESS SIXTY, $3500.

Gearless Sixty, 5-passenger touring car; 4-cylinder, ertical, water-cooled, 4-cycle, 60 H. P. motor, under e hood at the front, on sub-frame, 5x5¾; valves right side, mechanically operated; general chassis ecifications similar to the Gearless Sixty "Greyound" except the weight, which is 3385 lbs., and e body, which is of the 5-passenger touring type; th 2 gas lamps, 2 side oil lamps, 1 tail light, coat d foot rails, horn and generator; car sells for $3500.



GEARLESS MODEL 75, $4000.

Gearless Model 75, 7-passenger touring car; 6-cylinr motor, water-cooled, 4-cycle, 4 13-16x5½-inch, 75 P., located under the hood at the front, on a b-frame; mechanical valves on opposite sides of the linder heads; crank shaft and cam shaft bearings of arsons white bronze; dual ignition from storage battry and magneto; lubrication by pump in the crank se; internal ring clutch; "Gearless" friction transission on ball-bearings, giving 2 speeds forward and reverse, direct on the high, operated by foot levers; aft drive to semi-floating rear axle; I-section front le; 126-inch wheel base; 36-inch wheels, front fitted th 4-inch tires and on ball-bearings, rear fitted

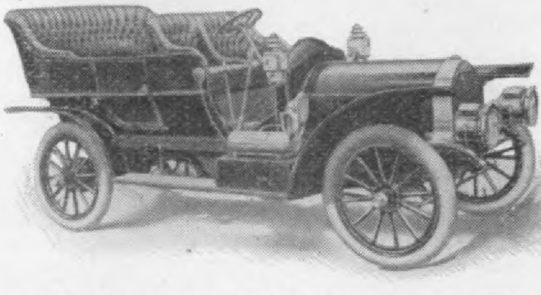


GEARLESS 75 "GREYHOUND," $4000.

Gearless 75 "Greyhound:" this high-powered about seats 3 or 4 passengers and is fitted wit same 6-cylinder motor as the Model 75 Touring the general specifications are also the same, the weight is but 3000 lbs. Price, $4000, wit same equipment as the Model 75. Gearless 1908 described in our September, 1907, issue, page

Halladay Gasoline Cars.

Made by the Streator Motor Car Co., Streator



HALLADAY MODEL C TOURING CAR. $30

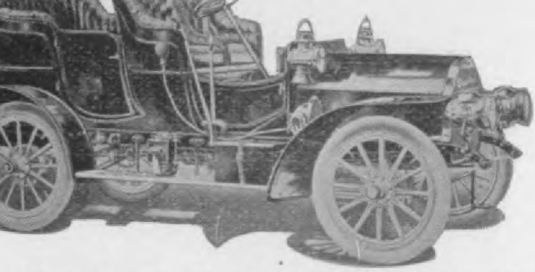
Halladay Model C touring car; 4-cylinder, ver water-cooled, 4⅝ by 5, 35-40 H. P. motor, lo under the hood on trussed frame; mechanical v on one side; ball bearing crank shaft and cam bearings; jump spark ignition from storage ba dry cells or magneto, if desired; Hill precision leather covered spring clutch, 3 speeds forward 1 reverse sliding change gear on ball bearings, on the high, shaft drive to floating rear axle; axle I-section; 118-inch wheel base; 34-inch w on double sets of ball bearings; 4-inch tires, steel frame and sub-frame; semi-elliptic springs and rear; 44 by 2 inches, 7 leaves, at the 50 by 2 inches, 10 leaves, at the rear; worm gear steering; internal expanding and external tracting brakes on rear wheels; 15-gallon ga tank under the front seat; passenger capaci or 7 persons; weight, complete, 2650 lbs.; equip Prest-O-Lite gas tank and full Solar lamps, F horn and tools; price, $3000. Same chassis i ted with runabout, limousine or touring car bodi

Bellefontaine Gasoline Automobiles

Built by the Bellefontaine Automobile Co., fontaine, O.

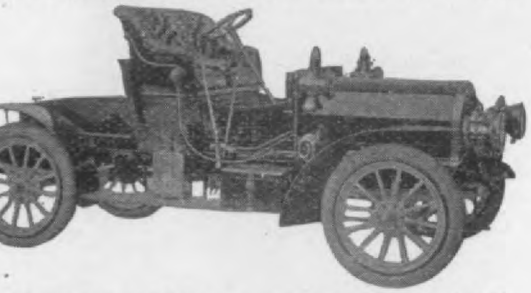
BELLEFONTAINE MODEL B-8. $2500.

Bellefontaine Model B-8; King of Belgium 4-cylinder, vertical motor under the hood, 4⅜ by inch 32 H. P.; valves located on one side of ders; force feed lubrication cone clutch; sel three speed and one reverse change speed gear, m ed on ball bearings and operated by hand lever; drive to floating type rear axle; front axle I-se drop forging; 112-inch wheel base; wheels on bearings and fitted with 34 by 4-inch sta



THAM MODEL D. L. TOURING CAR. $1800.

tham Model D. L touring car; 4-cylinder, ver- air-cooled, 4-cycle, 4x4¼, 20 H. P. motor un- ood on 4 point suspension; mechanical valves ad; jump spark ignition from storage and dry mechanical oiler; cone clutch, progressive slid- hange speed gear on Parson's bronze bearings, speeds, direct on high, operated by hand lever; drive; 32-inch wheels on ball-bearings front, rear; 3½-inch tires; 96-inch wheel base; press- eel frame and sub-frame; semi-elliptic springs,



ALTHAM MODEL D. R RUNABOUT. $1750.

ches long front and 45 rear, 6 leaves; wheel ng; internal expanding hub brakes and brake aft; passenger capacity, 5; weight, 1850 pounds; llon gasoline tank under front seat; price, in- g gas and oil lamps, horn and tools, $1800.

ltham Model D. R.; this car is the same as the l D. L. touring car, but is fitted with runabout weight, 1700 pounds; price, $1750.

WALTHAM MODEL 17. RUNABOUT. $350.

ltham Model 17, runabout; single cylinder, ver- air-cooled, 4-cycle, 3¼x4¼, 4 H. P. motor in valves automatic; ignition from 4 dry cells; pump lubrication; friction transmission, 5 ls, on Parson's bronze bearings, operated by lever; double chain drive; 26x2½-inch tires;

26x2½-inch tires; wheels on ball-bearings, wheel base; ash frame; elliptical springs, 19 inches long, front 3 leaves, 22 inches long rear; 4 leaves

WALTHAM, MODEL 27. RUNABOUT. $525.

tiller steering; external band and internal expand ing brakes; passenger capacity, 2; weight, 70 pounds; 3½-gallon gasoline tank rear of seat; price including tools, $525.

Waltham Model 28, runabout; same general spec fications as Model 27; furnished with wheel stee ing; price, $600.

WALTHAM MODEL E T. $650.

Waltham Model E T; 4-passenger tonneau car; cylinder, 4-cycle, V motor, air-cooled, 4x3¼, 8 H. P located in rear on frame on 4-point suspension; m chanical valves in head; jump spark ignition fro dry cells; mechanical oiler; friction transmission, speeds; double chain drive; 26-inch wheels on ba bearings; 2½-inch tires; 84-inch wheel base; a frame; elliptical springs, 19 inches long in front, inches in rear, 4 leaves; wheel steering; intern expanding brakes; passenger capacity, 4; weigh 850 pounds; 5-gallon tank on back of seat; price, $65 including tools.

Waltham 1908 cars described in our December, 190 issue. Page 96.

Wolf Air-Cooled Gasoline Cars.

Made by the H. E. Wilcox Motor Car Co., Minnea olis, Minn.

Wolf touring car; 4-cylinder, vertical, air-cool motor, 4 by 4, 24 H. P., located under the hood sub-frame; mechanical valves in cages on top cylinders; Parson's white brass crank shaft bea ings; bronze cam shaft bearings; jump spark igniti from storage batteries, dry cells and magneto special order; force-feed mechanical lubrication; co clutch with flat springs under the leather; 3-speed a reverse sliding change gear on bronze bearings, dire on the high, progressively operated; side chain dri to 1½-inch solid rear axle, front axle, 1½-inch sol 108-inch wheel base; 34-inch wheels on Timken ro

WOLF TOURING CAR. $1800.

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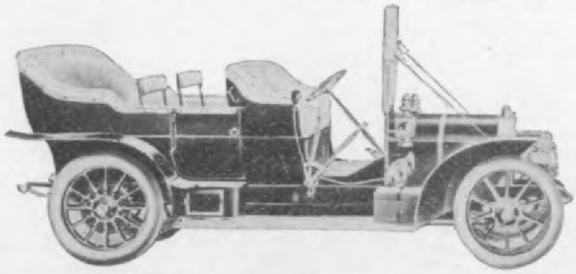
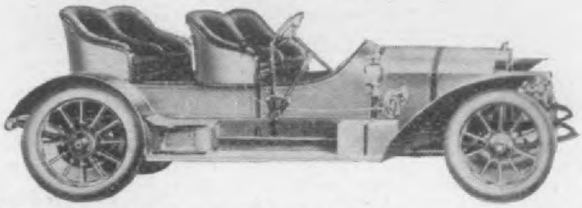
on bearings; 3½-inch tires; prest steel frame,

M. rating) under the hood; valves on opposite sides of cylinder, mechanically operated; babbitt crank shaft bearings; high speed bronze cam shaft bearings; jump spark ignition, using either dry batteries with Atwater-Kent generator or Bosch magneto; mechanical force-feed lubrication; Thomas 3-disc clutch; 4-speed and reverse sliding change speed gear on annular and roller bearings, direct on the high; side chain drive to I-section solid rear axle; front, I-section forging; 115-inch wheel base; 36-inch wheels;



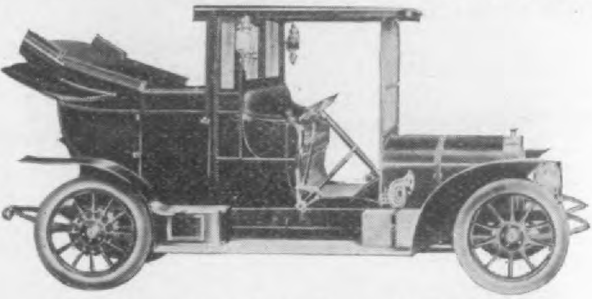
THOMAS MODEL DX. PRICE, $4000.

4-inch front and 5-inch rear tires; wheels on Timken rollers at the front and annular ball bearings at the rear; prest steel channel frame trussed; semi-elliptic springs front and rear, 39½ inches by 2¼, front; 50 by 2¼, rear; worm and sector steering gears; contracting band brakes on rear wheels and contracting band brakes on countershaft on sprocket drums; spark and throttle control on steering wheels; foot accelerator; 22-gallon gasoline tank under front seat; capacity, 7 passengers; weight, complete, 3510 lbs.; price, $4000. The same chassis is fitted with runabout, tourabout, limousine and landaulette bodies, prices ranging from $4000 to $5200.



THOMAS MODEL F. PRICE $4500 AND UPWARD, ACCORDING TO BODY.

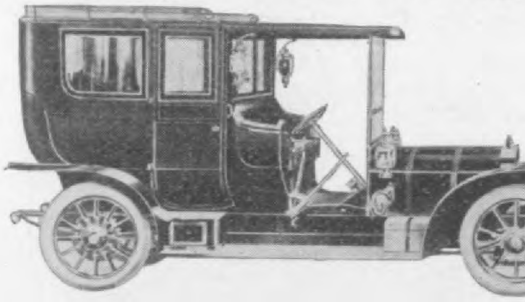
E. R. Thomas Model F, fitted with either touring, limousine, landaulette, tourabout or runabout bodies; motor, 48.4 H. P. (A. L. A. M. rating) same as used in Model DX; same general chassis specifications as Model DX; semi-elliptic springs are 40 inches, 2¼ inches front, 54 by 2½ at the rear; 20-gallon gasoline



THOMAS MODEL F. LANDAULETTE.

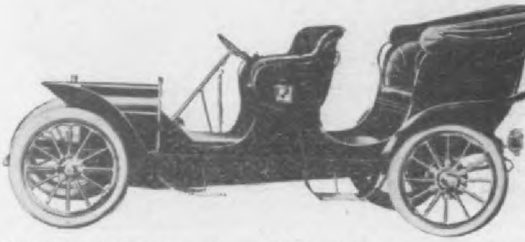
tank is fitted under the front seat; wheel base is 127 inches for the touring car, limousine and landaulette and the passenger capacity is 7, except for the runabout; price, $4500 and upward according to body; equipment: head lights, side and tail lights, Prest-O-Lite tank, tire irons, front rack, horn, shock absorbers, bumpers.

force-feed lubrication; Thomas 3-disc clutch; 4 and reverse sliding selective change gear, direct high, mounted on annular ball bearings; side drive, I-beam solid rear axle, front axle same inch wheel base; 36-inch wheels; 4½ by 5 inch



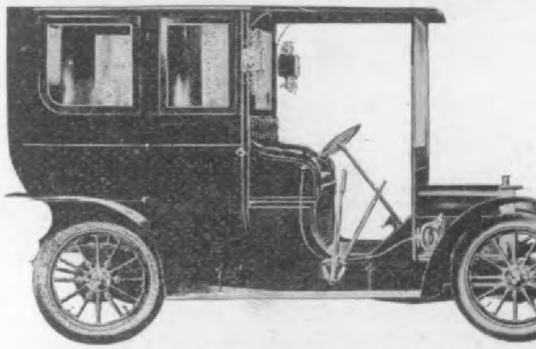
THOMAS MODEL K. LIMOUSINE.

tires; front wheels on Timken bearings, rear on ball bearings; semi-elliptic springs fron rear; front, 40 by 2¼; rear, 54 by 2½; wor sector steering gear; internal expanding brak rear wheels; external contracting brakes on c shaft; 22-gallon gasoline capacity tank under seat; passenger capacity, 7; equipment: head Prest-O-Lite tank, side and tail lights, top, s meter and clock, tire irons, shock absorber glass front; $6000 and upward, according to



THOMAS MODEL G. CABRIOLET, $3000. LIMOUSINE BODY, $3250.

Model G taxicab, town car, brougham, limous cabriolet; 4-cylinder, motor cast in one piece, cooled by thermal circulation, 3⅜ by 4 5-16, 18



THOMAS MODEL G. LIMOUSINE.

L. A. M. rating), motor under the hood on point suspension on cross channels; valves on side, mechanically operated by cam pawl and rods; annular ball crank shaft bearings and cam bearings; 3-speed and reverse selective sliding c gear, direct on the high; tubular axle, carryin

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HOMAS MODEL G. SMALL BROUGHAM.

on rear wheels; 14-gallon gasoline tank under seat; price, $3000; limousine, $3250. Thomas odels described in our October 1907 issue, page

Locomobile Gasoline Cars.

by the Locomobile Co. of America, Bridgeport, Conn.

COMOBILE MODEL I STANDARD, $4750.

mobile Model I Standard, side entrance tonneau; der, vertical, water-cooled, 5x6, 40 H. P. motor, l under the hood; bronze crank case bolted to mechanical valves on opposite sides, all parts ed; crank shaft bearings alloy steel and bab- cam shaft bearings hard steel and babbitt; n, make-and-break from magneto; automatic feed lubrication; special cone clutch; change gear, selective type, or Hess-Bright bearings, 4 speeds forward and 1 reverse, direct on the operated by single hand lever; double side drive; front and rear axles I section; 123-inch base; Hess-Bright bearings, 36-inch wheels, 4- front tires, 4½-inch rear tires; frame, prest steel, no sub-frame; semi-elliptic springs front ear, front 4x2, rear 50x2 inches; irreversible steering gear; all metal brakes, contracting on countershaft; internal brakes on rear wheels; and gas lever on steering wheel, also foot e; 23-gallon gasoline tank, under seat; carrying ty, 7 persons; equipment, Rushmore headlights, amps, rear lamps, generator, tools, jack and apron; price, $4750.

OCOMOBILE MODEL E LIMOUSINE, $4200.

omobile Model E Limousine; 4-cylinder, water- vertical, 3¾x4½-inch, 20 H. P. motor, under ood at the front, supported by bronze crank case frame; mechanical valves on opposite sides and rts enclosed; make-and-break ignition from mag- automatic force feed lubrication; special cone ; selective sliding change speed gear, on Hess- bearings, with 4 speeds forward and 1 re- direct on the fourth, operated by single hand drive, double side chains; I-section rear and axles; 116-inch wheel base; 32-inch Hess-Bright earing wheels, 4-inch front and 4½-inch rear prest alloy steel frame, no sub-frame; semi-

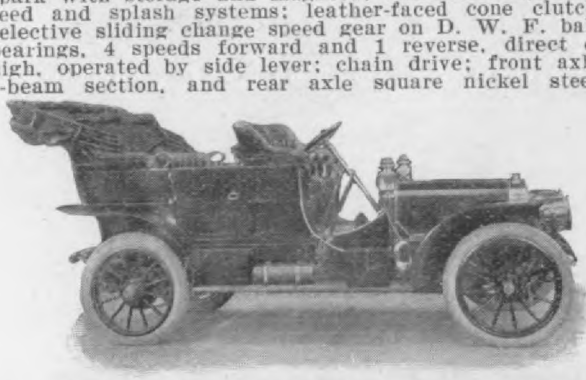
LOCOMOBILE MODEL E STANDARD, $2900.

which is 102 inches, and 32x4-inch tires all around, same as Model E Limousine. Body, side entrance tonneau; seats 5 persons; with same equipment as other models, $2900. Locomobile 1908 models described in our August, 1907, issue, page 56.

Acme Gasoline Cars.

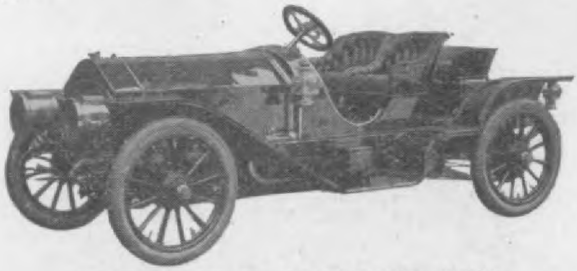
Made by the Acme Motor Car Co., Reading, Pa.

Acme Type 18 Touring Car; price, $4000; 4-cylinder, water-cooled, vertical, 4-cycle, 30 H. P. motor, located under hood and suspended on sub-frame; cylinders, 4½-inch bore, 5-inch stroke; mechanical valve action; cam shaft bearings of bronze and crank shaft bearings of Parsons white bronze; ignition, jump spark with storage and magneto; lubrication by force feed and splash systems; leather-faced cone clutch; selective sliding change speed gear on D. W. F. ball bearings, 4 speeds forward and 1 reverse, direct on high, operated by side lever; chain drive; front axle I-beam section, and rear axle square nickel steel



ACME TYPE 18 TOURING CAR, $4000.

tires, 36x4 inches in front, 36x4½ inches in rear wheels on Timken roller bearings; wheel base, 115½ inches; frame of prest steel; springs, semi-elliptic front and rear, 44x2 inches, 7 leaves, in front, and 52x2 inches, 10 leaves, in rear; irreversible worm and nut steering gear; internal expanding and external constricting brakes on rear wheels; spark and throttle control on wheel; capacity, 7 persons; 25-gallon gasoline tank, located under front seat; weight, 3500 lbs. price, including cape cart top, 2 acetylene headlights side oil lamps, tail lamp, horn, tool kit, gas tank $4000.



ACME TYPE 21 RUNABOUT, $4250.

Acme Type 18 Touring Car is also furnished with runabout body, known as Type 21, specifications which are the same, excepting the following: Gasoline capacity, 20 gallons, and weight, 3200 lbs.; rear springs, 9 leaves. Price, $4250.

Acme Type 16 Runabout; price, $3500; the general specifications are the same for this car as for Type 18 Touring Car chassis, excepting the wheel base which is 102½ inches; gasoline capacity, 20 gallons rear springs, 48x2 inches, 9 leaves; weight, 2400 lbs capacity, 3 persons.

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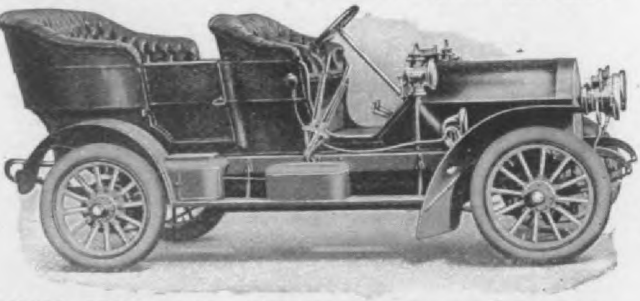
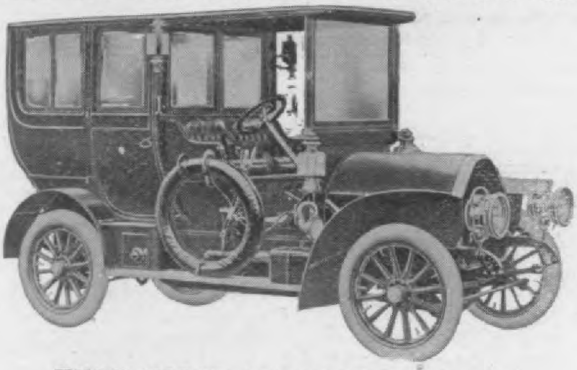
he hood on a 4-point suspension; valves in the head operated by tappet rods; crank shaft bearings, babbitt; jump spark ignition from magneto and dry cells; force-feed lubrication; metal to metal cone clutch with cork inserts; sliding change speed gear on Hess-Bright bearings, giving 4 forward and 1 reverse speed, direct on high, and selectively operated; double chains to rear wheels; rear and front axles I-section; 112-inch wheel base; 34-inch wheels on Hess-Bright bearings; front tires, 4-inch, rear, 4½; prest steel frame, no sub-frame; semi-elliptic front and rear springs; nut and screw steering gear; foot brake on differential, lever brake to each rear hub; spark and throt-



KNOX MODEL G TONNEAU AIR-COOLED CAR. $4000.

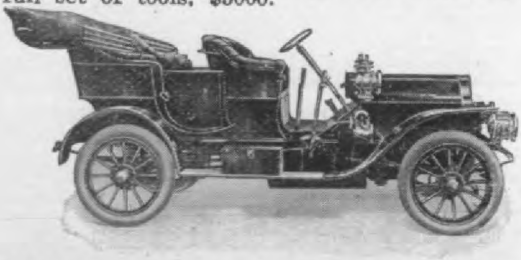
le levers on the steering wheel, also foot accelerator; 40-gallon gasoline tank under tonneau; weight, complete, 2800 lbs.; price, with oil side and tail lights, 2 gas head lights, horn, odometer and complete tool equipment, $4000. 1908 Knox cars described in our Jan., 1908, issue, page 182.

Knox Model G limousine, 6-passenger car; 4-cylinder, air-cooled, 4¾ by 5½, 40 H. P., located under the hood; valves in the cylinder heads, tappet rod operated; crank shaft bearings babbitt; jump spark ignition from magneto and dry cells; force-feed lubri-



KNOX MODEL G LIMOUSINE. $5000.

ation by internal leads; cone clutch, metal to metal, cork inserts; sliding change speed gear on Hess-Bright bearings, giving 4 speeds forward and one reverse, direct on high, operated on the selective system; drive, double side chains; rear axle, I-section, also front axle; 112-inch wheel base; front wheels, 34 by 4-inch tires; rear, 4½-inch tires, all mounted on Hess-Bright bearings; prest steel frame; semi-elliptic springs front and rear; steering gear, nut and screw; foot brake on differential; side lever operating brakes on rear hub; spark and throttle levers on steering wheel; 40-gallon gasoline tank under body; weight, complete, 3200 lbs.; price, with oil side and tail lights, 2 gas head lights, horn, odometer and full set of tools, $5000.



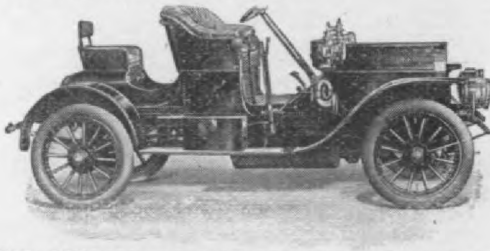
KNOX MODEL H TONNEAU CAR. $2600.

Knox Model H, 4-cylinder motor, air-cooled, 4¾

headlights and generator, oil side and tail jack and full set of tools, $2600. Special fe straight line drive.

KNOX MODEL H LANDAULETTE AIR-CO $3500.

Model H Landaulette; 4-cylinder, air-cooled 4¾ by 4¾, 30.6 H. P., located under the hood point suspension; general specifications same as el H touring car. Price, $3500.

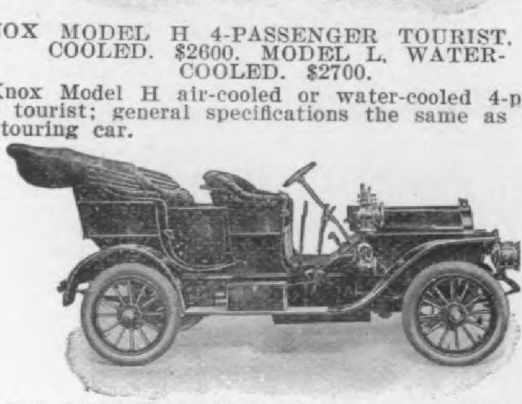


KNOX MODEL H AIR-COOLED 3-PASSEN TOURIST. $2500.

Knox Model H, 3-passenger tourist; air-cool cylinder motor. General specifications same as H touring car. Price, fully equipped, $2550.

KNOX MODEL H 4-PASSENGER TOURIST. COOLED. $2600. MODEL L, WATER-COOLED. $2700.

Knox Model H air-cooled or water-cooled 4-p ger tourist; general specifications the same as H touring car.



KNOX MODEL L TONNEAU. WATER-COO $2700.

Knox Model L tonneau, water-cooled car. $2700; general specifications same as Model H to car.

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H & L AIR AND WATER-COOLED SPORT-ABOUT. H. $2500. L. $2600.

Model H air-cooled and Model L water-cooled bout; prices $2500 and $2600 respectively; fitted 30.6 H. P. air or water-cooled motors; general cations, with the exception of body, same as H touring car.

MODEL H & L AIR AND WATER-COOLED LIMOUSINES. H. $3500. L. $3600.

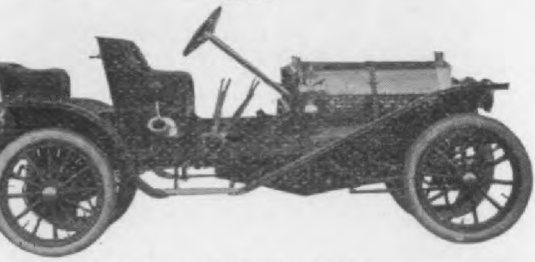
Model H air-cooled and Model L water-limousine; prices, $3500 and $3600 respectively; with 30.6 H. P. air or water-cooled motors; l specifications, with the exception of body, as Model H touring car.

Model L landaulette; water-cooled, 4-cylinder 30.6 H. P. General specifications same as H. Price, $3600.

Model L 3-passenger Tourist; 4-cylinder, water-motor, 30.6 H. P. motor; general specifications as Model H touring car. Price, fully equipped.

Dixie Gasoline Cars.

by the Southern Motor Car Factory, Houston, Texas.



DIXIE FLIER. $2000.

e Flier runabout, with single or double rumble 4-cylinder, vertical, water-cooled motor, 4x4, . P., located under the hood, supported from de frame members; mechanical valves, on oppo-sides; die-cast crank shaft bearings of special cam shaft bearings the same; jump spark igni-

IXIE 5-PASSENGER TOURING CAR. $2000.

from storage battery; force feed lubrication; ple disc clutch; 2 speeds forward and reverse; er sliding gear, direct on the high; shaft drive e rear axle; front axle I-section; 102-inch wheel

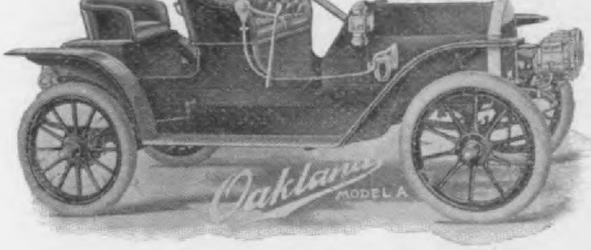
DIXIE JUNIOR. $700.

Dixie Junior, buggy type; 2-cylinder, horizontal, op-posed motor, air-cooled, 4x4, 10-12 H. P., under body on sub-frame; mechanically operated valves, in the head; die-cast interchangeable crank shaft bearings, cam shaft bearings the same; jump spark ignition from dry cells; force feed lubrication; friction change speed gear, 2 speeds and reverse, operated by foot lever; side chain drive to rear wheels; 72-inch wheel base; 42-inch front wheels and 46-inch rear wheels, on Tim-ken roller bearings; 1¼-inch solid tires; frame and sub-frame of steel; longitudinal springs, 2 inches wide, 8 leaves; non-reversible wheel steer; band brake on friction wheels, operated by foot lever; control by spark and throttle or steering column; 4-gallon gaso-line tank, in body; passenger capacity, 2; weight complete, 700 lbs.; equipment, 3 oil lamps; price $700. Same chassis used for delivery wagon and 2 seat cars.

Oakland Gasoline Cars.

Made by the Oakland Motor Car Co.

Oakland Model A Runabout, with seats for 3 per-sons; 2-cylinder, vertical, water-cooled motor, therma circulation, bore 4½, stroke 5, 20 H. P., located unde the hood, on 3-point suspension; mechanically operated valves; jump spark ignition by storage battery and



OAKLAND MODEL A RUNABOUT. $1375.

dry cells; sight feed lubrication; multiple dis clutch; 2 speeds and reverse, planetary, change spee gear, direct on high; shaft drive to live rear axle front axle tubular; 96-inch wheel base; 32-inch wheels front on 2-point ball-bearings, rear on roller bearings 3½-inch tires; wood frame; semi-elliptic front springs 36x2 inches; full elliptic rear springs, 38x2 inches

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cooled, 32 H. P., located under the hood at the front on 3-point suspension; mechanical valves; adjustable white brass cam shaft and crank shaft bearings; jump spark ignition from 6 volt, 60 ampere accumulators; mechanical force feed lubrication; self contained cone clutch; selective sliding change speed gear, mounted on roller bearings, giving 3 speeds forward and one reverse, direct on high, operated by side lever; shaft drive to floating rear axle; front axle, tubular; wheel base 112 inches; 36-inch wheels, fitted with 4-inch tires front and rear, front mounted on ball-

RAMBLER MODEL 34-A. $2250.

bearings, rear mounted on roller bearings; prest steel frame; semi-elliptic springs front and rear, front 40 ins.x2, 10 leaves, rear 52 ins.x2½, 6 leaves; screw and nut steering gear; contracting and expanding band brakes on the rear wheels; spark and throttle lever control on steering wheel; 15-gallon gasoline tank under the seat; weight, complete, 2400 pounds; price, with two gas head lights, oil side lights and tail light, pump, horn and tools, $2250.

RAMBLER MODEL 34, 5-PASSSENGER TOURING CAR. $2250.

Rambler Model 34, 5-passenger touring car; general specifications same as Model 34-A, except weight, which is 2400 pounds complete; with similar equipment to 34-A, the price is $2250. Special features, straight line drive and offset crank shaft.

Rambler Model 31, side entrance, detachable tonneau car; 2-cylinder, opposed motor, 5x6, 22 H. P., water-cooled by thermal circulation, located under the body directly from the main frame; all valves mechanically operated; crank shaft and cam shaft bearings white brass; jump spark ignition from 6-volt, 60 ampere accumulators; force feed lubrication; multiple disc clutch; planetary change speed gear, 2 speeds forward and one reverse, direct on the high, operated by side lever for high and low, and pedal for reverse; single chain drive; live rear

RAMBLER MODEL 31. DETACHABLE TONNEAU. $1400.

axle; tubular front axle; 106-inch wheel base; 34-inch wheels, front on ball-bearings, rear on roller bearings, 4-inch pneumatic tires front and rear; prest steel frame, semi-elliptic front springs, 40 ins.x2 ins., 10 leaves, full elliptic rear springs, 52 ins.x2½ ins., 7 leaves; screw and nut steering gear; contracting and expanding band brakes on each of the rear wheels; throttle and spark control on the steering wheel; 15-gallon tank under the hood; weight complete, 2100 pounds; passenger capacity, 5 persons; price, with gas headlights, oil side and tail lights, pump, tools, tire kit, $1400. Special features, de-

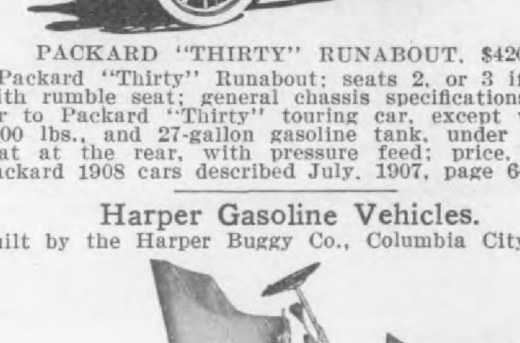
the high; shaft drive to floating rear axle; front axle; 123½-inch wheel base; 36-inch wh ball-bearings; 4-inch front and 4½-inch rear prest steel frame, no sub-frame; semi-elliptic

PACKARD "THIRTY," $4200.

front and rear, front 42, rear 56; worm and steering gear; quadruple brakes, all acting on attached to the rear wheels; spark and throttl levers on steering wheel, also governor on t passenger capacity, 5, or, with extra seats, gallon gasoline tank, under front seat; c weight, 3300 lbs.; price, $4200.

PACKARD "THIRTY" LIMOUSINE. $560

Packard "Thirty" Limousine; general specif same as Packard "Thirty" touring car; weigh lbs.; price, $5000.

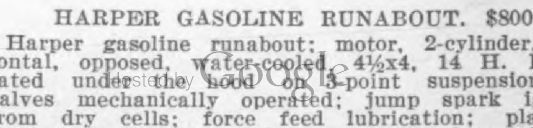


PACKARD "THIRTY" RUNABOUT. $42

Packard "Thirty" Runabout; seats 2, or 3 i with rumble seat; general chassis specification lar to Packard "Thirty" touring car, except 2500 lbs., and 27-gallon gasoline tank, under seat at the rear, with pressure feed; price, Packard 1908 cars described July, 1907, page 6

Harper Gasoline Vehicles.

Built by the Harper Buggy Co., Columbia City



HARPER GASOLINE RUNABOUT. $800

Harper gasoline runabout; motor, 2-cylinder, zontal, opposed, water-cooled, 4½x4, 14 H. cated under the hood on 3-point suspension valves mechanically operated; jump spark i from dry cells; force feed lubrication; pl

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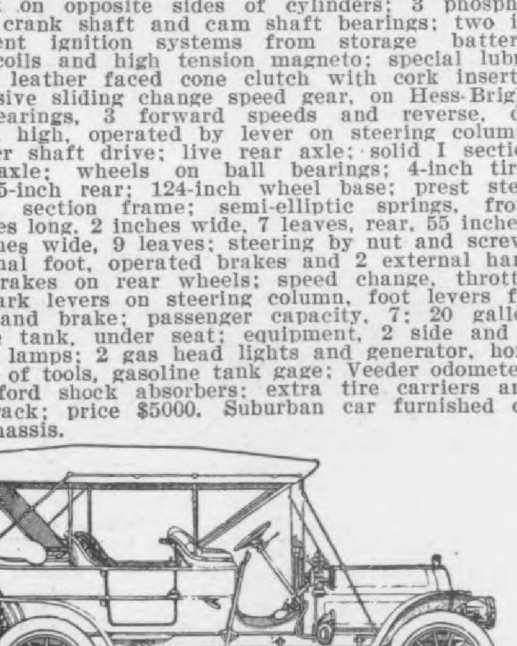
PIERCE GREAT ARROW. $4000.

e Great Arrow touring car; 4-cylinder, 4-cycle, l, water-cooled, 4¼x4¾, 30 H. P. motor in supported on cross girders; mechanical valves, and exhaust on opposite sides of cylinder; 3 or bronze crank shaft bearings, 3 phosphor cam shaft bearings; two independent ignition s; storage battery, spark coils and high tension o; special lubrication; leather faced cone clutch cork inserts; progressive sliding change gear ss-Bright ball bearings; 3 speeds forward and , direct on high; operated by lever on steer- lumn; propeller shaft drive; live rear axle; h wheel base; frame, pressed steel channel sec- semi-elliptic springs, front 38 inches long, es wide, six leaves; rear, 50 inches long, 2 wide, 8 leaves, steering by nut and screw; rnal foot brakes and 2 external hand lever on rear wheels; speed change, throttle and levers on steering column; left foot lever for right for brake; passenger capacity, 5; 19-gal- soline tank under seat; equipment, 2 side oil 1 tail oil lamp, 3 gas head lamps and gen- horn, full set of tools, gasoline tank gage; odometer, 4 Hartford shock absorbers, ex- e carrier and trunk rack; price, $4000.

PIERCE GREAT ARROW. $5000.

e Great Arrow touring car; 4-cylinder, verti- ater-cooled, 4-cycle, 5x5½, 40 H. P. motor in n cross girders; mechanical valves; inlet and on opposite sides of cylinders; 3 phosphor crank shaft and cam shaft bearings; two in- ent ignition systems from storage battery, coils and high tension magneto; special lubri- leather faced cone clutch with cork inserts; sive sliding change speed gear, on Hess-Bright earings, 3 forward speeds and reverse, di- high, operated by lever on steering column; r shaft drive; live rear axle; solid I section axle; wheels on ball bearings; 4-inch tires 5-inch rear; 124-inch wheel base; prest steel section frame; semi-elliptic springs, front es long, 2 inches wide, 7 leaves, rear, 55 inches; nes wide, 9 leaves; steering by nut and screw; nal foot, operated brakes and 2 external hand rakes on rear wheels; speed change, throttle ark levers on steering column, foot levers for and brake; passenger capacity, 7; 20 gallon tank, under seat; equipment, 2 side and 1 lamps; 2 gas head lights and generator, horn of tools, gasoline tank gage; Veeder odometer, ford shock absorbers; extra tire carriers and ack; price $5000. Suburban car furnished on hassis.



on steering column; propeller shaft drive; live rear axle; solid I beam front axle; wheels on ball bearings; 4-inch tires front, 5-inch rear; 130-inch wheel base; prest steel channel section frame; semi-elliptic springs, 40 inches long, 2 inches wide, 7 leaves, front 55 inches, long, 2¼ inches wide, 9 leaves; steering nut and screw, 2 internal foot-operated and 2 external hand lever-operated brakes on rear wheels; speed change; throttle and spark levers on steering column, foot levers for clutch and brake; passenger capacity, 7; 20 gallon gasoline tank under seat; equipment, 2 oil side lamps, 1 tail oil lamp, 2 gas head lamps and generator, horn, full set of tools, gasoline tank gage; Veeder odometer, 4 Hartford shock absorbers; extra tire carriers and trunk rack; price, $5500. Also furnished with suburban and road car bodies.

PIERCE GREAT ARROW. $6500.

Pierce Great Arrow touring car; 6-cylinder, vertical, water-cooled, 4-cycle, 5x5½, 60 H. P. motor in front on cross girders; mechanical inlet and exhaust valves on opposite sides of engine; 7 phosphor bronze crank shaft and 4 phosphor bronze cam shaft bearings; 2 independent ignition systems from storage, battery and spark coils and high tension magneto; special lubrication; leather faced cone clutch with cork inserts; progressive sliding change speed gear on Hess-Bright ball bearings; 3 forward speeds and reverse; direct on high, operated by lever on steering column; propeller shaft drive; live rear axle, wheels on ball bearings, 4½-inch tires front; 5-inch rear, 135-inch wheel base; prest steel channel section frame; semi-elliptic springs, front, 40 inches long, 2 inches wide, 8 leaves, rear, 55 inches long, 2¼ inches wide, 10 leaves; nut and screw steering; 2 internal foot-operated brakes and 2 external hand lever-operated brakes on rear wheels; speed change, throttle and spark levers on steering column, foot levers for clutch and brake; passenger capacity, 7 persons; 25 gallon gasoline tank under seat; equipment, 2 side oil lamps, 1 tail oil lamp, 2 gas head lamps and generator; horn, full set tools, gasoline tank gage, Veeder odometer, 4 Hartford shock absorbers; extra tire carriers and trunk rack; price, $6500. Suburban and road car bodies also furnished. Pierce Great Arrow cars described December, 1907, page 120.

Winton Six-Teen-Six Touring Car.

Made by the Winton Motor Carriage Co., Cleveland, Ohio.

WINTON SIX-TEEN-SIX TOURING CAR. $4500.

Winton Six-Teen-Six, 6-cylinder, 7-passenger touring car, price $4500; vertical, water-cooled, 4-cycle, 4½-inch bore by 5-inch stroke; 48.6 H. P. motor, set under bonnet on drop frame; mechanically operated valves; phosphor bronze crank and cam shaft bearings; jump spark ignition, by storage battery and Eiseman magneto; mechanical lubrication; multiple disc clutch, 3 speed and reverse selective sliding change speed gear, direct on 3rd, operated by lever, mounted in Hess-Bright bearings; shaft drive;

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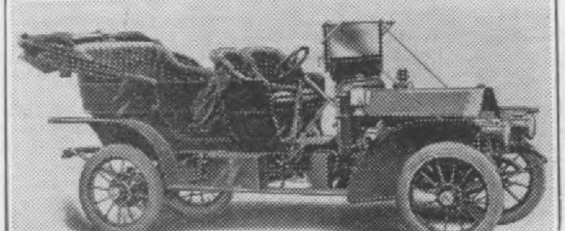
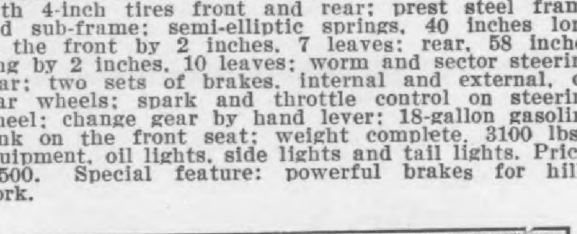
GLIDE MODEL H 6-CYLINDER CAR. $5000.

Glide Model H 6-cylinder straight line body touring car; motor under the hood on sub-frame, 4½x5-inch, 54-60 H. P.; mechanical valves on one side; special die cast Babbitt bearings on crank shaft and cam shaft; jump spark ignition, storage battery and Eisemann magneto; positive lubrication; multiple disc clutch; sliding change speed gear, on Timken roller bearings, 3 speeds forward and 1 reverse, direct on high, operated by side lever, with thumb button release; shaft drive to bevel gear; front axle; triangular section; wheel base, 132 inches; 36-inch wheels, on Timken roller bearings, 4½-inch tires; prest steel frame and sub-frame; semi-elliptic springs front and rear; front, 40x2 inches, 7 leaves; rear, 58x2 inches, 10 leaves; worm and sector steering gear; internal and external brakes on rear wheels; spark and throttle control on steering wheel; 18-gallon gasoline tank, under front seats; passenger capacity, 5 or 7; equipment, oil lamps, horn and tools. Price $5000. Special feature: large brake surface.



GLIDE MODEL G. $2500.

Glide Model G, 4-cylinder touring car; straight line body; capacity, 5 or 7 passengers; motor, water-cooled, using fan and circulating pump, 4½x5-inch, 40 H. P., motor under the hood, on sub-frame; valves on one side of engine mechanically operated; die cast Babbitt crank shaft and cam shaft bearings; jump spark ignition, from storage and dry cells; positive force feed oiler; multiple disc clutch; sliding change speed gear on Timken roller bearings, giving 3 speeds forward and 1 reverse; shaft drive to bevel gear; live rear axle; I-section front axle; wheel base, 120 inches; wheels on Timken roller bearings, 34 inches diameter, with 4-inch tires front and rear; prest steel frame and sub-frame; semi-elliptic springs, 40 inches long in the front by 2 inches, 7 leaves; rear, 58 inches long by 2 inches, 10 leaves; worm and sector steering gear; two sets of brakes, internal and external, on rear wheels; spark and throttle control on steering wheel; change gear by hand lever; 18-gallon gasoline tank on the front seat; weight complete, 3100 lbs.; equipment, oil lights, side lights and tail lights. Price, $2500. Special feature: powerful brakes for hilly work.



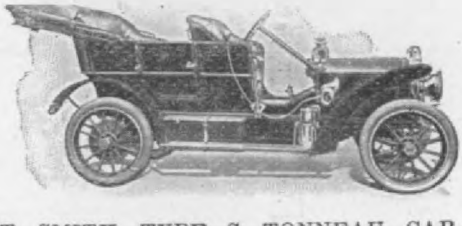
GLIDE MODEL G SPECIAL. $3000.

on steering wheel; 18-gallon gasoline tank, front seat; passenger capacity, 5 or 7; weigh plete, 3200 lbs.; equipment, horn, oil lamps and Price, $3000.

Great Smith Gasoline Cars.

Made by the Smith Automobile Co., Topeka,

Great Smith Type S tonneau car; 4-cylinder, cal, water-cooled, 4½ by 5, 24 H. P. motor und hood in the front on 3-point suspension; mecha operated valves on opposite sides of the cyl crank shaft and cam shaft bearings of swage bitt; jump spark ignition from storage batter cells and magneto, dynamo, if desired, extra; automatic lubrication; multiple disc clutch; 3 forward and 1 reverse "Great Smith" sliding speed gear, direct on the high, mounted on T roller bearings, operated by lever; shaft drive vided live rear axle; front axle single piece



GREAT SMITH TYPE S TONNEAU CAR.

forging; 110-inch wheel base; 34-inch whe Timken roller bearings, 4-inch tires; trussed frame, no sub-frame; full elliptic springs fro rear, 36 by 1½ inches, 8 leaves; "Great Smit ternal sector and worm steering gear; cone brakes on each rear wheel and band brake on mission; spark and throttle on stationary sec steering wheel; 15-gallon gasoline tank on fron capacity, 5 persons; weight, complete, 2475 equipment: complete oil and gas lamps and rep tool outfit; price, $2750. Special features: change gear, operated by a single lever, whic matically disengages the clutch, special wood and steering gear.

SMITH TYPE T ROADSTER. $2650.

Smith Type T roadster; 4-cylinder, wate motor, 4½ by 5, 24 H. P., under the hood point suspension; general arrangements of the sis similar to the tonneau car, Type S; wheel 110 inches, but 36-inch wheels with 4-inch ti used; the weight complete is 2200 lbs., and th ing capacity is 3; with the same outfit as th car the price is $2650. 1908 cars described November, 1907, issue, page 77.

Monarch Gasoline Cars.

Made by the Monarch Machine Co., Des Moines

MONARCH MODEL D ROAD KING. $750

Monarch Model D Road King, price $750.00 4; 2-cylinder, 4-cycle, water cooled, horizontal, bore and stroke; 20 H. P. motor, set in center mechanically operated valves; bronze crank sh cam shaft bearings; jump spark ignition by dr

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ULLMAN MODEL 4-40 RUNABOUT. $3000.

nan Model 4-40 runabout; 4-cylinder, vertical, cooled, 4-cycle, 4 15-16x5¼-inch, 40 H. P. under hood on four-point suspension; valves nt and left of cylinders, white brass crank shaft gs, cam shaft bearings, bearing bronze; jump ignition from storage, dry cells and magneto; feed lubrication to crank base and cylinder; lutch with cork inserts; selective sliding change gear on Hess-Bright bearings, 3 forward and verse speed, direct on the third speed, operated ver through H slot; shaft drive to live rear front axle I-section; 34-inch wheels on roller gs; 4-inch tires; wheel base 108 inches; prest frame and sub-frame; semi-elliptic springs, 39 long, 2¼ inches wide, 9 leaves, front and 50 long, 2¼ wide, 7 leaves rear; nut and screw teering gear; 2 sets brakes on rear wheels; spark rottle friction retained on top of steering wheel; ger capacity, 3; weight, complete, 2350 pounds; on gasoline tank under front seat; price, $3000. ng lamps, horn, etc. Special features, high

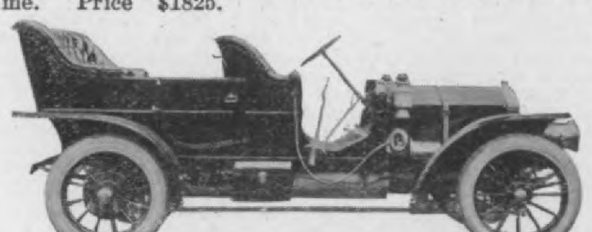
LLMAN MODEL 6-30 RUNABOUT. $2750.

an Model 6-30 runabout; 6-cylinder, vertical, cooled, 4-cycle, 3¾x3¾-inch, 30 H. P. motor under hood on 4-point sub-frame; mechanical on right side of engine; crank shaft bearings, brass, cam shaft bearings, bearing bronze; spark ignition from storage and dry cells and o; force feed lubrication to crank case; cone with cork inserts; selective sliding change gear on Hess-Bright bearings, 3 speeds forward, rse, direct on third speed, operated by lever H slot; shaft drive; floating rear axle; I-front axle; 34-inch wheels on roller bearings; tires rear; 104-inch wheel base; pressed steel and sub-frame; semi-elliptic springs, 36 inches inches wide, 5 leaves front, 45½ inches long, es wide, 7 leaves rear; steering gear, nut and type; 2 sets of brakes on rear wheels; spark rottle friction retained on top of steering passenger capacity, 3; weight complete, 1950 12-gallon gasoline tank under front seat; $2750, including lamps, horns, etc. Special fea- high power, light weight and speed.

LLMAN MODEL H TOURING CAR. $1875.

an Model H, detachable tonneau touring car; steering gear; 2 brakes on rear wheels, emergenc brake on drive shaft; spark and throttle friction re tained on top steering wheel; passenger capacity, 5; weight, 1900 pounds; 12-gallon gasoline tank under front seat; price $1875, including lamps, horn, etc.

Model H Touring Car is convertible into runabout by removing tonneau and placing deck in place of same. Price $1825.



PULLMAN MODEL I TOURING CAR. $3250.

Pullman Model I, 5-passenger touring car; 4-cylinder, vertical, water-cooled, 4-cycle, 4 15-16x5¼, 40 H. P. motor under hood on 3 point suspension; valves at right and left of cylinders; crank shaft bearings, white brass, cam shaft bearings, bearing bronze; jump spark ignition from storage and dry cells and magneto; force feed lubrication to crank case and cylinder; cone clutch with cork inserts; selective 4 speed and reverse change speed gear on Hess-Bright bearings, direct on third speed, operated by lever through H slot; shaft drive; floating rear axle, I-beam front axle with roller bearing steering knuckles; 34-inch wheels on roller bearings; 4-inch tires front, 4½ rear; 118-inch wheel base; prest steel frame and sub-frame; half elliptic springs front, 41 inches long, 2¼ inches wide, 8 leaves; rear, platform 3 point, 44 inches long sides and 40 inches cross springs, 2¼ inches wide, 8 leaves; nut and screw type steering gear; 2 sets brakes on rear wheels; spark and throttle friction retained on top of steering wheel; weight, 3000 pounds; 18-gallon gasoline tank under front seat; price, $3250, including lamps, horn, etc.

PULLMAN MODEL J TOURING CAR. $3500.

Pullman Model J; this model is the same as Model I, with extension cape top and two extra folding chairs in tonneau; price $3500.

1908 Pullman cars described in our October, 1907, issue. Page 126.

Selden Gasoline Cars.

Made by the Selden Motor Vehicle Co., Rochester, N. Y.

SELDEN MODEL 28. $2000.

Selden Model 28 touring car or runabout, 4-cylinder, vertical, water-cooled, 4-cycle, 4¼x4½, 28-30 H. P. motor located in front on sub-frame, all valves on one side; white brass crank shaft and cam shaft bearings; jump spark ignition from dry cells; magneto selective change speed, gear on Timken roller bearings; direct on third speed, operated by hand lever; extra; pump lubrication; leather cone clutch; 3 speed bevel gear drive; tubular rear axle, front axle I-beam

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or. 4½x4¾, under the hood, on sub-frame; valves echanically operated, on opposite sides; crank shaft nd cam shaft bearings D. W. F. ball-bearings; jump park ignition from storage battery and Bosch magneto; mechanical sight feed oiler; self-contained cone utch, spring cushioned; selective type, sliding hange speed gear, on annular ball-bearings, giving 3 orward speeds and 1 reverse, direct on high; shaft rive to floating type rear axle; front axle tubular; 16-inch wheel base; 36-inch wheels, on annular ball-earings; 4½-inch tires; prest steel frame and sub-rame; semi-elliptic springs front, and platform rear; ront, 40x2, 7 leaves, and rear, 50x2, 9 leaves; steer-g, gear and sector; double set of internal expanding etal-to-metal brakes on the rear hubs; control by park and throttle on the steering wheel, also foot hrottle; 17-gallon gasoline tank, on the front seat;

NATIONAL MODEL R. $4200.

eight complete, 3000 lbs.; equipment, 2 Rushmore as lamps, generator, 2 side oil lamps, tail lamp, torm apron, horn and tools; price, $4200. Special eatures: cast aluminum body, ball-bearing thruout, ncluding engine; accessible rear axle mechanism.

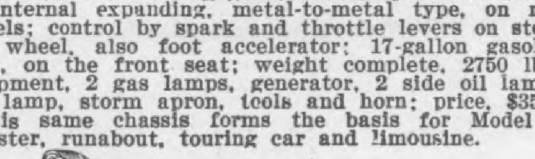
This same chassis is used for Model R Roadster, unabout, touring car and limousine.

National Model K 7-passenger touring car, with urved line cast aluminum body; 4-cylinder, vertical, vater-cooled motor, 4⅞x5, under the hood, on sub-rame; mechanically operated valves on opposite sides; rank shaft and cam shaft bearings D. W. F. ball-earings; jump spark ignition from storage battery nd magneto; mechanical sight feed oiler; aluminum one clutch, self-contained, spring cushioned; 3 speeds nd reverse, selective, sliding change speed gear,

ATIONAL MODEL K 7-PASSENGER CAR. $3500.

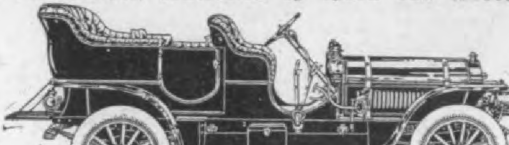
n annular ball-bearings, direct on the high; shaft rive to floating rear axles; front axle tubular; 112-nch wheel base; 34-inch wheels, on annular ball-bear-gs; 4½-inch tires; frame and sub-frame prest steel; emi-elliptic front springs, platform rear; front, 40x2 nches, 7 leaves, and rear, 50x2 inches, 9 leaves; rew and nut steering gear; double system of brakes internal expanding, metal-to-metal type, on rear heels; control by spark and throttle levers on steer-g wheel, also foot accelerator; 17-gallon gasoline nk, on the front seat; weight complete, 2750 lbs.; quipment, 2 gas lamps, generator, 2 side oil lamps, il lamp, storm apron, tools and horn; price, $3500.

This same chassis forms the basis for Model K adster, runabout, touring car and limousine.



NATIONAL MODEL N. $3700.

National Model N, curved line cast or straight line eet aluminum body; seats 7 passengers; 4-cylinder, ertical, water-cooled motor, under the hood, on sub-ame; bore 5, stroke 5; mechanically operated valves, n opposite sides; other general specifications same Model K; price $3700; weight complete, 2750 lbs.; me chassis is used for roadster, runabout, touring r and limousine.



NATIONAL MODEL T. $5000.

steering wheel, also foot accelerator; 20-gallon line tank, on the front seat; weight, 3750 lbs.; the same general equipment as the other cars; $5000.

Same chassis used for Model T touring car limousine.

1908 National models described in our Dece 1907, issue, page 110.

Pope-Tribune Gasoline Cars.

Made by the Pope Mfg. Co., Hagerstown, M

POPE-TRIBUNE MODEL X. $1750.

Pope-Tribune Model X, with runabout or 4-pass touring car body; motor, 4-cylinder, vertical, 16-P., located under the hood; mechanical valv the head; jump spark ignition from dry cells; chanical oiler; splash and grease cup lubric inverted cone clutch; 3 speeds and reverse s change speed gear, direct on the high; shaft to floating rear axle; forged front axle; 9

POPE-TRIBUNE MODEL X RUNABOUT.

wheel base, 32-in. wheels, 3½ front and rear tire mor wood frame, prest steel sub-frame; 2 se brakes, one on transmission shaft and expanding in drums of the rear wheels; passenger capaci with runabout body, or 4 with touring car 10½ gallons gasoline under the seat; equipme lamps, tools and horn, $1750. Described M 1907, page 263.

POPE-HARTFORD MODEL M. $2750.

Pope-Hartford Model M; 4-cylinder, vertical, cooled, 30 H. P. motor, located under the hood chanical valves in the head; jump spark ignition dry cells and storage battery; provision mad magneto; mechanical oiler, splash and grease lubrication; cone clutch with cork inserts; 3 and reverse selective sliding change speed gea rect on the high; shaft drive to floating rear solid forged front axle; wheel base, 112 inches inch wheels, 3½-inch front and 4-inch rear

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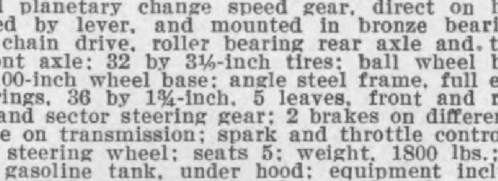
TAR MODEL 12 TOURING CAR. $1250.

Model 12, 5-passenger, tilting body, touring car, $1250; 2-cylinder, horizontal, opposed, 24 horse water cooled motor, 5-inch bore by 7-inch set under body on cross frame; mechanically ed valves; nickle babbitt crank shaft bearings onze cam shaft bearings; spark ignition, by dry mechanical lubrication; 3-plate metallic disc; l planetary change speed gear, direct on high, ed by lever, and mounted in bronze bearings; chain drive, roller bearing rear axle and tubu- nt axle; 32 by 3½-inch tires; ball wheel bear- 00-inch wheel base; angle steel frame, full ellip- rings, 36 by 1¾-inch, 5 leaves, front and rear; and sector steering gear; 2 brakes on differential e on transmission; spark and throttle control on steering wheel; seats 5; weight, 1800 lbs.; 16- gasoline tank, under hood; equipment includes d oil lamps, generator, horn and tools.



TAR MODEL 14 TOURING CAR. $1350.

Model 14, 5-passenger touring car, price $1350; base, 104 inches; 20-gallon gasoline tank, lo- under hood; other specifications the same as del 12. Model 14 is also furnished with a road- dy.

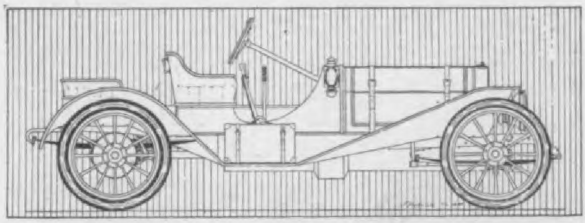
TAR MODEL 16 TOURING CAR. $4000.

Model 16, 7-passenger touring car, price $4000; ler, 4-cycle, vertical, water cooled, with fan, P. motor, suspended on sub-frame under hood; rs, 5-inch bore by 5½-inch stroke; mechanically d valves; nickle babbitt crank shaft bearings; cam shaft bearings; double jump spark igni- vith storage battery and Bosch magneto; me- l oiler; multiple (28) disc clutch; selective change speed gear, 4 speeds forward, direct on perated by one side lever and mounted in Tim- ler bearings; shaft drive; floating type rear d I-beam front axle; tires, 36 by 4½-inch in d 36 by 4-inch in front; ball wheel bearings; base, 122 inches; prest steel main and sub- semi-elliptic springs, 44 by 2 inches, 7 leaves, t, and 54 by 2 inches, 9 leaves, in the rear; nd sector steering gear; external and internal on hub; spark and throttle control on top of wheel; seats 7; 30-gallon gasoline tank under weight, 3000 lbs.; equipment: oil and gas generator, horn and tools. Also furnished with bout body.

Model 18, 5-passenger touring car, price $2500; ler, verticle, 4-cycle, water cooled with fan, P. motor, set in front under hood, on a sub- cylinders 4¼-inch bore by 5-inch stroke; nickle crank shaft bearings; bronze cam shaft bear-

Belden Gasoline Cars.

Made by the Belden Motor Car Co., Pittsburg, Pa.

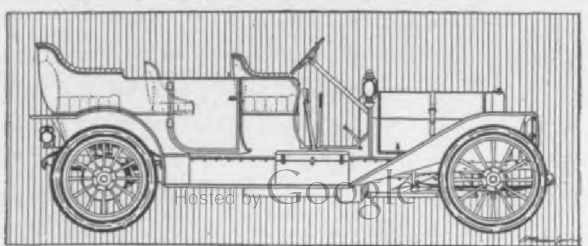


BELDEN MODEL B 6-CYLINDER ROADSTER. $4700.

Belden Model B Roadster; seating capacity, 3; motor, 6 water-cooled, 4-cycle cylinders, 4⅝x5-inch, 40-60 H. P., motor under hood in the front, on three-point suspension; mechanical valves in the heads, operated by walking beams; special bronze crank and cam shaft bearings, lined with Parsons white metal; double ignition, jump spark, from storage battery and jump spark from Bosch magneto; splash lubrication; multiple disc clutch; selective sliding change speed gear, giving 4 speeds ahead and 1 reverse, direct on the third speed, accelerated tail shaft on the fourth; change speed mounted on F. & S. ball-bearings; shaft drive to floating type rear axle, front axle I-section drop-forged; 36x3½-inch front tires and 36x4-inch rear; wheel base, 120 inches; wheels on F. & S. ball-bearings; chrome nickel steel prest frame, no sub-frame; front springs semi-elliptic, 44 inches long, 2¼ inches wide, 5 leaves; rear springs, full elliptic, 39 inches long, 2¼ inches wide, 5 leaves, both top and bottom; irreversible adjustable screw-action steering gear; internal and external brakes on the rear wheel drums; spark position fixt, throttle on wheel and also accelerator pedal; 25-gallon gasoline tank, under front seat; complete weight, 2700 lbs.; equipment, acetylene headlights, Prest-O-Lite tanks, electric side and tail lights, tools, mats, etc.; price, $4700. Special features: straight line drive, low centre of gravity, with large clearance.

BELDEN MODEL A 6-CYLINDER TOURING CAR. $4800.

Belden Model A 6-cylinder touring car; light touring body; passenger capacity, 5; motor, 6 cylinders, 4⅝x5-inch, 40-60 H. P., water-cooled, under hood in the front, on three-point suspension; mechanically operated valves in the head; bronze Parsons white metal-lined crank and cam shaft bearings; double ignition, jump spark, by storage and Bosch magneto; splash lubrication; multiple disc clutch; selective 4-speed sliding change gear on F. & S. bearings, direct on third speed, operated by hand lever; shaft drive to floating rear axle; front axle I-section, drop-forged; 36x4-inch front tires, 36x5-inch rear tires; 127-inch wheel base; wheels on F. & S. ball-bearing; chrome nickel steel frame, no sub-frame; semi-elliptic front springs, 44 inches long, 2¼ inches wide, 6 leaves; full elliptic rear springs, 39 inches long, 2¼ inches wide, 6 leaves in each half; irreversible and adjustable screw-action steering gear; brakes, external and internal on rear hubs; throttle on wheel, also foot accelerator; fixt spark; 25-gallon gasoline tank, under the front seat; weight complete, 2800 lbs.; equipment, same as Model P; price, with touring body, $4800; limousine or landaulette, $6000.



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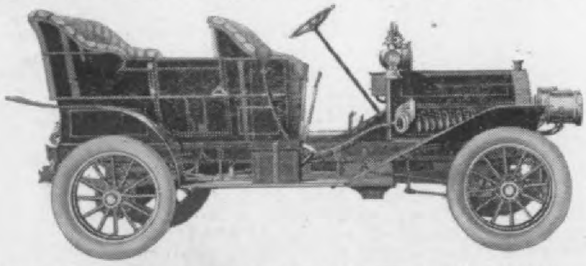
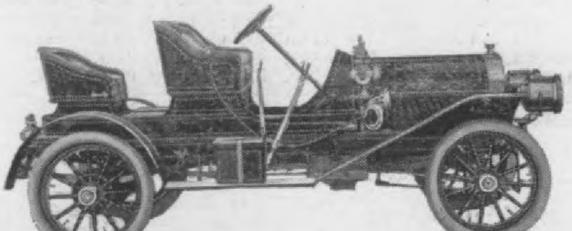
front on main frame; marine type die cast babbitt crank shaft bearings; imported annular ball cam shaft bearings; jump spark ignition, with dry cells and La Coste magneto; splash and pressure feed lubrication; leather faced cone clutch; sliding transmission change speed gear; 3 speeds forward and 1 reverse, direct on high; operated by one side lever and mounted on marine type die cast babbitt bearings; shaft drive; live rear axle on Timken roller bearings; tubular front axle; 103-inch wheel base;



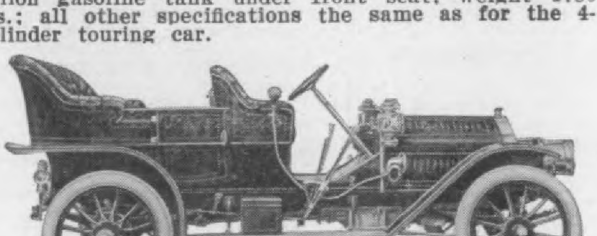
MORA TOURER FOUR, 5-PASSENGER. $2500.

Timken roller wheel bearings; 4 by 32-inch tires; armored wood frame; transverse semi-elliptic springs, 40½-inch by 2½-inch, 7 leaves, in front, and platform springs in the rear, 43 by 2-inch, 6 leaves, on sile, 35½ by 2-inch, 4 leaves on end; screw and nut steering gear; two external contricting brakes operated by foot pedal, and two internal expanding brakes operated by emergency hand brake lever, on rear hubs; throttle and spark with stationary segment; seats 5; 13½-gallon gasoline tank under front seat; weight 1900 lbs.; equipment: 2 searchlights and generator, 2 side lamps and tail lamp, full set of tools; special feature, aluminum pan cast integral with lower half of engine case.



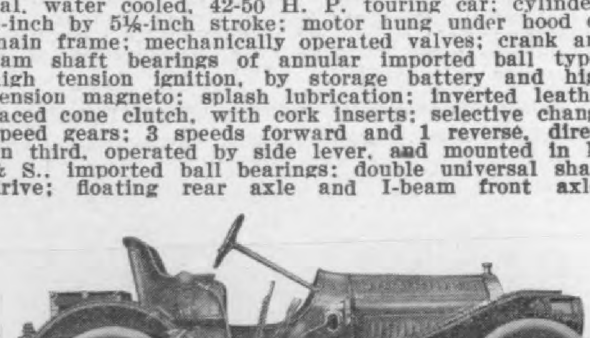
MORA RACYTYPE FOUR, 3-PASSENGER. $2350.

Mora Racytype Four, 3-passenger runabout; price $2350; tires 32 by 3½-inch; wheel base 98 inches; 15-gallon gasoline tank under front seat; weight 1750 lbs.; all other specifications the same as for the 4-cylinder touring car.



MORA TOURER SIX, 5-PASSENGER. $3600.

Mora "Tourer" Six, 5-passenger; 6-cylinder, vertical, water cooled, 42-50 H. P. touring car; cylinders 4-inch by 5½-inch stroke; motor hung under hood on main frame; mechanically operated valves; crank and cam shaft bearings of annular imported ball type; high tension ignition, by storage battery and high tension magneto; splash lubrication; inverted leather faced cone clutch, with cork inserts; selective change speed gears; 3 speeds forward and 1 reverse, direct on third, operated by side lever, and mounted in F. & S., imported ball bearings; double universal shaft drive; floating rear axle and I-beam front axle;

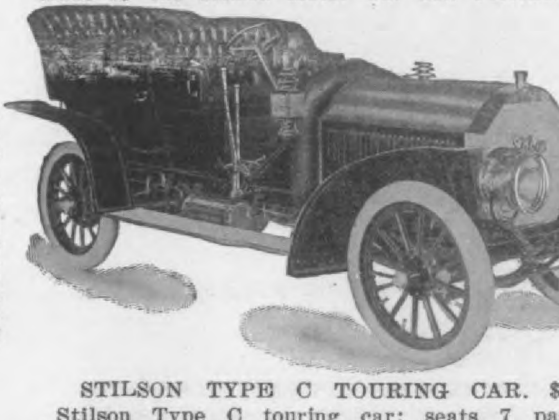


nal brakes on rear hubs, operated by foot
side lever; throttle and spark levers abov
with stationary segment; 18-gallon gasoline ta
front seat; weight 2500 lbs.; equipment in
searchlights and generator, 2 side lamps, t
and set of tools.

Mora "Racytype" Six, runabout, $3500; 36
inch tires; 105-inch wheel base; semi-elliptic
in front, 41 by 2-inch, 10 leaves, 2 auxili
platform spring in the rear, 43¼ by 2-inch,
and 2 auxiliary on the sides, and 38 by
leaves, and 2 auxiliary in the rear; weight 2
16-gallon gasoline tank under seat; other
tions and equipment same as for the 6-cylin
ing car. 1908 cars described in our Novemb
issue, page 72.

Stilson Gasoline Cars.

Made by the Stilson Motor Car Co., Pittsfiel



STILSON TYPE C TOURING CAR. $

Stilson Type C touring car; seats 7 pa
6-cylinder, vertical, water-cooled motor, 4
5½, 50-60 H. P. motor under the hood and su
valves on opposite sides, mechanically ope
roller type lifters; white bronze cam sh
crank shaft bearings; jump spark ignition
cells and magneto, with quadruple coil; sp
pressure feed lubrication; cone clutch with
leather face; 3 speed and 1 reverse selectiv
gear on Timken roller bearings; shaft drive
ing rear axle, I-section drop forged front a
inch wheel base; 36-inch wheels on 2-point b
ings, 4-inch front tires and 4½-inch rear tir
steel frame and sub-frame; semi-elliptic spri
and rear; front, 34 by 2, 7 leaves; rear,
inches, 11 leaves; worm and segment stee
panding and contracting brakes on rear
spark and throttle control levers on steerin
22-gallon gasoline tank under rear of the
passenger capacity, 7; weight, complete, 3
Price, $4500.

Okey Two-cycle Gasoline Car

Made by the Okey Motor Car Co., Columb

OKEY TWO-CYCLE RUNABOUT, $14

Okey two-cycle runabout; passenger caps
motor, 3-cylinder, 2-cycle, 4½x3½, water-c
thermal circulation, 20 H. P., under the hoo
front; valveless, 3-port type; crank shaft bea
babbitt; jump spark ignition from storage
cells; lubricated by oil in gasoline tank;
metal cone clutch; 2 speeds forward and 1
planetary change gear on plain bearings,
the high; shaft drive to live rear axle; fr
manganese bronze; 92-inch wheel base; 34-inch
on F. & S. annular ball-bearings; 3½-inch

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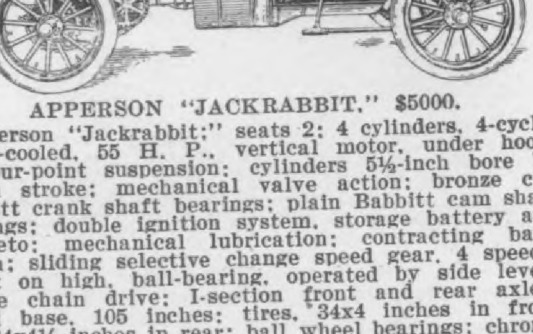
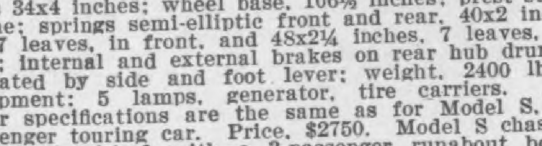
ERSON MODEL K. TOURING CAR, $4200.

son Model K. 7-passenger touring car; price, 4-cylinder, vertical, water-cooled, 50-55 H. P., motor, set under hood, on four-point suspen- ylinders 5½-inch bore, 5-inch stroke; mechanical ction; crank shaft in bronze cup Babbitt bear- m shaft in Babbitt bearings; double ignition by storage and magneto; mechanical lubrica- ontracting band clutch; selective sliding change gear, 4 speeds forward, direct on high, operated lever; ball-bearings in change speed gear; side drive; drop-forged solid axles, front and rear; 36x4 inches in front, 36x4½ inches in rear; wheel bearings; wheel base, 114 inches; main of chrome knickle steel; springs semi-elliptic nd rear, 40 inches long; wheel and worm irre- e type steering gear; contracting brakes on heel drums and contracting brakes on jack operated by side lever to wheel drums and by ever on jack shaft; gasoline capacity, 15 gal- ank located under driver's seat; equipment, fold- p, trunk rack, robe rail, foot rest, tire car- lamps and generator; weight complete, 3400 This model is also furnished with a runabout t $4000.



APPERSON "JACKRABBIT," $5000.

erson "Jackrabbit;" seats 2; 4 cylinders, 4-cycle, -cooled, 55 H. P., vertical motor, under hood, ur-point suspension; cylinders 5½-inch bore by stroke; mechanical valve action; bronze cup tt crank shaft bearings; plain Babbitt cam shaft gs; double ignition system, storage battery and eto; mechanical lubrication; contracting band ; sliding selective change speed gear, 4 speeds, on high, ball-bearing, operated by side lever; e chain drive; I-section front and rear axles; base, 105 inches; tires, 34x4 inches in front 4x4½ inches in rear; ball wheel bearings; chrome steel frame; front springs, semi-elliptic, 34x1¾ s; rear, semi-elliptic, 38x1¾ inches; worm and irreversible type steering gear; brakes internal external on rear hub drums; 24 gallons gasoline ity; tank located in back of seats; weight, 2200 equipment; 5 lamps and generator. Price, .



APPERSON MODEL M ROADSTER, $2750.

person Model M, 4-passenger roadster; 4 cylinders, nch bore by 5-inch stroke, 35 H. P. motor; shaft e; floating type rear axle, drop-forged front axle; 34x4 inches; wheel base, 106½ inches; prest steel e; springs semi-elliptic front and rear, 40x2 inch- 7 leaves, in front, and 48x2¼ inches, 7 leaves, in ; internal and external brakes on rear hub drums, ated by side and foot lever; weight, 2400 lbs.; pment; 5 lamps, generator, tire carriers. All r specifications are the same as for Model S, 7- enger touring car. Price, $2750. Model S chassis

versible type steering gear; brakes or rear hubs and on jack shaft; foot lever and side lever control; gaso- line capacity, 15 gallons, tank under front seat; weight, 3475 lbs.; equipment: top, trunk rack, 7 lamps, generator, etc. Price, $5000.

Kiblinger Gasoline Vehicles.

Made by W. H. Kiblinger Co., Auburn, Ind.

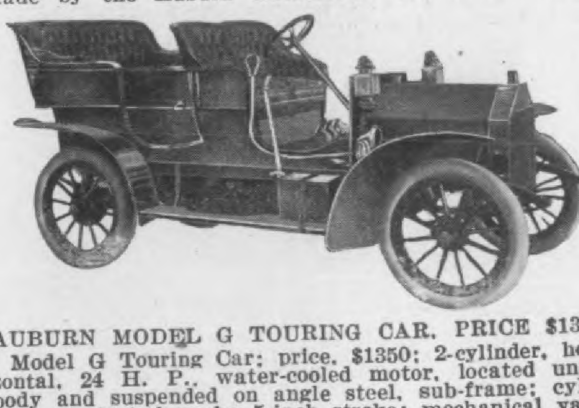
Kiblinger Model H, 2-passenger car, piano box body; 2-cylinder, opposed, air-cooled motor, 12 H. P., 4⅛ by 3¾, located on the left side of the chassis, hung from angle iron cross members under the body; me- chanical valves in the head; jump spark ignition from dry cells; forced sight feed lubrication; planetary change speed gear, fibre faced clutch for the high, 2 speeds forward and 1 reverse, operated by hand lever; drive to rear wheels by double chains; solid axles, 1⅛ inches; 69½-inch wheel base; high wheels, fitted with 1¼-inch solid rubber tires; wheels fitted

KIBLINGER MODEL H 2-PASSENGER VEHICLE $450.

with plain or roller bearings as ordered; 2-inch angl iron frame; 36 by 1½-inch elliptic springs, 5 leaves wheel steering, with spark and throttle control o the post; contracting brakes on the rear wheel hub 5-gallon gasoline tank under the seat; weight, com plete, 800 lbs.; price, with leather dash, storm apro brass hub bands, brass seat handles, and set of tool $450. Described in our September, 1907, issue, pa 106.

Auburn Gasoline Cars.

Made by the Auburn Automobile Co., Auburn, In



AUBURN MODEL G TOURING CAR, PRICE $13

Model G Touring Car; price, $1350; 2-cylinder, h zontal, 24 H. P., water-cooled motor, located un body and suspended on angle steel, sub-frame; cy ders, 5¼-inch bore by 5-inch stroke; mechanical va action; crank shaft and cam shaft in Babbitt be ings; jump spark ignition, by dry cells; mechani force feed lubrication; cone clutch; planetary cha speed gear, 2 speeds forward and 1 reverse, di on high, operated by foot pedal and lever; bro bearings in change speed gear; center chain dri roller bearings in rear axle and ball-bearings in

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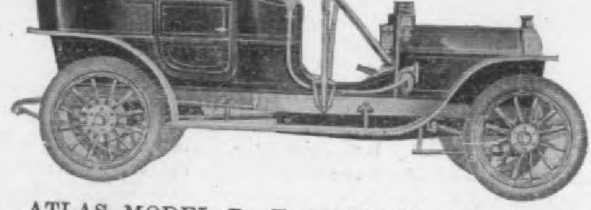
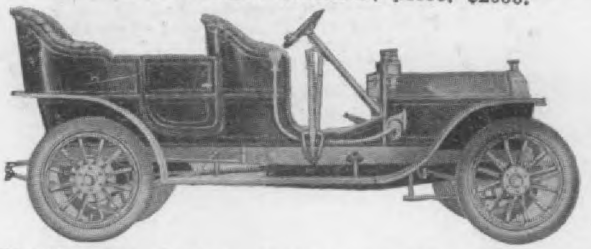


ATLAS MODEL D. T. TOURING CAR. $2000.

Atlas Model D. T. Touring Car; 3-cylinder, vertical, 2-cycle, motor 4½x4½, 34 H. P., water-cooled by thermal circulation; no valves or cam shafts; hardened steel and bronze bushings; crank shaft bearing surfaces; jump spark ignition from dry battery; force feed oiler; 3 speed forward and reverse sliding change speed gear, cone clutch, or planetary change speed gear of Atlas make, giving 2 forward speeds and reverse, with multiple disc clutch, can be had; shaft drive to live rear axle; tubular front axle; 106-inch wheel base; 34-inch wheels, on roller bearings; 3½-inch tires; wood frame, angle steel sub-frame; ¾-elliptic springs front and rear; front, 40x1¾ inches, 6 leaves, and rear, 48x1¾ inches, 7 leaves; worm and gear steering, irreversible; internal expanding brakes on rear wheels and brake on engine; spark and throttle on steering wheel; 18-gallon gasoline tank, under front seat; capacity, 4 persons; weight complete, 2200 lbs.; equipment, side lamps, tail light, horn, tool kit, jack, oiler and headlight brackets; price, $2000.



ATLAS TWO-CYCLE MODEL E TOURING CAR. $2400.

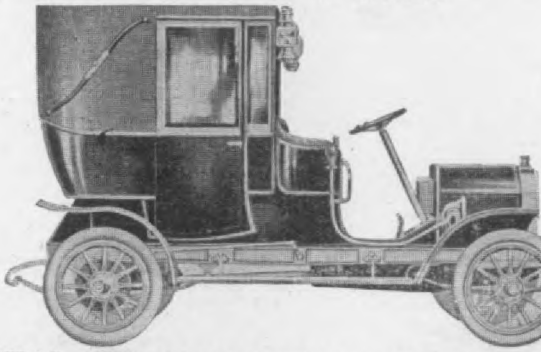
Atlas Two-Cycle Model E Touring Car; 4-cylinder, vertical, 2-cycle, 4½x4½, 46 H. P. motor, water-cooled by thermal circulation, motor under hood on sub-frame; bronze bushed crank shaft bearings; jump spark ignition from dry batteries; forced feed lubrication; cone clutch; 3 speeds forward and 1 reverse, sliding change gear, operated by foot lever; shaft drive to live rear axle; front axle I-section; 114-inch wheel base; 34-inch wheels, on roller bearings; 4-inch tires on Quick Detachable rims; prest steel frame, angle steel sub-frame; ¾-elliptic springs front and rear; front, 40x2 inches, 7 leaves, and rear, 52x2 inches, 8 leaves; worm and gear irreversible steering; expanding bands on rear wheels and band brake on engine; spark and throttle control on steering wheel; 20-gallon gasoline tank under the front seat; passenger capacity, 5; weight complete, 2400 lbs.; equipment, headlights, 2 side lights, tail light, horn, tool kit, jack and oiler; price, $2400. Special features: valveless, gearless engine, aluminum body.

ATLAS MODEL R TWO-CYCLE RUNABOUT. $1400.

Atlas Model R Two-Cycle Runabout; 2-cylinder, vertical, 2-cycle, 4½x4½, 22 H. P. motor, water-cooled by thermal circulation; motor under the hood, on sub-frame angles; bronze bushed crank shaft bearings; jump spark ignition from dry cells; force feed lubrication; 3 speed and 1 reverse planetary change gear; multiple disc clutch on the high speed, operated by hand lever; shaft drive to live rear axle, tubular front axle; 90-inch wheel base; 30-inch wheels, on roller bearings; 3-inch tires on Quick Detachable rims; white, cab

ATLAS TWO-CYCLE MODEL D RUMBLE-SEATED RUNABOUT. $1800 OR $1900 (According to Change Speed Gear).

Atlas Two-Cycle Model D Rumble-Seated Runabout; 3-cylinder, 2-cycle, 34 H. P. motor; general specifications similar to Model D. T.; double rumble seat; weight complete, 2000 lbs.



ATLAS TWO-CYCLE TAXICAB OR TOWN CAR. $2600.

Atlas Two-cycle Taxicab or Town Car; same general specifications as the Model R runabout, with the exception of the special enclosed body; price, $2600. See models described December, 1907, page 104.

Elmore 2-Cycle Gasoline Cars.

Made by the Elmore Mfg. Co., Clyde, O.

TWO-CYCLE ELMORE MODEL 40. $2500.

Elmore Model 40, 2-cycle gasoline touring car, 2-cylinder, vertical motor, under the hood at the front, water-cooled, 4½x4-inch, 35 H. P., mounted on sub-frame; no valves; Babbitt crank shaft bearings; ignition by Atwater-Kent generator from dry battery; mechanical lubrication; expanding ring clutch; selective sliding change speed gear on roller bearings, giving 3 forward speeds and 1 reverse, direct on high; shaft and bevel gear drive to live rear axle; front axle I-section; 109-inch wheel base; 34-inch wheels, on roller bearings, front on ball-bearings; 4-inch tires, front and rear; semi-elliptic front springs, platform rear; prest steel frame and sub-frame; steering gear adjustable worm and gear; internal and external brakes on rear wheels; spark and throttle on steering wheel; 20-gallon gasoline tank, under seat; weight complete, 2550 lbs.; passenger capacity, 5; equipment, 5 lights and tools. Price, $2500. Special features, valveless 2-cycle motor and new ignition system, giving increased mileage with dry cells.

2-CYCLE ELMORE MODEL 30. $1750.

2-Cycle Elmore Model 30 and Roadster, both w

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g wheel: 15-gallon gasoline tank under front complete weight as a runabout, 2050 lbs.; as a car, 2150; passenger capacity, 5; special fea- valveless 2-cycle engine and Atwater-Kent ig- equipment, 5 lights and tools. Price, $1750.

Euclid 2-Cycle Gasoline Cars.

by the Euclid Motor Car Co., Cleveland, Ohio.

id 2-cycle roadster, with runabout body, with g capacity for 2 or 3 persons; motor, 3 air- 2-cycle cylinders, 3⅜x3½-inch, 20 H P., lo- on the sub-frame, under the hood; air-cooled haust fan and casing; combination bronze and t crank shaft bearings; jump spark ignition by e cells; mechanical lubrication by multiple force ubricator; friction change speed mounted on bearings, operated by side lever and giving all forward and back; double chain drive to live xle, front axle tubular; 100-inch wheel base; 30- vheels, on Timken roller bearings, fitted with h tires; frame and sub-frame of tubular type; springs, full elliptic, 40x1¾ inches, 5 leaves; prings, half-elliptic and platform, 40x1¾ inches.

HE EUCLID 2-CYCLE ROADSTER, $850.

es; wheel steer; internal expanding brakes on ar wheels; spark and throttle control on top of g wheel; 10-gallon gasoline tank, under bonnet r of engine; weight complete, 1350 lbs.; equip- 2 side oil lamps, tail light, 2 gas head lights. $850. Special features: valveless 2-cycle en- direct feed of mixture to cylinders by tandem pistons.

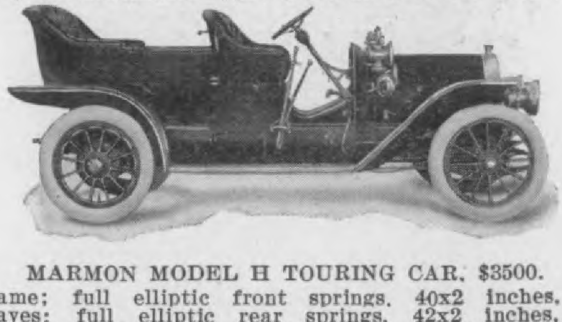
Euclid 2-cycle Light Tourer; passenger capacity, cylinder, 2-cycle, air-cooled motor, 35 H. P.; nent and general specifications similar to the Roadster; $1000.

Marmon Gasoline Cars.

by the Nordyke & Marmon Co., Indianapolis, Ind.

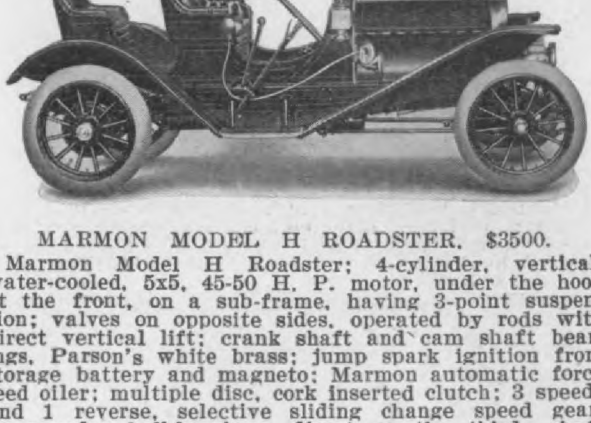
ARMON MODEL G TOURING CAR, $3000.

mon Model G, 5-passenger touring car; 4-cylin- 90-degree angle, air-cooled motor, 5x4½ inches, H. P., located in the front, on a sub-triangular , having 3-point suspension; valves operated by bar and push rods in the cylinder heads; crank bearings, Parson's white brass, cam shaft the jump spark ignition from storage and dry cells; on automatic force feed lubrication; disc clutch cork inserts; selectively operated, 3 speeds and e, change speed gear, on annular ball-bearings, on the high; shaft drive to floating rear axles; axles, I-section; 104-inch wheel base; 34-inch s, on annular ball-bearings on the front; conical bearings at the rear; 4½-inch rear tires and 4- front tires, quick detachable; prest steel frame ub-frame; full elliptic springs, front and rear; 40x2 inches, 5 leaves, and rear, 42x2 inches, 6 ; screw and nut irreversible steering gear; 2 , internal expanding on each rear wheel; con- spark and throttle on steering wheel; 20-gallon e tank, on the front seat; passenger capacity, of quick detachable type; prest steel frame and su



MARMON MODEL H TOURING CAR, $3500.

frame; full elliptic front springs, 40x2 inches, leaves; full elliptic rear springs, 42x2 inches, leaves; steering gear, irreversible screw and nut type brakes, internal and external on rear wheel drum control, spark and throttle on steering wheel, foo accelerated; 20-gallon gasoline tank, under seat, ai pressure feed; complete weight, 3250 lbs.; passenge capacity, 5 to 7; equipment, 2 gas, 3 oil lamps, horn tools, jack, shock absorbers; price, $3500. Specia features; same as other cars.

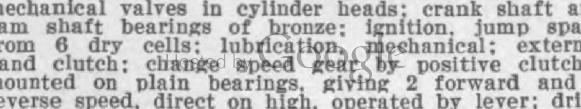


MARMON MODEL H ROADSTER, $3500.

Marmon Model H Roadster; 4-cylinder, vertical water-cooled, 5x5, 45-50 H. P. motor, under the hoo at the front, on a sub-frame, having 3-point suspen sion; valves on opposite sides, operated by rods wit direct vertical lift; crank shaft and cam shaft bea ings, Parson's white brass; jump spark ignition fro storage battery and magneto; Marmon automatic forc feed oiler; multiple disc, cork inserted clutch; 3 speed and 1 reverse, selective sliding change speed gea on annular ball-bearings, direct on the third; shaf drive to floating rear axles; front axle I-section; whee base, 114 inches; 34-inch wheels, on conical rolle bearings; 4-inch front and 4½-inch rear, quick de tachable tires; prest steel frame and sub-frame; ful elliptic springs, 40x2 inches, 6 leaves, front; rear, ful elliptic, 42x2 inches, 5 leaves; screw and nut irre versible steering gear; brakes, internal and externa on rear wheels; control, spark and throttle on whee and also foot accelerator; 20-gallon gasoline tank, o the front seat, under air pressure; weight complete 2900 lbs.; equipment, 2 gas lamps, 3 oil lamps, horn tools, jack and shock absorbers; price, $3500.

International Gasoline Auto Buggies.

Made by the International Harvester Co., 7 Monro St., Chicago, Ill.

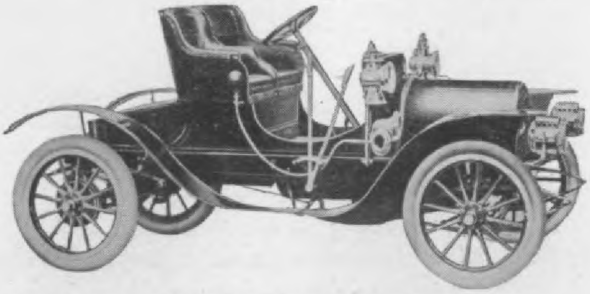


INTERNATIONAL AUTO BUGGY, MODEL A.

International 2-seated surrey; 2-cylinder, horizonta opposed, air-cooled by double fan motor, 5 by 5, 1 H. P., located under the body on steel sub-frame mechanical valves in cylinder heads; crank shaft an cam shaft bearings of bronze; ignition, jump spar from 6 dry cells; lubrication, mechanical; externa band clutch; change speed gear by positive clutche mounted on plain bearings, giving 2 forward and reverse speed, direct on high, operated by lever; dri

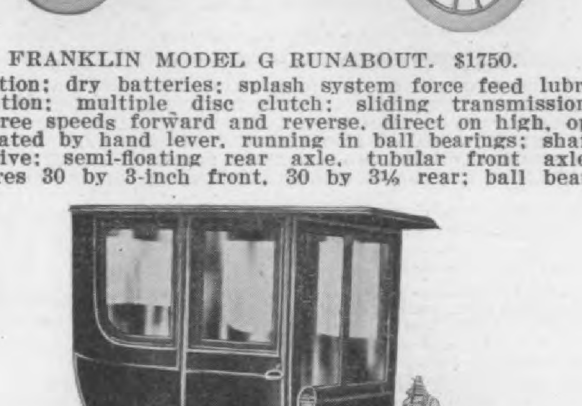
FRANKLIN MODEL G TOURING CAR. $1850.

Franklin Model G touring car, price $1850; 4-cylinder, air cooled, vertical, 16 H. P. motor, in front, suspended on angle irons to sills; cylinder 3¼-inch bore and stroke; mechanical valve action; die cast babbitt crank shaft and cam shaft bearings; jump spark ig-



FRANKLIN MODEL G RUNABOUT. $1750.

nition; dry batteries; splash system force feed lubrication; multiple disc clutch; sliding transmission; three speeds forward and reverse, direct on high, operated by hand lever, running in ball bearings; shaft drive; semi-floating rear axle, tubular front axle; tires 30 by 3-inch front, 30 by 3½ rear; ball bear-



FRANKLIN MODEL G BROUGHAM. $2250.

ings in rear wheels, and Timken roller in front; wheel base 90-inch; frame, ash sill and cross bars; full elliptic springs front and rear; 36 by 1½-inch, 4 leaves in front, 36 by 1½-inch, 5 leaves, in rear; bevel steering gear; double acting Raymond brake on transmission drive shaft, operated by foot pedal and two

FRANKLIN MODEL D TOURING CAR. $

Franklin Model D touring car, price $2850; der, vertical, air cooled, 4-cycle, 28 H. P in front on angle iron sills; cylinders, 4¼ 4-inch stroke; mechanically operated valves; babbitt crank shaft and cam shaft bearings spark ignition by dry battery, also by Bos tension magneto; splash system of lubricatio tiple disc clutch; selective sliding change spe

FRANKLIN MODEL D SURREY SEAT RUNABOUT

three speeds forward and reverse, direct on h erated by hand lever, and running in ball b shaft drive; floating rear axle, tubular fron 34 by 3½-inch front tires, and 34 by 4-inch rea ball bearings in rear wheels, Timken rollers i wheel base, 105 inches; frame ash sills on cro full elliptic springs, 40 by 1¾-inch, 5 leave and rear; bevel steering gear; brakes, double Raymond on transmission drive shaft operated

FRANKLIN MODEL D LANDAULET. $40

pedal, and two double acting rim brakes on e hub operated by hand lever; seats 5; weig lbs.; 12-gallon gasoline tank under seat; equ 2 oil lamps, 1 rear lamp, 2 headlights, hor plete tool equipment and jack. Model D ch furnished with a runabout body weighing 20 at $2850, and with landaulet body, weight, 24 seating 3 persons inside, $4000. Described 1907, page 168.

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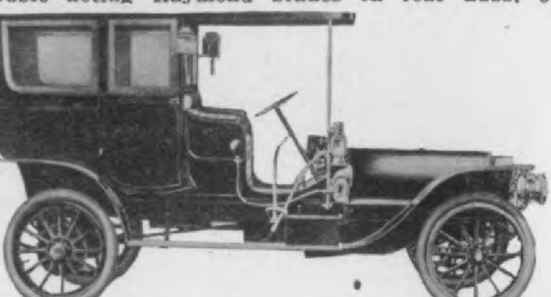
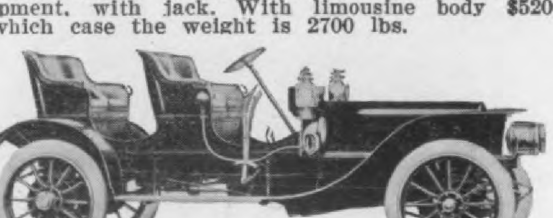
es on transmission drive shaft by foot pedal and
ouble acting Raymond brakes on rear hubs, op-



RANKLIN MODEL H LIMOUSINE. $5200.
ed by hand lever; seats 7; weight, 2500 lbs.; 16-
on tank under seat; equipment: 2 oil side lamps,
rear lamp, 2 headlights, horn, complete tool
pment, with jack. With limousine body $5200,
which case the weight is 2700 lbs.

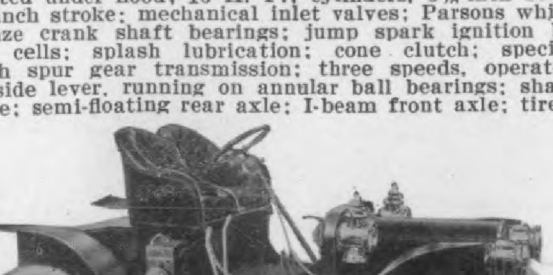


RANKLIN MODEL H RUNABOUT. $4000.
anklin Model H runabout; wheel base, 118 inches;
ht, 2350 lbs.; price $4000; all other specifications
the same as for the Model H touring car.

Cameron Air Cooled Gasoline Cars.

e by the Cameron Car Co., Brockton and Beverly, Mass.

IERON MODEL 8 3-PASSENGER TOURING CAR. $1050.
meron Model 8 3-passenger touring car, price
0; 4-cylinder, vertical, air cooled, 4-cycle, motor
ted under hood; 16 H. P.; cylinders, 3⅝-inch bore,
nch stroke; mechanical inlet valves; Parsons white
ze crank shaft bearings; jump spark ignition by
cells; splash lubrication; cone clutch; special
h spur gear transmission; three speeds, operated
side lever, running on annular ball bearings; shaft
e; semi-floating rear axle; I-beam front axle; tires,



IERON MODEL 6 2-PASSSENGER RUNABOUT. $850.

Pennsylvania Gasoline Cars.

Made by the Pennsylvania Auto-Motor Co., Br
Mawr, Pa.

PENNSYLVANIA TYPE C 50, $2800.
Pennsylvania Type C 50 touring car; 4-cylinder, v
tical, water-cooled motor, 4¾x5¼, 50 H. P., un
the hood, on a sub-frame; mechanical valves in
head; push rod and rocker arm operated from t
cam shafts; die-cast babbitt crank shaft bearin
bronze cam shaft bearings; jump spark ignition fr
storage battery, magneto or dynamo; mechanical
brication; cone clutch; 3 speeds forward and 1
verse sliding change speed gear, selectively opera
and mounted on annular ball bearings; shaft dr
to floating rear axle; I-section drop-forged front ax

PENNSYLVANIA ROADSTER.
114-inch wheel base; 34-inch wheels, on annular b
bearings; 3½-inch front, 4½-inch rear tires; pr
steel frame and sub-frame; semi-elliptic sprin
front, 38x2, 7 leaves, and rear, platform, 48x2,
leaves; steering gear internal and external worm
nut; expanding and contracting brakes on the r
wheel drums; spark and throttle control on the ste
ing wheel; passenger capacity, 5; 23-gallon gasol
tank, under the seat; weight complete, 2800 l
price, with 5 lamps and horn, $2800. Described
vember, 1907, page 134.

Hatfield Gasoline Vehicles.

Made by the Hatfield Motor Vehicle Co., Miamisbu
Ohio.

HATFIELD BUGGYABOUT. $650.
Hatfield Buggyabout with special body, seatin
persons; 2-cylinder, horizontal, opposed, air-coo
4x4, 12 H. P. motor, located crosswise under
rear of the body on 3-point suspension; autom
inlets; crank shaft and cam shaft bearings,
son's white bronze; force feed lubrication; no ma
clutch; friction drive mounted on roller bearin
giving any number of speeds forward and reve
operated by side lever; drive to rear wheels by

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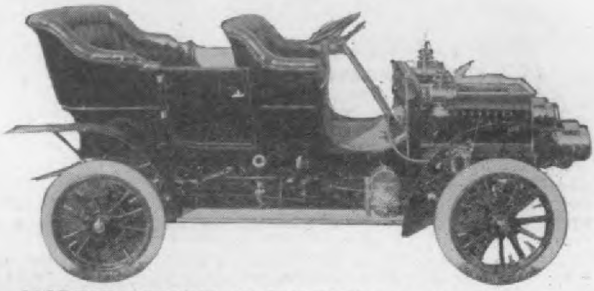
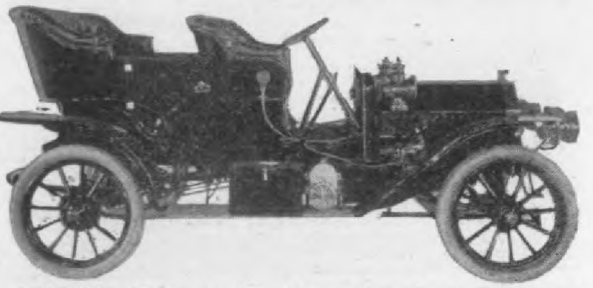
MOLINE MODEL A TOURING CAR. $2500.

Moline Model A touring car, price $2500; 4-cylinder, -cycle, vertical, water cooled, 35 H. P., 4½-inch bore y 5-inch stroke, suspended in front under hood, on our point suspension; mechanically operated vales, ll on one side; babbitt crank shaft bearings; bronze am shaft bearings; jump spark ignition by storage attery; force feed lubrication; cone clutch; progres-ive type change speed gear, 4 speeds direct on high peed, operated by hand lever, and mounted in babbitt earings; shaft drive; tubular front and rear axle; 4 by 4-inch tires; wheel bearings, ball in front and oller in rear; wheel base, 110 inches; prest steel hannel frame; half elliptic springs, 46 by 2½ inches, 0 leaves, in front, and full elliptic, 38 by 2-inch, 6 eaves, rear; irreversible screw and nut wheel steer-ng; external and internal brakes on rear hubs; seats ; 18-gallon gasoline tank under front seat; weight, 650 lbs.; equipment: gas lamps, dash lights, tail ght, tube horn, tool and tire kit.



MOLINE MODEL H TOURING CAR. $1250.

Moline Model H, 5-passenger touring car, price $1250; cylinder opposed, horizontal, water cooled, 5 by 5; 0 H. P. motor, located under body, and suspended on our-point suspension direct to frame; mechanically perated valves; babbitt crank shaft bearings; bronze am shaft bearings; jump spark ignition by storage atteries; force feed lubrication; 3-speed planetary ransmission, direct on high operated by hand lever; hain drive; divided tubular rear and tubular front axle; 0 by 3½-inch tires; wheel bearings, ball in front and oller in the rear; 96-inch wheel base; prest steel chan-el frame; half elliptic, 44 by 1¾-inch springs, nine aves, in front, and full elliptic, 42½ by 1¾-inch, 5 aves in the rear; irreversible screw and nut steer-g; double-acting Raymond brakes on rear hubs; seats ; 14-gallon gasoline tank under hood; weight, 1800 ounds; equipment: gas lamps, dash lights, tail ghts; tube horn, tool and tire kit.



MOLINE MODEL S TOURING CAR. $2000.

Moline Model S, 5-passenger touring car, $2000; 4-linder, 4-cycle, vertical, water cooled, 3⅞-inch bore 4½-inch stroke; 24 horse power motor, set in front nder hood on four-point suspension, mechanically perated valves; babbitt crank shaft bearings; bronze m shaft and bearings; 4-speed, progressive type hange speed gear, direct on high, operated by hand ver, and mounted in babbitt bearings; shaft drive; vided rear axle and tubular front axle; 32 by 3½-inch heels; wheel bearings, ball in front and rollers

ALBANY SURREY, MODEL G.

Albany Surrey, Model G; 2-cylinder, 18-20 H air-cooled, horizontal, opposed motor, under cylinder 5-inch bore and stroke; motor is suspend lugs on cylinder heads; mechanical valve a crank shaft and cam shaft bearings of bronze; spark ignition by dry battery; six-feed mech oiler; friction drive by friction wheel and di bronze bearings; friction wheel operated by lever; drive by 1½-inch Diamond roller chain; 1⅛x34-inch solid Diamond side wire; roller

ALBANY MODEL F RUNABOUT.

bearings; wheel base 96 inches; frame 2-inch steel; sub-frame of heavy tire steel; full elliptic and rear springs, 36x1¼ inches, 4 leaves, fron rear; wheel steering with direct ball and socket to take up all lost motion; drop-forged knuckle pansion brakes on rear wheels; spark lever on and gas control by foot pressure; capacity, 4 or sons; gasoline capacity, 9 gallons; tank located seat; weight, 1500 lbs. This chassis is also fur with runabout body, known as Model F, seat persons; weight, 1400 lbs. An equipment consist top, storm front, lamps, horn and tools is fur at $75 extra for the Surrey, and at $50 extra f Runabout. Albany Runabout described in our Oc 1907, issue, page 96.

Schacht Gasoline Car.

Made by the Schacht Mfg. Co., Cincinnati,

SCHACHT MODEL K. PRICE, $680.

Schacht Model K; Corning type body; 2-cyl horizontal, water-cooled, 4-cycle, 4 by 4, 12 H. P tor in rear suspended on sills of body; crank and cam shaft bearings; Parson's white metal; spark ignition from dry cells; mechanical sight lubrication; friction transmission; Timken roller

BUGMOBILE MODEL A. $500.

gmobile Model A runabout; motor, 2 cylinders, sed, horizontal, air-cooled, under the centre of body, bore and stroke 4 inches, 12 H. P.; me- ical valves, located on the upper side; anti-fric- metal crank shaft and cam shaft bearings; igni- jump spark from dry battery; force feed lubri- n; 2 speed and 1 reverse, special Bugmobile ge gear with finger clutch, operated by lever on steering post; lubricated chain cable; axles, 1⅛

MOBILE MODEL A, WITH SURREY SEAT.

s; 68-inch wheel base; wheels on plain bear- and fitted with 1¼-inch solid tires; 2-inch angle frame; full elliptic springs front and rear, 1½ s wide, with 4 leaves; left side lever steering; s applied to outside of rear wheel sheaves; spark throttle on steering post; cable tension controlled ot levers moving the rear axle; 6-gallon gasoline under the seat; carrying capacity, 2; complete veighs 950 lbs.; equipment includes extra surrey without top, lamps or fenders. Price, $500. Spe- feature: automatic differential without gears.

IODEL B BUGMOBILE RUNABOUT, $750.

el B Bugmobile runabout; stanhope body, with

rear axle by foot lever; 10-gallon gasoline tank, un hood; weight complete, 1250 lbs.; equipment, f leather Victoria top, 2 acetylene lamps in bla enamel. Price, $750. Special feature: automatic d ferential without gears.

Brush Gasoline Cars.

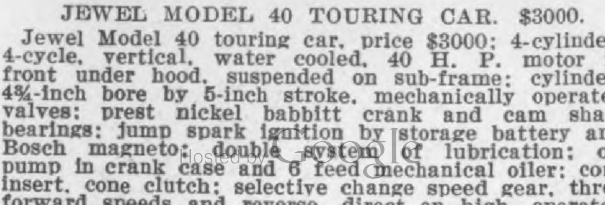
Made by the Brush Runabout Co., Detroit, Mich.

BRUSH MODEL 1 A RUNABOUT. $500-$550.

Brush Model 1 A Runabout, piano box body; mot 1 vertical, water-cooled, cylinder, 4-cycle, 4x4, 6 H. P water-cooled by thermal circulation under the ho at the front, mounted on three-point suspension; valv mechanically operated, located on the side; Babbi crankshaft bearings; ignition jump spark, from d cells; lubrication from crank case compression; mets to-metal cone clutch; internal planetary change spe gear, on ball-bearings, giving 2 forward and 1 rever speed, direct on high, operated by a single ha lever; drive is bevel gear to countershaft and si chains to the rear wheels; front and rear axles wood, reinforced; wheel base, 84 inches; trust wo frame; 32x2-inch solid tires, or 28x3-inch pneumat tires; wheels on ball-bearings; spiral springs of speci vertical type used in front and rear; steering by e cyclic internal gearing, which moves slowly fro straight ahead position, but accelerates as it turn internal expanding brakes in the rear wheel sprock drum, acting equally in either direction; seating c pacity, 2; weight complete, 900 lbs.; 4-gallon gasoli tank, under the floor; equipment, mat and tools onl price, $500-$550. Described in our December, 190 issue, page 75.

Jewel Gasoline Cars.

Made by the Forest City Motor Car Co., Massillon,



JEWEL MODEL 40 TOURING CAR. $3000.

Jewel Model 40 touring car, price $3000; 4-cylinde 4-cycle, vertical, water cooled, 40 H. P. motor front under hood, suspended on sub-frame; cylinde 4¾-inch bore by 5-inch stroke, mechanically operat valves; prest nickel babbitt crank and cam sha bearings; jump spark ignition by storage battery a Bosch magneto; double system of lubrication; c pump in crank case and 6 feed mechanical oiler; co insert, cone clutch; selective change speed gear, thr forward speeds and reverse, direct on high, operated

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also furnished with roadster and limousine bodies.

JEWEL MODEL D RUNABOUT. $500.

ewel Model D runabout, price $500; body of piano type; single-cylinder, 2-cycle, horizontal, water led, 10 H. P. motor, placed in rear of chassis, ted to sub-frame, cylinder, 4½-inch bore by 4-inch oke; jump spark ignition by dry cells, automatic r-feed oiler; high speed disc type clutch; planetary nge speed gear, 2 speeds forward and one reverse, ect on high, operated by hand lever and running bronze bearings; chain drive; live rear axle with t steel I-section frame and I-beam cast steel front e; tires, 28 by 3-inch; wheel bearings, nickle bab-

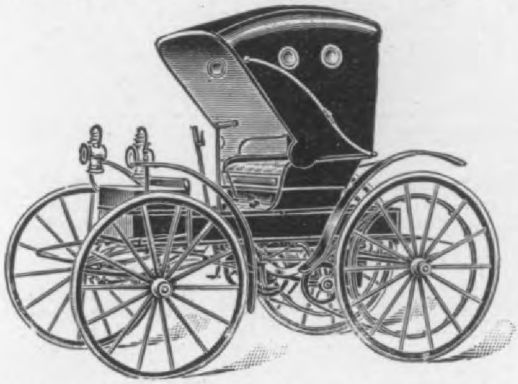
JEWEL MODEL E STANHOPE. $750.

t rear and bronze in front; wheel base, 70 inches gle steel main and sub-frame; full elliptic springs nt and rear, 1⅜-inch wide in front, and 1¼-inch rear; rack and pinion wheel steer; one brake on r axle; seats 2; 5-gallon gasoline tank under seat; ipment; lamps, horn and tools; weight, 950 lbs. nplete. This Model B runabout chassis is also fur-hed with a Stanhope body, known as Model E; ight, 1050 lbs.; price $750.

Holsman Gasoline Automobiles.

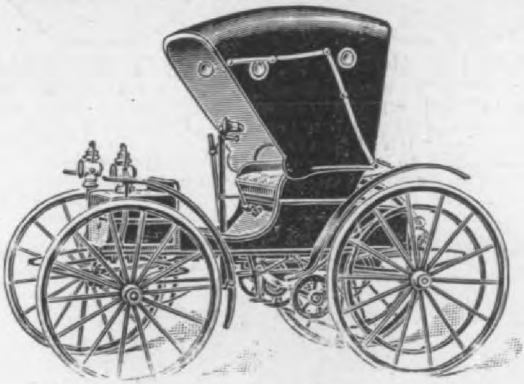
de by the Holsman Automobile Co., Chicago, Ill.

rect on high and low, operated by single lever; by Holsman patent steel cable; tires, 1 1-8-inch s rubber; wheels, 44-inch front and 48-inch rear, Timken roller bearings; 65-inch wheel base; s frame; full elliptic springs, front and rear; stee by lever; four brakes operated by hand lever; five lon gasoline tank in seat back; weight complete pounds, without top; equipment, tools and lan Price, $650 without top. Special features; one trol lever for all speeds forward and reverse.



HOLSMAN MODEL 9. $700, WITHOUT TOP.

Holsman Model 9 runabout, 32x77-inch body; s 2 people; 2-cylinder, horizontal, opposed, air-co motor, 4x4, 12 4-5 H. P., located under the body steel tubing; automatic intake; crank shaft ni babbitt bearings, cam shaft phosphor bronze beari jump spark ignition from dry batteries; force lubrication; positive lug clutch; change speed of sliding type for high and low; variable speeds to 30 miles, 4 reverse, direct on high and low, erated by one lever; drive by Holsman patent s cables to the rear wheel sheaves; 1 1-8-inch, s rubber tires; wheel base, 75-inch, wheels, 44-front and 48-inch rear, on Timken roller beari steel frame; full elliptic springs; lever steering brakes operated by one hand lever; 5-gallon gaso tank in seat back; weight complete, 930 pounds, w out top; equipment: tools and lamps; price $700 w out top; special features; one control lever for speeds, forward and reverse.



HOLSMAN MODEL 10 RUNABOUT. $750.

Holsman Model 10 runabout, 32x77-inch body; eral specifications the same as Model 9; price plete without top, $750.

LIABLE DAYTON SURREY, MODEL F. $925.

eliable Dayton Surrey, Model F, price $925; 2-inder, water cooled, horizontal, 4-cycle, 4⅜-inch bore 4-inch stroke, 15 H. P. motor, located under hood l set crosswise of frame in front; mechanically rated valves by push rods; Parsons white brass nk shaft bearings; phosphor bronze cam shaft bear-s; jump spark ignition by dry cells; mechanical rication; external contracting clutch; sliding nge speed gear; 2 speeds forward and 1 reverse ling change gear, direct on high, operated by lev-on steering column, mounted in Hyatt roller bear-s; double chain drive; solid square front and r axles; tires, 40 by 1½-inch front and 44 by 1½-

LIABLE DAYTON COUPE SPECIAL, MODEL E. $1200.

h rear, solid; Timken roller wheel bearings; 103-h wheel base; wood frame; half elliptic springs, by 1½-inch, 5 leaves, in front, and full elliptics, by 1½-inch, 6 leaves, in rear; rack and pinion ering gear; internal expanding brakes on rear eels; spark and throttle levers on steering post; lal operated clutch and brakes; seats 4; 10-gallon oline tank under seat; weight, 1600 lbs.; equip-nt; 3 oil lamps, mats and tools; special feature; de-hable box for light delivery purposes to go in place rear seat.

LIABLE DAYTON RUNABOUT, MODEL E. $780.

eliable Dayton Runabout, Model E, price $780; gle seat runabout body for 2 passengers; 84-inch eel base; springs, 5 leaves front and rear; weight, 0 lbs.; other specifications same as for Model F rey. Runabout Model E chassis is also furnished h a special coupe body Model E for $1200; weight, 0 lbs. 1908 models described in our November, 7, issue, page 67.

Regal Gasoline Cars.

lade by the Regal Motor Car Co., Detroit Mich.

egal 5-passenger touring car, $1250; **4-cylinder**, ycle, water-cooled, vertical, 4-inch bore by **4¼-inch** ke, 25 H. P. motor, under hood on arms to frame;

REGAL 5-PASSENGER TOURING CAR. $1250

steel frame, semi-elliptic springs in front, 38x2 inc 6 leaves and full elliptic 36x2-inch, 6 leaves rear; worm and gear type steering gear; internal external band brakes on rear wheels; 15-gallon g line tank under seat; weight, 1900 pounds; equipm

REGAL 3-PASSENGER RUNABOUT. $1250.

tools, side oil and tail lamps and horn. Speci tions for the runabout are same as for the t ing car, with the following exceptions: Seats, springs, 5 leaves front and rear; weight, 1750 pou The touring car chassis is also furnished with icab and delivery bodies.

Mier Gasoline Cars.

Made by the Mier Carriage and Buggy Co., Ligo Ind.

MIER MODEL A RUNABOUT. $575.00

Mier Model A Runabout; torpedo stern; price $57 2-cylinder, vertical, water cooled, 4-cycle, 4-inch and stroke, 10 to 12 H. P. motor, located under in front, suspended on four full ellliptic springs; tomatic intake valves; Parsons white bronze c shaft bearings, bronze cam shaft bearings; jump s ignition, by 6 dry cells; pressure lubrication; tion clutch; friction transmission, operated by lever, and mounted in Parsons white bronze; do side chain drive; solid axle front and rear; 1½

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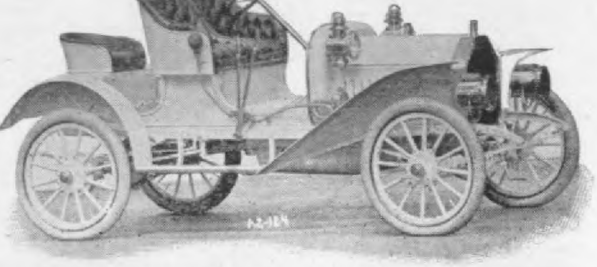
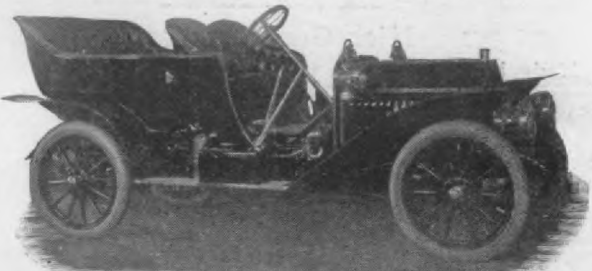
MIER MODEL B RUNABOUT. $575.00



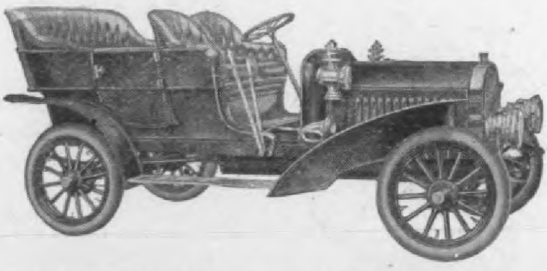
BUICK RUNABOUT, MODEL 10, $900.

Buick Runabout, Model 10; price, $900; 4-cylinder, rtical, 4-cycle, water-cooled, bore and stroke 3¾ ches, 18 H. P. motor, set under hood, on sub-ame; mechanical valve action; valves operated from e cam shaft; plain crank and cam shaft bearings; mp spark ignition; storage and dry batteries; me-anical force feed lubrication; cone clutch; plane-ry change speed gear, 2 forward speeds and 1 verse, direct on high, operated by side lever and ot pedals, and mounted in plain bearings; shaft ive to divided rear axle; tubular front axle; tires, x3 inches; ball-bearings in front wheels, Hyatt ller bearings in rear; 88-inch wheel base; prest steel ain and sub-frame; half-elliptic springs, 36x1½ inch-, 5 leaves, in front, and full elliptic springs, 37½x ¼ inches, 4 leaves, in rear; irreversible steering ar; external contracting brakes on drive shaft and ternal expanding brakes on rear hubs; spark and rottle levers on top of steering wheel, on sta-onary sector; seats 3; 11-gallon gasoline tank, on ont seat; weight, 1500 lbs.; equipment, tools, repair tfit, 2 headlights, 2 oil lamps, generator, tail lamp. rn. Described January, 1908 issue, page 186.



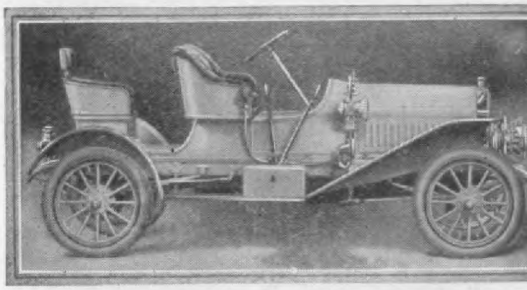
BUICK TOURING CAR, MODEL 5, $2500.

Buick Model 5, 5-passenger touring car; price, 500; 4-cylinder, vertical, water-cooled, 4-cycle, 4⅝-ch bore, 5-inch stroke, 40 H. P. motor, set under od, on sub-frame; superior babbitt crank and cam aft bearings, jump spark ignition, from storage attery and magneto; positive valveless system of brication; cone clutch; selective sliding change eed gear, 3 speeds forward and 1 reverse, direct on ird, operated by side lever, mounted on roller bear-gs; shaft drive; semi-floating rear axle and I-beam ont axle; 34x4-inch tires; Timken roller wheel bear-gs; 108-inch wheel base; prest steel main and sub-ame; semi-elliptic springs front and rear, 40x2 ches, 7 leaves, in front, and 50x2¼ inches, 8 leaves, rear; irreversible steering gear; external con-acting brakes on drive shaft; internal expanding on ar wheels; spark and throttle control on top of eering wheel; 18-gallon gasoline tank, under front at; weight complete, 2500 lbs.; equipment, 2 gas mps, 2 oil side lamps, 1 tail lamp, horn, generator, ols and tire repair outfit.



BUICK TOURING CAR, MODEL D, $2000.

ary sector; 16-gallon gasoline tank, under front equipment, tool repair outfits, gas headlights, oil lamps, tail lamp, horn and generator.



BUICK RUNABOUT, MODEL S, $2000.

Buick Model S has the same specifications as M D touring car, with the exceptions of the wheel which is 106 inches; either single or double ru seat is furnished; double rumble seat, $50 e price of Model S, $2000.

BUICK TOURING CAR, MODEL F, $125

Buick Model F Touring Car; seats 5; price, $ 2-cylinder, horizontal, 4-cycle, water-cooled, 4¼ bore, 5-inch stroke, 22 H. P. motor, under suspended from cross members; babbitt metal and cam shaft bearings; jump spark ignition; st and dry cells; mechanical force feed lubrication; clutch; planetary change speed gear, 2 forward s and 1 reverse, direct on high, operated by foot p and side hand lever, mounted in plain bearings; drive; divided rear axle, tubular front axle; inch tires; Timken roller front wheel bearings Hyatt roller rear wheel bearings; 92-inch wheel angle iron frame; ¾ elliptic springs, 37x1¾ inch leaves, in front, and full elliptic, 44x1¾ inch leaves, in rear; pinion and sector steering gear ternal expanding hub brakes; control details; pedals for slow speed, reverse, and brake; spark throttle levers on top of steering wheel; stati sector; 15-gallon gasoline tank, under hood; ment, full repair and toll outfit, 2 gas headligh oil lamps, 1 tail lamp, horn and generator.

BUICK RUNABOUT, MODEL J, $1150.

Buick Model G Runabout, turtle back; price, $ tires, 30x3½ inches; springs, 7 leaves in rear; al er specifications same as for Model F touring

Speedwell Gasoline Cars.

Made by the Speedwell Motor Car Co., Dayton,

Speedwell Model C roadster; 4-cylinder, ver

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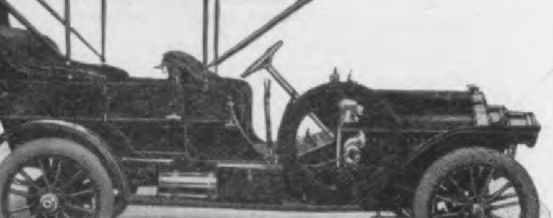
SPEEDWELL MODEL C, $2500.

ar; brakes, internal and external on rear wheels; and throttle on steering wheel; auxiliary foot le; 21-gallon gasoline tank under seat; 2 or 3 pas-s; equipment: full set of lamps, generator, tools, etc.; price, $500.



SPEEDWELL MODEL B. PRICE, $4250.

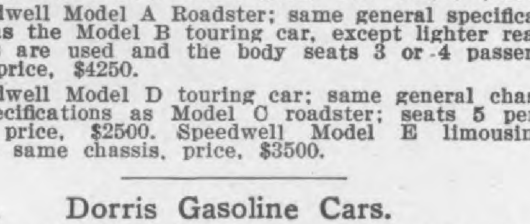
dwell Model B touring car; 6-cylinder, vertical, cooled, 4½ by 5, 60 H. P. motor, on sub-frame the hood; Parson's white brass crank shaft gs, bronze cam shaft bearings; jump spark ig-from storage batteries and magneto optional; le force-feed lubrication; cone clutch; 3-speed reverse sliding change gear on roller bearings, on the high; shaft drive to floating rear axle, axle I-section; 132-inch wheel base; 36-inch on ball bearings; 4-inch front tires and 4½-ar tires; prest steel frame and sub-frame; semi-front springs, 44 by 2¼, 10 leaves, full ellip-ar springs, same dimensions; worm and seg-steering gear; internal and external brakes on heels; spark and throttle on steering wheel; ry foot throttle; 21-gallon gasoline tank under eat; passenger capacity 7; equipment: full set ps, generator, tools, jack, etc. Price, $4250.

dwell Model A Roadster; same general specifica-s the Model B touring car, except lighter rear are used and the body seats 3 or 4 passen-price, $4250.

dwell Model D touring car; same general chas-ecifications as Model C roadster; seats 5 per-price, $2500. Speedwell Model E limousine same chassis, price, $3500.

Dorris Gasoline Cars.

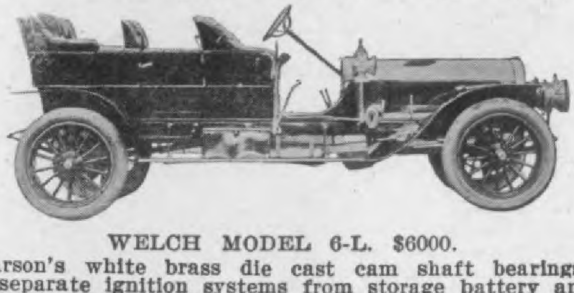
by the Dorris Motor Car Co., St. Louis, Mo.



DORRIS MODEL C, $2500.

s Model C tonneau car; 4-cylinder, vertical, ooled, 4-cycle, 4¼x5, 30 H. P. motor, under on three-point suspension; mechanical valves d; Parson's white brass crank shaft and cam bearings; jump spark ignition, with Atwater-park generator and dry cells; mechanical lubri-multiple disc clutch; selective, 4-speed change n plain bearings, direct on third speed, operated d lever; shaft drive to live rear axle; I-section

mounted on frame from integral arms of the bronz crank case; mechanically operated valves, inverte at 45 deg. angle in cylinder head, operated by rocke arms; bronze babbitt lined crank shaft bearings



WELCH MODEL 6-L. $6000.

Parson's white brass die cast cam shaft bearings 2 separate ignition systems from storage battery an Bosch magneto; force-feed lubrication by Hill pre cision oiler; multiple disc clutch; individual clutc transmission on bronze babbitt lined bearings, give 3 speeds forward and 2 reverse, direct on the high operated by one lever forward and one reverse, gear always in mesh; shaft drive to live rear axle; one piece I-section drop forged front axle; 138-inch whee base; 36-inch wheels, 5-inch tires; bronze bab bitt lined wheel bearings; semi-elliptic fron springs, 40-inch by 2¼, 11 leaves, full elliptic spring at the rear, 45 inches, 2¼, 9 leaves; prest chrom nickel steel channel section frame, sub-frame angl iron, worm and sector steering gear; Welch interna and external brakes; 28-gallon gasoline tank unde the front seat; 6 gallons in reserve; 5 or 7 passen gers; weight, complete car, 4000 lbs.; equipment lamps, 2 gas, 2 oil, 1 tail; Prest-O-Lite tank, too kit and horn, extra set of spark plugs; price, $6000.

WELCH MODEL 6-I LIMOUSINE. $7000.

Welch Model 6-I limousine; general specifications the same as Model 6-L touring car; weight, complete, 4400 lbs., with same equipment; price, $7000.

Welch Model 4-L touring car; 4-cylinder, water-cooled, motor, using Welch honeycomb radiator; bore 4⅝, stroke 5, 50 H. P. motor under hood, supported from the frame on integral arms from the bronze crank case; inverted mechanically operated valves set in the head at 45 degrees; bronze babbitt lined crank shaft bearings; die cast Parson's white brass cam shaft bearings; 2 separate ignition systems, using storage battery and Bosch magneto; force-feed lubrication; individual clutch transmission, using multiple disc clutches, mounted on bronze babbitt lined bearings, giving 3 speeds forward and 2 reverse, direct on the high speed, operated by one lever forward and one reverse; shaft drive to live rear axle; I-beam one-

WELCH MODEL 4-L TOURING CAR. $4500.

piece drop forged front axle; 129-inch wheel base; 36-inch wheels on bronze babbitt lined bearings; 4½-inch tires; prest nickel steel channel section frame; angle iron sub-frame; semi-elliptic front springs, 40 by 2¼, 9 leaves, full elliptic rear springs, 45 inches

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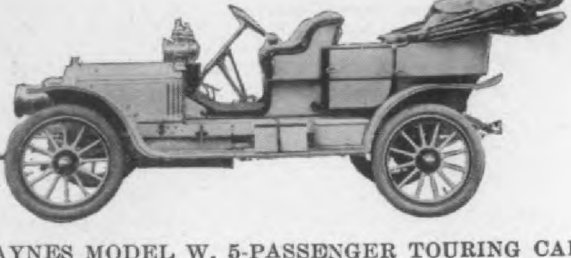


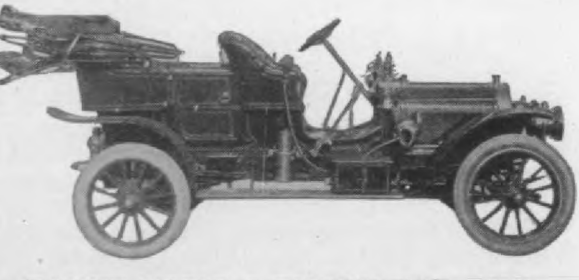
AYNES MODEL W, 5-PASSENGER TOURING CAR. $3000.

Haynes Model W, 5-passenger touring car, with aight line body; motor, 4 cylinders, cast in pairs; ter-cooled, 4¾x5-inch, 45 H. P., under the hood front; valves mechanically operated on opposite les of the cylinders; crank shaft bearings plain and ecial roller bearings; cam shaft bearings plain; ig-ion, jump spark from dry batteries and Bosch mag-to; force feed; lubrication; band clutch; selective ding change speed gear, mounted on roller bearings, ving 3 speeds forward and 1 reverse, direct on th, operated by hand lever; shaft drive to live rear le; front axle I-section drop forging; 108-inch wheel se; 34-inch wheels, on Timken roller bearings, fitted th 4-inch tires; prest steel frame; semi-elliptic rings front and rear, front, 34½x2 inches, and rear, x2 inches; adjustable worm and gear steering; in-rnal and external expanding and contracting brakes rear wheel hubs, foot pedal and hand lever con-l; passenger capacity, 5; 20-gallon tank, under nt seat; weight, complete, 3000 lbs.; price, with mps, horn, full set of tools, $3000.

AYNES MODEL U, 7-PASSENGER TOURING CAR, $3750.

Haynes Model U straight line body, 7-passenger uring car; motor, 4 cylinders, 5½x6, water-cooled, H. P., under the hood at the front, supported by ns from the upper half of the crank case; valves opposite sides, mechanically operated; general assis specifications as regards ignition, oiling and ange speed gears same as Model S; wheel base, 3 inches; wheels, 36 inches, mounted on Timken ler bearings and fitted with 4½-inch tires; prest el frame, semi-elliptic springs front and rear, nt 39½, width 2½; rear, 45½, width, 2½; adjust-le worm steering gear; internal and external brakes rear wheels, operated by foot and hand levers, ark and throttle on steering wheel; 20-gallon gaso-e tank, under front seat; complete car weight, 50 lbs.; price, with lamps, horn and full set of ols, $3750.

Haynes Model U Roadster, same chassis specifica-ns as Model U touring car. Haynes Model U mousine, same specifications as Model U touring r. Haynes 1908 cars described in our December, 07, issue, page 102.



HAYNES MODEL S TOURING CAR, $2500.

Haynes Model S, 5-passenger, straight line body uring car; motor, 4 cylinders, cast in pairs, water-oled, 4¼x5, 30 H. P., located in the front by arms

foot lever and hand lever; 18-gallon gasoline under the front seat; complete car weight, 2500 price, with lamps, horn and full set of tools, $2

Single Centre Gasoline Cars.

Made by the Single Centre Buggy Co., Evansville,

SINGLE CENTRE AUTO BUGGY, $675.

Single Centre Auto Buggy; roadster style of b price, $675; 2-cylinder, opposed, water-cooled, 4-c motor, 5-inch bore, 4-inch stroke, 15-17 H. P., set der hood in front, suspended from lugs on en cylinders; mechanically-operated valves; ignition rent from dry cells; self-contained lubricating sy in engine; friction transmission, mounted on r bearings; double chain drive; 1⅜-inch solid tires inches in front and 38 inches in rear; Timken r wheel bearings; 84-inch wheel base; 2-inch s steel frame; elliptic springs, 36x1½ inches, 4 le front and rear; reversible steering gear; two band reverse brakes on transmission; side lever spark throttle control, also foot accelerator; seats 2 c 12-gallon gasoline tank, located under front weight, 900 lbs.; equipment, 3 lamps and horn.

SINGLE CENTRE ROADSTER, $800.

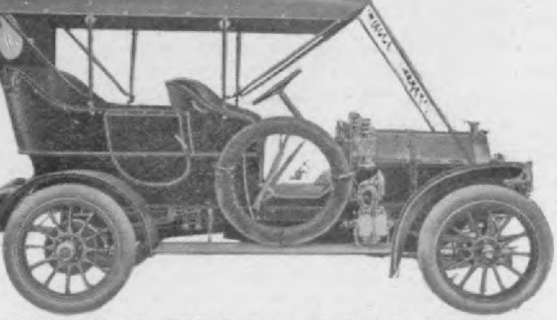
Single Centre Roadster; price, $800; wheel base inches; 32x3-inch tires; all other specifications as for the Auto Buggy. Described in our Jan 1908 issue, page 110.

Chief Gasoline Cars.

Made by Chief Mfg. Co., 624 Ellicott Sq., Bu N. Y.

CHIEF MODEL A RUNABOUT, $600.

Chief Model A Runabout; 2-cylinder, vertical, w cooled, 2-cycle, 3½x4, 10-12 H. P. motor, front, u hood, on four-point suspension; babbitt crank s bearings; jump spark ignition from dry cells;



OLBURN TOURING CAR, MODEL C, $3250.

burn 5-passenger Model C touring car; price,); 4-cylinder, 4-cycle, 4½x5, 30 H. P. motor in under hood; Bosch high tension magneto igni- system; double pump force feed oiler; 4 speeds ard, direct on third, selective type transmission,

OLBURN ROADSTER, MODEL D, $3250.

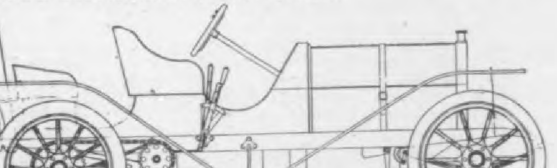
ted on Hess-Bright bearings; cone clutch; 4 s on rear wheels; floating type rear axle; drop d I-section steel front axle; springs, 50½x2 ins.; s on Timken roller bearings; with roadster body, chassis specifications for the touring car, $3250.

Tincher Gasoline Vehicles.

by the Tincher Motor Car Co., South Bend, Ind.

HER MODEL H 7-PASSSENGER CAR, $6500.

cher Model H straight line body, 7-passenger g car; 4-cylinder, vertical, water-cooled motor, 6, 50 H. P., under the hood; mechanical valves ad operated by overhead cam shaft; crank shaft ngs, alligator metal; cam shaft bearings jump spark ignition from storage battery and on; splash and centrifugal force-feed lubrication; acting band clutch; 4-speed selective sliding e gear, on annular ball bearings, direct on the double chain drive to solid truck I-section rear front axle same; 127-inch wheel base; 36-inch s on annular ball bearings; 4-inch front and 5- rear tires; nickel prest steel frame, no sub- ; semi-elliptic springs front and rear; front, 2 inches, 8 leaves; rear, 52 by 2¼ inches, 10 ; segment and pinion steering gear; four brakes ar wheel drums; spark and throttle control on nary sector on steering wheel; 32-gallon gaso- tank in the rear of frame; complete weight, lbs.; special features: Krupp nickel chrome used throughout; price, $6500.



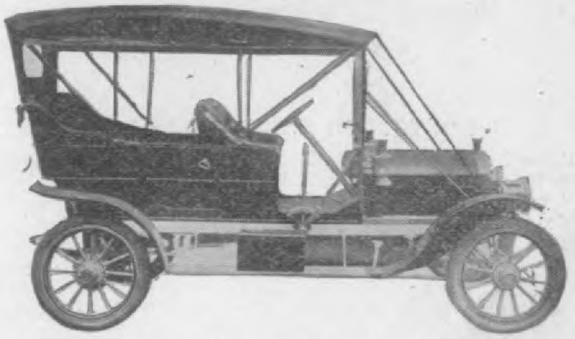
1-section rear axle; front axle same; 110-inch wh base; 36-inch wheels on annular ball bearings; 3 inch front and 4-inch rear tires; semi-elliptic sprin front and rear; front, 32 by 2, 7 leaves; rear, 50 2¼, 8 leaves; segment and pinion steering gear; brakes on rear wheels; spark and throttle control steering wheel; gasoline capacity, 32 gallons at re of frame; seating capacity, 3; weight, complete, 27 lbs.; price, with complete equipment, $5500.

6-CYLINDER TINCHER ROADSTER, $7500.

6-cylin. Tincher roadster; motor, 6-cylin., vertic water-cooled, 5 by 6, 90 H. P., under hood, suppo ed on four arms to main frame; overhead cam sha with mechanical valves in head; alligator metal cra shaft and cam shaft bearings; jump spark ignitio from storage battery and Bosch magneto; splash a centrifugal force-feed lubrication; contracting ba clutch; 4-speed selective sliding change gear, dire on the fourth and mounted on annular ball bearing double chain drive to Krupp I-section rear axle; section front axle; 127-inch wheel base; 36-in wheels on annular ball bearings; 4-inch front a 5-inch rear tires; semi-elliptic springs front a rear; front, 32 by 2, 8 leaves; rear, 52 by 2¼, leaves; segment and pinion steering; 4 brakes on re wheel drums; spark and throttle control on steeri wheel; 32-gallon gasoline tank in rear of frame; sea ing capacity, 3 or 4 persons; weight, complete, 29 lbs.; completely equipped, $7500. Special featur Krupp chrome nickel steel throughout.

Blomstrom "30" Gasoline Cars.

Made by the Blomstrom Mfg. Co., Leib & Wight Sts Detroit, Mich.



BLOMSTROM "30" TOURING CAR, $2250.

Blomstrom "30" 5-passenger touring car; pric $2250; 4-cylinder, vertical, water-cooled, 4 3-16 bor 4½ stroke, motor under hood in front; prest ste frame; half-elliptic springs in front and full ellipt in rear; dropt tubular rear axle, Weston-Mott re axle; shaft drive, direct on high; 3 speed forwa and reverse, selective type transmission; wheel bas 110 ins.; jump spark ignition; spark and thrott control on top of steering wheel; 32x3½-in. clinch tires; mechanically operated valves; mechanical oile irreversible steering gear; internal and external hu brakes; 15-gal. gasoline tank; double cone clutc weight, 2150 lbs.; equipment: 2 gas and 3 oil lamp horn and tools. Described in our November, 190 issue, page 63.

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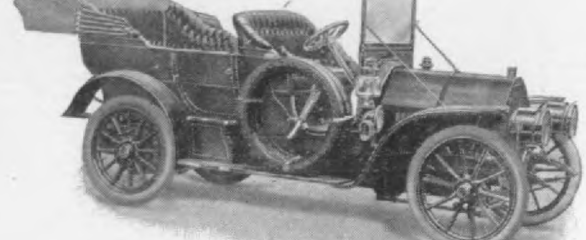
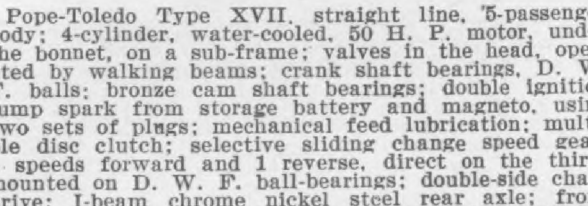


POPE-TOLEDO TYPE XVI. $4250.

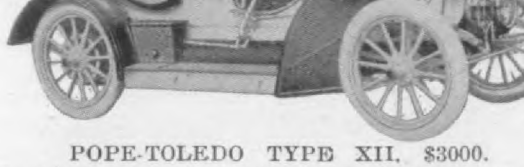
Pope-Toledo Type XVI, curved line, 5-passen-er touring cars; 4-cylinder, vertical, water-cooled motor; 50 H. P., located under the hood, on sub-frame; valves in cylinder heads, operated y walking beams; D. W. F. crank shaft ball-bear-ngs; bronze cam shaft bearings; double ignition, 2 ets of plugs, storage battery and magneto; sight feed ubrication; multiple disc clutch; selective sliding hange speed gear, 4 speeds forward and 1 reverse, irect on the third speed; double chain drive to rear xle of I-section chrome nickel steel; front axle, I-ection chrome nickel steel; 115-inch wheel base; 6-inch wheels; 4-inch front and 4½-inch rear tires; heel bearings, .D W. F.; prest steel frame, inverted prest steel sub-frame; semi-elliptic front springs, 8x2 inches, 7 leaves; semi-elliptic rear springs 50x2 nches, 7 leaves; irreversible worm and sector steering ear; 2 brakes on the rear wheels and 1 on the driv-ng shaft; spark and throttle control on the steering heel; passenger capacity, 5; 25-gallon gasoline tank n the rear; weight complete, 3200 lbs.; equipment, 5 amps, complete set of tools; price, $4250. Special eature: prest steel body.

POPE-TOLEDO TYPE XVII. $4500.

Pope-Toledo Type XVII, straight line, 5-passenger ody; 4-cylinder, water-cooled, 50 H. P. motor, under he bonnet, on a sub-frame; valves in the head, oper-ted by walking beams; crank shaft bearings, D. W. . balls; bronze cam shaft bearings; double ignition ump spark from storage battery and magneto, using wo sets of plugs; mechanical feed lubrication; multi-le disc clutch; selective sliding change speed gear, speeds forward and 1 reverse, direct on the third, nounted on D. W. F. ball-bearings; double-side chain rive; I-beam chrome nickel steel rear axle; front xle the same; 126-inch wheel base; 36-inch wheels; -inch front and 4½-inch rear tires, mounted on . W. F. bearings; prest steel inverted U-section rame; prest steel sub-frame; semi-elliptic springs ront and rear; front, 38x2, 6 leaves, and rear, 52x2, leaves; steering gear, irreversible worm and sec-or; brakes, 2 on rear wheels and 1 on driving shaft; park and throttle levers on steering wheel; 27-gallon asoline tank, in the rear; passenger capacity, 5; veight complete, 3400 lbs.; equipment, 5 lamps, com-lete set of tools; price, $4500.



POPE-TOLEDO TYPE XVIII RUNABOUT. $4500.

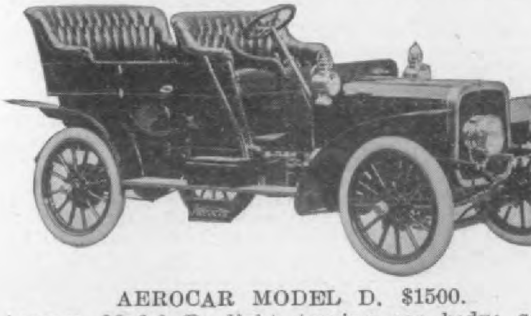


POPE-TOLEDO TYPE XII. $3000.

ings; bronze cam shaft bearings; double jump ignition, 2 sets of plugs, including storage b and magneto; mechanical feed lubrication; mu disc clutch; 4 speeds forward and 1 reverse, sel sliding change speed gears, on D. W. F. bearing rect on the third speed; double chain drive; I-s chrome nickel steel axle; front axle, same; 10 wheel base; 36-inch wheels, on D. W. F. bearin inch front, 4½-inch rear tires; semi-elliptic s front and rear; front, 30x1¾, 7 leaves, and rea 1¾, 7 leaves; irreversible worm and segment steering gears; 2 brakes on rear wheels and driving shaft; capacity, 5 persons; 17-gallon ga tank, in the rear; equipment, 5 lamps and co set of tools; price, $3000. 1908 Pope-Toledo described in our January, 1908, issue, page 190

Aerocar Gasoline Cars.

Made by the Aerocar Motor Co., Detroit, M



AEROCAR MODEL D. $1500.

Aerocar Model D, light touring car body; s persons, weighs complete, 2000 lbs.; motor, 4 cyl air-cooled; bore 4-inch, stroke 4-inch, 20 H. P.; on sub-frame, under hood; valves in the head o by rocker arms; ignition jump spark, from battery with dry cells in reserve; force feed l tion; multiple-disc clutch, 3 speed sliding change mounted on roller and ball-bearings; shaft front axle seamless steel tube; tires 34x3½ wheels on ball-bearings; wheel base, 104 inches; prest steel; semi-elliptic springs in front and inches in width, front 40 inches long, with 6 and the rear 42 inches long, with 8 leaves; s by nut and screw; 2 sets of brakes, emergency mission brake and rear hub expanding brakes; line capacity, 17 gallons, in tank under front equipment: 5 lamps, generator, French tube carpet, tool and tire kit. Price, $1500.

AEROCAR MODEL E TOURING RUNABOUT.

Aerocar Model E Touring Runabout; same chas Model D, but is fitted with the touring runabout suitable for carrying 3 persons, the rumble seat removable; car complete weighs 1800 lbs. Price,

Aerocar Model F Touring Car; seats 5 perso cylinder, water-cooled, 40 H. P. motor, 5x5, 1 on the sub-frame, under the hood; valves on one the crank shaft bearings are bronze and the shaft bearings are Babbitt; ignition jump spark storage battery, dry cells in reserve; lubrication feed; multiple disc clutch; 3 speed sliding gear, mounted on ball and roller bearings; shaft front axle is of seamless steel tubing; 34-inch w on ball-bearings, fitted with 4-inch tires, fron rear; wheel base, 115 inches; frame prest steel; elliptic springs, front and rear, 2 inches wide,

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HMOND MODEL I, 5-PASSENGER TOURING CAR, $2000.

chmond Model 1, 5-passenger touring car; price 0; 4-cylinder, 4-cycle, air-cooled, 4¼-inch bore 4½-inch stroke; 30 H. P. motor, set in front r hood, bolted to main frame; mechanically oper- valves; 5 crank shaft bearings and 3 cam shaft ings; jump spark ignition by storage and dry ; splash lubrication; cone clutch; 3 speed selective ng change gear, direct on high, operated by hand- ; mounted on plain bearings; shaft drive; tu- rear axle and I-beam front axle; 34x4-inch tires; r wheel bearings; 108-inch wheel base; angle iron armored frame; semi-elliptic springs, front and 38x2-in, 7 leaves in front and 40x2-inch, 6 s rear; sector and pinion steering gear; internal nding and external constricting brakes on rear ; spark and throttle control on steering wheel. foot pedal throttle control; 17-gallon gasoline under foot seat; weight 2400 pounds; equipment. s lamps and generator, 2 oil dash lamps, tail s and tools.

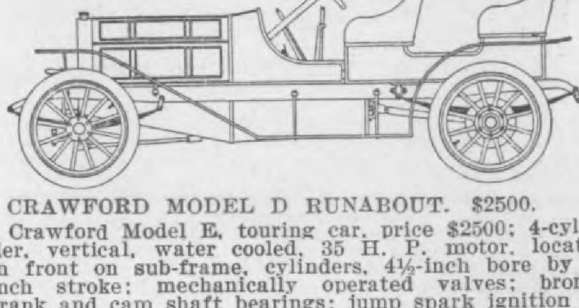
RICHMOND 4-PASSENGER TOURING CAR.

chmond Model H, 4-passenger touring car; 4- nder, 4-cycle, vertical, air-cooled, 4-inch bore and ke, 26 H. P. motor, set under head in front main frame; mechanically operated valves; 5 k shaft and 3 cam shaft bearings; jump spark ion by dry cells; splash lubrication; cone clutch; ressive sliding change speed gear, 3 speed for- l and reverse, operated by hand lever, mount- n plain bearings; shaft drive, tubular rear axle I-beam front axle; tires 30x3½-inch; roller wheel ings; 91-inch wheel base; angle iron wood armor- rame; elliptic springs front and rear, 36x1¾-inch, eaves in front and 38x1¾-inch, 5 leaves in sector and pinion steering gear; internal ex- ling brakes on hubs; spark and throttle control by ls on steering wheel, also throttle control by lever; 12-gallon gasoline tank under front seat; ght, 18,000 pounds; equipment, 2 gas lamps and rator; 2 oil dash lamps, tail lamp and tools. chmond, Model J, runabout; 4-cylinder, 4-cycle ooled, 3¾-inch bore by 4-inch stroke, 22 H. P. or; progressive sliding change gear, 2 speeds, ard, direct or high; 30x3-inch tires; semi-elliptic t springs and full elliptic rear springs, 4 leaves ear; 88-inch wheel base; other specifications same for Model H touring cars.

Crawford Gasoline Cars.

e by the Crawford Automobile Co., Hagerstown, Md.

re-enforced front axle; tires, 34 by 4-inch; ball wh bearings; wheel base, 114-inch; prest steel ma frame and angle iron sub-frame; semi-elliptic sprin front and rear, 42 by 2-inch, 8 leaves, in front, a 49 by 2-inch, 8 leaves, in rear; irreversible type ste ing gear; 4 internal expanding brakes; seats 5; gallon gasoline tank under front seat; weight, 2600 l



CRAWFORD MODEL D RUNABOUT. $2500.

Crawford Model E, touring car, price $2500; 4-cyl der, vertical, water cooled, 35 H. P. motor, locat in front on sub-frame, cylinders, 4½-inch bore by inch stroke; mechanically operated valves; bro crank and cam shaft bearings; jump spark ignition storage or dry cells, magneto extra; force feed lub cation; multiple disc clutch; selective type cha speed gear, three speeds forward, direct on hi operated by side lever, ball bearings; double ch drive; tubular front and rear axles; tires, 34 by 4-in ball wheel bearings; wheel base, 106-inch; prest st main frame; angle iron sub-frame; semi-elliptic spri front and rear, 42 by 2-inch, 7 leaves, in front, 49 2-inch, 7 leaves, in rear; band brakes on rear and transmission cross shaft; 5-passenger capaci 15-gallon gasoline capacity, tank under seat kno as Model D; weight, 2500 lbs. This chassis is a furnished with a runabout body seating three; wh base, 114 inches; price $2500; weight, 2200 lbs. other specifications are the same as for the tour car.

CRAWFORD MODEL F TOURING CAR. $3500

Model F touring car, price $3500; 7-passengers; 4-c inder, water cooled 50 H. P., vertical motor; cy rders, 5-inch bore by 5½-inch stroke; three speeds ward, direct on third; 2¼-inch springs front and re 9 leaves in rear springs; weight 2800 lbs.; all ot specifications are the same as for Model G touring c 1908 models described in our Februray, 1908, iss page 88.

Hay Berg Gasoline Cars.

Made by Hay Berg Motor Car Co., Milwaukee, W

HAY BERG MODEL B ROADSTER, $2000.

Hay Berg Model B roadster, runabout body rumble seat; price, $2000; 4-cylinder, vertical, wa cooled, 4-cycle, 4¼ bore, 4¾ stroke, 28-30 H. P. m under hood on sub-frame; all valves on one side; B son's white brass crank and cam shaft bearings; ju spark ignition with storage battery; self-contai oiling system; cone, cork inserted clutch; se tive sliding change speed gear 3 forward spe and reverse, direct on high, operated by hand le and mounted on roller bearings; shaft drive; Tim

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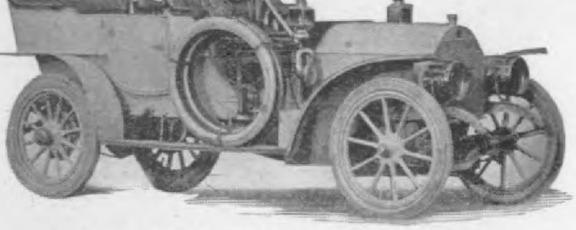
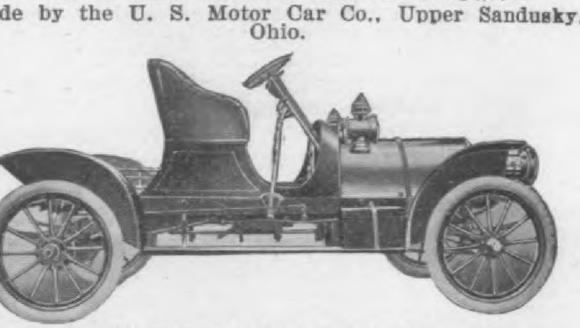


CLEVELAND TOURING CAR, $3500.
leveland touring car; 4-cylinder, 4-cycle, 40-45 H. water-cooled motor, located under hood and sus-nded on sub-frame; cylinders, 5-inch bore and stroke; aight line metal body; mechanically operated valves; rsons white metal crank shaft bearings and bronze n shafts; 2 systems of ignition, by storage battery l magneto; pump lubrication, oil reservoir in crank e; coneoidal multiple disc clutch, having 52 discs, ective change gear, 4 speeds forward and reverse. ect on third, running in F. & S. annual ball-bear-s; shaft drive; floating type rear axle, I-beam nt axles; tires 34x4-inch front, 36x4½-inch rear; l wheel bearings; wheel base, 122 inches; half-ptic front springs, 43x2 inches, 7 leaves, in front; tform rear springs, 50x2 inches, 11 leaves; nut l worm steering gear; internal expanding brakes rear wheels; foot accelerator; spark and throttle wheel; seating capacity, 7; weight, 2800 lbs.; gaso-e capacity, 21 gallons, tank under front seat; equip-nt, 5 lamps, generator, French horn, oak tool box. ce, $3500. This chassis is also furnished with about and limousine body. 1908 Cleveland cars cribed in our December, 1907, issue, page 67.

U. S. Air-cooled Gasoline Car.

de by the U. S. Motor Car Co., Upper Sandusky, Ohio.



U. S. MODEL 2-PASSENGER CAR, $900.
. S. Model 2-passenger car; price, $900; 4-cylinder, tical, air-cooled, 4-cycle, 3¼-inch bore and stroke, H. P. motor, located under hood on sub-frame; me-nical valve action; Babbitt crank and cam shaft rings; jump spark ignition, by dry cells; force feed splash lubrication; contracting band clutch; slid-progressive change speed gear, 3 forward speeds reverse, direct on high; operated by hand lever, nted on ball-bearings; shaft drive; ball-bearing live r axle and tubular front axle; 32x3-inch tires; ball eel bearings; 96-inch wheel base; hickory frame; l angle sub-frame; full elliptic springs, 40x1¾ hes, 5 leaves, front and rear; Brown-Lipe steering r; 2 brakes on rear hubs and 1 on driving pinion ft; spark and throttle control on steering post; 10-lon gasoline tank under seat; weight, 1450 lbs.; ipment, full kit of tools, pump, tire and repair lit; special features; cold air valve, controlled by ottle lever, shuts off mixture and admits air to nder; acts as a brake and is an efficient cooling ncy. Described November, 1907, page 146.

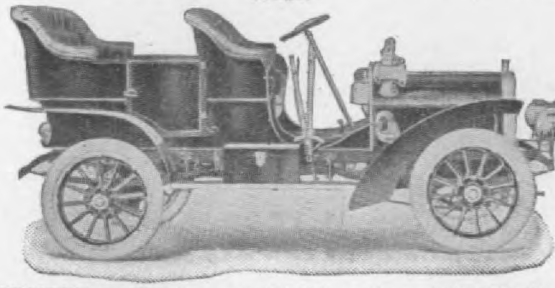
Firestone Air-cooled Motor Buggies.

Made by Columbus Buggy Co., Columbus, O.

on Timken bearings; 1⅜-inch solid tires; 7½ wheel base; armored wood frame, steel sub-fra full elliptic springs, 36 inches long in front and inches rear; side lever steering; countershaft br and emergency brakes on tires; single lever con passenger capacity, 2 persons; weight, 1200 lbs. gallon gasoline tank, back of seat; equipment, horn, tools and lamps.

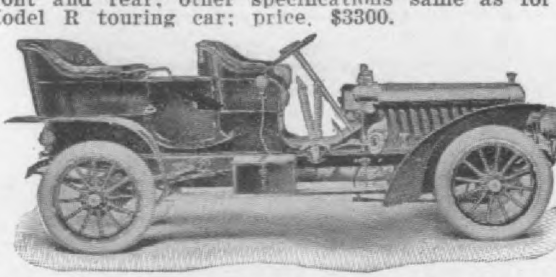
Stevens Duryea Gasoline Cars.

Made by the Stevens Duryea Co., Chicopee F Mass.

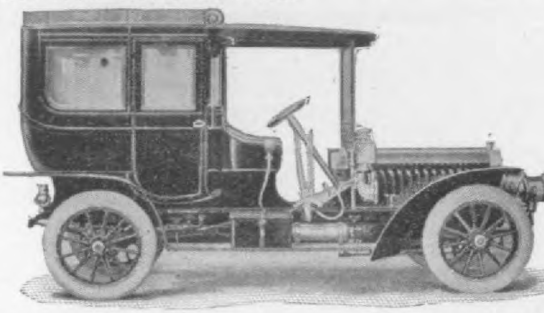


STEVENS-DURYEA MODEL R, 5-PASSENG TOURING CAR, $2500.
Stevens-Duryea Model R, 5-passenger touring price, $2500; 4-cylinder, vertical, 4-cycle, water-coo 3⅞ bore, 4½ stroke, 20 H. P. motor, in front u hood; jump spark ignition; dry batteries; shaft dr 3 forward and 1 reverse sliding change speed g internal expanding brakes on rear wheels and tracting brakes on transmission; multiple disc clu wheel base, 90 ins.; tires, 30x3½ front and rear; p $2500; top, $100 extra.

Stevens-Duryea Model R, limousine; tires, 31x4 front and rear; other specifications same as for Model R touring car; price, $3300.



STEVENS-DURYEA MODEL U, LIGHT SIX, $3
Stevens-Duryea Model U "Light Six;" 6-cylin 35 H. P., vertical, water-cooled, 3⅞ bore, 4¾ str under hood in front; jump spark ignition; sto and dry cells; shaft drive; 3 speed forward and reverse, sliding gear transmission; seats 5; mult disc clutch; 114-in. wheel base; tires, 34x4 ins.; tracting and expanding brakes on rear wheels; p $3500; cape top, $150 extra.



STEVENS-DURYEA MODEL U, LIMOUSINE, $4
Model U limousine; seats 7; other specifications s as for Model U touring car; price, $4500.

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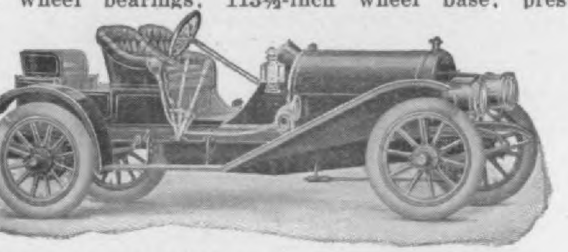
RIUMPH MODEL B TOURING CAR. $3000.
riumph Model B touring car, price $3000; 4-
nder, 4-cycle, vertical, water-cooled, 4¼-inch bore
5-inch stroke, 30 H. P. motor, located in front,
sub-frame, mechanically operated valves; plain
k and cam shaft bearings; jump spark ignition by
age battery and magneto; force feed lubrica-
; disc clutch; four speed, direct on high, selective
ge speed gear, mounted in ball bearings, oper-
by side lever; shaft drive; floating rear axle;
le steel I-beam front axle; 36 by 4-inch tires;
wheel bearings; 113½-inch wheel base; prest



RIUMPH MODEL A ROADSTER. $2250.
l frame main and sub-frame; semi-elliptic springs
t and rear, 40 by 2-inch, 8 leaves in front, and
by 2-inch, 10 leaves, in rear; worm gear steer-
gear; two brakes on each rear hub; spark and
ttle control on top of wheel; seats 5; 20-gallon
line tank under front seat; weight, 2800 lbs.;
pment: 5 lamps, generator, 1 horn and set of
s. Roadster Model A, weight, 2300 lbs.; 16-gal-
gasoline tank under front seat; front springs,
aves, and rear springs, 8 leaves; price $2250; all
r specifications same as for the touring car.

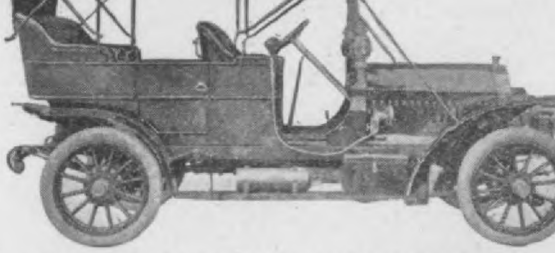
Lindsley Gasoline Pleasure Cars.

e by J. V. Lindsley Co., 2207 College Ave., Indianapolis, Ind.

LINDSLEY RUNABOUT. $475.
dsley runabout, piano box body; 2-cylinder, verti-
10 H. P., air-cooled motor, 4-inch bore and 4-inch
ke, under body; mechanical valves in the head;
k shaft and cam shaft bearings bronze; jump
k ignition, dry cells; force-feed lubrication; plan-
y change speed gear, 2 speeds forward and 1 re-
e, operated by lever and foot pedal; double chain
e to the rear wheels; 70-inch wheel base; 36-
wheels with 1⅛-inch solid tires; elliptic springs,
by 2¼ inches, 5 leaves; tiller or wheel steer, as
red; brakes on rear wheel drums; spark advance
side of seat; foot throttle; carrying capacity, 2
ons; 4 gallons of gasoline under seat; weight,
plete, 850 lbs.; price, $475. Tops, lights, etc., ex-

Perfection Gasoline Cars.

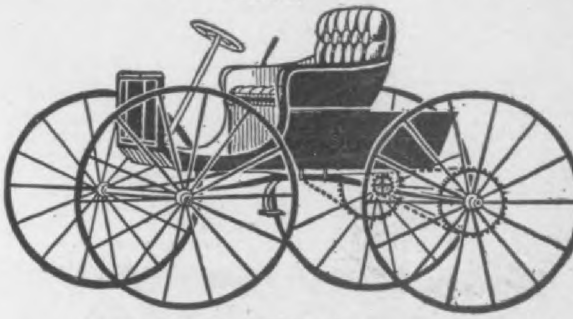
e by the Perfection Auto Works, South Bend, Ind.



PERFECTION 5-PASSENGER CAR. $1850.
semi-elliptic springs front and rear; front, 45x2,
leaves, and rear, 49x2, 7 leaves; worm and sec
steering gear; 2 external brakes on rear wheels,
emergency brake on line shaft; spark and throt
control on steering wheel; 20-gallon gasoline t
under front seat; passenger capacity, 5; weight c
plete, 2250 lbs.; price, with lamps, tire and t
equipment, $1850. Special features: cast alumin
dash and special radiator.
Perfection 6-cylinder car, water-cooled, 4½x5,
H. P.; general specifications, with the exception
wheel base, which is 134 inches, same as the 4-cy
der model; price, $2500.

Cosmopolitan Air-Cooled Gasoline Car

Made by the D. W. Haydock Auto Mfg. Co., Louis, Mo.



COSMOPOLITAN TYPE 4. $625
Cosmopolitan Type 4; 2-cylinder, horizontal, oppos
air-cooled motor, 4x4, 10-12 H. P., motor located
the front, under the hood, suspended by lugs on
cylinders; automatic valves on top; crank shaft be
ings, Parson's white brass; jump spark ignition fr
dry cells; forced sight feed lubrication; friction cha
speed gear, all speeds forward and reverse, fitted w
thrust ball-bearings; single chain drive; 1¼-inch
rear axle; front axle, 1¼ square steel; 87-inch wh
base; high wheels, of large diameter; roller bear
at the rear and plain in the front; 1¼-inch solid ti
2-inch angle steel frame; full elliptic springs fr
and rear, 36x1¼ inches, 5 leaves; rack and pin
steering gear; 1 brake on differential, 1 on each r
wheel; control of friction disc by hand lever
pedal; 8-gallon gasoline tank, under the seat; pass
ger capacity, 2; weight complete, 1000 lbs.; pr
without top, $625; with top, $650.
Cosmopolitan Type 5; 2-cylinder, horizontal, oppos
air-cooled motor and general chassis specifications
Model 4; passenger capacity, 3 persons; price, $
with top.
Cosmopolitan Type 6; general specifications same
the Type 4 runabout; seating capacity, 4 persons, w
rear seat; weight, 1100 lbs.; price, $675, open; $
with extension top.

Walter Gasoline Cars.

Made by the Walter Automobile Co., 49-51 W. 6
St., New York.

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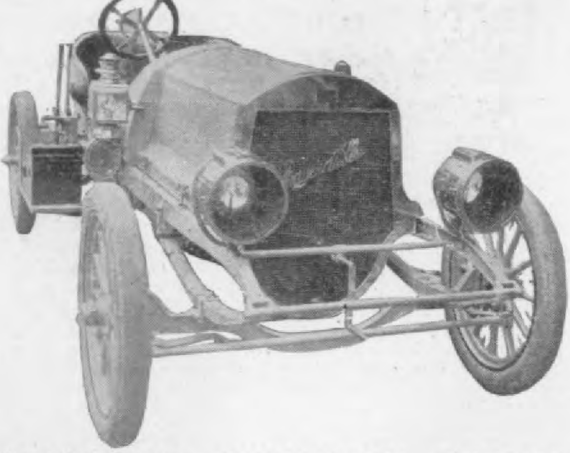
WALTER 7-PASSENGER TOURING CAR. $500



RAYER-MILLER PHILADELPHIA RUNABOUT. $2250.

Frayer-Miller Philadelphia Runabout, price $2250: cylinder, 4-cycle, vertical, air cooled, 24 H. P. otor, located under hood on four-point suspension; linders, 4 1-16 bore, 5⅛ stroke; mechanically op-ated valves; Parsons white brass crank shaft bear-gs and bronze cam shaft bearings; Atwater Kent nition with dry cells; McCord Precision oiler; ne clutch; selective type change speed gear on rear le; 3 speeds forward and reverse, direct on high, erated by hand lever and running in ball bearings; aft drive; floating type rear axle, I-beam front le; tires, 32 by 4-inch; ball wheel bearings; 100-ch wheel base; prest steel main and sub-frame; mi-elliptic springs, 40 by 2-inch, 7 leaves, in front d full elliptic, 38 by 2-inch, 5 leaves in rear; ir-versible steering gear; internal and external brakes rear wheels; spark and throttle control on top steering; seats 2; 20-gallon gasoline tank in back at; weight, 1850 lbs.; equipment: 2 front oil lamps, side lamps, tail light, tool kit and tire holder.

FRAYER-MILLER COMBINATION RUNABOUT. $2500.

Frayer-Miller combination runabout, price $2500, th all combinations; rear springs semi-elliptic, 52 2-inch, 7 leaves; weight 2250 lbs.; 15-gallon gas-ne tank under seat; seats 4. All other specifi-tions are the same as for model Philadelphia Run-out.

FRAYER-MILLER MODEL D TAXICAR.

Frayer-Miller Model D taxicab; 4-cylinder, cal, air-cooled, 4-cycle, 4 1-16 bore, 5⅛ stroke H. P. motor in front under hood; mechanically ated valves on top of cylinder; Parson's white crank shaft bearings and phosphor bronze cam bearings; Atwater-Kent ignition system with cells; McCord force feed lubrication; cone clut speed and reverse, direct on high, sliding cl speed gear, operated by side lever and mounte ball bearings; shaft drive; I-beam front axle; in. tires; prest steel frame, angle iron sub-fr half-elliptic springs, 40x2 ins. in front, and full tic, 44x2 ins. in rear; worm and gear steerin brakes; control details on top of steering gear; 1 gasoline tank under seat; weight, 2500 lbs.; e ment; 2 gas lamps, 2 side and 1 tail oil lamp

Aurora Gasoline Cars.

Made by the Aurora Motor Works, Aurora, I

AURORA RUNABOUT MODEL B, $775.

Aurora 3-passenger Runabout Model B; 2-cyli horizontal opposed, water-cooled, 4½x5, 20 H. P. tor; mechanically operated intake and exhaust va positive feed lubrication; jump spark ignition, two sets of batteries; two speed forward and re planetary transmission, direct on high speed; gear drive; tubular front axle; angle steel fr semi-elliptic springs front, 39 ins. long, 1¾ ins. 4 leaves; platform springs rear, 40x1¾ ins.; base, 80 ins.; 32-in. wheels, equipped with cli or Goodyear quick detachable rims; 3-in. soli pneumatic tires; internal expanding and ext band, camel's hair lined brakes on steel drum rear wheels; spark and throttle control levers steering wheel; weight, about 1500 lbs.; 10-gal. line tank under seat; price, $775, including two oil lamps, one rear oil lamp, chime horn, tire r kit, floor mat and tools. Large compartment at of seat and extending to rear end of body for extra tires, baggage, etc.; this compartment ma removed, leaving flat deck for trunk, baggage, et

C. V. I. Gasoline Cars.

Made by the C. V. I. Motor Car Co., Jackson, I

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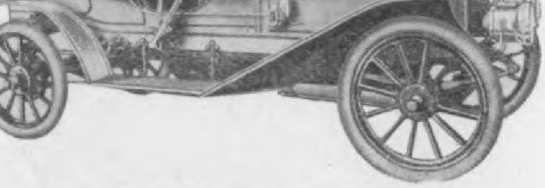


. V. I. 6-CYLINDER RUNABOUT, $4000.

cal oiler and splash system of lubrication; I-section nickel steel front axle and floating type axle; wheel base, 117 ins.; cone, leather faced, inserted, clutch; bevel gear drive; F. & S. im-d bearings; worm and sector steering gear; front ls, 36x3½, rear, 36x4; 16-gal. gasoline tank; ment: 2 headlights, 2 dash lamps, tail lamp, generator, complete tool equipment with jack; $4000. Described in our January, 1908, issue, 98.

V. I. runabout; seats 3 or 4; same chassis spe-tions as for the touring car; price, $4000.

ennegin Air-Cooled Gasoline Cars.

by the Commercial Automobile Co., Chicago, Ill.

nnegine Model G Family and Utility Car, No. 8; inder, 4-cycle, horizontal, air-cooled, 4½x4, 12-14 P. motor, under foot-boards, on three-point sus-on; mechanical valves in cylinder head; adjust-bronze crank shaft bearings, 5 and 8 inches, ctively; bronze cam shaft bearings; jump spark ion, from storage battery, dynamo if desired; feed mechanical lubrication; no clutch; friction mission on roller bearings; no set positions for ls; roller side chain drive; tubular trust axle; ar front axle; 1½-inch solid rubber tires; hard e, grease-packed wheel bearings; 87-inch wheel

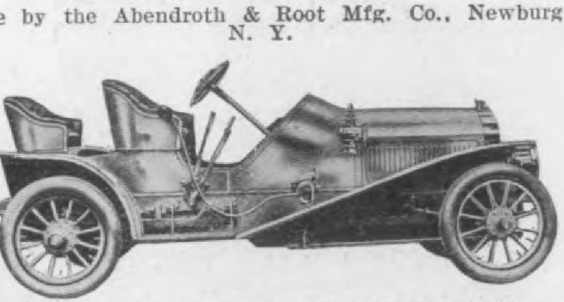
NNEGIN MODEL F PHYSICIAN'S CAR, $650.

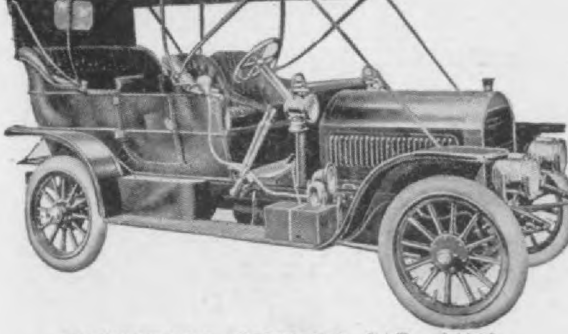
channel steel frame; no sub-frame; full elliptic gs front and rear; front, 34 inches long, 1¼ s wide, 4 leaves; rear, 34 inches long, 1¼ inches 5 leaves; wheel steering with spur gear reduc-external, 10x1¾, double-acting brakes; spark ol by hand on steering column; automatic gov-for gas; capacity, 4 persons; weight, 1200 lbs.; llon gasoline tank, under seat; 1 gallon in re-; equipment, 3 oil lamps, full set tools and oil ; price, $725. Special features: Automatic gov , accessibility and left side control.

nnegin Model F Physician's Car, No. 4. This car uilt on the same chassis as the Model G, but has 75-inch wheel base, and the rear springs con-4 leaves instead of 5; weight, 1100 lbs.; passen-capacity, 2 or 3; price, $650.

Frontenac Gasoline Cars.

e by the Abendroth & Root Mfg. Co., Newburg, N. Y.



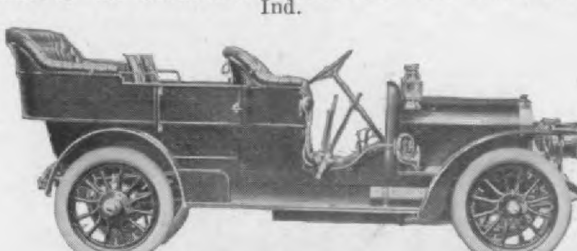


FRONTENAC TOURING CAR, $4000.

in. wheel base; price, $4000. This chassis is al furnished with touring car body, seating 7; weigh 3300 lbs.; price, $4000; also with type E limousi body, weighing 3600 lbs., price, $5000. The price the runabout and the touring car includes the follo ing equipment: full set of lamps, horn, folding ba gage carrier, full set of tools in a metal box running board. 1908 Frontenac cars described in o October, 1907, issue, page 152.

Studebaker Gasoline Cars.

Made by the Studebaker Automobile Co., South Ben Ind.



STUDEBAKER MODEL B 40 H. P. TOURING CA $4250.

Studebaker Model B 40 H. P. touring car; 4-cylind vertical, water-cooled, 4¾x5¼ inches, 40 H. P. mot in front under hood, make and break ignition Simms-Bosch low tension magneto; mechanically op ated valves; 4 speed forward and 1 reverse, dire on third, selective type transmission; cold rolled pr steel frame; 114-inch wheel base; spark and throt levers on steering wheel; stationary segment, ir versible steering by wheel; positive feed mechani oiler; 34-inch wheels; Standard clincher 4½-inch tir brakes, internal expanding on rear axle, actuated hand lever, and external constricting by foot ped dropt forged nickel steel I-beam front axle, mount on ball bearings and composite construction rear ax bevel gear drive; semi-elliptic springs in front a semi-platform in rear; 20-gallon gasoline tank; equ ment, 2 acetylene headlights with generator, two side lights, 1 oil rear light, horn, tire carriers, ga line gage, jack and complete outfit of tools; weig 3050 lbs.; price, $4250. Cape top, $150 extra.

STUDEBAKER MODEL H 30 H. P. TOURING CA

Studebaker Model H 30 H. P. touring car; 4-cylind vertical, water-cooled, 4⅛-inch bore, 5¼-inch stro 30 H. P.; 3 speed forward and 1 reverse; progressi sliding type transmission, controlled by one lev direct drive on third speed; 104-inch wheel base; by 4-inch clincher tires on artillery type wheels; ternal expanding brakes on rear axle and exter constricting on transmission drum; drop forged nic steel I-beam front axle, composite construction b bearing rear axle; bevel gear drive; semi-ellip

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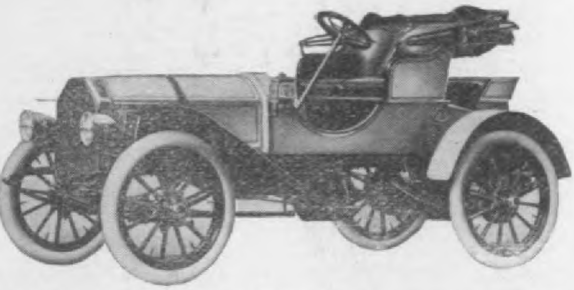
anufactured by the Baker Motor Vehicle Co., Cleveland, O.



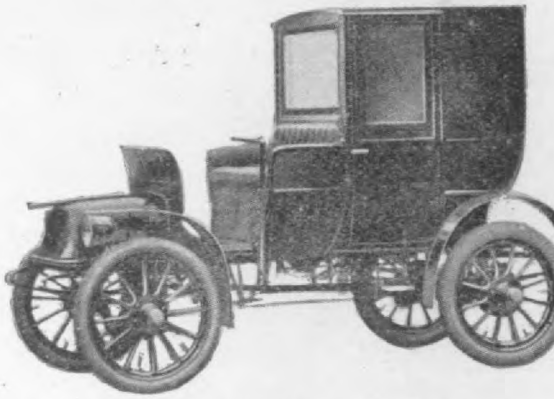
BAKER ELECTRIC MODEL M. PRICE $2500.

Baker Electric Model M, roadster body; motor, 4-e, series wound, mounted in the middle of the assis on a two-point spring suspension (patent ap-ed for); 3½ H. P.; overload capacity, 300 per t.; battery consists of 40 80-volt, 96-ampere hour ide cells; complete weight of battery, 950 lbs.; con-oller, drum, continuous torque system, giving 9 rward speeds and 3 reverse; drive by shaft and el gears; tubular front axle and live rear axle; inch artillery ball-bearing wheels, fitted with 4-h pneumatic tires; armored wood frame; semi-el-tic springs front, 44 inches long, 2 inches wide, 7 ves rear, 50 inches long, 2 inches wide, 7 leaves; o sets of brakes, all internal expanding, one set rear wheel drums, the other on shaft, operated by t levers; equipment, top and shock absorbers. Spe-l features: great mileage, speed of from 3 to 30 les without using resistance. Price $2500.

KER ELECTRIC MODEL L. QUEEN VICTORIA, $1800.

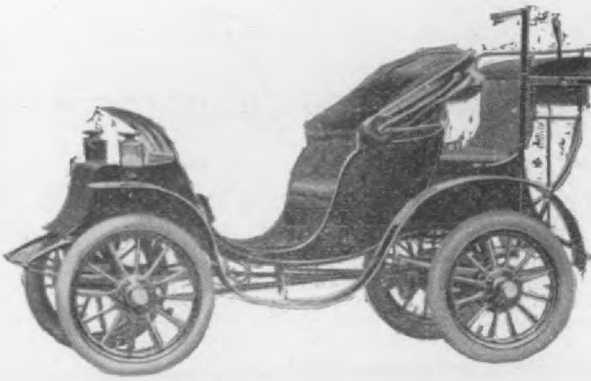
aker Electric Model L, Queen Victoria; 2 H. P. tor, of 300 per cent. overload capacity, 4-pole, les wound, located under the seat, mounted on tubu-frame, so that it is free to oscillate; battery, 24

brakes on rear wheels, pedal operated. Specia tures; batteries in series at all speeds; all par annular ball-bearings; 3 bodies interchangeabl same chassis; speed changes without sparking; mileage on single charge. On this chassis Queen toria Coupe and Extension Coupe bodies are fi



BAKER COUPE. $3000.

Baker Coupe; 2½ H. P. motor, 300 per cent. load capacity; transmission, silent chain reduc shaft and bevel gear drive; batteries, 28 cells, 9 wheel base, 92½ inches; 36-inch artillery wheels by 3½ inches tires front, 36 by 4½ rear, double pneumatics; side lever steering; two internal br on rear axle operated by foot lever, one internal b on transmission shaft operated by controller le semi-elliptic springs front and rear; mileage ca ity, 40 miles on a single charge of battery; p $3000.



BAKER VICTORIA. $3000.

Baker Victoria; price, $3000; wheel base, 86½ inc other specifications same as Coupe.

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BAKER STANHOPE. $1600.

tor, 300 per cent. overload; controller, 3 speeds d and reverse; single chain drive; price, $1600; specifications, same as for Coupe.

BAKER DEPOT CARRIAGE. $3000.

r Depot Carriage; price, $3000; wheel base, otherwise same specifications as Coupe.

BAKER IMPERIAL. $1200.

Imperial; price, $1200; other specifications, s for the Baker Stanhope.

BAKER ELECTRIC MODEL I. $4000.

Baker Electric Model I, with brougham or landaulette body; $4000; motor, 6 H. P., 4-pole, series wound, located in the front of the chassis, in special cradle; overload capacity, 300 per cent.; battery, 40 80-volt, 140-ampere hour Exide cells, weighing complete, 1400 lbs.; drum controller, continuous torque system, giving 6 speeds forward, 3 reverse; drive by Renold silent chain to countershaft and by shaft and bevel gear to the rear live axle; tubular front axle; 34-inch artillery ball-bearing wheels, fitted with 4-inch tires on the front and 4½-inch at the rear; prest steel frame; semi-elliptic springs, front, 40 inches long by 2 inches wide, 8 leaves; rear, 44x2 inches, also 8 leaves; internal and external brakes on rear wheels, operated by pedal and hand levers. Special features: high speed and large mileage on single charge; batteries in series at all speeds; no sparking when changing speeds. With brougham or landaulette body, $4000.

Pope-Waverley Electrics.

Made by the Pope Motor Car Co., Indianapolis, Ind.

POPE-WAVERLEY MODEL 70 VICTORIA COUPE. $1900.

Pope-Waverley Model 70 Victoria Coupe; motor, Pope-Waverley design, double overload capacity; noiseless herring-bone gearing; side lever steering; 2 foot brakes and 1 electric brake; batteries, 30 cells of 11 P. V. Exide or 11 C. B. National, 10 cells in front and 20 in the rear, in compartments; artillery 30-inch wheels; 3-inch front tires, 4-inch rear tires; wheel base, 7 feet 5 inches; price, with removable coupe top, $1900; with leather top, $1700; with both, $2000.

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POPE-WAVERLEY MODEL 65 STANHOPE. $1500.

Pope-Waverley Model 65 Stanhope; general specifi-
cations of the chassis the same as Model 70 Victoria
Coupe; buggy top will be furnished if desired; wheel
base, 5 feet 10 inches.

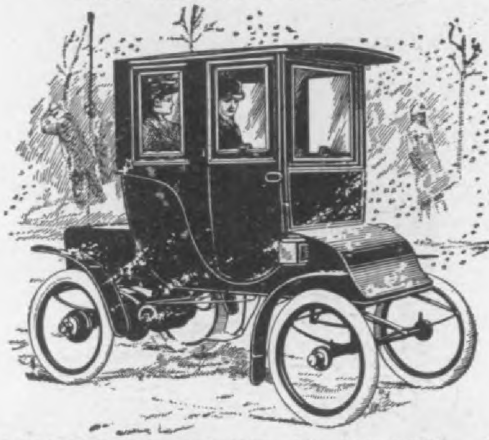
POPE-WAVERLEY MODEL 60 SURREY. $1750
WITHOUT TOP.

Pope-Waverley Model 60 Surrey; 2 special Pope-
Waverley motors of double overload capacity; speed,
5 to 15 miles per hour; battery, 42 cells of 9 V. P.
Exide or 9 C. B. National; 30-inch wheels, with 3½-
inch front and 4-inch rear tires; wheel base, 7 feet
6 inches; with extension leather top, $1900; other
chassis specifications similar to the other models.

POPE-WAVERLEY ELECTRIC MODEL 30 STATION
WAGON. $2000.

Pope-Waverley Model 30 Station Wagon; 2 special
Pope-Waverley motors, double overload capacity;
speed, 5 to 15 miles per hour; side lever steering;
battery, 41 cells of B. V. Exide or 11 C. B. National;

POPE-WAVERLEY MODEL 67 VICTORIA
TON, WITHOUT TOP, $1525.



POPE-WAVERLEY MODEL 26 CHELSEA.
OUT TOP, $1400.

Pope-Waverley Model 26 Chelsea; wheel b
feet 8 inches; general chassis specifications the
as Model 70 Victoria Coupe; with leather top,
with removable coupe, $1700; choice of side
or centre lever steering is given.

POPE-WAVERLEY MODEL 69 RUNABOUT,
WITHOUT TOP.

Pope-Waverley Model 69 Runabout; speed, 5
miles per hour; wheel base, 6 feet; general sp
tions otherwise same as Model 70 Victoria Pl
with leather top, $1225.

Detroit Electric Cars.

Made by the Anderson Carriage Mfg. Co., D
Mich.

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DETROIT INSIDE OPERATED COUPE.

verse speeds of from 8 to 13 miles an hour; prings are 40x1½ ins. full elliptic, and front are 40x1¾ half-elliptic; channel and angle rame; 32x3½-in. wheels fitted with pneumatic 74-in. wheel base; motor is fitted with Hess- ball bearings; double-side chain drive; 2 brakes, ting on rear hubs and the other on the motor equipment: Veeder odometer, Whitney combina- oltmeter, 2 side lamps and 1 tail lamp; also with inside operated coupe body. Described in ptember, 1907, issue, page 65.

Babcock Electric Cars.

by the Babcock Electric Carriage Co., Buffalo, N. Y.

BABCOCK MODEL 5 ROADSTER, $1500.

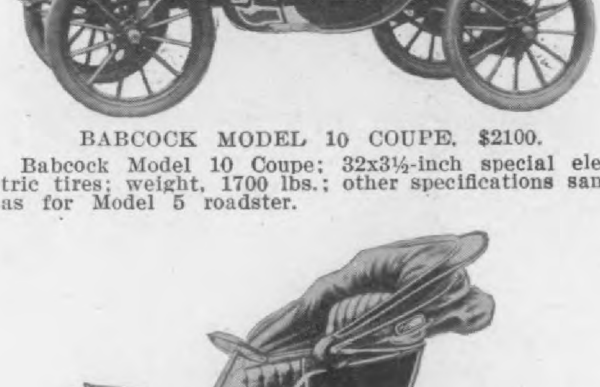
cock Model 5 Roadster; price, $1500; series , 2 H. P. motor; 300 per cent. overload ca- ; Babcock 36 cell, 72 volt, 100 ampere hour y; weight, 675 lbs.; Babcock drum pipe con- ; 5 speeds forward and 2 reverse; drive, Morse first reduction and side roll chain second re- n; tubular front and rear axles; artillery s; annular ball-bearings; 3-inch clincher tires and rear; wood frame reinforced with steel; ½ rm springs, 36x1½ inches, 5 leaves, in front, croll shackle, 38x1½ inches, 5 leaves, in rear; s, one on countershaft, one on each rear hub; l by foot levers, countershaft being operated in tion with electric control; weight, 1600 lbs.; nent, lamps and necessary tools, storm apron. l feature: method of control, one lever cutting ower and applying countershaft brake on any

BABCOCK MODEL 7 BROUGHAM, $4000.

Babcock Model 7 Brougham; weight of battery 1050 lbs.; double series motor, 3 H. P. each; drum type controller; 4 speeds forward and 2 reverse; tires 32x3½ inches front, 36x4 inches rear; springs ful elliptic, 38x1¾ inches, 6 leaves, front and rear; weigh of car, 3000 lbs.; equipment, electric annunciator dome lights, card rack, speaking tub and complet tool equipment.

BABCOCK MODEL 10 COUPE, $2100.

Babcock Model 10 Coupe; 32x3½-inch special elec tric tires; weight, 1700 lbs.; other specifications sam as for Model 5 roadster.



BABCOCK MODEL 1 SPECIAL STANHOPE, $180

Babcock Model 1 Special Stanhope; price, $1800 3 H. P., series-wound motor; 300 per cent. overloa capacity; motor located on rear axle; 40 cell, 8 volt, 120 ampere hour Babcock battery; weight, 80 lbs.; Elwell-Parker controller; 3 regular and 3 a celerated speeds forward and 2 reverse, with acceler tor; gear and pinion drive; 4-inch front axle and sp cial rolled revolving rear axle; 32-inch front and 3

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COLUMBIA MARK 68 ELECTRIC.

Columbia Mark 68; brougham or landaulette body; General Electric high-speed motor, mounted by brackets to the main frame; Exide 44-cell battery, 168 ampere hours, at 42-ampere rate; battery weight, 1885 lbs.; roller type controller, 5 speeds ahead and 3 reverse; drive by double reduction gears; live axle at the rear; I-section front axle; artillery wheels, on Timken bearings; front tires 815x105 mm.; rear, 820x 120; prest steel frame; semi-elliptic springs front and rear; 2 sets of brakes, foot lever operated; weight complete, 3700 lbs.; equipment, toilet cases, umbrella rack, electric lights, etc.; landaulette, brougham, hansom and Victoria bodies placed on this chassis.

COLUMBIA MARK 693 ELECTRIC.

Columbia Mark 693 Electric, fitted with Victoria phaeton or inside-operated coupe body; General Electric motor, hung from the main frame; 32-cell Exide battery; 5 forward and 2 reverse speeds, from roller type General Electric controller; chain drive to floating type rear axle; tubular front axle; 32-inch wheels, on Timken roller bearings; 3½-inch tires; angle iron frame and sub-frame; semi-elliptic springs front and rear; 2 brakes, foot-operated; complete car weighs 1600 lbs.

Woods Electric Vehicles.

Made by the Woods Motor Vehicle Co., Chicago, Ill.

4 reverse; double chain drive to solid rear axl front tires, 34 by 2½ inches; rear tires, sol ber; armored wood frame; Parson's manganese sub-frame; platform springs front and rear; 37½ by 1½, 5 leaves; rear, 31¼ by 1½, 5 leave troller asbestos internal expanding bronze and operated by controller handle and foot lever; ment; lamps, Yale locks, toilet case and fu kit; price, $2700. Special features: no resistan to obtain various speeds. The same chassis u inside operated coupe.

WOODS QUEEN VICTORIA, NO. 214. PR $2100.

Woods Queen Victoria, No. 214; Woods mu series wound motor under the seat on unit fr Parson's manganese bronze, 3¼ H. P., overlo pacity, 400 per cent.; 40-cell 9 M. V., 80-vo ampere hours Exide cell battery; complete 1000 lbs.; Woods 7-point spring contact con giving 4 speeds forward and 4 reverse; double drive to solid rear axle; solid front axle; artillery wheels on D. W. F. ball bearings tires, 2½ inches front and rear; armored wood platform springs front and rear, similar to Queen Victoria Brougham; control details: same; weight, 2500 lbs.; equipment: same brougham; price, $2100.

Bailey Electric Victoria Phaeto

"BAILEY" VICTORIA PHAETON, $200

Bailey Electric Victoria Phaeton, with Quee made by S. R. Bailey & Co., Inc., Amesbury, Motor, General Electric, 2½ H. P., suspended Bailey flexible system, under the rear hood; o capacity, 200 to 300 per cent.; 30-cell Gould b weighing 825 lbs.; General Electric controller m 3 speeds ahead and 2 reverse, chain drive; Bailey pivot axles; the wheels are 34 inches, tillery type, of Bailey design and manufactu

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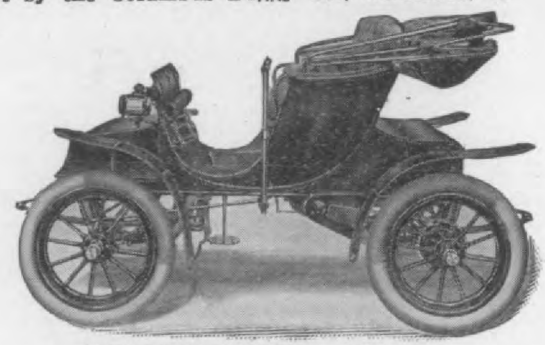
LENOX VICTORIA-PHAETON. $1800.

t Victoria Phaeton, price $1800; multiple ser-
ll bearing motor, located at the rear, above
and pivoted from the chassis; 3 H. P. nom-
verload capacity, 300 per cent.; 30-cell, 60-volt,
pere hour, Exide battery; weight 800 lbs.; con-
torque, non-arcing controller, five speeds for-
and three reverse; Maxim-Goodridge, helix
solid square rear axles; tubular front axles;
wheels mounted on Timken taper roller bear-
olid tires, 32 by 3½-inch; patented prest steel
semi-elliptic springs, front and rear, 36 by 1½-
front and 44 by 1½-inch in rear; double inde-
t brake system, operated by foot pedals; weight
s.; equipment: top, lamps, volt ammeter, tools
arging cables.

Columbus Electric Cars.

t by the Columbus Buggy Co., Columbus, O.



COLUMBUS MODEL 1000.

nbus Electric Model 1000; Phaeton body; mul-
motor, mounted under the seat on sub-frame
ed to the prest steel frame, 1½ H. P.; over-
apacity 300 per cent.; battery 24 cells, 9 plate,
peres at 4 hours' rate of discharge; weight,

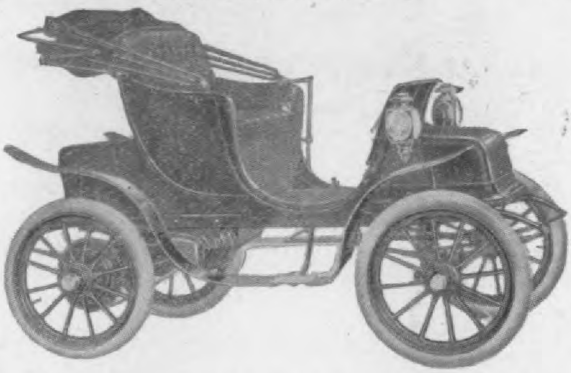
This chassis with coupe top is Model 1002.

COLUMBUS ELECTRIC MODEL 1100.

Columbus electric surrey, Model 1100; multipolar motor, 2½ H. P., under seat, mounted on a sub-frame; overload capacity 300 per cent.; 11 plate, 24 cell, 35 ampere 4-hour battery, weighing 850 pounds complete; radial controller, giving three speeds forward and one reverse; drive by double side chain; axles tubular; 34-inch artillery wheels mounted on taper roller bearings and fitted with 4-inch tires front and rear; prest steel frame; front springs half platform, 40 inches long, 1¾ wide, 5 leaves; rear springs, full elliptic, 40 inches long, 2 inches wide, 5 leaves; 2 brakes are fitted, the emergency on the rear wheels and the service on the motor, the latter operated by the controller and the emergency brakes by foot lever; complete car weight, 2300 pounds.

Rauch & Lang Electric Vehicles.

Made by the Rauch & Lang Carriage Co., 631 Superior St., Cleveland, O.



RAUCH & LANG MODEL 10 STANHOPE. $1850.

Rauch & Lang Stanhope on Model 10 chassis; 74 inch wheel base; 32-inch artillery wheels mounted with 3½-inch pneumatic tires, solid tires extra brakes, electric brake, motor brake and expanding hub brakes; side lever steer; 24 cell, 9 M V Exide battery continuous torque control; mileage, 50 to 100 miles on normal speed, speed 10 to 12 miles per hour weight, 1800 lbs.; price, $1850; also furnished with coupe body; price, $2100.

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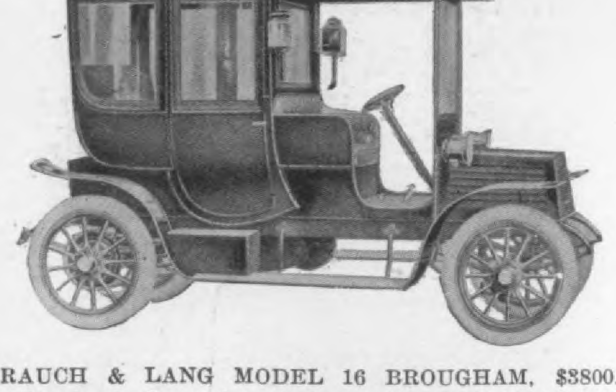


RAUCH & LANG MODEL 16 BROUGHAM, $3800.

Rauch & Lang brougham mounted on Model 16 chassis; wheel base, 103 inches; 34-inch wheels; 4½-inch tires, double tube or solid, make optional; wheel steering; 24 cell, 15 M V Exide battery; speed, 7 to 18 miles per hour; weight, 3600 lbs.; price, $3800. Other specifications same as Model 14; also furnished with landaulette or extension top surrey body.

Studebaker Electric Cars.

Made by the Studebaker Automobile Co., South Bend. Ind.

STUDEBAKER MODEL 16d VICTORIA PHAETON.

clincher pneumatic tires; constricting band br rear wheel hubs and constricting band brake

STUDEBAKER MODEL 22e STANHOPE

of armature shaft; weight, 2000 lbs.; equipme either Victoria or Gypsy quartered voltamete light, 2 side light, tail light, necessary too pump, tire repair outfits, charging plug with of cable.

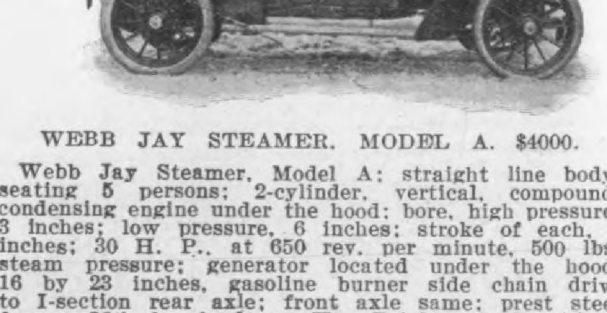
STUDEBAKER MODEL 22a STANHOPE

Studebaker Model 22e Stanhope; 67-inch whee 30 by 3-inch front tires and 30 by 3½-incl weight, 1750 lbs.; other specifications same Model 16d Victoria Phaeton. Model 22e is als ished with a straight line body with buggy top Model 22a. All other specifications are same Model 22e.

Steam Pleasure Cars

Webb Jay Steamers.

Made by the Webb Jay Motor Co., Chicago, Ill.



WEBB JAY STEAMER, MODEL A. $4000.

Webb Jay Steamer, Model A; straight line body, seating 5 persons; 2-cylinder, vertical, compound, condensing engine under the hood; bore, high pressure, 3 inches; low pressure, 6 inches; stroke of each, 4 inches; 30 H. P., at 650 rev. per minute, 500 lbs. steam pressure; generator located under the hood, 16 by 23 inches, gasoline burner side chain drive to I-section rear axle; front axle same; prest steel

only 43 inches in length; engine fitted with Bright bearings and chrome nickel one-piece shaft.

Lane Steam Cars.

Made by the Lane Motor Vehicle Co., Poughk N. Y.

LANE MODEL 11 TOURING CAR, $200

Lane Model 11 Touring Car; seats 5; price, aluminum body; 2-cylinder, compound engine, under front foot-board; bores, 3¼-inch high-p cylinder and 5¼-inch low-pressure; strokes, 3

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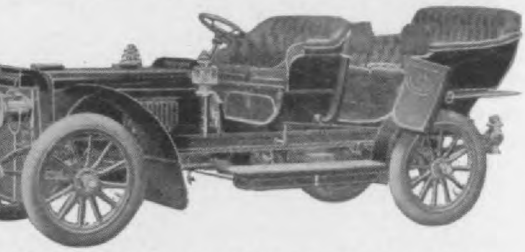
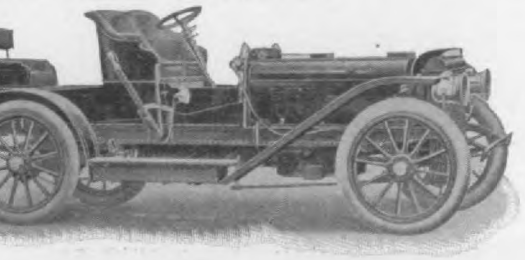
LANE MODEL 10 RUNABOUT, $1800.

Model 10 Runabout; price, $1800; 7 leaves in prings; screw steering gear; weight, 2350 lbs.; 3; all other specifications same as for Model 11.



ANE MODEL 9 TOURING CAR, $3100.

Model 9 Touring Car; 7-passenger, aluminum 2 cylinders, inclined, located under front floor; nd condensing motor; bores 3⅞ H. P. and 6½ strokes, 4-inch; 30 H. P.; 350 lbs. pressure; enerator, located under bonnet; Lane tubular burner; centre chain drive; steel frame; live les; I-beam front axles; 36x4-inch front wheels x4½-inch rear wheels, mounted on roller bear- -inch tires on front and 4½-inch tires in rear; semi-elliptic front and rear, 42x1½ inches, 8 in front, and 48x1¼ inches, 9 leaves, in rear; steering gear; three brakes; service by foot n equalizer, hub brakes by hand side lever; details; wheel steer throttle on columns, re- y side lever; automatic fuel and water regu- 22-gallon gasoline tank, under front seat; 3400 lbs.; equipment, Hartford shock ab- oil lamps, acetylene headlight and generator, nd complete tool equipment.



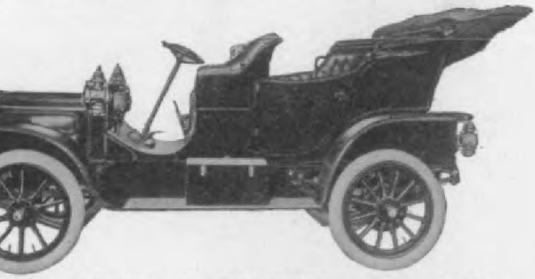
LANE MODEL 8 ROADSTER, $2800.

Model 8, folding rear seat roadster; price, springs, 7 leaves in front, 8 leaves in rear; ; weight complete, 3200 lbs.; all other specifi- same as for Model 9.

Lane models described November, 1907, page

White Steam Cars.

ade by the White Co., Cleveland, Ohio.

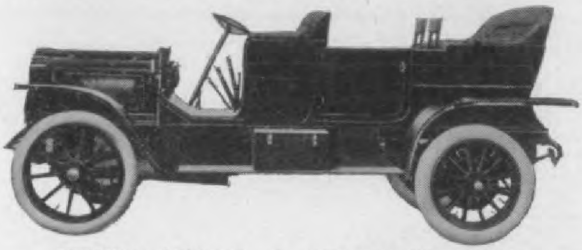


ITE MODEL L TOURING CAR, $2500.

Model L 5-Passenger Touring Car; price, $2500; er, bores 3-inch H. P. and 5-inch L. P.; stroke

WHITE MODEL L LIMOUSINE, $3200.

wheel; control entirely by throttle; 19-gallon gasolin tank, in rear of chassis; equipment, 2 side oi lamps, tail lamp and horn. Model L Limousine, seat 6. 10 leaves in rear spring. Price, $3200.



WHITE MODEL K PULLMAN, $3700.

White Model K Pullman; price, $3700; 2-cylinder vertical, compound engine, located in front, unde hood; cylinder bores, 3-inch H. P. and 6-inch L. P. 4½-inch stroke, 30 H. P.; semi-flash generator, set i center of chassis; Bunsen type of burner; shaft drive armored wood frame; live rear axle and tubular fron axle; 36x4-inch front and 36x5-inch rear tires; wheel

WHITE MODEL K LIMOUSINE, $4500.

mounted on ball-bearings; semi-elliptic springs front and rear, 44x2½ inches, 8 leaves, in front, and 54x2½ inches, 10 leaves, in rear; irreversible and external brakes on rear wheels; seats 7; 22-gallon gasoline tank, in rear of chassis; equipment, 2 side oil lamps, tail lamp and horn. Model K chassis is also furnished with limousine body for $4500; all specifications are the same excepting the rear springs, which are 48 inches in length. 1908 models described February, 1908, page 186.

Stanley Steam Cars.

Made by the Stanley Motor Carriage Co., Newton, Mass.

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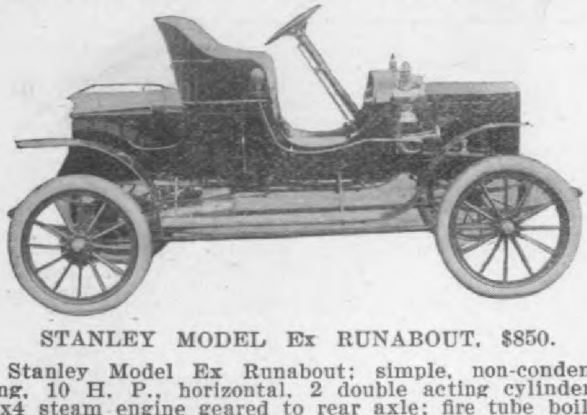
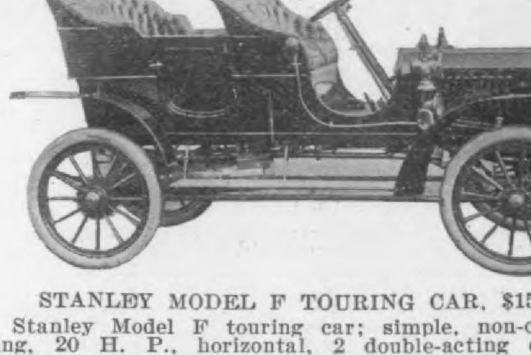
rear seat; wheel base, 100 ins.; price, $2500.



STANLEY MODEL Ex RUNABOUT, $850.

Stanley Model Ex Runabout; simple, non-condensing, 10 H. P., horizontal, 2 double acting cylinders, 3x4 steam engine geared to rear axle; fire tube boiler under hood in front; 18-in. gasoline burner; direct drive; wood frame; 30-in. wheels on ball bearings; 3-in. tires; full elliptic springs front and rear, 5 leaves; bevel and sector steering gear; 2 brakes on differential, 2 on hubs; throttle control entirely, no gear changes; fuel is regulated automatically by



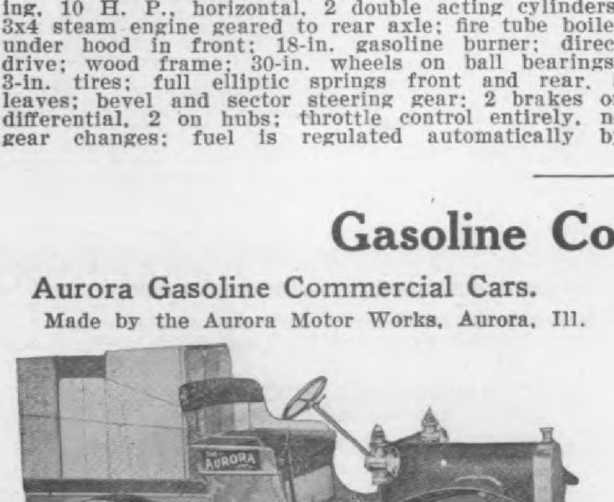
STANLEY MODEL F TOURING CAR, $15

Stanley Model F touring car; simple, non-c ing, 20 H. P., horizontal, 2 double-acting steam engine geared to rear axle; bore, 3⅝; 5; fire tube boiler under hood in front; 23-in. burner; direct drive; wood frame; 34-in. wh ball bearings; 3½ in. tires; full elliptic spring and rear, 6 leaves; bevel and sector steerin 2 brakes on differential, 2 on hubs; throttle entirely, no gear changes; fuel regulated au cally by steam pressure, water by hand by-pa senger capacity, 5; weight, 1850 lbs.; 16-gal line tank under rear seat; wheel base, 100 ins. $1500.

Gasoline Commercial Cars

Aurora Gasoline Commercial Cars.

Made by the Aurora Motor Works, Aurora, Ill.



AURORA LIGHT DELIVERY WAGON.

Aurora light delivery wagon; 2-cylinder, horizontal, water-cooled by thermo-syphon system, 4-cycle, 4½ bore, 5-in. stroke, 20 H. P. motor, located under hood in front of car on 3-point suspension; mechanically operated valves on top side of cylinder; Parson's white brass crank and cam shaft bearings; jump spark ignition by dry batteries; mechanical lubrication; planetary change speed gear, 2 speeds forward and reverse, direct on high; shaft drive; semi-floating rear axle; tubular front axle; 32x3-in. tires; Standard roller wheel bearings; 80-in. wheel base; half-elliptic front springs and platform rear springs; external and internal brakes on rear hubs; control levers on side of steering column; seats 3; weight, 1500 lbs.; 10-gal. gasoline tank under front seat; complete lamp and tool equipment.

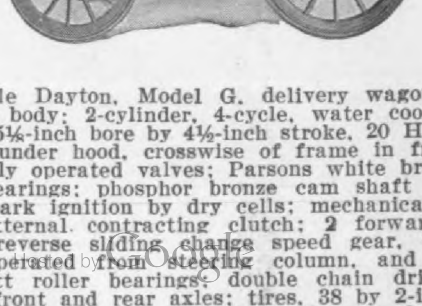
Bendix Gasoline Commercial Cars.

Made by the Bendix Company, Cragin Station, Chicago, Ill.

cylinder, vertical, air-cooled, 4-cycle, 4x4, 20-24 engine under hood on sub-frame; mechanical white brass crank shaft bearings; brass car bearings; jump spark ignition from dry cells feed lubrication; no clutch; double friction gear, on bronze bearings, any number of speed ated by side lever; double side chain drive rear axle, 1½-in. front axle; wheels on Timke bearings; 2½-in. tires rear, 2-in. tires front base, 103 ins.; angle steel frame and sub-fra elliptic springs, 36 ins. long, 1½ ins. wide, 5 front and 7 rear; irreversible wheel steering; expanding brakes; spark and throttle control o ing column; carrying capacity, 1 ton, 100 p overload; weight, 2400 lbs.; 15 gal. gasoli under seat; equipment, tools, lamps, horn, etc.; price, $2000. Special features: double drive, no differential, load over rear wheels.

Reliable Dayton Gasoline Commerci

Made by the Reliable Dayton Motor Car Co., May St., Chicago, Ill.



Reliable Dayton, Model G, delivery wagon; delivery body; 2-cylinder, 4-cycle, water coole zontal, 5½-inch bore by 4½-inch stroke, 20 H. or, set under hood, crosswise of frame in fro chanically operated valves; Parsons white bra shaft bearings; phosphor bronze cam shaft b jump spark ignition by dry cells; mechanical tion; external contracting clutch; 2 forward and 1 reverse sliding change speed gear, d high, operated from steering column, and in Hyatt roller bearings; double chain driv square front and rear axles; tires, 38 by 2-in

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SAYERS & SCOVILLE TRUCK. $2500.

ers & Scoville commercial cars; any type of body ied to order; 4-cylinder, vertical, air-cooled mo- 4 by 4, 25 H. P., under the front seat on a rame; mechanically operated valves on one side on top; jump spark ignition from storage, dry and magneto; mechanical lubrication; multiple clutch; 3-speed sliding change gear on Timken bearings, direct on the high; side chain drive ad 2¼-inch square section rear axle; front axle, ch I-section; wheel base as required; 3½-inch 32 or 34-inch wheels on Timken roller bear- wood and steel frame, steel sub-frame; semi- lc front springs; platform rear springs; screw ut steering gear; 2 counter shaft brakes and 2 acting band brakes on the rear wheels; change lever is under the hand wheel; gasoline tank on lash; complete weight, 3000 lbs.; paying load ity, 1½ tons; equipment: full set of tools, , etc.; price, $2500. Special features: no side ; single control. Described in our October, 1907, page 222.

Mitchell Gasoline Commercial Car.

by the Mitchell Motor Car Co., Racine, Wis.

MITCHELL TRUCK. $2000.

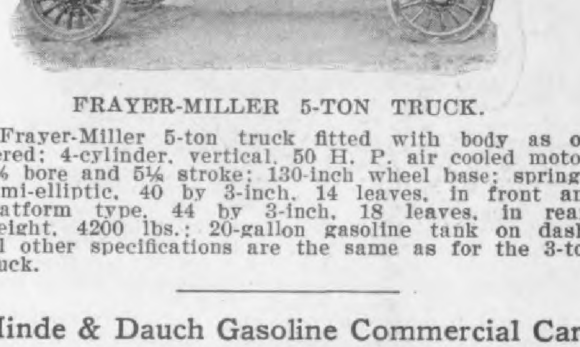
hell Truck, with open or closed type of body; $2000; 4-cylinder, vertical, water cooled, 4-cycle, bore and stroke, 20 H. P. motor, set in front hood on sub-frame; mechanical valves; babbitt shaft bearings; 2 brass and 1 babbitt cam shaft gs; ignition current dry batteries and magneto; nical oiler under hood; leather faced cone ; sliding change speed gear; 3 speeds forward everse, direct on high, operated by side levers, ed in babbitt bearings; worm gear drive; I- front axle; 30 by 3-inch front tires and 30 by ch rear tires; front ball wheel bearings; wheel 110 inches; prest steel main and sub-frame; elliptic front springs, 39½ by 1¾-inch, 8 leaves, nt, and triple-action, 41 by 2 inches, 11 leaves, springs; irreversible steering gear; internal ex- g brakes on rear wheels operated by hand and external contracting operated by foot ; spark and throttle levers on steering post; ns capacity; 15-gallon gasoline tank under seat; t. 2300 lbs.; equipment: side oil lamps and com- set of tools. Described November, 1907, page 275.

yer-Miller Gasoline Commercial Cars.

ball bearings; side chain drive, 2½-inch square r axle, I-beam front axle; 34 by 4-inch front tire

FRAYER-MILLER 3-TON TRUCK.

36 by 3½-inch twin tires in rear; roller wheel bea ings; wheel base, 112-inch; 6-inch channel ir frame, and 4-inch channel sub-frame; semi-ellipt springs in front, 39½ by 3-inch, 9 leaves, and pla form, 39½ by 3-inch, 10 leaves, in rear; irrevers ble steering gear; internal and external brakes rear wheels and differential brake on counter shaf control on top of steering wheel; 15-gallon gasoli tank on dash; weight 3800 lbs.; equipment: one hor 2 side lamps, tail lamp, tool kit and wrenches.



FRAYER-MILLER 5-TON TRUCK.

Frayer-Miller 5-ton truck fitted with body as o dered; 4-cylinder, vertical, 50 H. P. air cooled moto 5½ bore and 5½ stroke; 130-inch wheel base; spring semi-elliptic, 40 by 3-inch, 14 leaves, in front a platform type, 44 by 3-inch, 18 leaves, in rea weight, 4200 lbs.; 20-gallon gasoline tank on das all other specifications are the same as for the 3-t truck.

Hinde & Dauch Gasoline Commercial Car

Made by Hinde & Dauch, Sandusky, Ohio.

HINDE & DAUCH COMMERCIAL CAR. PRICE $80

Hinde & Dauch detachable top commercial ca single cylinder, horizontal motor, water-cooled, cycle, 4¾x5½-inch, 8 H. P., located under the body mechanical valves; nickel Babbitt crank shaft an cam shaft bearings; jump spark ignition by dry ba tery; positive lubrication; individual clutch, chang speed, giving 2 speeds and reverse, direct on the high

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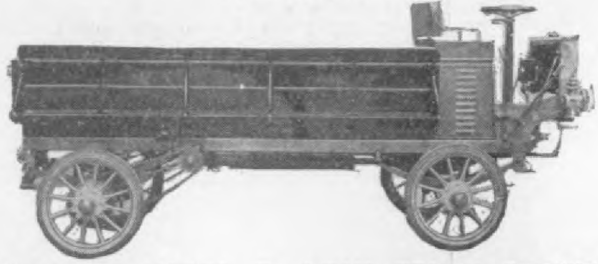


RELIANCE MODEL F, 2-TON TRUCK CHASSIS, $2500.

Reliance Model F, 2-Ton Truck, with freight or passenger body; price of chassis, $2500; 2-cylinder, vertical, water-cooled, 2-cycle, 5⅛-in. bore, 5-in. stroke, 30 H. P. motor, set under front seat, on four-point suspension; babbitt crank shaft bearings; jump spark ignition, from storage and dry cells and magneto; mechanical lubrication; cork inserted cone clutch; 4-speed progressive change speed gear, direct on high, mounted on ball-bearings; chain drive; 32x4-inch tires; semi-elliptic springs; worm and sector steering gear; internal and external brakes; weight of chassis, 3400 lbs.; 20-gallon gasoline tank, located under seat; equipment, tools, lamps and horn.

Reliance Model G, 2½-ton Truck; price of chassis, $2750; weight, 3600 lbs.; all other specifications same as for the 2-ton truck.

RELIANCE MODEL H, 3-TON TRUCK CHASSIS, $3500.

Reliance Model H, 3-Ton Truck; price of chassis, $3500; 3-cylinder, vertical, water-cooled, 2-cycle, 5⅛x 5, 45 H. P. motor, set under seat, on four-point suspension; tires, 5 inches front, 3½ inches twin rear; 130-inch wheel base; weight, 4500 lbs.

Reliance Chassis Model F and G are furnished with the following bodies: Model K combination passenger and baggage body; capacity, 12 passengers and 1500 lbs. freight; Model I, 22-passenger sight-seeing body; Model L, 26-passenger sight-seeing body, with elevated seats; Model M depot wagon, passenger capacity, 16-18, drop windows, seats and back upholstered; model H, 22-passenger sight-seeing body, seats of wood, finished, not upholstered.

RELIANCE MODEL E, BODY ON MODEL H CHASSIS.

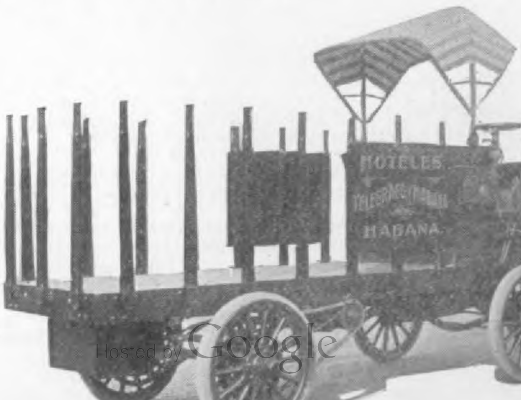
Models G and H Chassis are furnished with the following bodies: Model D truck body, size of bed, 13 feet by 6 feet, sideboards slant; Model G, light express body, size of bed 10 feet 6 inches by 4 feet; Model F truck body, sideboards detachable, size of bed 13x5 feet; Model E, heavy stake detachable sideboards, size of bed, 13x5 feet inside; also made in 10 feet 6 inches by 5 feet size for light work.

AUTO CAR 5-TON GASOLINE TRUCK, $4

selective sliding change speed gear, on Timken bearings, three speeds forward, direct on high, ated by lever; double chain drive; 2¾-inch rear axle and 2¾-inch I-section front axle; tir 6-inch in front and 36x7-inch in the rear, on T roller-bearings; wheel base 120 inches; main of armored steel and sub-frame of channel springs half-elliptic, 3-inch wide in front, and form type, 3-inch wide, in rear; worm type, irr ble steering gear; gasoline capacity 20 gallons located under driver's seat; weight, 6500 lbs.; ment consists of 2 brass side oil lamps, 1 searc 1 tail light and 1 horn. This chassis is also fu with a 40-passenger sight-seeing body.

AUTO CAR 20-PASSENGER GASOLINE B $3500.

Auto Car 20-passenger gasoline brake; price seats crosswise; 4-cylinder, 35 H. P., vertical, cooled motor, located in front, on three-point sion; cylinders 4 11-16-inch bore by 5½-inch mechanical inlet valves; crank and cam shaft b of Parsons white brass; jump spark ignition, b age and dry cells; magneto or dynamo furnished mechanical pump lubrication; cone clutch; change speed gear, three speeds, direct on high ated by lever; Timken roller-bearings in tr sion case; double chain drive; 2-inch square de axles and I-beam front axles; tires, 36x4-inch i 36x5-inch in rear; Timken roller wheel bearin mored wood main frame and channel iron sub springs, half-elliptic, 2½-inch in front, and p springs, 2½-inch, in rear; worm type steerin internal expanding brakes on rear wheels a emergency brakes on jack shaft; weight, 500 gasoline capacity, 20 gallons, tank located und er's seat; equipment, 2 brass side lamps, 2 lights, horn and tail light.



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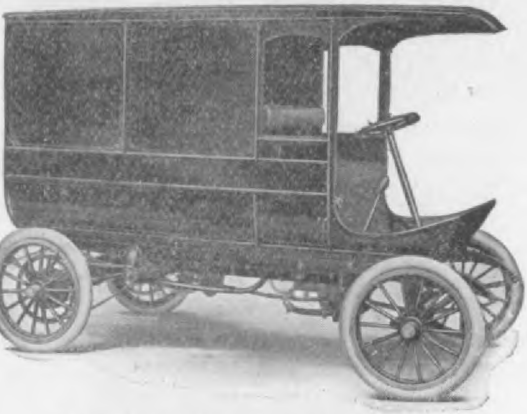
, 12-14 H. P. motor under seat on 4-point sus-
on; mechanical valves in head; jump spark ig-
from dry cells; mechanical oiler; friction
mission, 5 speeds; double chain drive; 30x3-inch
wheels on Hess-Bright bearings; 88-inch wheel



WALTHAM MODEL 178 C, $1450.

prest steel frame and sub-frame; elliptical
gs, 33 inches long front, 34 rear, 6 leaves;
steering; internal expanding brakes; carrying
ity, 1000 pounds; weight, 1600 pounds; 10-gal-
gasoline tank on dash; equipment, oil lamps,
and tools; price, $1450.

THAM MODEL 178 B, SCREENED WIRE EX-
PRESS WAGON, $1425.

tham Model 178 B, screened wire express
; furnished on same chassis as Model 178 C;
elliptic springs front and full elliptic rear;
t, 1500 pounds; price $1425.

THAM MODEL 178 A, LIGHT DELIVERY,
$1425.

tham Model 178 A, light delivery; furnished on
chassis as Model 178 C; semi-elliptic springs

WALTHAM MODEL D C, LIGHT DELIVERY
$650.

lever on left side; internal expanding brakes; carry
ing capacity, 600 pounds; weight, 750 pounds;
gallon gasoline tank at extreme rear of body; wit
tools, price $650.

WALTHAM MODEL 178 D, $1375.

Waltham Model 178 D, open delivery; furnished o
same chassis as Model 178 C; weight 1400 pound
price, $1375.

WALTHAM MODEL 188, DEMOCRAT WAGO
$1400.

Waltham Model 188, Democrat wagon; furnished o
same chassis as Model 178 C; semi-elliptic sprin
front and full elliptic rear; carrying capacity 10
pounds or 4 or 6 passengers; weight, 1475 pound
price $1400.

Waltham 1908 cars described in our Decembe
1907,, issue. Page. 96.

Knox Gasoline Commercial Cars.

Made by the Knox Automobile Co., Springfield, Mas

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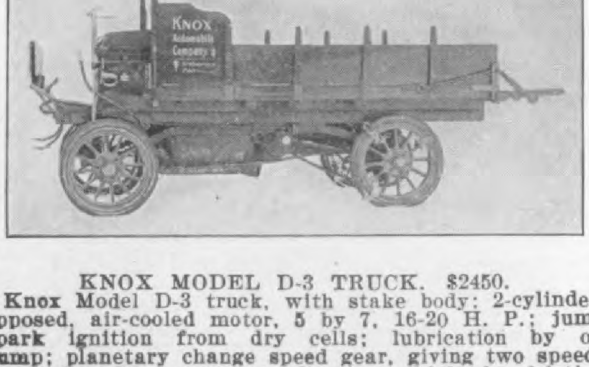
rame, channel steel, 5 inches by 2.06 inches; sub-rame; angle steel; 3-point suspension to main frame; emi-elliptic springs, front and rear; front, 40; rear, 0 inches; hand wheel steering, nut and screw gear; edal operating jack shaft brake; lever operating ear hub brakes; spark and throttle control levers; 8-gallon tank under driver's seat; weight, complete, 000 lbs.; paying load, 3 tons; price, with horn, dometer, jack and full set of tools, $3700.



KNOX MODEL D-3 TRUCK. $2450.

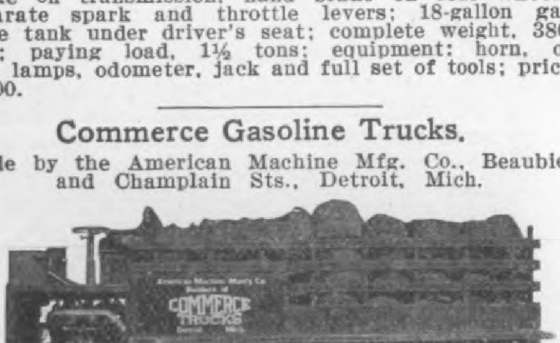
Knox Model D-3 truck, with stake body; 2-cylinder, pposed, air-cooled motor, 5 by 7, 16-20 H. P.; jump park ignition from dry cells; lubrication by oil ump; planetary change speed gear, giving two speeds orward and one reverse, direct on high, by friction isc clutch, hand lever operated; drive by chain to lve 2½-inch nickel steel axle; front axle, I-section teel; 96-inch wheel base; 32-inch wheels on Timken oller bearings, 3¼-inch tires; angle steel frame, no ub-frame; longitudinal side springs, extending from ront to rear axle; wheel steer; foot brake on trans-nission, side lever to rear axle brakes; 12-gallon gas-line tank under the driver's seat; weight, complete, 300 lbs.; paying load, 1¼ tons; equipment: side amps, odometer, horn, jack and full set of tools, 2450.

KNOX MODEL D-6 TRUCK. $2800.

Knox Model D-6 truck; express body; 2-cylinder, hor-zontal, opposed, air-cooled, 5 by 7, 16-20 H. P. motor nder body; 4-point suspension to sub-frame; auto-natic intake valves; crank shaft bearings of bab-itt, ball bearing cam shaft; jump spark ignition from ry cells; mechanical lubrication from 6-feed oil ump; friction disc clutch; 2-speed and 1 reverse plan-tary change gear on phosphor bronze bearings, direct n the high, operated by hand lever; double chain rive to dead 2½-inch square section steel axle; front xle, 4 by 2½ channel steel; 100-inch wheel base, 34 nch wheels on Timken roller bearings; 3½ front tires, -inch rear; channel steel frame, 4 inches by 1.65; ngle steel sub-frame; 3-point suspension to main rame; semi-elliptic springs, front, 40 inches, rear, 6 inches; steering gear, nut and screw type; foot rake on transmission, hand brake on rear wheels; eparate spark and throttle levers; 18-gallon gas-line tank under driver's seat; complete weight, 3800 bs.; paying load, 1½ tons; equipment: horn, oil ide lamps, odometer, jack and full set of tools; price, 2800.

Commerce Gasoline Trucks.

Made by the American Machine Mfg. Co., Beaubien and Champlain Sts., Detroit, Mich.



change gear, mounted on Hess-Bright bearings; chain drive to 3-inch solid square section rear front axle 2½ I-section; 130-inch wheel base; 3 front wheels, with 5-inch tires; 36-inch rear w with 8-inch tires; wheels on Timken roller bea semi-elliptic springs front and rear; enclosed gear steering; brakes internal and external on wheels and on countershaft; spark and throttle trol on steering wheel; 30-gallon gasoline tank, of radiator; weight complete, 8400 lbs.; paying capacity, 5 tons; equipment, 3 lamps, tool bag, etc.; price, $4500.

COMMERCE MODEL A GASOLINE TRUCK.

Commerce Model A Gasoline Truck; any ty body; 4-cylinder, vertical, water-cooled, 4¾x4 H. P. motor, under the driver's seat, mounted 9-point suspension; valves on one side and m ically operated; Parson's white brass crank sha cam shaft bearings; jump spark ignition from batteries; mechanical lubrication from 5-feed also splash; 3 disc metal clutch with cork inse speeds and 1 reverse, selective, change speed on roller bearings; double chain drive to dead 2 square rear axle; front axle 2½-inch I-section; 1 wheel base; 36-inch rear wheels, with 5-inch tir inch front wheels, with 4-inch tires, all on bearings; Carnegie 5-inch steel frame; semi-front springs, 14 leaves; platform rear sprin leaves; spur gear steering; 2 contracting band on countershaft; 2 expanding brakes on th wheels; 25-gallon gasoline tank, on top of ra weight complete, 5800 lbs.; paying load, 3 tons; ment, lamps, tool kit, etc.; price, $3500.

Hennegin Air-cooled Commercial Ca

Made by the Commercial Automobile Co., Chica

HENNEGIN MODEL A DELIVERY. $650

Hennegin Model A Delivery, No. 1; 2-cylin cycle, horizontal, air-cooled, 4½x4, 12-14 H. P. under foot-boards, on three-point suspension; m ical valves in cylinder head; adjustable bronze shaft bearings, 5 and 8 inches, respectively; cam shaft bearings; jump spark ignition, fron age battery, dynamo if desired; sight feed m cal lubrication; no clutch; friction transmiss roller bearings, operated by hand and foot, leve set positions for speeds; roller side chain tubular trust axle; tubular front axle; 1½ inc rubber tires; hard bronze, grease-packed wheel ings; 87-inch wheel base; channel steel fram sub-frame; full elliptic springs front and rear;

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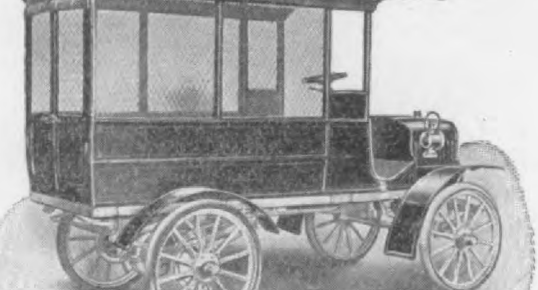
ler, horizontal opposed water-cooled motor, ther-
circulation, 5½ by 5, 22 H. P. motor under the
on 3-point suspension; mechanically operated
s in chambers on cylinders; crank shaft and
shaft bearings of babbitt; jump spark ignition
dry batteries; mechanical lubrication by Hill
sion oiler; self-contained cone clutch; 2 speeds
rd and 1 reverse sliding change gear on bab-
bearings, direct on the high; shaft drive to
ed live rear axle, 1⅜ nickel steel; front axle,
ch square section; 90-inch wheel base; 32-inch

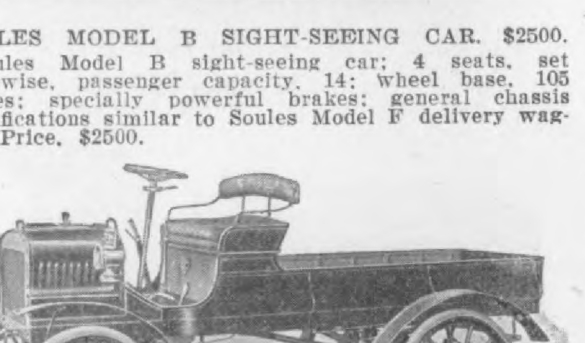


OULES MODEL F GASOLINE DELIVERY WAGON. $1800.

wheels with 3-inch tires, 34-inch rear wheels, 3½-inch tires; wheels on Timken bearings; steel frame, no sub-frame; ¾ elliptic springs, and rear; 42 by 2 inches, front, 7 leaves; rear, aves; irreversible worm and segment steering internal and external drum brakes on rear ls; spark and throttle lever control on steering n; 10-gallon gasoline tank under the seat; t, complete, 2600 lbs.; carrying capacity, 1500 equipment: 3 lamps, horn and tools; price, $1800. al features: ample power, accessibility of clutch transmission without removing load; engine at ront under hood.

LES MODEL B SIGHT-SEEING CAR. $2500.

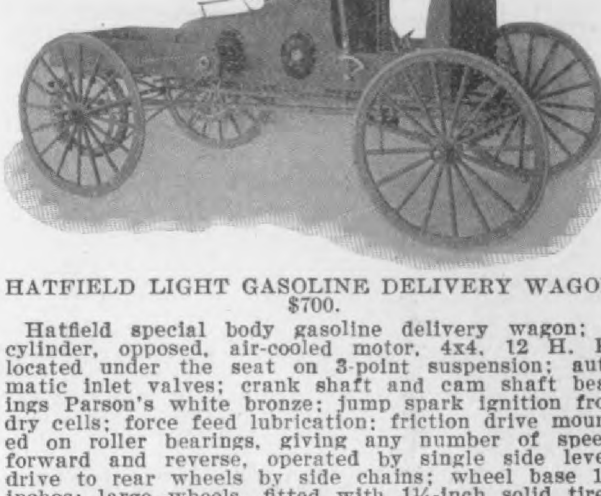
les Model B sight-seeing car; 4 seats, set wise, passenger capacity, 14; wheel base, 105 s; specially powerful brakes; general chassis fications similar to Soules Model F delivery wag- Price, $2500.



frame, no sub-frame; ¾ elliptic springs front a rear; 42 by 2 inches, front, 8 leaves; rear, 9 leave also half elliptic supplementary spiral springs on t rear; worm and segment irreversible steering gear; i ternal and external brakes on rear wheel drums; spa and throttle lever on steering column; 15-gallon gas line tank on the seat; complete weight, 2800 lbs paying load capacity, 2500 lbs.; equipment: 3 lamp horn, tools; price, $2000; special features: acces bility of mechanism without removing load; body feet long behind seat; 55 inches wide.

Hatfield Gasoline Commercial Vehicles

Made by the Hatfield Motor Vehicle Co., Miam burg, O.

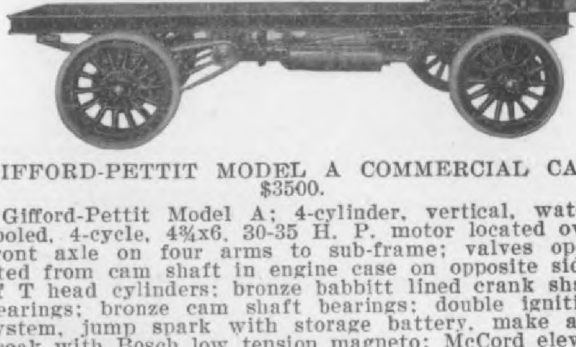


HATFIELD LIGHT GASOLINE DELIVERY WAGO $700.

Hatfield special body gasoline delivery wagon; cylinder, opposed, air-cooled motor, 4x4, 12 H. located under the seat on 3-point suspension; au matic inlet valves; crank shaft and cam shaft be ings Parson's white bronze; jump spark ignition fr dry cells; force feed lubrication; friction drive mou ed on roller bearings, giving any number of spee forward and reverse, operated by single side leve drive to rear wheels by side chains; wheel base 1 inches; large wheels, fitted with 1¼-inch solid tire wheel bearings Timken roller; frame, wood; full liptic springs front and rear, front 37½ inches lo width, 2 inches, 6 leaves; rear, 36 inches long, inches wide, 6 leaves; steering by Hatfield chain a sprocket; 2 band brakes, spark and throttle on ste ing post; 8-gallon gasoline tank in the dash; co plete weight of car, 1100 pounds; paying load, 8 pounds; price, $700, equipped with 2 lamps a tools.

Gifford-Pettit Gasoline Commercial Ca

Made by the Gifford-Pettit Mfg. Co., Chicago, Il



GIFFORD-PETTIT MODEL A COMMERCIAL CA $3500.

Gifford-Pettit Model A; 4-cylinder, vertical, wat cooled, 4-cycle, 4¾x6, 30-35 H. P. motor located o front axle on four arms to sub-frame; valves op ated from cam shaft in engine case on opposite si of T head cylinders; bronze babbitt lined crank sh bearings; bronze cam shaft bearings; double ignit system, jump spark with storage battery, make a break with Bosch low tension magneto; McCord elev force feed oiler; cone clutch leather faced; progr sive, sliding change gear on bronze bearings, 3 spe forward, 1 reverse, direct on high, operated by lever; chain drive; 2½ in. square dead rear axle, in. I-beam front axles; wheels on Timken ro bearings; wheel base, 120 ins.; frame, 16 ft. 8 in sub-frame, 10 ft.; 5 in. single tires front, 3½ t tires rear; semi-elliptic springs, 50 ins. long, 3

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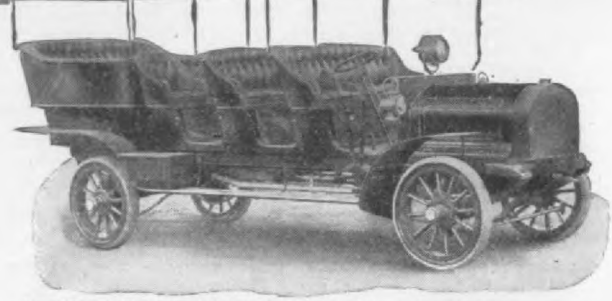
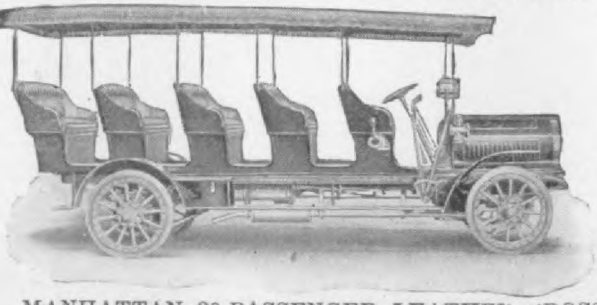


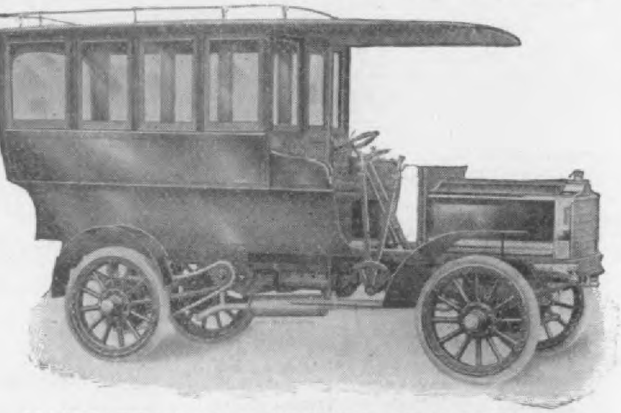
MANHATTAN 20-PASSENGER TONNEAU.

Manhattan 12-passenger Tonneau; straight line body; -cylinder, 4-cycle, water cooled, vertical, 5½-inch bore y 6-inch stroke, 48 horse power motor, set in front nder hood on sub-frame; mechanically operated alves; all on one side; Parsons white bronze crank haft bearings and phosphor bronze cam shaft bearings;



MANHATTAN 20-PASSENGER LEATHER CROSS SEAT.

mp spark ignition double system, with dry cells and emy H. B. high tension magneto; lubrication, splash nd McCord 8-feed oiler; inverted cone clutch, lined ith diagonal strips of Gandy belting; patented in- ividual clutch change speed gear, 3 speeds forward nd reverse, direct on high; double chain drive; 2¼-



MANHATTAN 12-PASSENGER ENCLOSED BUS.

ch sq. hammer forged rear axle and 2-inch sq. ammer forged front axle; tires, 36 by 4-inch front nd 36 by 3-inch tires in the rear; Timken roller wheel earings; wheel base, 120 inches; 5-inch channel steel ain frame, and ⅜ by 2 by 2½-inch angle-steel sub- rame; springs, semi-elliptic, 48 by 2½-inch, front and

1 tail lamp, horn, tool box, full set tools, full curtains, top and spare parts. Also furnished 12-passenger end bus and 16-passenger cross sea

The other models made by this concern are with practically the same power outfit, the changes being in the springs, wheel base, etc other specifications not mentioned being the sa for the 12-passenger tonneau. In the following fications of the different models, only the ch will be given. Manhattan 20-passenger rattan seat; wheel base, 156 inches; weight 6500 lbs. the 20-passenger tonneau (straight line) the 20-p ger leather cross seat and the 12-passenger con tion the wheel base is 156 inches and the weig 6800 lbs.

MANHATTAN 2-TON TRUCK.

Manhattan 2-ton truck; body to suit, up to 6 ft. by 16 ft. long; tires, 4½ by 36-inch front, and 36 by 3-inch rear; wheel base varies with body to 160 inches; double sweep semi-elliptic sp front and rear, 48 by 2¼-inch, 12 leaves in and 48 by 2¼-inch, 13 leaves in rear; tread,

MANHATTAN 3-TON TRUCK.

72 inches. Manhattan 3-ton truck; body to su to 6 by 16 ft.; engine located forward, drivers' form over engine; rear axle, 2½-inch sq.; front 2¼-inch sq.; tires, 36 by 5-inch front, 36 by 3½ twin, rear; springs, double sweep half elliptic, 2½-inch, 15 leaves, in front and platform, 49 b

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ANHATTAN 5-TON TRUCK.

inch, 14 leaves, on the end; 2 3½ by 16-inch in-
l expanding brakes, others same as 12-passenger
au; 18-inch hand wheel; weight, 7300 lbs. Man-
n 5-ton truck; body to suit, up to 8 by 18 ft.;
e located in front; 126 to 180-inch wheel base;
6-inch front tires, and 36 by 4-inch twin, rear;

MANHATTAN 5-TON BARREL TRUCK.

e sweep semi-elliptic front springs, 48 by 3-inch,
aves, and platform rear springs, 49 by 3-inch, 16
s. on sides, and 40½ by 3-inch, 15 leaves on end;
20-inch steering wheel; 2 3½ by 16-inch internal
nding rear hub brakes; weight, 7800 lbs.

ANHATTAN 22-PASSENGER ENCLOSED BUS.

hattan 22-passenger enclosed bus; straight line
rear axle, 2¾-inch square; front axle, 2½-
square; tires, 36 by 6-inch front; 36 by 4-inch
rear; wheel base, 168 inches; 5-inch channel
frame, 44 inches wide; half elliptic front springs,
2½-inch, 16 leaves; rear springs, platform type,
2½-inch, 16 leaves, on sides, and 40½ by 2½-
15 leaves on end; weight, 10,000 lbs.; tread, 72
s. Described in our February, 1908, issue, page

Miller Gasoline Commercial Cars.

by Miller Motor Car Co., Bridgeport, Conn.

er Model D; 12 passengers; 4 cross seats; 2-
er, horizontal, 4-cycle, water-cooled by pump
an, 5½x6, 20-24 H. P. motor, cross-wise under
on channel steel sub-frame; mechanically-op-
l valves; crank shaft and cam shaft bearings,
n's white metal; jump spark ignition, from

feature: Fool-proof transmission.

This chassis is fitted with 1-ton delivery body, pan
or platform, called Model E.

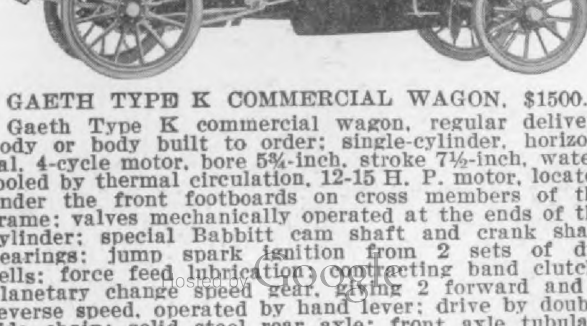
MILLER MODEL B 30-PASSENGER CAR, $550

Miller Model B 30-Passenger Car, 6 cross seats;
cylinder, vertical, water-cooled by pump and fan,
cycle, 5¾x6, 45-55 H. P. motor, in front, under hoo
on angle iron sub-frame; mechanical inlet and e
haust valves on opposite sides of engine; 5 crank sha
and 5 cam shaft bearings; jump spark ignition, fro
storage and dry cells, magneto if desired; positiv
pump lubrication to crank case; Hele-Shaw multip
disc clutch; 2-speed and reverse change gear,
phosphor bronze bearings, direct on both speeds, ope
ated by two levers; shaft drive to jack shaft, tw
chains to rear wheels; rear axle, 2½-inch square har
mered steel; front axle, 2¼ inches; wheels on Stan
ard roller bearings; 3-inch twin tires front, 3½-in
rear; wheel base, 144 inches; 5-inch ship chann
steel frame, 2½-inch angle iron sub-frame; semi-elli
tic springs, 36 inches long front, 2½ inches wide,
leaves; 48 inches long rear, 2½ inches wide,
leaves; irreversible worm and sector steering;
ternal expanding brake on rear hub drums and o
service brake on shaft; French system of contro
capacity, 30 passengers, or 3½ tons; weight, 66
lbs.; 28-gallon gasoline tank, under front seat; equi
ment, 2 oil dash lamps, 2 gas lamps, 1 tail lam
and set of tools. Special features: ease of contr
and system of transmission. Price, $5500.

This chassis is also furnished with stake platfor
body; springs have 12 leaves front, 16 rear; contro
gas and spark on top of wheel; 25-gallon gasoli
tank; capacity, 3 to 5 tons; weight, 6000 lbs. a
proximately; same equipment as Model B.

Gaeth Gasoline Commercial Cars.

Made by the Gaeth Automobile Co., Cleveland, Ohi



GAETH TYPE K COMMERCIAL WAGON, $1500.

Gaeth Type K commercial wagon, regular delive
body or body built to order; single-cylinder, horizo
tal, 4-cycle motor, bore 5¾-inch, stroke 7½-inch, wate
cooled by thermal circulation, 12-15 H. P. motor, locat
under the front footboards on cross members of t
frame; valves mechanically operated at the ends of t
cylinder; special Babbitt cam shaft and crank sha
bearings; jump spark ignition from 2 sets of d
cells; force feed lubrication; contracting band clutc
planetary change speed gear, giving 2 forward and
reverse speed, operated by hand lever; drive by doub
side chain; solid steel rear axle; front axle tubula

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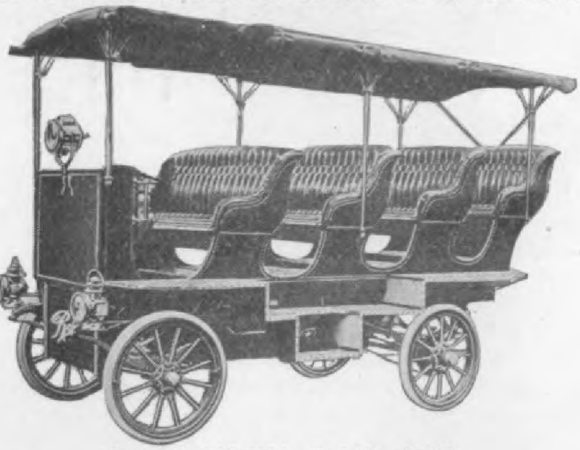
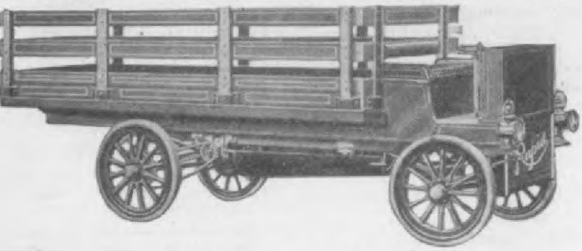
H. P. motor; set under body on three-point suspen-
on; cylinders, 5-inch bore and stroke; mechanically
erated valves; bronze crank and cam shaft bearings;
mp spark ignition by storage battery; Lavigne oiler;
anetary transmission, two-speeds forward; multiple
sc clutch on the high speed; operated by hand lever,



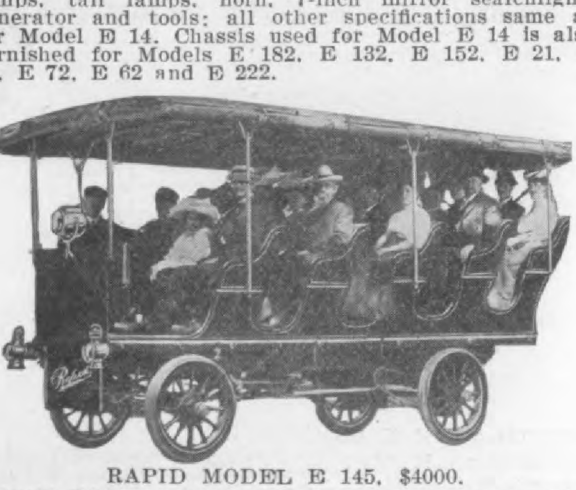
RAPID MODEL E 182, $2500.

d mounted in bronze bearings; side chain drive;
4-inch front and rear axle; 3-inch solid endless
bber tires; Timken wheel bearings; 100-inch wheel
se; angle steel main frame; 8-inch oak sub-frame;
ll platform springs front and rear; gear and sector
eering gear; internal expanding brakes on rear hubs;
ark and throttle control on steering post beneath
eering wheel; weight, 3100 lbs.; 15-gallon gasoline
nk in dash; equipment: 2 oil side lamps, tail lamps,



MODEL E 72, $1750.

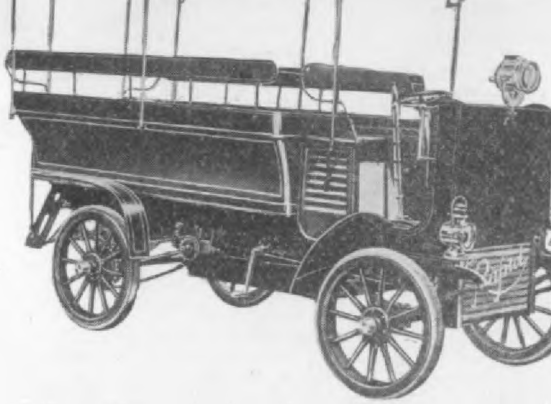
rn and tools. Rapid Model E 182, 12-passenger Pull-
an car, price $2500; 90-inch wheel base; 9-inch oak
b-frame; weight, 3950 lbs.; equipment: 2 oil side
mps, tail lamps, horn, 7-inch mirror searchlight,
nerator and tools; all other specifications same as
Model E 14. Chassis used for Model E 14 is also
rnished for Models E 182, E 132, E 152, E 21, E
E 72, E 62 and E 222.



RAPID MODEL E 145, $4000.

Rapid Model E 145, 25-passenger Pullman, price
000; 4-inch solid endless tires; full platform springs,
¼ by 2¼-inch front and rear, 7 leaves, in front,
d 8 leaves in rear; weight, 4600 lbs.; all other
ecifications same as for Model E 95.

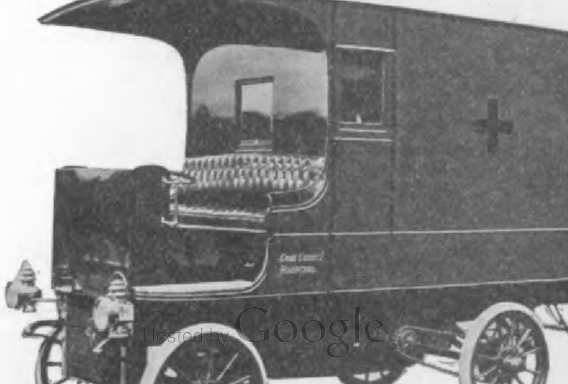
Rapid Model E 152, 16-passenger car; panelled
dy; 2-cylinder, horizontal, water-cooled, 4-cycle, 5x
24 H. P. engine under body on three-point suspen-
n; mechanical valves, facing crank case; large



RAPID MODEL E 152, 16-PASSENGER CAR, $
by hand lever; weight, 3100 lbs.; 15 gal. gal
tank in dash; price, $2200, including 2 oil side la
tail lamp, horn, 7 in. mirror searchlight and com
tool outfit.

RAPID MODEL E 202, 12-PASSENGER CAR, $

Rapid Model E 202, 12-passenger car; full pan
body; 2-cylinder, horizontal, water-cooled, 4-c
5¼x5, 30 H.P. motor under body on 3-point suspen
mechanically operated valves; large bronze crank
bearings; bronze cam shaft bearings; jump
ignition by 6 volt, 60 amphere hour battery; La
oiler; 2 speed, planetary transmission, friction
clutch on the high; double side chain drive;
axles front and rear; wheels on Timken bearings
in. tires; wheel base 100 ins.; heavy angle
frame; oak sub-frame; full platform springs;
sector steering; internal hub brakes controlled by
speed lever; throttle and spark control levers on
ing column; low speed and reverse operated by
pedals; high speed operated by hand lever; w
4200 lbs.; 15 gal. gasoline tank in dash; price, $
including 2 oil side lamps, tail lamp, horn and
plete tool outfit.



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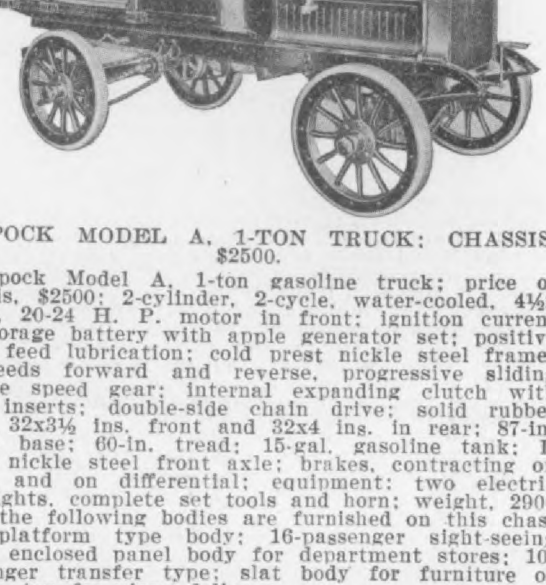
and rear, wheel on Timken bearings; 3 in. solid ss rubber tires; wheel base, 90 ins.; heavy angle frame; oak sub-frame; full platform springs; sector steering; internal hub brakes; throttle spark levers on steering column, forward and re- by foot pedals, high speed by hand lever; ca- y, seats for three attendants and 2 full-sized gency cots, and 3 persons on driver's seat; 15 galosine tank in dash; weight, 4012 lbs.; price, , including 2 oil side lamps, tail lamp, 11 in. and complete tool outfit.

oppock 2-Cycle Gasoline Commercial Cars.

by the Coppock Motor Car Co., Decatur, Ind.



OCK MODEL A, 1-TON TRUCK; CHASSIS, $2500.

pock Model A, 1-ton gasoline truck; price of s, $2500; 2-cylinder, 2-cycle, water-cooled, 4½x 20-24 H. P. motor in front; ignition current orage battery with apple generator set; positive feed lubrication; cold prest nickle steel frame; eeds forward and reverse, progressive sliding e speed gear; internal expanding clutch with inserts; double-side chain drive; solid rubber 32x3½ ins. front and 32x4 ins. in rear; 87-in. base; 60-in. tread; 15-gal. gasoline tank; I- nickle steel front axle; brakes, contracting on and on differential; equipment: two electric ghts, complete set tools and horn; weight, 2900 the following bodies are furnished on this chas- platform type body; 16-passenger sight-seeing enclosed panel body for department stores; 10- nger transfer type; slat body for furniture or s top for piano delivery.

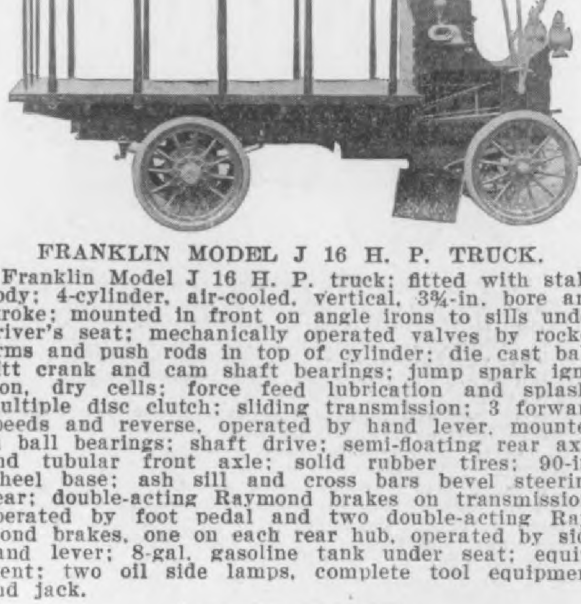
iselbach Gasoline Commercial Cars.

by the A. D. Meiselbach Motor Wagon Co., North Milwaukee, Wis.

MEISELBACH 1-TON TRUCK, $2000.

elbach 1-ton truck; 2-cylinder, horizontal, 6x4¼, P., water-cooled motor in front under seat; g double mitre friction drive transmission; 34-in. artillery wheels front and rear, fitted with 3½- lid Firestone rubber tires; I-beam front axle, Timken roller bearings, 1¾-in. square dead xle, with Timken roller bearings; springs, 2x38 10 leaves; Whitney or Baldwin double-side chain 10-gal. gasoline tank; wheel base, 84, 96 and s., according to body; 60 ins. gage; weight of s, 3800 lbs.; price of chassis, $2000, fitted with yle body.

elbach 2-ton truck; Firestone 4-in. solid rub- res; Timken roller 2-in. I-beam front axle and

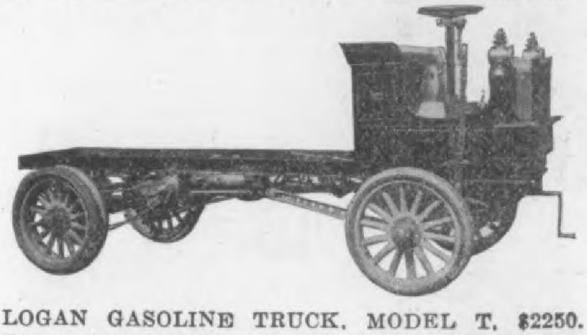


FRANKLIN MODEL J 16 H. P. TRUCK.

Franklin Model J 16 H. P. truck; fitted with stal body; 4-cylinder, air-cooled, vertical, 3¾-in. bore a stroke; mounted in front on angle irons to sills und driver's seat; mechanically operated valves by rock arms and push rods in top of cylinder; die cast ba bitt crank and cam shaft bearings; jump spark ign tion, dry cells; force feed lubrication and splas multiple disc clutch; sliding transmission; 3 forwa speeds and reverse, operated by hand lever, mount in ball bearings; shaft drive; semi-floating rear ax and tubular front axle; solid rubber tires; 90-i wheel base; ash sill and cross bars bevel steeri gear; double-acting Raymond brakes on transmissio operated by foot pedal and two double-acting Ra mond brakes, one on each rear hub, operated by si hand lever; 8-gal. gasoline tank under seat; equi ment; two oil side lamps, complete tool equipme and jack.

Logan Gasoline Commercial Vehicles.

Made by the Logan Construction Co., Chillicothe,



LOGAN GASOLINE TRUCK, MODEL T, $2250.

Logan Gasoline Truck, Model T; 4-cylinder, vertica air-cooled, 4x4-inch, 20 H. P. motor, under the sea mounted on sub-frame; overhead cam shaft and valv in the heads; crank shaft bearings, 3 of white bras cam shaft bearings, 3 of bronze; jump spark ignitio from storage battery and dry cells; Kinsey mechanic lubricator, expanding band clutch; 3-speed, sliding selectively operated change speed gear, mounted o Hess-Bright and Timken bearing, direct on the high double side chain drive; rear axle, 1¾ square, front section; 96-inch wheel base; 32 inch wheels, on Tim ken bearings; 4-inch tires front and rear; 3-inch cha nel frame; sub-frame, 2x3-inch angle steel; full ellip tic front springs, 38x2 inches, 7 leaves; rear, pla form, 36x2½, 9 leaves; screw and nut steering gea brakes, band on rear hubs, also on jack shaft drums control, spark and throttle levers on steering po and foot clutch lever; 11-gallon gasoline tank, und seat; weight complete, 4000 lbs.; 1 ton paying loa capacity; equipment, oil lamps, horn and tools; pric $2250.

Safir Gasoline Commercial Cars.

Imported by the Commercial Motor Car Co., Time Building, New York City.

SAFIR 5-TON TRUCK, $5000.

Safir 5-ton gasoline truck; price, $5000; 4-cylinder 4-cycle, vertical, water-cooled, 4 5-16-in. bore, 5½-i

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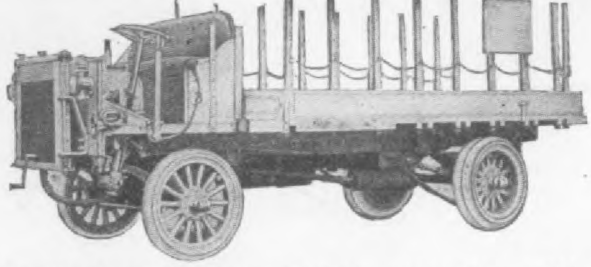


HEWITT FIVE-TON TRUCK, CHASSIS, $4500. Hewitt 5-ton truck; any style body desired; 4-cylinder, vertical, water-cooled, 4-cycle, 4¼x5½, 30 H. P. motor located in front, 6 points on sub-frame; mechanical valves on one side; crank shaft bearings; babbitt, cam shaft bearings, bronze, jump spark ignition; force feed lubrication; fibre faced clutch; 4 speeds forward and reverse, planetary change gear on plain bearings; direct on high, operated by pedals; chain drive; dead solid rear axle; solid front axle; 36-inch tires; wheels on Timken bearings; wheel base, 138 inches; 9-inch prest steel frame and sub-frame, semi-elliptic springs, 40 inches long, 3½ inches wide, 15 leaves front; 48 inches long, 3½ inches wide, 17 leaves, rear; rack and pinion steering gear; internal expanding brakes; control by pedals to push; capacity, 5 to 7 tons; weight, chassis, 6800 pounds; 35-gallon gasoline capacity in tanks, in front and at side; equipment, 3 lamps and horn; price, chassis, $4500. Special features: Radiator spring suspended; special control. Described November, 1907, issue; page 282.

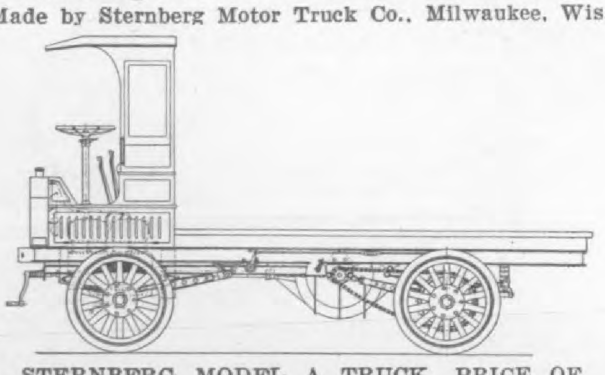
Lambert Friction Driven Gasoline Commercial Vehicles.

Made by the Lambert Motor Truck Co., Anderson, Ind.

LAMBERT MODEL C FRICTION-DRIVEN TRUCK. Lambert Model C friction-drive truck; motor, 4-cylinders, 35-40 H. P. Rutenber, cylinder, 4½ by 5-inch; friction change speed and direct chain to each rear wheel; jump spark ignition; foot ratchet brake on differential; internal expanding brakes on rear hubs; complete weight, 3500 lbs.; carrying capacity, 3000 lbs.

Sternberg Gasoline Commercial Cars.

Made by Sternberg Motor Truck Co., Milwaukee, Wis.

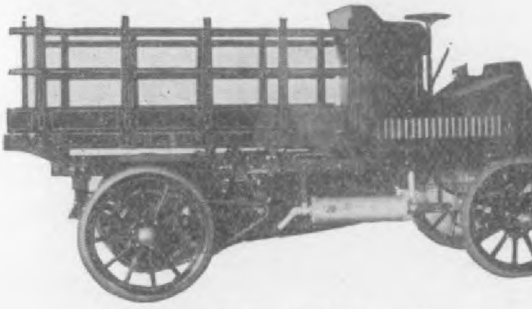


STERNBERG MODEL A TRUCK, PRICE OF

frame and 3-in. channel sub-frame, full springs, 38x2½ ins., 12 leaves in front, and elliptic, 40x3 ins., 12 leaves, in rear; adjustable and nut steering gear; double internal expa brakes on rear wheels; 3 tons capacity; weight lbs.; 20-gal. gasoline tank under seat; equip lamp, horn, storage battery and tools.

Plymouth Gasoline Commercial Ca

Made by the Commercial Motor Truck Co., Plym Ohio.

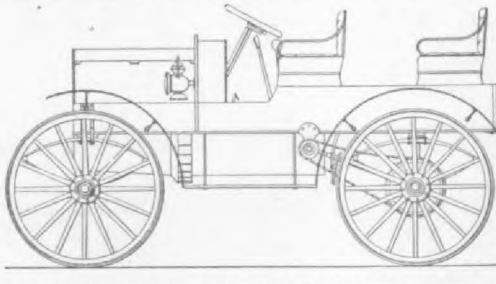


PLYMOUTH TRUCK, $2250.

Plymouth truck, price $2250, furnished with stake or side board body; 4-cylinder, 4-cycle, ve 43 H. P. brake test, water cooled, motor loca front, suspended by hangers; cylinders 4¾-inch by 5-inch stroke; mechanically operated valves; crank shaft and cam shaft bearings; jump spa nition by storage and dry cells; friction change gear on Hyatt roller bearings, operated by side friction drive, speeds from 2 to 25 miles per tires, 34 by 3 1-7-inch; 2-inch Timken square rear axle and Timken 2-inch I-beam front axle; ken bearings on wheels; wheel base, 103-inch; nel steel frame; elliptic springs front, 38-inch l 2¼-inch wide, 9 leaves, and platform springs by 2¼-inch wide, 10 leaves, 38 by 2¼-inch wi leaves, in rear; Barnes steering gear; double i expanding brake, 16-inch in diameter by 2½-inc in rear wheels; foot lever control; capacity 2 weight, 3900 lbs.; gasoline capacity, 15 gallons under seat; equipment: 2 front oil lamps, 1 tai and searchlight. Described in our December, issue, page 276.

Chase Air-cooled 2-Cycle Gasoline C mercial Cars.

Made by Chase Motor Truck Co., Syracuse, N



CHASE BUSINESS RUNABOUT, $750.

Chase business runabout, Democratic delivery 2-cylinder, vertical, air-cooled, 2-cycle motor, in front, under hood, and mounted on side f cylinders, 4½-inch bore by 5-inch stroke, 15 crank shaft bearings of bronze; jump spark ig 2 sets of dry cells; automatic self-feed oiler; etary change speed gear, 2 speeds forward, di high, operated by hand lever; plain change spee ings; side chain drive; square dead 1½-inch re and square 1¼-inch front axle; tires 40x1¾ solid; plain wheel bearings; wheel base, 84 wood frame; springs full elliptic, 32x1½ inc leaves, front and rear; worm and gear whee steering gear; brakes on rear wheel rims; spa throttle control on steering wheel; seating ca 4; 10 gallons gasoline capacity, tank located driver's seat; weight complete, 1400 lbs.; equi oil lamps and horn. Price, $2500.

Chase 2-3-ton stake or express body truck; 4-c

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AMERICAN 5-TON TRUCK.

rican 5-ton truck; motor, 4-cylinder, vertical, bore, 6-in. stroke, 35-40 H. P.; jump spark igni- y storage batteries; flash and force feed lubri- ; spark, carburetor and governor levers on steer- olumn; 2 speed forward and reverse planetary nission, direct on high; bevel gear drive on nission shaft to jack shaft; side chain to rear s; irreversible steering gear, 20-in. hand wheels; n front axle; square rear axle; steel channel, iveted frame; front springs, semi-elliptic; rear s, 3 semi-elliptic platform type; 36-in. wheels; rubber tires; 118-in. wheel base; 20-gal. gaso- tank; brakes, regular brake operated by foot emergency brakes on drums on rear wheels; ng capacity, 6000 to 10,000 lbs.; equipment, 2 il lamps, tail lamp, horn and full set of tools. standard unless otherwise specified. This chas- also fitted with 2-ton body. Described in our ber 1907, page 286.

rnational Gasoline Commercial Cars.

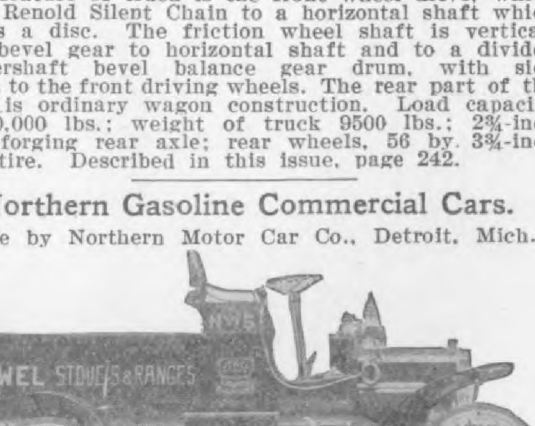
by the International Motor Car Co., Philadelphia, Pa.

INTERNATIONAL TRUCK.

rnational truck; motor, 4-cylinder, 4-cycle, water- , 5-inch bore and stroke, 40 B. H. P., at 1000 M.; spark and throttle control levers on top quadrant at the driver's right; steering by hand ; wheel base, 146 inches; gage, 57½ inches. The feature of truck is the front wheel drive, which Renold Silent Chain to a horizontal shaft which s a disc. The friction wheel shaft is vertical, bevel gear to horizontal shaft and to a divided rshaft bevel balance gear drum, with side to the front driving wheels. The rear part of the is ordinary wagon construction. Load capacity ,000 lbs.; weight of truck 9500 lbs.; 2¾-inch forging rear axle; rear wheels, 56 by 3¾-inch tire. Described in this issue, page 242.

orthern Gasoline Commercial Cars.

e by Northern Motor Car Co., Detroit, Mich.



speed, direct on high, planetary change speed gea mounted on bronze bearings, operated by lever o steering column; shaft drive; tubular front and rea axles; 32x4-in. cushion tires; Timken wheel bea ings; 106-in. wheel base; angle steel frame; springs 36x2, 7 leaves, ¾ elliptic in front and full ellipti in rear; bevel steering gear; camel hair lined, ex ternal contracting brakes; spark and throttle contro levers on steering columns; capacity, ½ to 1 ton 20-gal. gasoline tank under front seat; equipment 3 lamps, horn, tools and tool box; weight, 2400 lbs. special features; no mechanism of any kind unde any part of body.

Cadillac Gasoline Commercial Cars.

Made by Cadillac Motor Car Co., Detroit, Mich.

CADILLAC MODEL M, DELIVERY, $1000.

Cadillac Model M, delivery; price, $1000; enclose delivery body; 1-cylinder, 4-cycle, 10 H. P., horizon tal, water-cooled motor, located under body, bolte to cross members; cylinder, 5-inch bore and stroke vertical, mechanically operated valves in cylinde head; Babbitt and bronze crank shaft bearings; jum spark ignition, dry cells; force feed lubricator; dis clutch; planetary speed change gear, 2 speeds forwar and reverse, direct on high, operated by side leve bronze bearings; chain drive; tubular front and rea axles; tires, 30 inches; ball wheel bearings; whee base, 76 inches; prest steel frame; semi-elliptic fron and rear springs; 35x1¾ inches, 7 leaves, in front 42¼x1¾ inches, 7 leaves, in rear; rack and pinio steering gear; constricting band brake on differentia spark and throttle levers on steering post; hig speed and reverse controlled by hand lever, low spee and brakes by foot lever; capacity, 600 lbs.; 7-gallo gasoline tank, under front seat; equipment include 3 oil lamps and horn.

Brush Gasoline Commercial Cars.

Made by the Brush Runabout Co., Detroit, Mich.

BRUSH RUNABOUT MODEL 2 A, DELIVERY WAGON, $600.

Brush delivery wagon; motor, 1 vertical, water-coole cylinder, 4-cycle, 4x4-inch, thermal circulation, 6 H P. motor, under the hood, on three-point suspension valves mechanically operated and located on the side ignition jump spark from dry cells; lubrication b crank case compression; metal-to-metal cone clutch

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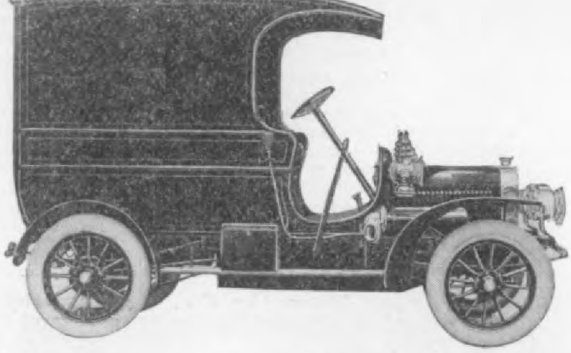


ARTERCAR MODEL C DELIVERY WAGON. $1400.

Cartercar Model C delivery wagon; price, $1400; 000 lbs. capacity; 2-cylinder, horizontal opposed, ater-cooled motor, 25 H. P., in front under hood; ½-in. bore, 4½-in. stroke, Lavigne oiler; 30x3½-in. ires; 96-in. wheel base; 15-gal. gasoline tank; Car-ercar friction transmission, operated by one side ever; front axle of the tubular type, rear axle, tubu-r divided type; Brown-Lipe differential, mounted on Iyatt roller bearings; semi-elliptic springs, 40 ins. ng in front, 48 ins. in rear; equipment: 3 oil lamps, ube, horn, mats, tire repair kit, battery box of prest teel with tray for small tools on running board.

Lindsley Commercial Gasoline Vehicles.

Iade by J. V. Lindsley Co., 2207 College Ave., Indianapolis, Ind.

LINDSLEY COMMERCIAL CAR. $500.

Lindsley commercial car, box body; capacity, 1500 bs.; 2-cylinder, vertical, air-cooled, 4¼ by 4⅛-inch, 4 H. P. motor under the seat; mechanical valves; am shaft and crank shaft bearings bronze; jump park ignition, dry cells; force-feed lubrication; fric-

pacity, 8 gallons; tank under seat; equipment: $500.

Standard Gasoline-Electric Comme Cars.

Made by the Standard G. E. Power Co., 50th Lancaster Ave., Philadelphia, Pa.

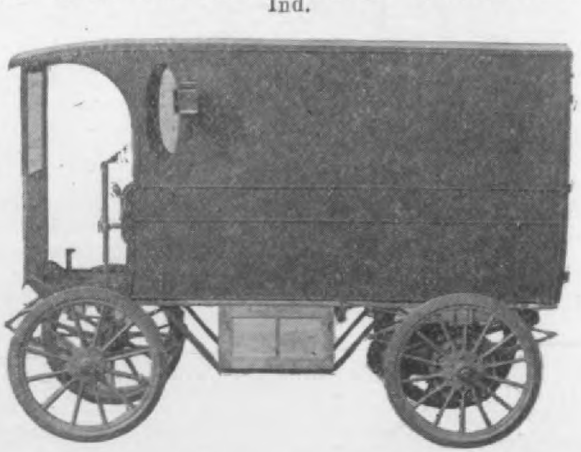
STANDARD G. E. TRUCK.

Standard gasoline-electric truck; 2-cylinder o motor; 2½ H. P. electric motor in front under d seat, cylinders, 5½-inch bore, 6-inch stroke; le faced cone clutch; 3 forward and 1 reverse gear; 42-inch rear wheels; control handle at ri driver's seat; 80 volt, 40 ampere hour electri tery; self-starting device; internal expanding on rear wheels; 5-inch channel iron frame; tr fitted throughout with roller or annular ball bea 3½-inch solid side wire tires in front, 4-inch ti rear; 96-inch wheel base; 60-inch gage; semi-e springs, 44 inches in front and 48 inches in rea gallon gasoline tank under seat; equipment in side lamps and tail lamp, fitted with incand globes, current being supplied from storage bat Special feature: The truck is driven by the ga motor. When the speed of the engine drops 1000 R. P. M. the motor takes current fro storage battery and its torque tends to kee engine up to its normal and effective working where it is capable of developing sufficient d power. When the gasoline engine is running 1000 rev. the motor automatically becomes a ge and supplies the batteries with current. The e motor does not drive the machine, but acts as ernor on the engine. Full description of this will be found in our February, 1908, issue, page

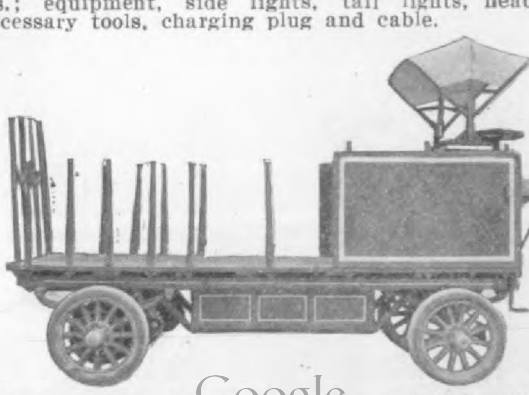
Electric Commercial Cars

Studebaker Electric Commercial Cars.

Iade by the Studebaker Automobile Co., South Bend, Ind.



ing band inside drum on rear wheels and hub other foot lever controls expanding inside dru motor countershafts; weight, 3500 lbs.; capacity lbs.; equipment, side lights, tail lights, hea necessary tools, charging plug and cable.



STUDEBAKER MODEL 2610a 3½-TON S TRUCK.

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Model 2610a Studebaker Electric 3½-ton stake

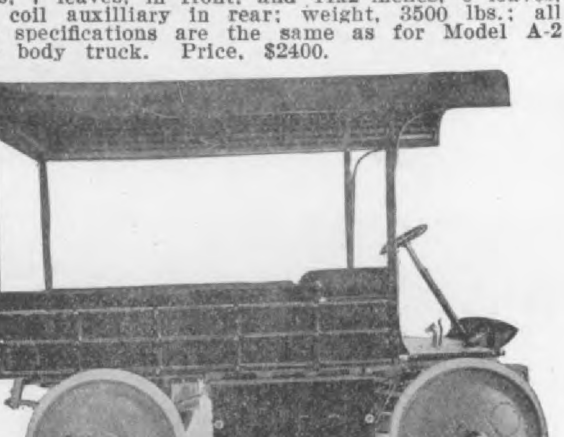
ding bands inside drums mounted on motor ershaft.

ple Gear Electric Commercial Cars.

le by Couple Gear Freight Wheel Co., Grand Rapids, Mich.

PLE GEAR, MODEL E-2, PANEL BODY EXPRESS WAGON, $2400.

ple Gear Moded E-2 Express Wagon; weight of ry, 1600 lbs.; 80 volts, 35 amperes; Couple Gear ay type controller; 2¼-inch nickel steel rear Sarvin type rear wheels and bearings, Couple disc front wheels, on roller bearings; 2¼-inch tires in the rear and 3-inch rubber tires in ; springs semi-elliptic in front and rear; 38x2-s, 7 leaves, in front, and 44x2 inches, 6 leaves, coil auxilliary in rear; weight, 3500 lbs.; all specifications are the same as for Model A-2 body truck. Price, $2400.



PLE GEAR, MODEL ED-2, PANEL BODY EXPRESS WAGON, $2500.

ple Gear, Model ED-2, express wagon; 40 cells, olt, 35-ampere, National Exide or Universal bat- weight, 1600 lbs.; 3½-inch tires; semi-elliptic gs front and rear, 38x2 inches, 7 leaves, in front,

2800 lbs.; 88 volts, 63 amperes; 5 speeds forward, reverse; Couple Gear drive to both sides of whee trussed type axles front and rear; disc wheels on roll bearings; tires 4-inch dual on all wheels; steel I-bea frame; semi-elliptic front and rear springs, 43x3 inche 20 leaves, in front, and 43x3 inches, 19 leaves, rear; double-acting band brakes, operated by fo lever; complete weight of car, 10,000 lbs.; equipme includes seat, top and curtains, volt and ammete cyclometer, gong, lights and tools. Price, $5000.

Lansden Electric Commercial Car.

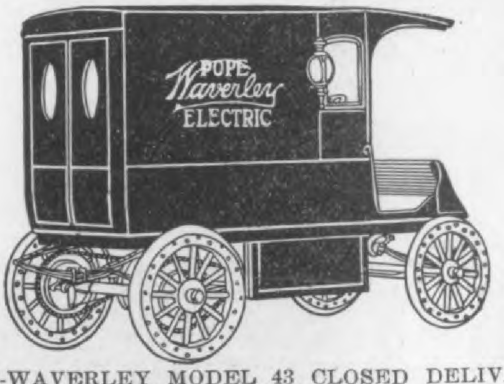
Made by the Lansden Co., Newark, N. J.

LANSDEN TYPE 36 EXPRESS WAGON, $2250.

The Lansden Type 36 chassis, fitted with Model open express body, with top; General Electric moto under footboard, on angle iron sub-frame, sliding fe on motor, 3 H. P.; Edison 60-cell, 50 ampere hou 75-volt battery, weight 850 lbs.; General Electric co tinuous torque, 3 speeds forward and 2 reverse, co troller; double side chain drive from countershaf single chain to motor; solid square forging rear a front axles; artillery type wheels; 32x2½-inch tire wood and steel plate frame; semi-elliptic sprin front and rear, dimensions according to load capacit internal expanding brakes on rear hub drums, operat by foot pedal; weight, 3000 lbs.; equipment, si lamps, horn or bell, tail lamp, top with curtain tools and odometer; price, $2250. This concern al builds other types of wagons, from 500 lbs. to tons capacity.

Pope-Waverley Electric Commercial Vehicles.

Made by the Pope Motor Car Co., Indianapolis, In



POPE-WAVERLEY MODEL 43 CLOSED DELIVER WAGON, $1800.

Pope-Waverley Model 43 Closed Delivery Wago double reduction; drive by double side chains; ba tery, 42 cells, 11 P. V. Exide or 11 C. B. Nations 32-inch artillery wheels in the front, 36-inch in t rear, fitted with 3-inch solid rubber tires; 2 h brakes and a countershaft brake; steering by han wheel, with sector and pinion; wheel base, 7 feet inches; body-carrying space, length, 5 feet 3 inche width, 3 feet 4 inches; length over all, 10 feet inches; bodies of any shape or design will be fu nished at extra cost; carrying capacity, 1200 lbs.

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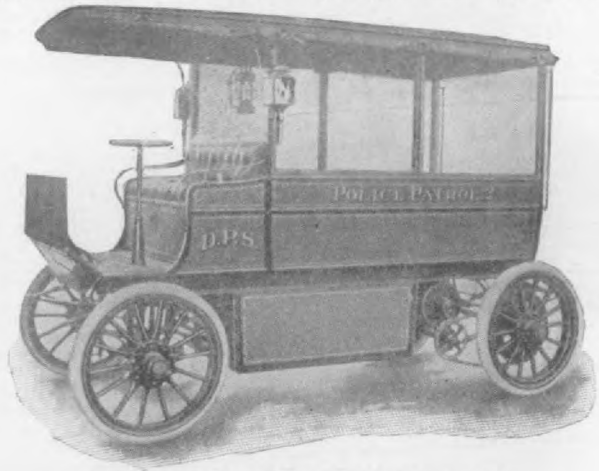
Baker Model N Commercial Electric

BAKER ELECTRIC MODEL N COMMERCIAL CHASSIS, $2300.

ontinuous drum type, giving 5 speeds forward and reverse; drive, Renold silent chain to countershaft nd double chain drive to rear wheels; forged rear xle, square section; I-section drop-forged front axle; rtillery wheels, on roller bearings; motor on annular all-bearings; tires, 34x3½-inch solid rubber; frame, rest steel; 40x2-inch semi-elliptic springs, front, 9 eaves; rear, 8 leaves; brakes, internal expanding on ear wheels, operated by pedal. Special features: unerslung battery; special patented battery cradle and ountershaft mounting. Price of chassis, $2300.

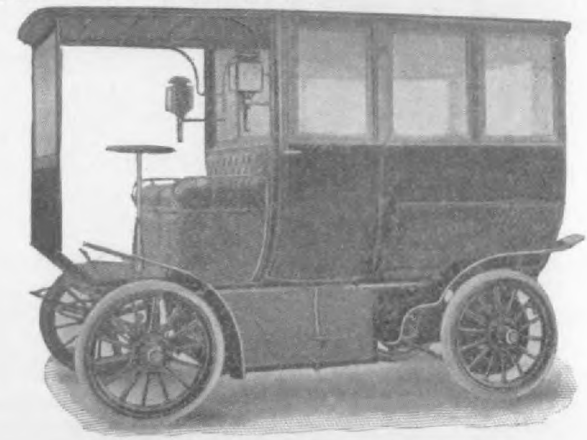
General Vehicle Electric Commercial Cars.

Made by General Vehicle Co., Long Island City, N. Y.



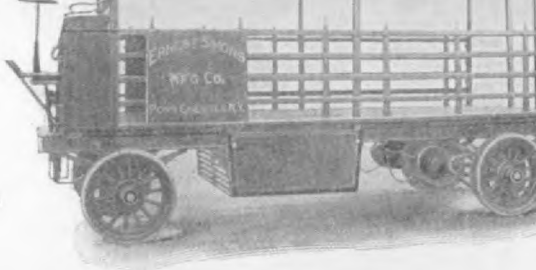
GENERAL VEHICLE MODEL 835.

General Vehicle police patrol wagon; weight, 5600 os.; General Electric motor, suspended from frame n cradle; 2.8 H. P., overload capacity, 100 per ent.; voltage 85, ampere 30; 4 speeds forward and reverse; chain drive, Morse, 1st reduction, Whitney, d reduction; Exide battery, 44 cells; wheel base, 07¼ ins.; gage, 64¾ ins.; channel frame; tires, x32 ins.; springs, half-elliptic, 40 ins. long, 2 ins. vide, 8 leaves, front, 9 rear; internal expansion brake perated by foot pedal.



GENERAL VEHICLE MODEL 2067.

General Vehicle Chatsworth 'bus; weight, 4400 os.; General Electric motor, suspended from frame n cradle; voltage 85, ampere 20; 4 speeds forward, reverse; chain drive, Morse, 1st reduction, Whitney,



GENERAL VEHICLE MODEL 830.

reverse; Morse chain drive, first reduction; Wh second reduction; 44-cell Exide battery; wheel 144 ins.; gage, 71½ ins.; channel frame; 7 tires front, 4x36-in. twin tires rear; half-e springs, 50 ins. long, 3 ins. wide, 13 leaves, 16 leaves, rear; two internal expanding brakes, ated by foot pedal.

Autocar Commercial Electric Cars

Made by the Auto Car Equipment Co., 77 Edwar Buffalo, N. Y.

AUTO CAR 24-PASSENGER ELECTRIC SIGHT ING CAR, $3150.

Auto Car 24-passenger electric sight-seeing price $3150; 2 Westinghouse motors; double drive; 2-inch square dead rear axles and 2-inch tion front axles; tires, 36x4 inches front, 36x5 rear; Timken roller wheel bearings; wheel bas inches; armored wood frame; platform spring inches wide; worm type steering gear; intern panding, foot-operated brakes; equipment, 2 e side lamps, 1 electric headlight, 1 electric tail and 1 horn.

AUTO CAR ELECTRIC AMBULANCE, $25

The Auto Car Electric Ambulance, 2 Westin motors; 4 speeds; double chain drive; 1¾-inch

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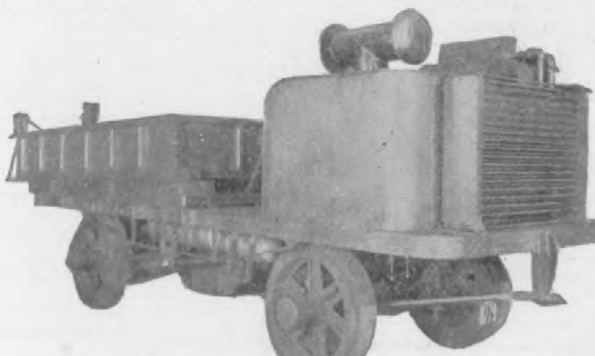
TO CAR 6-TON ELECTRIC TRUCK. $4500.
axle; 36x6-inch front tires and 36x7-inch rear; n roller wheel bearings; 100-inch wheel base; n tread; internal expanding, foot-operated brakes; liptic springs, 3 inches wide in front and rear; type steering gear; equipment, 2 electric side 1 electric headlight, 1 electric tail light; West-se horizontal controller.

Pittsburg Steam Car.

by the Pittsburg Machine Tool Co., Allegheny, Pa.

sburg heavy steam truck, 8 to 10 tons capa-

on the brake drum on the differential; transmissi provides one fast and one slow speed; wheels ar



PITTSBURG HEAVY STEAM TRUCK, 8 TO 1 TONS CAPACITY.

steel castings furnished with wooden tires; the truc is fitted with a steam driven winding drum fo hoisting, etc.; frame is of channels riveted togethe and the top plate is ¼-in. steel; stake pockets ar riveted along the outside of the frame for the re ception of steel stakes. Described February, 1909 page 192.

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MECHANICAL AND TECHNICAL DEPARTMENT

EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.

Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

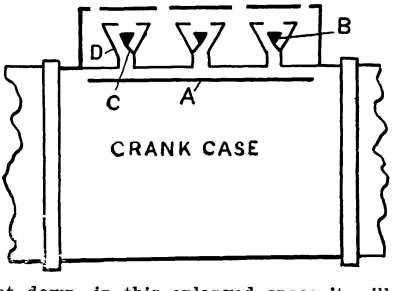
CHAS. E. DURYEA

BREATHING PIPES FOR 2-CYLINDER OPPOSED MOTOR.

Brookville, Ind.

Will you please answer the following question: I own a 2-cylinder opposed 20 H. P. car. I tried to relieve the crank case from the compression so I could keep the engine cooler. I put in the crank case lid seven pipes, each pipe one and three-eighths of an inch bore, extending four inches above the plate. Now when I get on the road the air forces the oil thru the pipes against the seat. What would be your advice to prevent this? They are common gas pipes with no valves nor screens. How would a relief vent do, and how many must I have? Will a screen of a funnel shape in each pipe keep the oil back? Be so kind and answer this question as soon as possible. H. W. SUHRE.

How to let a 2-cylinder opposed engine breathe is a hard problem. There is usually a lot of oil flying around in the case and this is carried out by the outgoing air. Some device like a steam separator is the best means of stopping this. The principle is that the oil must be thrown against a wall where it can run back and where it is not likely to be so exposed to the air that it will again be pickt up. If you have room put a plate inside so the oil cannot be thrown into the pipes in the first place. Then used flared pipes like an old-fashioned locomotive stack. If there is a cone held,



point down, in this enlarged space it will deflect the air to the outside. This cone should be supported by one or more wires down which the oil may run so it does not drop and get blown away again. If you can put a box over your present pipes into which the air may expand and deposit the oil with a pipe to lead the oil back into the case it may serve. The principle to be kept in mind is to throw the oil against a wall and to quiet the air so it can let the oil collect. A screen in the pipe as you propose will reduce the area and force the air to travel faster at that point and break up the oil into a spray, all of which make matters worse. We use a screen in the pipe to make a better mixture as it comes from a carburetor. Some steam separators use a revolving part which the steam strikes and this by centrifugal force throws the oil against the outside wall, but since the air goes both ways in your case this will not work. A sketch herewith will help you to get the idea. We shall be glad to hear from any of our readers who have solved this problem. C. E. D.

ADAPTING AUTO ENGINE TO BOAT.

2132 Germantown avenue, Phila.

I have a two-cylinder auto engine, 4½ bore and 5½ stroke, both cylinders on the same throw of crankshaft. This engine is 16 H. P. at 1200 revolution. I would like to use it in a 28-foot launch. Would you kindly let me know what weight and size fly-wheel it would take to reduce the speed and still have 10 to 12 H. P., as the fly-wheel that is on the engine was not made for it. The engine has so much vibration that we think the fly-wheel is too light, or does it come from not being a double throw crankshaft? Please give us the information to the best of your knowledge, as we would like to put the engine in first-class running order.

CHAS. MARBACH,

Increasing the weight of the wheel will lessen the vibration somewhat, but not very much. Add a stiff base of wood and maybe you can hold it firm enuf so the vibration will not be objectionable. When the boat is in the water the vibrations are resisted by the water and if the engine is securely fastened to the hull there will likely be very little vibration. Determine how you wish to set the engine and make the wheel as large as you can conveniently and it will not hurt to double the weight. You cannot reduce the speed much if you wish to get the power asked for. If you experiment a little with two-bladed narrow propellers you can use the high speed. Try for a speed that gives the least vibration, for if you do not you may get one that the boat responds to and thus magnify the trouble. Two pistons on a single crank are a badly balanced load and there is little that can be done to help. See balancing answer this issue. C. E. D.

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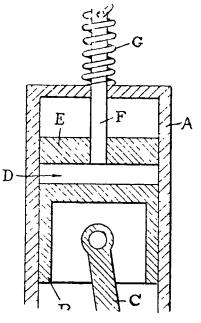
AUXILIARY PISTON.

Philadelphia, Pa.

I have been a reader of your Journal for six months and I will say that I have derived a fund of useful facts from your column of questions and answers, though I admit I have much to learn about gasoline motors. Will you devote a few minutes to the sketch I enclose and pass your opinion upon it? In the drawing A, are the cylinder walls; B, trunk piston; C, connecting rod; D, compression chamber; E, auxiliary piston; F, a sort of guide for E; G, a coiled spring requiring say 150 pounds to operate it. Now my idea is this: B, coming down to bottom of stroke draws gas into space D, is compressed to say 80 pounds, is fired and the piston E under the influence of the explosion moves upward while



B, of course, will move downward. The object of this device is to eliminate all vibration. Though I do not know the indicator pressure of a fired charge I will say it is 250 pounds, but I suppose that it falls considerably below at the exhaust end of the stroke so the apparent loss of power made by my device is compensated for by having a much greater pressure at the end of the stroke. Now will you answer me these questions: (1) Will it do away with all vibration? (2) Does the elimination of vibration compensate for the weight which will be added by the device?

HARRY J. MUHLER, JR.

Your idea of an auxiliary piston is not a new one. I do not recollect having seen it proposed as a means of relieving the high pressures at the beginning of the stroke as you propose to use it. It would probably have some effect in this direction, but not enuf to pay for the added weight, cost and leakage. It will not do away with "all vibration" for it does not remove the cause nor fully compensate. Motor vibrations are from unbalanced parts and from the reaction of the explosion. Your device does nothing to balance the parts. It does not do away with the reaction of the explosion, but simply eases it at the beginning and augments it near the end. The general effect would be much the same as without your device. The explosion would be felt rather as a push than as a knock, but the reaction must be there if the action is and if it reduces the action it is not what is wanted. The usual suggestion for such an auxiliary piston contemplates using this piston to completely exhaust the burnt gases at the end of the exhaust stroke. One of the first designs I tried when I began to experiment with vehicle motors was much like yours, except I had the spring behind the usual piston. This saved one piston. Many others have tried it, so do not waste any money on it.

C. E. D.

ABOUT REVOLVING CYLINDER MOTORS.

Sparta, Ont.

I have your January, 1907, Buyers' Guide Special. Let me know if you issue such a special this year. I would like to purchase it. The Burlat motor made in Lyons, France, is made in 4-cyl. and 8-cyl., also revolve about their crank shaft, similar to the Adams motor. I have Adams catalog and have written to the Burlat Co. for theirs. I cannot see why such an air-cooled motor would not be satisfactory. I would prefer it set perpendicular tho if connections to jack shaft could readily be made its disadvantage would be overcome. As Mr. Malcolm in January, 1907, article says a two-cycle motor built with say three revolving cylinders would give greatest power with least weight and least number of parts. Do you know of anyone else building that style of motor? I only want a motor, not the chassis.

J. A. WEBSTER.

The idea of revolving the engine to save the need of the flywheel has always seemed to me an attractive one. It gets rid of the dead weight of the wheel of which the only function is to carry over the dead spots and substitutes for this dead weight other weight that must be carried for working purposes. It would seem to be particularly adapted to aeronautic work where every ounce ought to be saved. When one comes to work it out, however, there are found certain difficulties that are not pleasant. One of these is the lubrication problem. The oil is needed on the cylinder walls, but the centrifugal force throws it into the heads of the cylinders where it is not wanted. Feeding oil freely will replace this and it would seem that this should not be a serious objection. How serious it is can only be told by trial in each particular engine. Another trouble that arises is also the effect of the centrifugal force. It is unpleasant to have an oil cup get loose and come out of that revolving mass like a bullet out of a gun. If one is working for the lighest weight and has gotten the iron about as thin as reasonable he is likely to wonder which way that head is going to go when it gets a bad heat strain and cracks under the combined influence of the centrifugal and the explosion forces. Foreign makers have increased the number of cylinders and thus have lessened the need for a flywheel and also have reduced the strain on the parts by getting a more continuous application of power. The simplest and best looking engine of the revolving type I have seen was shown by the Bailey Auto Co., of Springfield, Mass., at the Boston Show last year.

It was illustrated in this Journal May, 1907 issue, page 74. It had four cylinders of the two-cycle type and instead of the usual connecting rods employed Scotch yokes in which an annular bearing rolled. Each piston was carried by a piston rod passing thru a stuffing box in the lower end of the cylinder so each cylinder had its own compression chamber. This arrangement is tight, simple and effective. I regard it as better than the arrangement suggested by Mr. Malcolm. By mixing the lubricating oil with the gasolene it is possible to feed a two-cycle engine with oil positively and so evenly that there is no smoke yet ample oil. It beats a force feed or any other method. A gill of good oil to a gallon of gasolene or thereabouts will do to start with and the amount can be increased or decreased as the needs of the engine seem to indicate. The revolving two-cycle engine needs but a single coil and no distributer for the plugs get the spark as they come to a certain part of the revolution. A five-cylinder revolving engine has been shown at several of the auto shows held in New York. The Balzer. It usually had the shaft parallel to the car axle. We issue a Buyers' Guide Special each year in January.

C. E. D.

WILL IT CLIMB?

Port Republic, Va.

Answer me this question: Would the 6 H. P. Brush Runabout of Detroit, Mich., pull the hills in Virginia? Some of them are 25 per cent grade.

M. J. M.

To say whether any rig can traverse a certain hill or road requires that we know more about the road than merely its grade. If the surface is good, I would say that the Brush can pull it on the low gear and I have no doubt that if the makers know what your roads and grades are, they will fit the required low sprockets so that there need be no question about this.

C. E. D.

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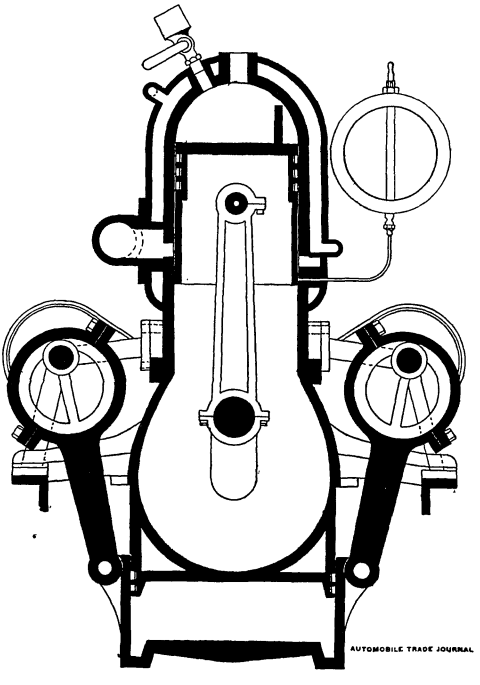
2-Cycle Engines

HUGH DOLNAR

SUGGESTED 2-CYCLE ENGINE.

Rochester, N. Y.

Please look over this design for a 2-cylinder, 2-cycle motor with underneath compression cylinder, driven by two eccentrics; to slide on a stationary piston integral with the crank-box lower member. I have had the design and idea registered before a notary and also applied for patent, as I expect to build one for my own use and as the unique features I think will quite change the usual practice of port construction, owing to the high pressure of the incoming gas being 30 to 40 lbs. per square inch. Please advise me if the following proportions will be right for 800 revolutions per minute. The motor as will be seen is for a marine purpose, the size is 5 by 5, with inlet port 7/16 deep and extending around the cylinders 3 in. with a drop of ¼ in. below exhaust and being full open when piston is at its extreme. The exhaust is ⅝ and 3 in. around cylinder, the compressing



chamber is 8¼ in. diameter provided with 2⅜-inch rings 3-16-inch apart. The eccentrics have a travel of 2½-inch, are on a 1-inch shaft, with a bearing close at its side. This shaft is run by gears which are to be 1-inch face and 14 inch from the main shaft. The by pass is ½-inch by 2½-inch in the smallest extremity, and connects to space at side of crank case, the bottom partition being drilled or bored out to give connection to compressing chamber. This by pass is to be provided with a carburetor connection of 1¼-inch. The fly wheel is to be a webbed affair, 17⅝-inches diameter and to weigh 100 lbs. The crank shaft is to be drop forged 1⅝-inch in diameter and 1⅝-inch pin, cranks placed 180 degrees. I contemplate using crank case pressure for a scavenging agent, by throwing it in the cylinder ahead of the incoming gas.—C. E. CRAPO.

This picture and story are printed because they convey an obvious lesson which need not be put into words. First, charge compression before the charge is in the working cylinder, is work lost, and no more compression than enough to cause the charge to enter the cylinder should be given. It is both better and cheaper to use a 2-diameter piston, integral, well known form, as in Palmer's "Euclid" motor, if the engine is to be of more than one cylinder, than to use a separate piston, and moving cylinder with a separate cylinder driving action. I am convinced that it is an error to water cool the 2-cycle motor, if other means can be used, as the water cools the cylinders too much and makes the water cooled 2-cycle motor wasteful of fuel. With crank-box supply there is some excuse for high pressure, because it increases the volume of charge delivered to the cylinder. Broadly, the less charge pressure before entering the cylinder the better, so long as the charge does enter.—H. D.

2-CYCLE MOTOR WITH INTAKE THRU PISTON.

I would appreciate your criticism of the following dimensions of an engine I intend to build, 3-cylinder, 2-cycle, water cooled. The exhaust is an annular passage. The inlet will enter the cylinder through the top of the piston. A cylindrical extension on the top of the crank case, into which the cylinder sets will act as a by pass.

Bore, 4¼ in., Stroke, 5 in., Exhaust ports 4, 1⅝ in. by 1 in., equally spaced around cylinder. Inlet ports 4, 1⅛ in. by ½ in., equally spaced around cylinders, in such a way that they correspond only to ports in piston. By box. Impossible to say anything with certainty without seeing working drawings. pass, ¼ in., by circulation of cylinder. Hole in top of piston, 1½ in. diameter. Connecting rod, 9 3-16 in. cylinder to cylinder. Piston pin bearing, 1 in. by 2¼ in. Crank wrist, 1½ in. by 2½ in. Crank shaft, main bearing, 5 5/16 in. by 1¾ in. Crank shaft, inside bearings, 4⅝ in. by 1¾ in. Crank shaft, front bearing, 4⅝ in. by 1¾ in. Cylinder wall thickness, 5/16 in. Jacket wall thickness, same. Water space, ⅞ in. Compression figures, about 65 lbs. Crank case compression about 5 lbs. About what will be highest working speed and B. H. P.? What size carburetor should I use? Will this motor back fire into case? It is not 3 port, but uses a light check valve admission to crank case 2½ in. in diameter, small lift. About what weight flywheel can I use if it is 20 in. diameter? Any information you may offer will be gratefully received.—L. J. ROBINSON.

I have seen this form of parts in but one motor, the "Atlas," and had no opportunity for extended observation. ¼ in. is thick enough for your finished cylinders and your jackets. You should obtain 20 to 25 H. P. at 1000 R. P. M., at least. As you have a constant suction on the carburetor a 1½ or 1¼ in. pipe should do. Fly wheel, 20 inches diameter, 3 inches rim face, 1 inch thick, you do not need much flywheel. As your exhaust port opens ½ in. before the intake opens, you are likely not to fire the crank Your dimensions are ordinary practice, far as I know. In regard to this form of motor piston, ports in two planes, with central opening in piston head, I would say that the "Atlas" had trouble with self ignition and made a change of some sort; also I have been told that the Atlas piston is patented. I believe that as good results can be had with the exhaust port and the intake port opposite each other, usual form, as with the ports in two planes. I do not believe that there is any gain in having extremely wide ports, as the charge has plenty of time to enter the cylinder. I do believe that deflector form is of great importance. Placing the ports in two planes, as intended by Robinson, adds greatly to pattern making and moulding cost.—H. D.

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O FRANKLIN FACTS

1. Light Weight—No power wasted carryin useless bulk.

2. Air Cooling—No freezing, n overheating.

3. Easy Riding—Wood frame an full elliptic springs absorb shock

4. Economy — Tire expense cu down; less fuel used.

5. Durability—Laboratory-tested ma terials save repair expens

Experience tells the story

Tire-saving

I have covered over 15,000 miles in my Franklin without a hitch Have bought only one new tire and had three recovered.—HENRY H. SIMONIN, 1217 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Climbing

I have owned several cars previous to the Franklin. Its actual performance during an entire season has been a revelation to me. At hill-climbing the Franklin is the greatest I have ever driven.—HERMAN A. ARUS, NEW YORK CITY.

The Best of 9

I have had 9 different makes of cars. Have had better service from my Franklin than from any other; with less trouble and annoyance. I have found it the most reliable and least expensive to run.—GEORGE T. CUSHMAN, M.D., 46 DUDLEY ST., OSTON, MASS.

Cooling

wo Franklins remained throughout the three hours of the procession t one mile per hour). No heat at all. Six water-cooled cars boiled water away in less than 30 minutes.—D. R. GARDNER, MEXICO Y.

An Unprejudiced Verdict

I have driven or watched the operation of nea all the well-known cars on the market, and your H. P. (1907 D) will out-run, out-carry and out-tra any 40 H. P. water-cooled car I have seen, and I o an excellent water-cooled car too.—MACGREG DOUGLAS, OKLAHOMA CITY, OKLA.

8 Tough Miles

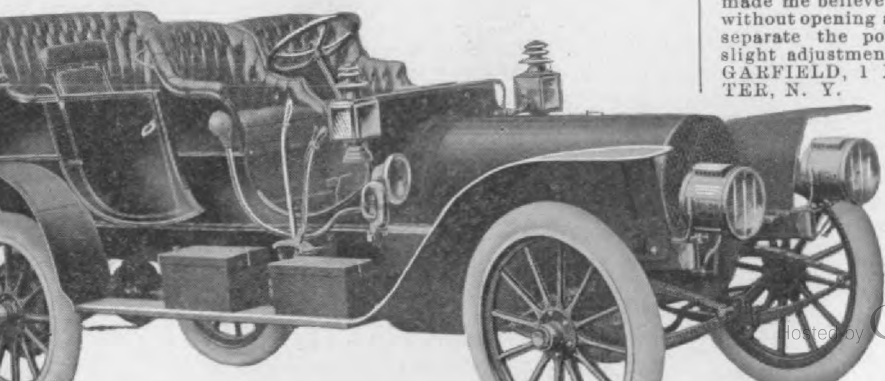
The engine will not get hot. About two we ago I ran the car eight miles through six inches mud on the low gear and the engine never fired o when I shut off the switch. I have had six cars, none of them ever did the work of the Franklin F. VAN BLAROOM, WESTMORELAND PLAC ST. LOUIS, MO.

10,500 Miles, No Repairs

The Model D we now have has run over 10, miles with absolutely no repairs except three r tires. Even the valves have never been ground, the machine is to-day running as smoothly and well as when it started.—S. C. LOWE CO., N BEDFORD, MASS.

Reliability

My FRANKLIN is a wonder. No one could h made me believe it was possible to cover 1600 m without opening a tool box but once, and then onl separate the points on a spark plug and to mak slight adjustment to the engine.—H. HARWO GARFIELD, 1 EXCHANGE STREET, ROCH TER, N. Y.



1908 Models

16 h.p. Runabout . . . .
16 h.p. Touring-car . . . .
28 h.p. Touring-car or Runabout
42 h.p. Touring-car or Runabout
Four-cylinder Landaulet .
Six-cylinder Limousine .

Prices f.o.b. Syracuse, N. Y

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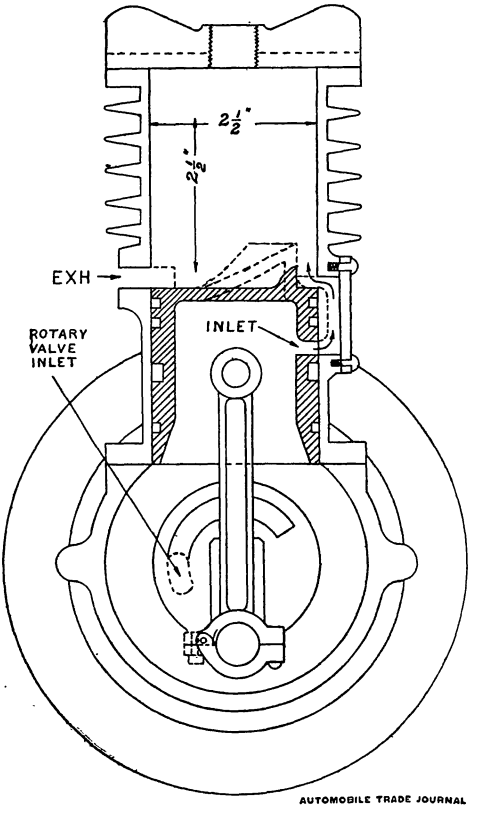
PROPOSED 2-CYCLE MOTOR.

Enclosed please find rough pencil sketch of a 2½ by 2½ inch 2-Cycle Engine, which I intend to build. Will you kindly tell me thru the columns of the Journal if you think the design practical. The sketch is full size. I intend to make the ports clear around cylinder. What H. P. will it develop?—J. O. THOMAS.

As shown the ports are 3-16 in. inlet and 5/16 in. exhaust. The inlet is rather short and the exhaust much too short, in my opinion. I would make the ports ¼ in. intake and ½ in. exhaust. Nothing is gained by holding the burning charge in the cylinder when the crank is near the end of working stroke. The drawing shows 13-16 in. compression space, with 2½ in. stroke and ½ in. exhaust port. The compression will be something like 50 lbs., cold air.

This would give say 75 lbs. mean working stroke pressure, or, at 2000 R. P. M., 166 feet of piston travel, 75 lbs. pressure, 4.8 inches piston area per minute, allowing the working stroke to be 2 inches long.



This gives 360 lbs. on the piston, multiplied by 166 feet piston travel gives 59,760 foot-pounds of work per minute, which divided by 33,000 gives 1 26-33 H. P. for your motor at 2000 R. P. M., rough estimate.

I would prefer to change the deflector as shown in dotted lines, and core up into the deflector with the piston core to keep the deflector cool, as shown in the dotted lines.

I would also hold the rod cap with two screws instead of hinging it, and would make the piston pin at least ¾ in. diameter instead of 7/16 in. as you have it.

You have shown ⅛ in. cylinder wall. This should be at least 3-16 in. thick, and 7-32 in. would not be too much in my opinion.

I would omit the lower piston ring, and use the middle piston ring only as a piston pin retainer.

You might make the piston 3-16 in. thick everywhere. The piston should be light as you can make it.

Make your deflector as high as you can and clear the cylinder head.—H. D.

WANTS H. P. FORMULA.

Rochester, N. Y.

Kindly furnish us with the latest formula that the A. A. A. has adopted in regards to figuring out H. P. of gas engines and oblige.

J. G. WAGNER, JR.

As far as I know the A. A. A. has not adopted any formula, but the A. L. A. M. has, which is as follows: Square the cylinder bore (dimensions being in inches), multiply by the number of cylinders and divide by 2.5. This is of course an approximation and will give fairly good results. However, if you wish to obtain more accurate, preliminary calculations, you can use the regular formula for any kind of engine, that is, Plan-:-33,000, in which P is the mean effective pressure in pounds per square inch. For 2-cycle boat motors 60 pounds is a fair pressure, for automobile 4-cycle engines, 75 pounds will probably give more accurate results. L is the length of stroke in feet. A is the area of the piston head in square inches, and N is the number of working strokes per minute. This divided by 33,000 will give the H. P. as close as most any method, except figuring it from indicator cards, which cannot be done unless the motor is already built, in which case the brake test is much more satisfactory and accurate.—Ed.

CARBURETORS AND SILENT CHAINS.

You so kindly helped me out once before when I was puzzled, that I make bold to again ask your advice.

Enclosed are two booklets. The first thing that I wish advice about is whether the Silent chain in your opinion is superior to any other for automobile use. Also is same perfectly satisfactory for an automobile, if not, why? run naked in the dirt. I have never seen it used to drive automobile driving wheels directly.

The only way to find out about carburetors is to try them, one after another, on your motor. Carburetors which give good results on one kind of motor are not so good on other motors, or it may be the other way about. Each one mentioned suits some motors best.—H. D.

the claims exaggerated or not, also which one would you use, if you had your pick, Holley, Shebeler or Stevens?—JOHN P. BATES.

The Renold silent chain has a very high reputation for use where it can be kept clean and well lubricated. I do not think it fit to

2. In the circular about carburetors, are

2-CYCLE ENGINE QUESTIONS.

1. Can a two-cylinder two-cycle engine be built for less than same four-cycle.

2. Does not a two-cycle engine, furnished with compression cylinder give better service than one fed by crank-case compression?

3. If two two-cycle engines are of the same bore, and one twice the stroke of the other, will not the shorter stroke engine speed up more than the other and therefore give more than ½ as much H. P?

(4). In the case of a ball-bearing crankshaft or wheel, is it advantageous to have the cones and ball runs as small as consistant with strength, that the balls will have less turning to do; or does the added strain on each ball make up for the decrease in wear? —W. R. M. V.

(1). Any small size of single acting 2-cycle motor costs much less than same size and number of 4-cycle cylinders, if crank-box pressure is used.

There are large, double-acting, 2-cycle motors with charging cylinders which cost as much as 4-cycle motors of same cylinder dimensions, but are much more powerful. (2). Yes. (3). Practice seems to favor the shorter strokes because of quicker acceleration, as you mention, but the short stroke should not show any gain of power for total quantity of fuel burned, as the friction is proportionally greater with the shorter stroke, as is, also, the port length loss. (4). I have had no experience with ball bearing crankshafts. It would seem that the more balls there were to take the work, the less load each ball would have to carry, while true rolling creates very little more friction because of velocity increase. As a rule, the more balls, the more durable the bearing.—H. D.

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Mosler Spit Fire PLUGS

ALWAYS FOREMOST
IN THE BATTLE OF SUPERIORITY

There are more than half a million Spit Fire Plugs in service to-day

BECAUSE

they are the plugs that work overtime when the others are taking a holiday.

The "Spit Fire" Plug is its own press agent—its own best advertisement. All its promises are made good by its performances.

It SPITS Fire. It Doesn't Quit.

Mosler Spit Fire
is the plug that always has
and Always Will
satisfy everybody

A. R. MOSLER & CO.

163 WEST 29TH ST.
NEW YORK

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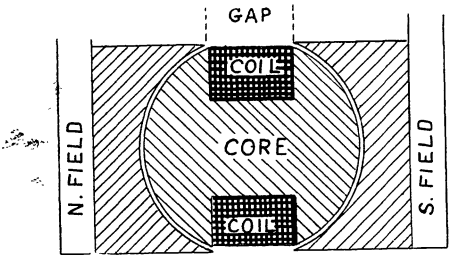
A CORRECTION.

The Trade Journal for January contains an article entitled "Considerations of Motor Car Elements," by Mr. Hugh Dolnar.

The writer states in several places that in an alternating current generator the current is strongest when the armature coil is passing along the gap between the pole pieces of the field magnets.

As the article was written primarily, for those having little or no knowledge of electricity, a few suggestions may prevent some reader from being misled, particularly as high-tension magnetos must be timed to obtain proper results.

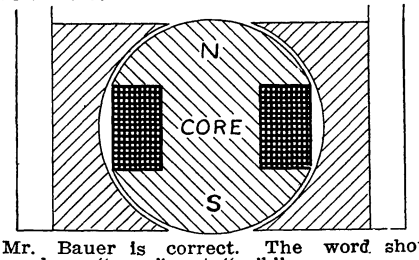
In any kind of electrical generator the current is strongest when the armature conductors are moving at right angles through the magnetic lines of force.



In the accompanying sketch the armature coil is shown passing along the field gap between the pole pieces.

In this position the conductors move parallel to the line of force and no current is generated at this part of the revolution.

As the armature rotates the conductors commence to cut through the line of force and current is generated which reaches its maximum value when the armature is in a position, one-fourth of a revolution from that shown. After that point is passed the current diminishes to zero when the conductors are again moving parallel to the lines of force.—F. J. BAUER.



Mr. Bauer is correct. The word should have been "core," not "coil."

This article was written with Mr. George Wacker, who is an able electrician, and was to have been a story of the Unterburg and Helmle high tension magneto, and as very few users know anything about magneto action, I proposed to write the simplest story possible of magneto "action," not "Principles." Mr. Wacker agreed, and the story was written in kindergarten terms, was read by Wacker in longhand, and after being typewritten. The Journal editor saw fit to divide the story and print part of it as "Principles." Mr. Wacker writes as follows:

Hugh Dolnar:

In the first place, your article says that in each revolution of the armature, two electrical impulses are generated or produced. So far we are correct. Now, these two impulses are not of a uniform strength or intensity during their existence, but vary from a point of maximum intensity to zero. The point of maximum intensity occurs when the armature of the magnet stands, as shown in Fig. 1, or when the ends of the armature core (also called poles as well as the fields), are passing the gap.

The point when the intensity of the current is zero is when the armature stands, as [illegible]

You see that when we say that the maximum effects are produced when the armature coil passes from one field to the other, we are wrong. If we say that the maximum effects are produced when the armature core passes from one field to the other, we are correct. Or you might correctly say, that the maximum effects are produced when the armature passes from one field to the other, as you do, in your article, in the paragraph "Time of Interruption," but the second line should read core, not coil.

The title was not appropriate. Your story described the U. H. magneto action all right, but it was not at all a good article on the "Principles Underlying Magneto Current Generation."—GEORGE W. WACKER.

STANDARD DRILLING JIG BUSHES.

F. Wertheim, 151 East 36th Street, Chicago, sends this table of proposed dimensions for "standard" drill jig bushings. Present practice is for each factory to make its own jig-bushes, which calls for a drawing for each separate size, and also makes it unlikely that the factory will have replacements on hand.

STANDARD BUSHINGS

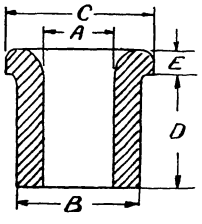
A	B	C	D	E	A	B	C	D	E
3/16	7/16	9/16	5/8	3/32	1	1 7/16	1 11/16	1 1/8	3/16
1/4	1/2	5/8	5/8	3/32	1 1/8	1 5/8	1 7/8	1 1/8	3/16
5/16	9/16	11/16	5/8	3/32	1 1/4	1 3/4	2	1 1/4	3/16
3/8	11/16	13/16	5/8	1/8	1 3/8	1 15/16	2 3/16	1 1/4	3/16
7/16	3/4	7/8	5/8	1/8	1 1/2	2 1/8	2 3/8	1 1/2	1/4
1/2	1 13/16	15/16	3/4	1/8	1 5/8	2 1/4	2 1/2	1 1/2	1/4
9/16	7/8	1 1/16	3/4	1/8	1 3/4	2 7/16	2 11/16	1 1/2	1/4
5/8	1	1 3/16	3/4	1/8	1 7/8	2 5/8	2 7/8	1 1/2	1/4
11/16	1 1/16	1 1/4	3/4	1/8	2	2 3/4	3	1 1/2	5/16
3/4	1 1/8	1 5/16	1	3/16	2 1/4	3 1/8	3 3/8	1 1/2	5/16
13/16	1 3/16	1 7/16	1	3/16	2 1/2	3 3/8	3 5/8	1 1/2	5/16
7/8	1 5/16	1 1/2	1	3/16	2 3/4	3 5/8	3 7/8	1 1/2	5/16
15/16	1 3/8	1 9/16	1	3/16	3	4	4 3/8	1 1/2	5/16

Mr. Wertheim suggests that some of our well known tool makers, Pratt and Whitney, Brown and Sharpe, Starrett or Wells Bros., should adopt standard body sizes and supply the trade. Perhaps some of the twist drill makers would be the best to supply jig bushings, as they supply the drills to be used with them.

Mr. Wertheim says, in part:

"Go into any shop and you will find at least a few jigs, and in some you will find jigs by the thousand.

Where you find jigs, you will invariably find loose and broken drill bushings.



With standard bushings in stock, drill jigs will be kept in much better repair, work will of course be of better grade, and jig repairs will be much cheaper than when each factory tool room has to make single bushings or a score of them.

Our large tool makers will know how to get bushings up in good shape, whether to get out bushings with a 2 degree taper, or to get out a straight bushing, and whether to make bushings plain or with a flange, out of case hardened machine steel, tool steel, or alloy steel."

All this is undoubtedly correct, and it is to be hoped that some of our small tool makers will take up Mr. Wertheim's valuable suggestion.

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THE "OLDSMOBILE"

NG CARS
SINES
SOUTS

THE CAR THAT DOES THINGS

1926 EUCLID AVE.

BELI
NOR'

CLEVELAND, O. Jan. 16,'08.

O. C: Foster, Esq.,
Mgr. Cleveland Branch,
Warner Instrument Co.,

Dear Sir:-- Last year you furnished me with an instrument which I used on the "Mudlark" in my tour from New York to Florida, and it gave us such good satisfaction that I would like to have one of your clock and light instruments for a model "M" Olds in which I will make a similar run this coming week from New York to New Orleans by way of Syracuse, Buffalo, Cleveland, Louisville and Birmingham.

Trusting that you will give this order your personal attention, and that I may receive the instrument in time, as other speed indicator companies have offered to furnish me free of charge an instrument for this occasion. However, I would rather buy a Warner than accept their offers as the Auto-Meter has always given me complete satisfaction.

I remain, yours very truly

R. R. Owen.
Oldsmobile Co

November 21, 1907.

THE AUTOMOBILE.

BUNK

¶ Webster says "Bunkum" means speechmaking for mere show—mere talk. It aptly illustrates the advertising methods of some Speedometer manufacturers. There's a lot of "bunkum" about wonderful tests in tours and races. In most of these events the Speedometers used are not selected and paid for by the car owners, but are installed by some Speedometer manufacturer, *free of charge*, for advertising purposes.

...unkum" concerni...

Our Competitor's Advertisement

Warner Instrument Co.

122 Wheeler Ave Beloit, Wis.

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Fires, Failures, Judgments, Etc.

The Homer Boushey Automobile Co., of San Francisco, Cal., has had two attachment suits filed, against it one for $1400 by Hattie Coblentz, and the other by James Fleming.

The Commercial Acetylene Co., of New York, in a decision handed down by the United States Court of Appeals, at Chicago, has been restrained from bringing suits against agents, customers, or users of automobile lighting equipment sold by the Avery Portable Lighting Co., of Milwaukee.

The report of the receiver at the creditors' meeting of the Consolidated Mfg. Co., Toledo, Ohio, shows a net profit for the twelve months of the receivership, after charging off $17,571.43 reserve for depreciation, and $3,175.17 reserve for bad debts, of $51,448.35. As soon as the present financial situation warrants it, a plan of re-organization will be submitted.

An explosion of gasoline in the repair shop of the Detroit Cycle and Motor Co., Detroit, Mich., located on the ground floor of a four-story building, set fire to the building causing a damage of $5000.

Da-an-nite Auto Supply Co., New York City, filed petition of involuntary bankruptcy; debts, $7263; nominal assets, $26,224.

Johnson, Wm. L., Automobile Supply Co., 4390 Olive St., St. Louis, Mo., fire completely destroyed stock and damaged building; loss, $1500.

Alfred N. Mayo, assignee of the Knox Automobile Co., Springfield, Mass., under date of Dec. 1st, 1907, issued $500,000 preferred stock, which has been accepted by all its creditors in full satisfaction of their claims.

Kansas City Motor Car Co., Sheffield, Mo., filed involuntary petition in bankruptcy. Mr. I. P. Ryland was chosen trustee.

Garage of Harry Lauterbach, 235 West Sixty-ninth St. New York, destroyed by fire. Four automobiles were burned; damage amounting to $13,000.

Lowell Automobile Co.'s garage, Lowell, Mass., damaged by fire to the extent of $45,000.

O. K. Machine Works, 887-889 Main St., Buffalo, N. Y., filed an involuntary petition in bankruptcy.

Acting on statements contained in the report of Receiver Geo. J. Smith, of the Okey Motor Car Co., Columbus, O., in the Common Pleas Court, an order was handed down directing the receiver to resume the business of the concern along the lines indicated in his report. The receiver outlined arrangements made with creditors having contracts partially fulfilled and asked permission to complete these contracts, which was granted.

Garage of Christian Peper, 4454 Forest Park boulevard, St. Louis, Mo., damaged by fire; loss, $75.

Robert Homans, of Boston, Mass., was appointed ancillary receiver of the Royal Motor Car Co., of Cleveland, Ohio, which has about $8000 worth of property in Massachusetts. Arthur Berry has been appointed ancillary receiver for New York City, the assets consisting of automobile parts and accounts valued at $8000.

The Appellate Division of the Supreme Court has just affirmed the judgment rendered by Justice O'Gorman in the suit of Rowland vs. Clifton, and known as the Searchmont suit.

Jos. N. Smith & Co., Detroit Mich. Fire on Feb. 12 temporarily disabled the working part of the factory.

E. C. Stearns & Co., of Syracuse, N. Y., purchased from the directors of the Pope Mfg. Co., the interest which that company held in the Stearns plant in Oneida street for the sum of $25,000.

The St. Louis Motor Car Co., St. Louis, Mo., according to the report of the trustee, J. M. Sholl, will pay its creditors from 20 to 25 per cent. on the dollar. An itemized report shows receipts from all sources amounting to $19,540.11, and disbursement of $6,157.20, leaving a balance on hand of $13,382.91.

Termaine Electrical Co., Washburn Building, School Street and City Hall Square, Brockton, Mass., garage, damaged by fire; loss, $200.

Winchester Speedometer Co., New York City, filed a petition in bankruptcy. Irving Washburn has been appointed receiver, under a $1000 bond.

Suit has been entered to the amount of $2508 by B. F. Nicholas, against the Wheeler Motor Co., of Colfax, Wash., to recover amount alleged due him for services as manager of their store in Colfax.

Fifth Avenue Garage, West Forty-fourth St., between the Algonquin and Iroquois Hotels, New York City, damaged by fire; loss, $16,000 in automobiles.

Following the guarantee made by Mayor Tiedeman of Savannah, Ga. that the races of the Savannah Automobile Club scheduled for March 18 and 19 would be held as planned, comes the news that those days will be made public holidays by that city's chief executive.

Trade Changes

George Bartel, 807 Commercial St., Burlingame, Kansas, sold his garage and machine shop to E. F. Standiford.

Broadway Rubber Tire Works, 51 W. 63rd St., New York City, will in the future be under the sole proprietorship of Otto Braunwarth.

J. D. Crum, Jacksonville, Fla., has sold his automobile business to his brother, C. F. Crum.

H. C. Farnham, of Warren, Ohio, recently purchased the entire business of the Valley Automobile Garage on East Market St., where the business will be continued as formerly under new management. A company is to be incorporated for $20,000.

Flint Motor Car Co., 212 Union St., Providence, R. I., moved to new and spacious quarters at the corner of Aborn and Washington Sts.

Hawley Automobile Co., of Constantine, Mich., has moved its auto factory to Menden, Mich.

The Hol-Tan Co., New York, has moved from its present quarters to 244-246-248-250 W. 49th St.

Interest in the garage of J. A. Hitchcock, Warren, Ohio, purchased by W. H. Crehan, Youngstown, Ohio. The firm will manufacture and repair automobiles.

J. C. Jensen has purchased an interest in the auto garage and horse livery of C. E. Beardsley, and the firm is now styled Beardsley & Jensen, Woodstock, Ill.

Chas. E. Miller, New York City, has moved his Cleveland branch from 406 Erie street, to 829 Euclid avenue.

Meteor Automobile Works, of Bettendorf, Iowa, has recently been succeeded by the Meteor Motor Car Co.

Lord Motor Co., Los Angeles, Cal., has moved from its present location to larger premises on Gasoline Row, near 12th street.

Parker, Lewis & Son, opened a garage at Frelinghusen Ave. and Wright St., Newark, N. J., where they will handle the Mora Car.

Ralph Rice, of the firm of Rice & Odell, Cedar Falls, Iowa, disposed of his interest in the firm to his partner, Earl Odell, who will continue the business at the old stand.

Lewis E. Rice, manufacturer of the Little Wonder Vulcanizer, recently purchased the interest of Frank Wilcox in the Lewis E. Rice Co., of Fort Dodge, Iowa, and is now sole owner of the business.

Jasen C. Stamp, who for some time past has successfully conducted the automobile garage at Eoff and 16th Sts., Wheeling, W. Va., has disposed of his interest to R. H. Mahlke, who will in the future conduct the business under the name of the Mahlke Automobile Garage.

Wabash Auto & Electric Co., Terre Haute, Ind., will move from its present quarters, 925 Wabash Ave., into a new building, which will be located on the vacant property west of the retail store of the J. R. Duncan Paper Company, 668 Ohio St.

Legislative and Legal

Recently in Jefferson City, Mo., Secretary of State Swanger ruled that a State license is good so long as the licensee uses the machine on which the license is taken out. Should he procure a new machine it will be necessary to take out a new license.

The Legal Committee of the Rhode Island A. C. recently presented to the General Assembly a drastic auto law with fines of from $10 to $500 and imprisonment of from 10 days to one year for its violations. It is chiefly aimed at non-resident scorchers.

A special committee representing the New York State Automobile Association recently introduced a bill, a feature of which is an annual registration fee based on the weight of the car. The cars will be divided into four classes—runabouts, small touring cars, medium touring cars and high power cars. The fees will be $2, $3, $4 and $5 a year, respectively. The proceeds will be used for the maintenance of State highways.

On request of the Toledo Automobile club, Senator Lamb, of Ohio, introduced a bill making it a misdemeanor to wrongfully take and use an automobile. The penalty is to be a fine of $100 to $500 or imprisonment in jail or workhouse six months to one year.

A new Delaware law is modeled after the New Jersey motor-vehicle measure, but allows non-residents to tour 10 days without securing a license. A fine of $100 or imprisonment for 30 days or both can be given for driving an automobile while intoxicated.

The National Battery Company owing to the increase in business has taken over the entire building at 236 W. Fifty-fourth street, New York.

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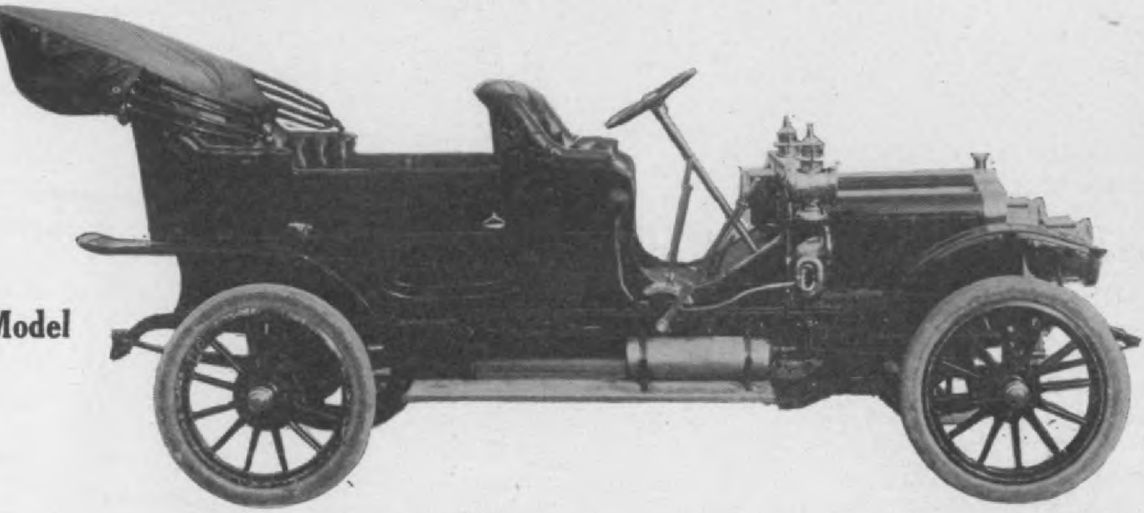
THE SELDEN CAR



Model

Five Passenger Touring Car, $2000
Three Passenger Runabout, $2000

AN ATTRACTIVE CAR
AT AN ATTRACTIVE PRICE

SPECIFICATIONS

Engine—4 cylinders $4\frac{1}{4} \times 4\frac{1}{2}$, 28-30 brake horse-power.

Transmission—3 speeds forward and reverse, selective, Timken bearings.

Wheel base—109 inches; tread, standard; clutch, cone leather.

Body—sheet metal, straight line type, roomy and comfortable.

Tires—$32 \times 3\frac{1}{2}$, quick detachable; make optional.

Frame—pressed steel, $4\frac{3}{4}$ inches deep.

Front axle—single I-beam drop forging, ball bearings.

Rear axle—Bevel gear drive, enclosed type, roller bearings.

Ignition—synchronized jump spark.

Weight—empty, 2,200 lbs. (actual, not catalog.)

REPRESENTED IN GREATER NEW YORK BY
The Palmer & Singer Manufacturing Company, 1620 Broadway

SELDEN MOTOR VEHICLE CO.

ROCHESTER, N. Y.

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Rider Lewis Sixes

The Rider Lewis Company's designs are based on a wide acquaintanceship with the best European practice, supplemented by years of American road experience. The result is a modern 6-cylinder motor car, containing no radical features, and yet at the same time embodying all that is latest according to accepted engineering practice.

These cars are made in two models, Type VIII, a touring car of ample tonneau room and a two-passenger roadster, Type IX, both use the same six-cylinder motor and the general chassis specifications are the same. The runabout can also be fitted with a single or double rumble seat at the rear.

GENERAL SPECIFICATIONS.

The motors are rated as 40 H. P., have 6 cylinders, cast individually, and are water cooled. Shaft drive with the change gear of sliding type selectively operated is mounted on the rear axle, which is of the live semi-floating type. The wheels are 34 inches, with 4-inch tires, and the springs are semi-elliptic front and C or ¾ elliptic at the rear. The wheel base is 122 inches, tread standard. The touring car weighs approximately 2375 lbs. and the roadster 2200 lbs. The price of each with an equipment of 2 gas head lights, 2 oil lamps, 1 tail light, horn and tools, is $2500.00.

The most striking feature of Rider-Lewis sixes is high power as related to weight. In obtaining this proportion it is claimed no strength has been sacrificed. Light weight has been arrived at, principally by elimination. Unnecessary parts have been left out; wherever one part could be made to do the work of two, and do it equally as well, it has been so incorporated in the designs. Simplicity is the very keynote of their construction. From the motor in front to the compact transmission axle in the rear, there is no surplus metal,—no roundabout methods of control. Accessibility is one of the most prominent features. In the motor, the valve cages are readily dismounted by the loosening of a locking ring. The valve is withdrawn with the cage as a unit, and may be either reground or a new valve cage inserted. This feature appeals strongly to those who have had their car "laid up" for a day to have valves ground. Valve-in-the-head motors were a marked feature of the recent shows, and in following this tendency the company has endeavored at the same time to provide ample cooling for valve pockets: this, when overlooked, has caused much trouble even in otherwise splendid cars.

The water pump is mounted on a vertical shaft driven by bevel gears enclosed in the forward crank case cap. This vertical shaft terminates in another set of bevel pinions that drive the cam shaft, which is across the top of the cylinders. Cams and rocker arms are protected by aluminum housings; thus ample lubrication is assured, together with long life of bearings, and silent motor operation.

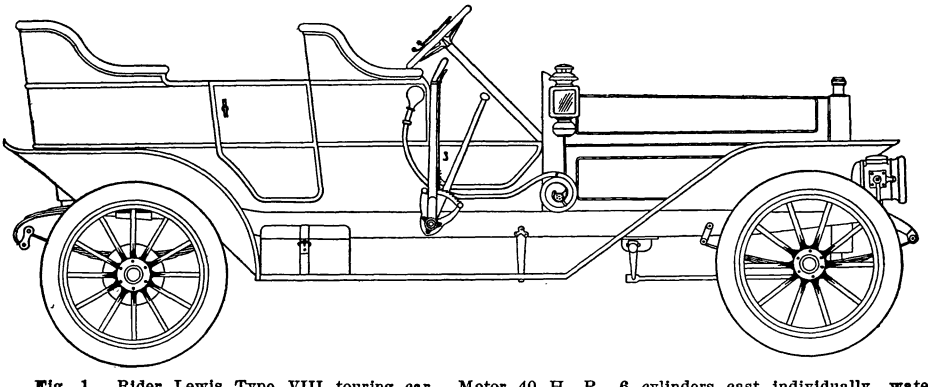

Fig. 1. Rider Lewis Type VIII touring car. Motor 40 H. P., 6 cylinders cast individually, water-cooled, overhead cam shaft, positive lubrication by pump to crank case, splash. Three speed sliding selective change gear on rear axle; shaft drive; 1 section front axle, 34 inch wheels, 42 inch tires. Internal and external brakes on rear hubs; 122 inches wheel base; weight, 2375 lbs.; galosine capacity, 16 gallons. Price, with 2 gas head lights, 2 oil lamps, 1 tail light, horn and tools, $2500.00. Landaulette and limousine bodies are also supplied on this chassis.

The crank case is a one-piece casing into which the crank shaft is assembled endwise. Front and rear caps close the crank shaft in, while hand hole plates give easy access to the connecting rods and crank shaft bearings.

The clutch and clutch operating mechanism is directly under the front floor boards, so that oiling and inspection of this important part can be readily looked after. The forward universal joint is coupled directly to the clutch sleeve casing.

The mounting of the change gears on the rear axle is being widely followed for 1908. This construction is followed in the Rider Lewis, as it eliminates the likelihood of serious disalignment of motor and transmission, whether they are mounted in units on the chassis, or supported together in a rigid housing on a "three point" suspension.

This three-speed selectively operated

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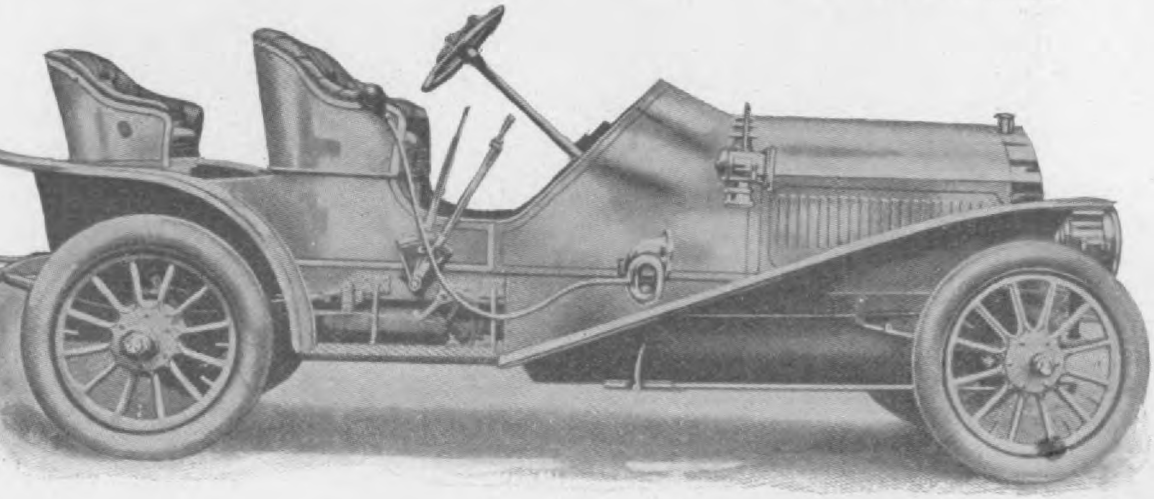
Frontenac

40-45 H.P. Runabout

$4000



rontenac Touring Car, 40-45 H. P., $4000
rontenac Limousine, - 40-45 H. P., $5000

The FRONTENAC Line is one of the best the dealer can handle. Frontenac cars are reliable because they are well-made and sell easily cause of their pleasing appearance and easy-running qualities. Frontenac rs are manufactured by a company which has been established for forty ars and earned the highest reputation for its product. Frontenac cars ust be and therefore are up to the high standard of our other products. you want to handle a car of quality, one that will make good under all nditions, you should not pass by the **Frontenac.** We want agents in l unoccupied territory. Write to-day for our attractive proposition.

Abendroth & Root Mfg. Co.

Newburgh, N. Y.

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change gear is very compact, and adds little weight to the usual type of rear axle, as it is claimed only the highest grade materials are used.

The transmission and rear axle form a compact unit. Aluminum housings of sufficient strength to make an exceptionally rigid axle are used; at the same time providing a very light method of mounting the transmission. The, gears and shafts can be readily withdrawn from the forward end of the combined differential and transmission housing. All gears are of chrome nickel steel mounted on chrome nickel steel shafts, after the most approved methods of construction.

Prest steel side rails of ample section are riveted to brace and tie members. The length of the wheel base will average well with cars of similar power. The frame is narrowed in front to permit of a shorter radius for turning, and drop frame construction is used at the rear, giving ample clearance above the rear axle, and at the same time providing a straight line drive, reducing universal joint wear to a minimum.

to exact micrometer measurements by special automatic machinery, thus insuring perfect bearings. Cylinders, pistons and piston rings are ground accurately to size and all parts made absolutely interchangeable.

STEERING GEAR.

A modern irreversible worm and nut steering gear is provided with a reduction ratio that makes high speed safe. Parts in the steering gear are all well hardened and carefully ground. Upon the steering wheel are mounted the spark and throttle control levers. Rods from these levers lead through the steering column and terminate in a bevel pinion and vertical shaft. On this small vertical shaft are mounted arms which connect direct to throttle and ignition levers.

The carburetor is of the Venturi tube type, giving, it is said, a constant mixture at variable motor speeds, without the use of moving parts. It responds immediately to the slightest movement of the throttle and is claimed to be very economical.

IGNITION.

High tension ignition is used, a storage battery of large capacity being the source

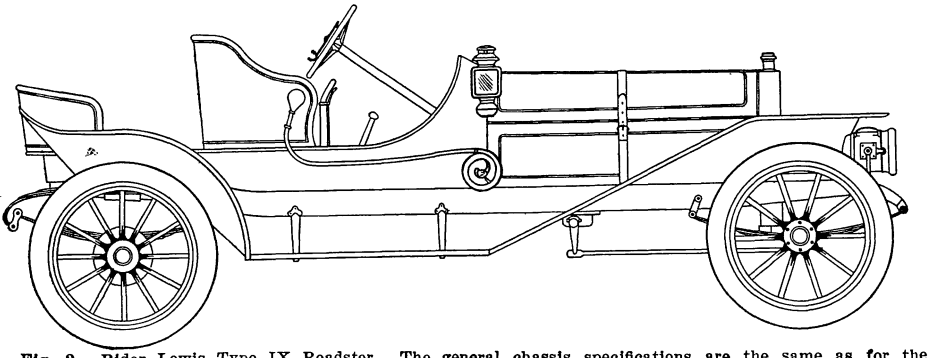

Fig. 2. Rider Lewis Type IX Roadster. The general chassis specifications are the same as for the touring car. Speed, 60 miles per hour. Weight, 2200 lbs. Price, $2500.00.

SPRINGS AND AXLES.

The semi-elliptic springs have proven themselves best for front axles, but are lamentably lacking in resiliency when used under the tonneau. To obviate this many manufacturers have installed springs of extraordinary length, while others have compromised on full elliptic and platform suspension. The "C" type of spring used, now so widely adopted abroad, it is claimed, gives an ease in riding that must be experienced to be realized. The lower half of spring is securely attached to the frame after the best semi-elliptic practice.

The front axles are of high grade "I" section steel forgings, of ample size. Careful attention has been given to the design of the steering spindle and yoke.

MATERIALS.

The company claims that nothing better in the way of materials is being used in the most expensive cars. The crank shaft is made of the very best steel for crank shaft purposes, by a firm who has thoroly tested out all of the steels proposed for this work. All crank shaft journals are ground

of electrical current. Provision is made for the installation of a high-tension magneto through a bevel gear drive from vertical shaft at the front of the motor.

A force feed oiler driven by a spring belt furnishes oil to the crank case of the motor, while the moving parts inside are thoroly lubricated by the splash system. The transmission and differential are also lubricated by splash. The forward wheel bearings are packed in grease. It has been the aim to simplify the lubricating proposition by using the splash system wherever possible.

The wheels are made from the very best ash obtainable, ten spokes being used in the front and twelve in the rear.

The brakes operate directly on the brake drums of the rear wheels, and therefore impose no strain on any of the driving parts. The percentage of brake surface to weight of car is said to stand exceptionally high. Adjustments can be quickly made and new brake liners may be installed at slight expense.

No pains have been spared to keep the

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ANNOUNCEMENT

SEASON OF 1908

The Springfield Motometer

The Motometer enters its fourth season the same correctly designed, beautifully made and thoroughly reliable instrument as when first offered to the American motor builder, seller and owner. In the three seasons past it has, while avoiding sensational methods and extravagant claims, steadily gained friends both at home and abroad by honest, accurate service. **No speedometer made has a better earned reputation.**

While in producing the 1908 models it has been possible to add several features of real and proven merit, it has **not** been found **necessary** or **possible** to materially change the model of previous seasons. It **was** and **is** right. For this reason, although it has **always** sold at a **fair** and **moderate** price, it has been possible to make for the coming season

A New Schedule of Prices

hich, quality considered, puts the motometer beyond egitimate competition as a **high-grade** speedometer. ere they are:

he Standard 50-Mile Pattern, with all 1908 improvements, complete **$35.00**

0-Mile Pattern, same in every respect except speed capacity **40.00**

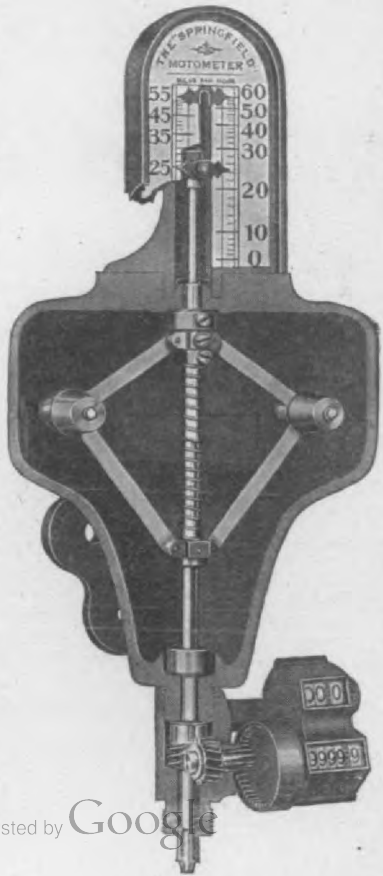
00-Mile Pattern, for high-power flyers . **50.00**

Either model fitted with our maximum speed hand, the est device of its kind, $5.00 extra. These new prices are vered by new and

INCREASED DISCOUNTS

O THE TRADE—You will receive within a few days our **New 1908 Catalog,** now in press;—

O THE CAR OWNER—You are cordially invited to write for it—and its worth your while.



he R. H. SMITH MFG. CO.

ablished 1865 **SPRINGFIELD, MASS.** Incorporated 1883

Forty-two years in business.
Four years making the Motometer

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finish up to the standard set by the rest of the car.

Refinement of design and the use of better materials has made possible reductions in weight that would have been considered unsound but a few years ago. The touring car weighs 2375 lbs. and the runabout 2500 lbs. Steel construction is used thruout the bodies, making them light and serviceable.

They are of the straight line type. Touring car, limousine, landaudet and roadster bodies are supplied. The guards are of the shield type, and the mechanism of the car is thoroly closed in. There is nothing unfinished, nothing crude in the tout ensemble. Large tires provide a luxury appreciated by "motorists who know." It has been the company's endeavor to provide the most serviceable car possible, together with the very best materials at a moderate price.

The A. A. A. Federal Automobile Bill

A hearing on the Federal Registration Bill (H. R. 428), introduced at the present session of Congress by the American Automobile Association, will be given by the Judiciary Committee of the House of Representatives on Thursday, March 12, 1908.

This movement is to obtain national registration which will make it possible for one desiring to tour, to obtain a single Federal license which shall be honored in all the States and do away with the unnecessary, troublesome and often unjust requirements now imposed by the various State laws. This bill does not, however, affect the rights of the individual States, but simply establishes a Federal control over automobiles used between the States, obviating the present necessity of securing a license in each State entered by the tourist.

This is a worthy cause and a decided step in the right direction, and it is desired that every automobilist lend his support to the movement.

Training Automobile Mechanics

The Auto Technical Association of Austria is organizing a training school for automobile repair work in the rooms of the Handicrafts Exhibition. It is especially intended for country blacksmiths, locksmiths and other mechanics with a knowledge of machinery, and, besides helping to provide automobile repair shops in country places, the school will open up a new means of livelihood to these workmen, many of whom have lost a good deal of their original business through the introduction of the automobile. The school will be completely equipt with tools and all requisites for the work of repairing all cars. The course of instruction will last four weeks. Special provision will be made for the admission of workmen in poor circumstances by the grant of a small pecuniary compensation for the time spent in the school.

The Detroit Show

This year's show at Detroit Mich., the seventh annual under the auspices of the Tri State Automobile and Sporting Goods Association, was indicative of the growth of the industry being bigger, better, and more successful than previous shows. New models were shown by The Aerocar Motor Co., The Blowstrom Mfg. Co., Regal Motor Car Co., and Oakland Motor Car Co., the latter showing a taxicab. A new speedometer was shown by Artizan Brass Co., a new anti skid by Perfection Non Skid Climber Co. and a new friction transmission by Seitz & Co.

Cleveland Auto Show

Cleveland's annual automobile show, Feb. 17-22, as usual this year takes position in the front ranks of local exhibitions. The exhibitors included 38 accessory makers and 29 agents representing 39 makes of cars. Decorations were in white and gold and 7500 electric lights were used in the illumination of the Central Armory building in which it was held.

A slight fire visited the factory of Jos. N. Smith & Co., of Detroit, Mich., but as most of the damage was done by the water and not by the fire, the plant was only temporarily disabled and will soon be in full working order again.

By some inexplicable error the address of Northwestern Storage Battery Company was given in the Buyers' Guide in the January "Journal" in two different places as Chicago, Ill. The correct address of this company is 448 Milwaukee street, Milwaukee, Wis.

H. H. Franklin Mfg. Co., of Syracuse, N. Y., held an automobile show in that city recently at which many accessory dealers and makers also exhibited. The Franklin Company had a unique method of demonstrating the value of light weight by drawing miniature cars of different weights up an incline by means of two equal weights to represent equal driving power. The lighter car, of course, traveled up the incline faster than the heavier one.

Mr. F. A. Babcock, President of the Babcock Electric Carriage Company on returning from abroad where he visited both the Olympia show in London and the Paris Salon, declares that at each show there was much that was interesting but the fact that impressed him most forcibly was the abscence of electrics of the runabout type. He finds that in the electric field only laudaus, laudaulets and broughams are used and they are almost entriely for public hire.

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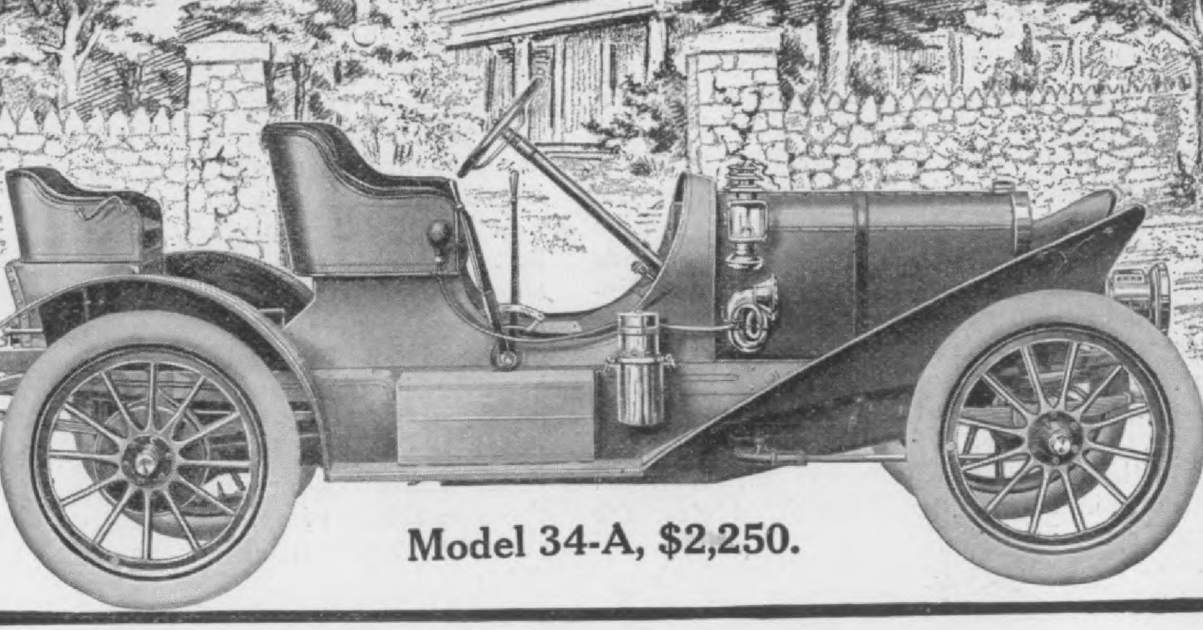

The Ideal Transportation

The gentleman's roadster is the ideal connection between he suburban home and city office. It changes the hot, dusty ourney on a crowded "local" to a pleasant ride in the clear, resh air that fits you for the business of the day.

Rambler

The Rambler roadster, Model 34-A., is a speedy, classy car with the power and endurance of a touring car and the convenience of a runabout.

Mechancially it possesses every valuable feature found in any car at any price, such as offset crank shaft, straight line drive, large wheels, etc., and in appearance has a distinctive character of its own that marks it a thoroughbred.

An examination will convince that

It is the Right Car at the Right Price

Two other models, touring cars at $1,400 and $2,250.
Our catalog gives full details, write for it today.

homas B. Jeffery & Compan

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The Euclid Motor Car Company, Cleveland, Ohio, U. S. A., was formed in May, 1907, to xploit the inventions of Herbert R. Palmer, M. E., who began to investigate the small internal combustion motor in 1900, and has produced several patented gas engine designs. The particular Palmer car-motor design selected for use in the car here described was three cylinders 2-cycle, air-cooled, with individual compression cylinders and pistons or supplying each working cylinder with a combustible charge of air and gasoline mixed by passing through a carburetor of ordinary form, the "Gaeth" carburetor being used with the motor here illustrated and described. Applications for patents on this motor are pending.

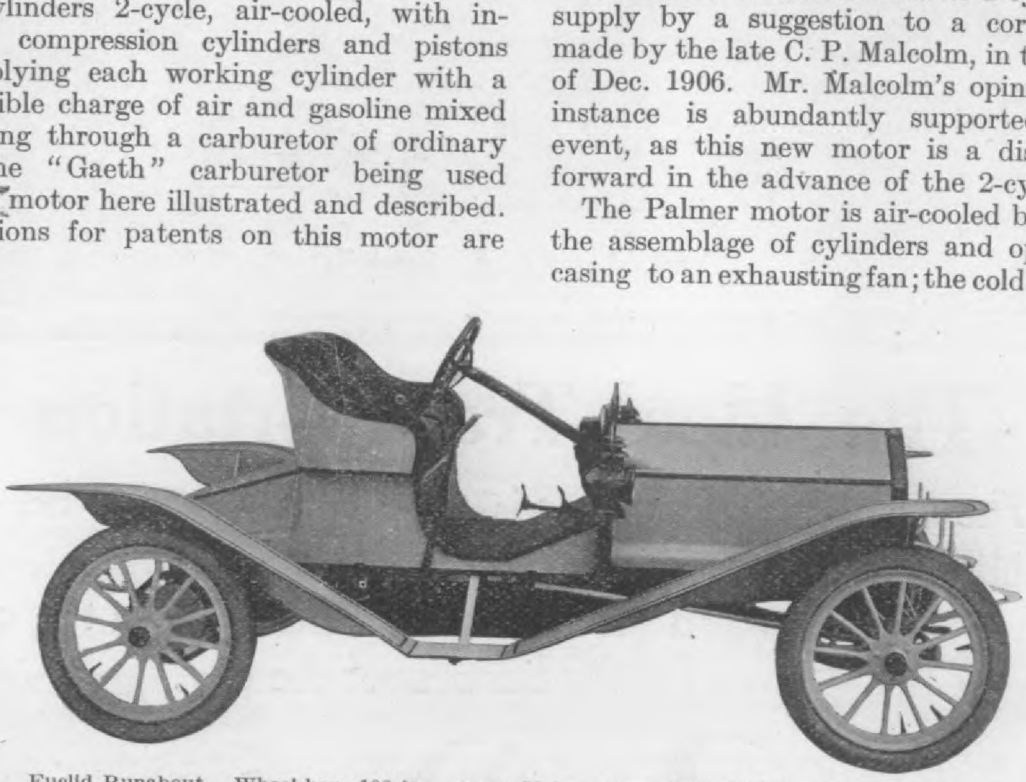

Fig. 1. Euclid Runabout. Wheel-base 100 ins., gauge 56 ins., tires all 30x3½ ins. Motor, 3-cylinders, 3⅜x3½ i
ycle, air-cooled, nominal 20 H. P.
Friction drive to divided countershaft with bevel balance gear and chains to the rear wheels. Weight from 1300 t
Price not yet fixed.
This illustration shows full elliptics in front and half-elliptics in rear. The rear springs are to be changed to platform

The supply cylinder and the working cylnder are integral, placed tandem, with the ame axis prolonged, while the working and harging pistons are also integral and conentric, each charging piston supplying, not s own working cylinder, but the working ylinder next behind it in order of firing. This akes it needful to pipe the charging cylinder elivery port of one cylinder to the intake ort of the next following cylinder in chargeing order, so that, numbering the cylinders 2, 3 front to rear, the No. 1 charging cylnder supplies the No. 2 working cylinder, e No. 2 supplies the No. 3 and the No. 3 harging cylinder supplies the No. 1 working ylinder.

This form of charging mechanism is well nown except in the one particular of indidual cylinder supply, previous examples

considerable volume variation, while individual supply, as here shown an scribed, each working cylinder receiv it should, a constant charge volume, r less of varying conditions. This diff is generic and is new to the writer.

It is interesting to note that attentio first directed to this method of 2-cycle c supply by a suggestion to a correspo made by the late C. P. Malcolm, in the Jo of Dec. 1906. Mr. Malcolm's opinion i instance is abundantly supported by event, as this new motor is a distinct forward in the advance of the 2-cycle m

The Palmer motor is air-cooled by end the assemblage of cylinders and openin casing to an exhausting fan; the cold air in

openings in the cylinder casing being adja to ports requiring most cooling effect, enal the exhaust fan to effect local cooling manner quite impossible with air forced the cylinder casing by a fan. This exhaus fan passes a current of cold air over the haust ports adjacent to the casing open to the atmosphere, and so can and does m the exhaust passage walls the coolest p of this new 2-cycle air-cooled motor.

For the chassis frame a steel tube arra ment is used, made of ordinary tubes special fittings, the joints being fixed pinning and brazing. The tube diam is 1½ ins., and the needful vertical load sistance is obtained by trussing the ch frame side-members as shown, with k posts and screw length-adjusted rods.

This first car, as here shown, was place

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Who Dares

How very few manufacturers stand ready to back the article they make "WITH A LONG TERM GUARANTEE"—that the article will prove to be all that they claim in their advertisements.

WE DO

We guarantee our Speedometers for five long years, against everything but misuse. This guarantee is absolute and unqualified. It has no strings to it—no holdbacks, no reservations of any kind. It don't cover some one part only, but applies to the entire instrument

Absolutely for Five Years

Our guarantee also covers the famous Stewart Flexible Shaft, Swivel Joint and all connections. We are the only Speedometer manufacturers guaranteeing the instrument and equipment complete. We know that our Speedometers and their equipment are really superior to all others, regardless of price, and back our claims with the most liberal Speedometer guarantee ever issued

Pin your faith to

STEWART SPEEDOMETERS

THEY MAKE GOOD ALWAYS

SEND FOR CATALOG

STEWART & CLARK MFG. CO.

Price List

No. 4. Stewart Combination Speedometer-

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nodel will have platform springs in the rear.

THE FRICTION DRIVE.

The drive is an aluminum friction disk and a riction wheel faced with tar-paper supplied by Rockwood of Indianapolis. The countershaft asing encloses divided sprocket shafts with a eveled balance gear. The chains are very nort, and the friction members are very nall, 14 ins. disk diameter and 14 ins. paper heel diameter. In the next model the disk nd paper wheel diameters will both be inreased. The paper wheel traverse is by a ell-crank with links to a collar in a groove n the paper-wheel hub. The present inention is to wholly enclose the friction drive nd the side chains in a dust-proof casing.

In the next model one single steel-ca header, suitably bored, will form the f cross-member of the chassis frame, and motor cylinders and upper part of the m base and the charge transfer passage w will form one integral casting, while the t crank-shaft boxes are integral with an in mediate motor-base member to which separate oil-basin is fixed underneath.

Following out the integral fittings sch a single steel casting will be placed in the chassis frame to reach across and take side tubes and support the disk-shaft and countershaft so that frame deflection ca change the relative positions of the disk the paper wheel, which is extremely impor as the slightest variation from correct pla causes the paper wheel to creep on the with a very powerful action difficult to strain.

The exhausting fan is now belt dri and the ignition is by jump spark plugs,

Fig. 2. Euclid Runabout, right side of motor in chassis and control levers.

The fuel-tank, 10 gallons capacity, 200 miles range, is placed close in front of the front-board. The fan, horizontal ane dia. 11 ins., is belt driven about 7 to 1 from the crank-shaft. This fan is to be changed however, to be gear drive laced on ball bearings. Fan exhausts the cylinder air jacket which is opened to the air at points where the motor needs oling effect.

The spark and throttle levers are on top of the steering wheel. The Ross steer ng gear is fitted. The outside hand ifts the friction wheel across the disk. There are two large pedals on the foot-board, both latched. The pedal at the pplies the internal brake shoes in the 10 ins. dia. rear hub brake drums and the left large pedal engages the friction driv unger cut-out pedal is also fitted.

The motor and countershaft are carried n a steel tube sub-frame. Struts are placed oth front and rear. The front struts have lobe ends and are of fixed length. The rear truts are from the stationary rear axle to the ountershaft journal boxes, and have right nd left screw-threaded, turn-buckle adjustnents, with check-nut retention.

The disk shaft is telescoping and universally

lubrication by mechanical oiler. These de are expected to be changed to gear dri for the fan with hammer-spark and gear-dr magneto and two-pinion oil pump lubrica constant oil circulation through unobstru piping to the cylinders and the fan-shaft and oil return to the oil well in which th pinion oil-pump is submerged.

The motor cylinders are only $3\frac{3}{8}$x$3\frac{1}{2}$

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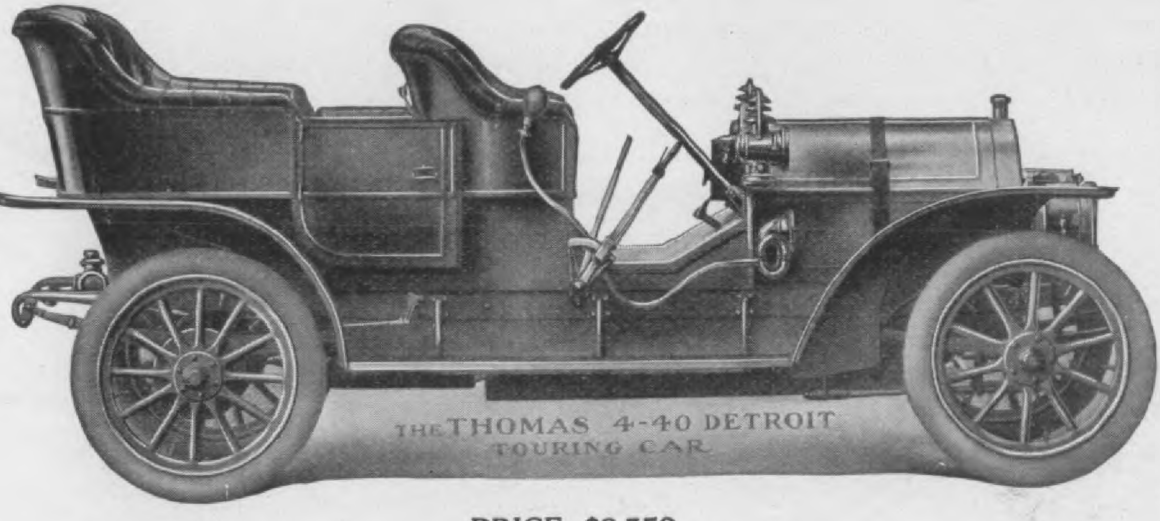
THOMAS 1908

A complete line of Motor Cars of the highest quality possible in Design, Material and Workmanship. They will do what you wish your car could do . . .



PRICE, $2,750.

homas 4-20 Towncar

e original Towncar, designed for City d Suburban use exclusively. Beautiful dies, quiet operation; low cost of main-nance. The Society Car.

Thomas 4-60 Flyer

Winner of hundreds of contests of speed, hill-climbing, reliability, and endurance. Has more records than any American car. This year improved, enlarged, and refined.

homas 4-40 Detroit

st of all shaft-drive cars. In power, eed, hill-climbing, and reliability the omas Detroit leads the five passenger ss.

Thomas 6-70 Special

The six-cylinder model of the Thomas Flyer, built by America's pioneer six-cylinder builders. The greatest car in America in power, speed, size, reliability and refinement.

Thomas Cars Succeed

E. R. THOMAS MOTOR COMPANY

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The cranks are set at 120 degrees, and the working piston diameter is $3\frac{3}{8}$ ins., the annular supply pistons are $4\frac{7}{8}$ ins. dia. outside, $3\frac{3}{8}$ ins. dia. inside, and have a displacement of 33.25 cubic inches, while the cylinder cubic contents above the exhaust port is 31.99 cubic ins., thus making the charge volume about four per cent. in excess of the cylinder capacity.

The two-diameter pistons are shown as constructed in the first model, with two snap rings at the top end, a single wide snap ring above the piston pin and two snap rings in the supply piston. The connecting rod is 8 ins., center to center, something less than $2\frac{1}{2}$ strokes.

$\frac{1}{4}$, then the supply piston will make ne its upward travel before the working cyl intake port opens to receive the charge, might have from, say, 12 to 15 lbs. gaug 27 to 30 lbs. absolute pressure, at the ti working cylinder intake port opening w not for the cubic capacity of the transfer sages, which is considerable for the two passages, and very much greater for th long passage from the No. 3 to the No. inder.* Because of all this, the actual c pressure at time of working cylinder i port opening may be from 5 to 7 lbs. fo

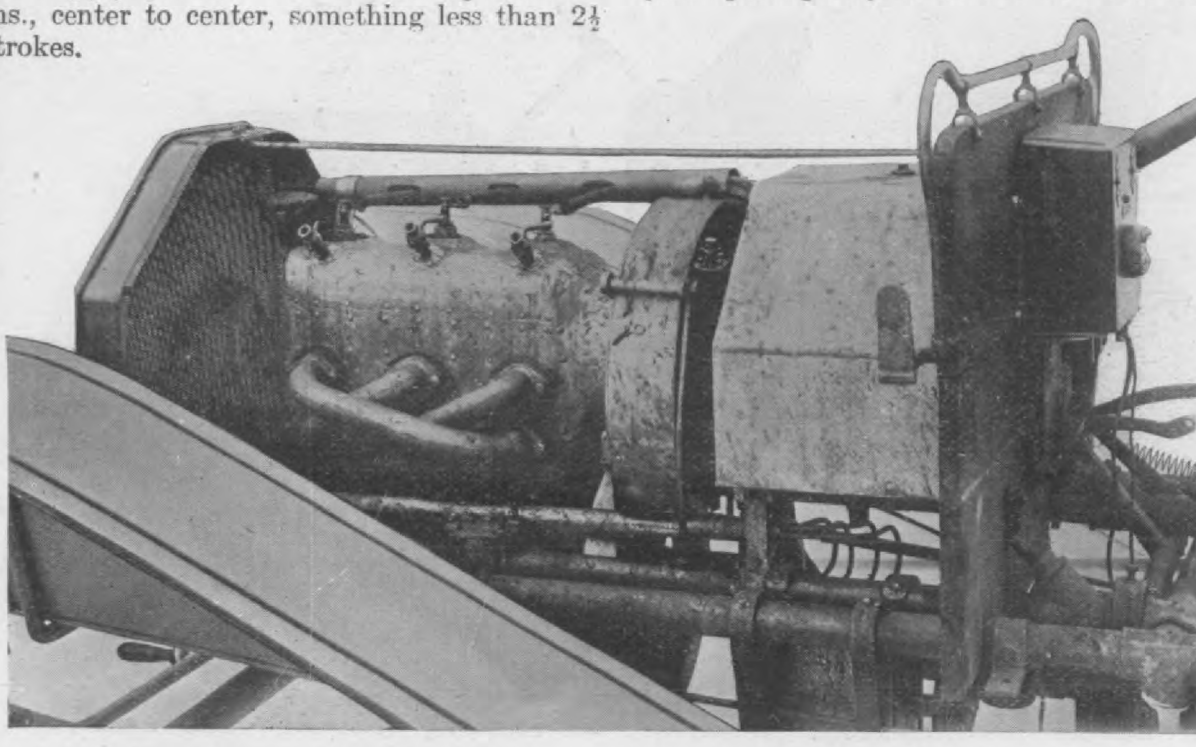

Fig. 3. Euclid motor in place on chassis, left side view, the charge transfer pipes from the charging cylinder motor cylinder to the following motor cylinder are plainly shown, the charging pipe from No. 3 passing outside of the harging pipes to No. 1 intake. A compression release cock is fitted near the top of each cylinder. The exhaust fan nd the tank are also shown.

Automatic valves opening to the three sup-ly cylinders are placed at the supply cylinder ntake ports and other three automatic valves, pening out of the supply cylinders, are placed n the supply cylinder delivery ports, so that o portion of the charge once delivered to the ransfer passages from the supply cylinders o the working cylinders can return to the upply cylinders. These two automatic valves tted to each supply cylinder causes a con-nuous suction of charge mixture through he carburetor, ensure equal filling of the harging cylinders in the suction stroke, equal upply-cylinder discharge volumes to the harge transfer passages and equal charge olumes delivered to each working cylinder fter the crank-shaft has made a single revo-

inders 2 and 3, at a guess, and from 3 to 5 for cylinder No. 1.

When the working cylinder intake opens the incoming charge pressure will rapidly as the working cylinder is filled the remainder of the charge will be transfe at a little above atmospheric pressure.

As will be seen from the illustrations air-casing covers most of the piston trav the supply cylinders, but does not surro the exterior, applied, transfer pipes. In p tice these transfer pipes are only moder heated by the passage of the compre charge and though quite warm to the t can be handled without discomfort.

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*(The writer of the above article assumes that the

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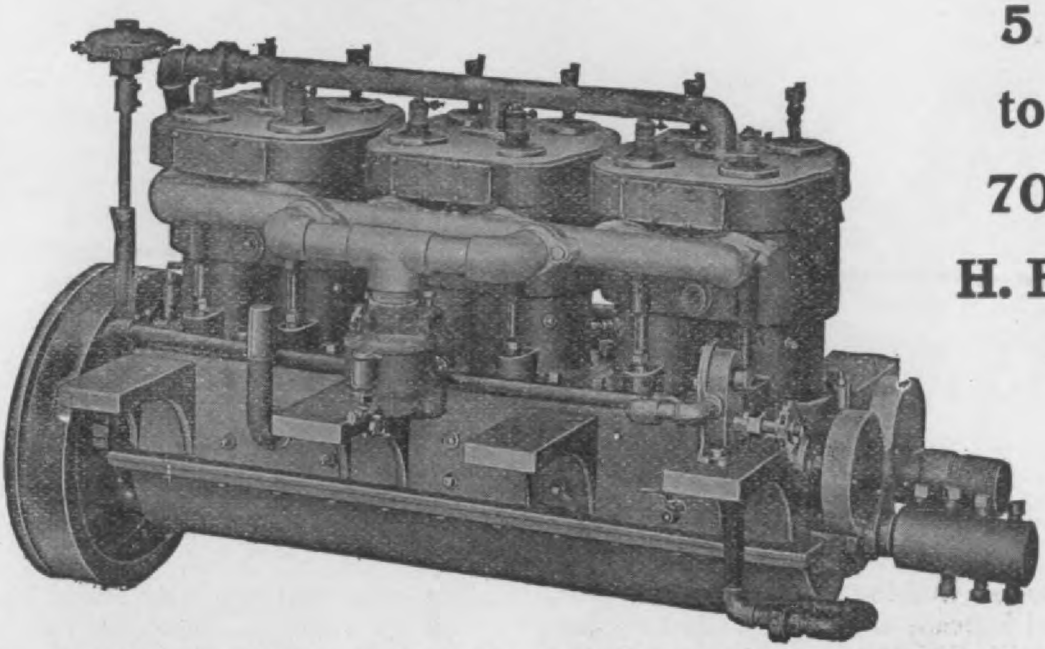
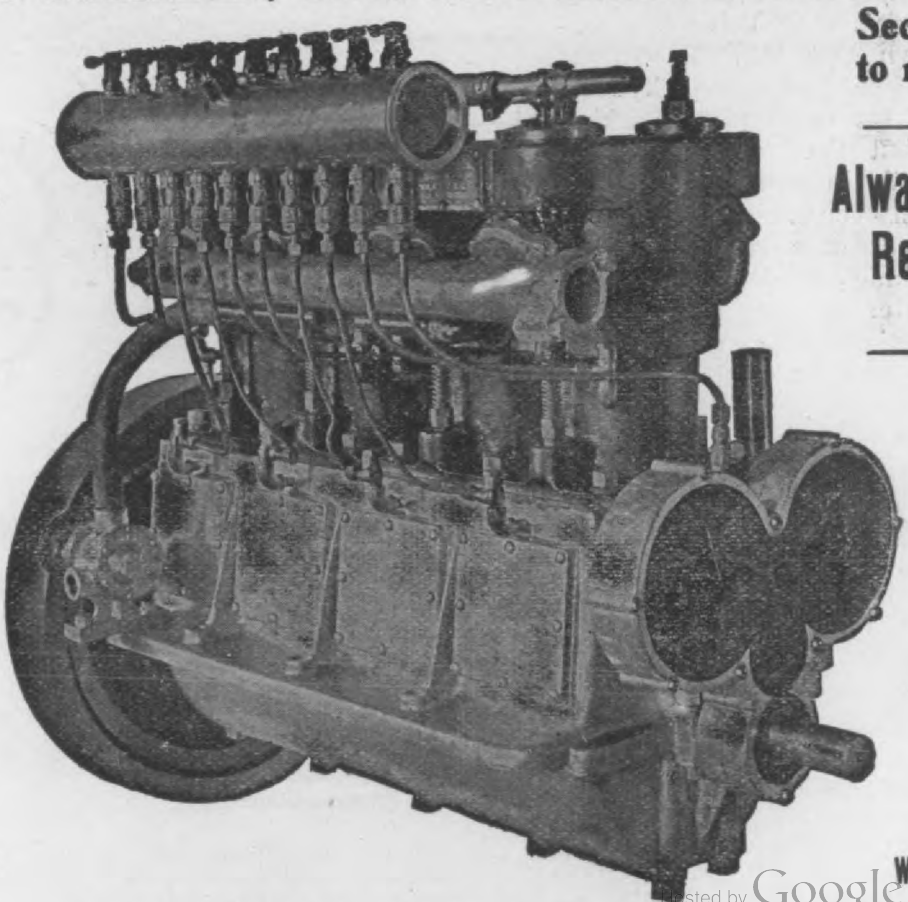
Motors



5 to 70 H. P.

6 CYLINDER, 45 H. P. AUTOMOBILE MOTOR.

Second to none.



Always Reliable

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Air and Water Cooled.

4 CYLINDER, 35 H. P. MARINE MOTOR.

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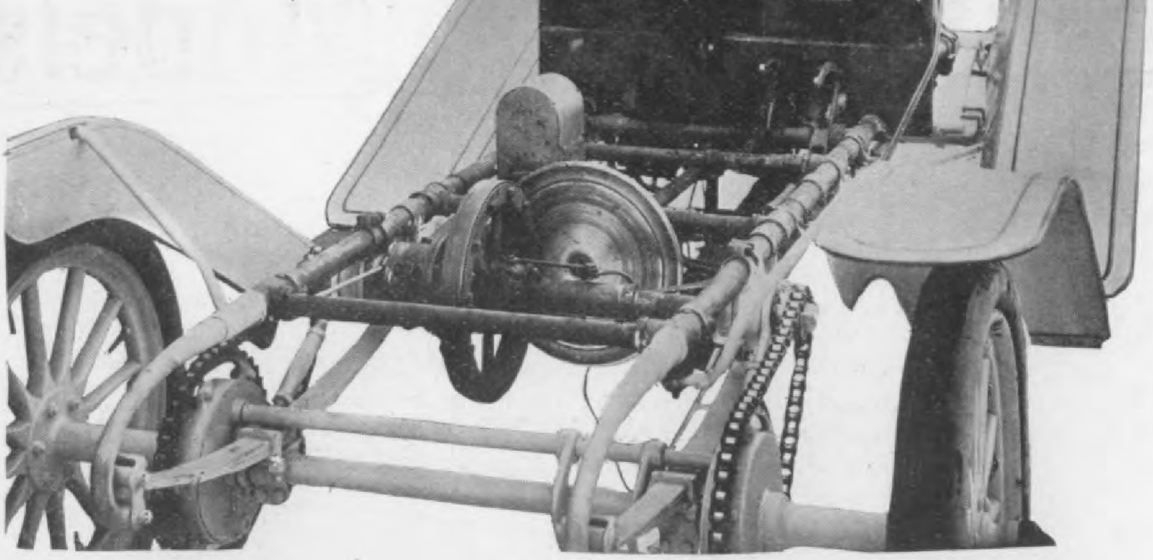

Fig. 4. Euclid Runabout, rear view, showing steel tube chassis frame and friction drive. The body sills rest o
tside of the frame tubes, and dropped low down, so that the body sills go outside of the frame tubes and below them
tirely hiding the tubular construction.
The friction drive is ordinary practice. The half-elliptic rear springs are to be changed to platform springs. The d
ains are very short.

Increase of working cylinder intake port, ngth and increase of working cylinder offset, oth diminish the charge pressure at the time working cylinder intake port opening.

Mr. Palmer says that this motor unaded has shown 2,500 R. P. M. without bration, all three pistons equally well icked and all the spark plugs working ually well, but that if one cylinder ntinuously fails in working, the exected vibration occurs.

Probably the charge compression at e time of working cylinder intake openg, is not greater than it should be to sure the entering charge against transr passage explosions. The vigorous sh of the charge into the working linder as soon as the intake port opens fects a very rapid cooling by expansion. e "cold-air" compression is calculated be about 65 lbs. in the working cylinr at the end of the working piston mpression stroke.

THE MOTOR.

The crank-shaft journals and wrists e all 1½ ins. diameter. In view of the nsiderable piston weights it would seem visable to give all the crank-wrist ngth safely obtainable; this dimension 1½ ins., crank arms ¾ ins., and interediate shaft journals 2½ ins. long. The anks are set at 120 degrees apart.

The vertical section shows ribs much thicker

The cross-section clearly shows the su cylinder automatic intake valve construct while the working cylinder port construc is shown by the section on B A. In this

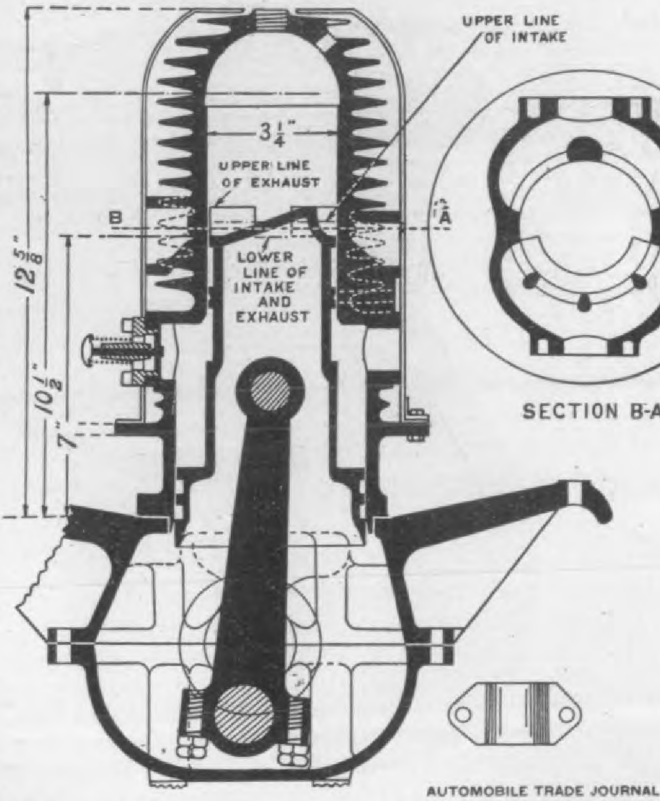

Fig. 5. Euclid motor, vertical section showing t diameters cylinder and piston construction, the co flanges which will be thinner in the next model, the pression cylinder intake valve, offset cylinders, and a right a horizontal section of the cylinder showing the wa

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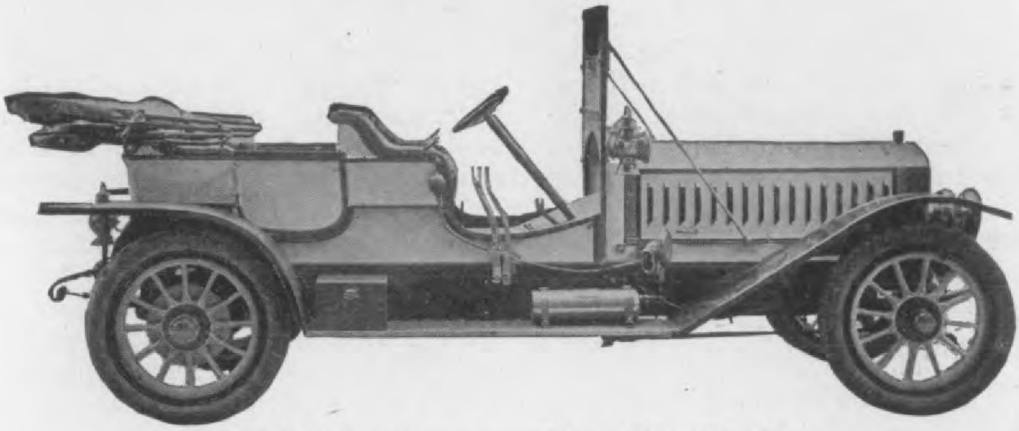
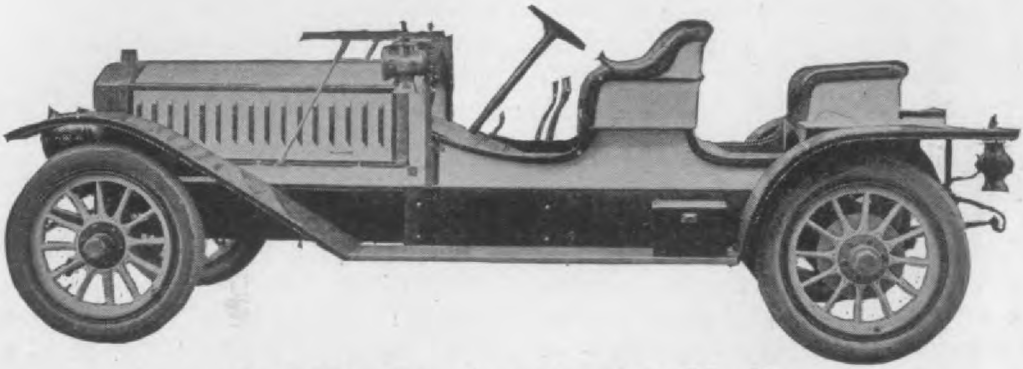
1908 Austin Models



6 Cylinder Austin, 90 H. P.



6 Cylinder Austin, 90 H. P.

The 1908 Austin Models are designed to exactly meet my own personal requirements after 6 years of building high grade cars, and to fulfill the ideas of that class of owners who want the "sportiest" kind of a car it is possible to get with *all* the power and speed they can possibly use—a car that is either a touring car or a runabout capable of making a 1000 mile trip any time, and will beat anything on the road.

Our 6 cylinder 90 h. p. model is my idea of such a car—and I believe it stands today without an equal in the Automobile world at any price.

Our new combination body as a touring car has an extra folding footboard chauffeur's seat. The tonneau seat can be replaced in 3 minutes by a rumble seat, thus converting the car into a runabout of the very latest design.

The equipment is complete in every respect, and includes both seats, and extension surrey top for the touring car, and single top for the runabout. We also furnish this new combination body on our regular 60 h. p. model in place of 7 passenger touring body. This regular standard body, either with or without detachable limousine top, will be furnished on both 60 and 90 h. p. models.

All Austin cars have the celebrated Austin Motor and are built in our own shops under my personal supervision.

Send for Catalogue and detailed information about our new models.

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The 6-bladed 11-inch fan is driven about 5) 1 by a flat belt in this first model; this belt ill be replaced by a toothed-gear drive with ı interposed friction in the next model. The anes are 3 ins. wide x 3 ins. radial length, et at about 10 degrees angle to the radius, ith the inside end of the vane leading. The elivery opening in the fan-case is 3 x 3¼ ins he opening from the cylinder casing to the ın casing is about 6 ins. dia. This fan gives strong suction and the cooling is regarded as holly satisfactory.

This Palmer 2-cycle, air-cooled motor is too ecent a construction to have been exhaustively ested, but it gives every indication of superrity.

The torque is the same as, or better than, aat of a 4-cycle, 6-cylinder motor, with a 3-ırow crank, no cam-shaft, no cams, and only ıtomatic valves handling the cold mixture e used.

This at once does away with the cams, camaft, cam-shaft gears, water-pump, water, ıd radiator, and produces an engine with fully warranting this first published des tion, although both motor and car will be considerably changed in the next m before offering to purchasers.

ON THE ROAD.

There was no opportunity to make a run on this first Euclid car, which had on tester's seat with no foot-board on the ch at the time of the writer's visit. The car been driven about 800 miles total, and writer had several runs of a few miles e Mr. Palmer driving. The motor is si save for the humming of the fan. whic barely audible, and there is no motor bration whatever, as the torque is contin and does not vary largely. The motor h very large range of speeds and is, of co strong on low speeds.

In every particular the motor working formance was all that could be desired and cooling is so efficient that the air-jacke contact with the exhaust pipe is never enough to burn the hand.

1908 Bailey Electric Victoria Phaeton

The S. R. Bailey & Company of Amesbury, ass., U.S.A., offer a unique small electric ehicle for city use in their 1908 Phaeton hese well known carriage makers embody in is vehicle all the points of superiority of their orse-drawn bodies and furnishings. As will be en from the accompanying photograph the carriage is extremely graceful in outline trim in appearance.

GENERAL SPECIFICATIONS.

The machine has a wheel base of 78½ and 34-inch wheels fitted with 3½-inch both on front and rear. The battery con of 30, 9-plate cells, 60 volts. A 2½ to 7 H motor is used and the drive is by double chains. The vehicle weighs complete, lbs., and sell for $2000.00

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he frame is a combination of sheet, rolled and orged steel made in very graceful curves by hich the effect of the drop frame with more rtistic lines is secured. The "Bailey Pivot xle" are of the company's own manufacture. hese have been used for twelve years in our orse drawn vehicles, where they have records is said of running for three years on a table-poonful of oil. The same principles of con-truction are embodied in the automobile axle, ut, of course, with a different design and roportion. The wheels are of the artillery ype also manufactured by the company, a ovelty being that the hub plates holding the pokes are made integral and united by webs nstead of being bolted through as in the case

Fig. 2. 1908 Bailey Electric Victoria Phaeton front ew, showing the "Bailey Pivot Axle" and the special ailey control arranged on the steering wheel in a similar ay to that of a gasoline car. The wheels are made by the ompany and the hub plates which hold the spokes are tegral and united by webs instead of being bolted. Steel ms with rivited on metal sockets the spokes are used. he battery is underhung below the floor of the vehicle, the eight being midway between the axles.

f ordinary Archibald or artillery wheels, so-alled. No wood rims are used, the ends of he spokes being inserted in thimbles or sockets iveted to the steel channel. These wheels are omewhat lighter and, the makers state, con-iderably stronger than the ordinary type.

The battery is under-hung, being directly nder the floor of the vehicle, the object being o carry this heavy weight low and as nearly idway between the front and back axles here there is the least motion. The plates

differential are used.

PECULIAR STEERING AND CONTROL.

The particular novelty of constructio however, in the steering apparatus. Alt wheel steer is supplied if required, the ma claim the lever, or swinging, steer is better quicker. A D shaped wheel is mounte the steering column, quite similar in ap ance to the ordinary wheel steer, but the w column swings from side to side, thus actua the front wheels. The leverage is ten to and is supported by bearings, so that no tr or vibration reaches the hand of the ope and the backlash may be adjusted. The troller is operated by a rod extending through the steering column and by a appearing on top of the steering wheel i actly the same manner that the spark l appear in the gasoline car. This brings steer and control of the speed right unde or both hands at all times.

The brake and controller are interlo so that when the brake is set the power not be put on, not only this, the applic of the brake throws the power off. Th any emergency a stop may be mad simply setting the brake.

Accidents are also guarded against a running plug cannot be inserted when controller lever is in any other position neutral this interlocking arrangement considered very important.

BODY CONSTRUCTION.

The body is of novel construction a made of bent, laminated wood in the pany's factory. It is very large, meas 48 ins. across the seat, but, neverth weighs only 30 lbs. in the wood. The t full Victoria of the most correct style in it is claimed the finest long grained leathe upholstery and the highest grade of cloth that is manufactured are used. green and maroon broadcloths are the materials altho other materials and will be used to order.

Referring to mileage, the company no mileage claim beyond the standard miles, and states that it does this advis believing it a great mistake to lead the p to expect great mileage from electrics. vehicle it is claimed, is of lighter ca weight for its size and capacity than any is made and the bearings are of the hi possible type and it is probable that i make a longer mileage run than any

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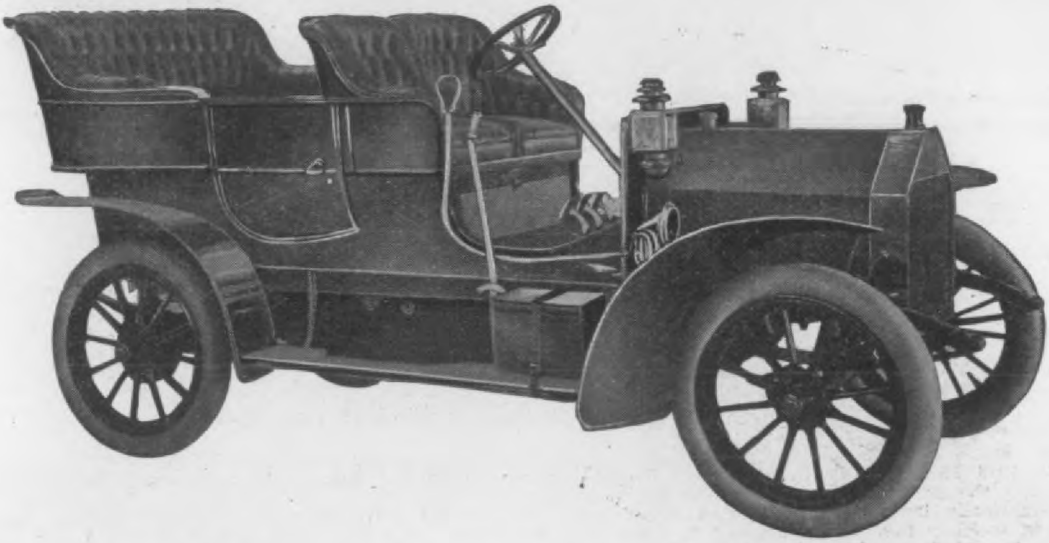
The "AUBURN"



5 Passenger Touring Car 24 H. P. $1350.
5¼ x 5 Double Opposed Motor.

Proved its dependability in competition with Roadsters, Four and Six Cylinder Cars in Chicago Sealed Bonnet Reliability Test 630 Miles Nov. 28, 29 and 30, 1907. Only car of its class to finish with perfect road score.

The Most for the Money

100-inch Wheel Base,
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And other features found only on cars of higher asking price.

If our Car is not represented in your vicinity write us for terms.

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The Aerocar line of cars which is be-
ng built by the Aerocar Motor Company,
f Detroit, for 1908, consists of a Model
F," 40-horse power, water-cooled, tour-
ng car, a Model "D," 20-horse power,
ir-cooled, touring car, and a Model "E,"
0-horse power touring runabout.

ried in a battery box strapped on the l
running-board, thus making the con
tions to the motor short and in a posi
where it is easy to locate any possible
nition trouble. The carburetor is o
popular float feed type and is carried u
the left side of the motor, where it is c

Fig. 1. 1908 Model F, 40 H. P. Water Cooled Aerocar. Bore 5 inches, stroke 5 inches. The Rutenber mo
ls used. The change speeds are by sliding gears giving three speeds ahead and one reverse. The drive is by sh
which is practically horizontal, eliminating unnecessary work of the universal joints. Wheel base 115 inches, t
34x4, seating capacity five. Body finished in royal blue with cream gear and black upholstery and a complete equ
ment consisting of 2 gas head lamps, 2 oil lamps, tail lamp, generator, French tube horn, carpet and foot rest
tonneau, full tool and tire kit, $2,200, F. O. B. Detroit.

These cars have been built as light as
s been found consistent with durability and
ood work, and gave such satisfaction
uring 1907 that the lines are essentially
e same.

The Model "D" is built upon a chassis
ith a wheel base of 104 inches with 3½
34 inch tires. The motor has four

of access. The oiler is of the mechan
type carried on the dash and forces the
into each section of the crank case, ke
ing the splash pool a uniform he
at all times. The spark and throttle le
are on the steering wheel on a station
sector.

An exclusive design of multiple

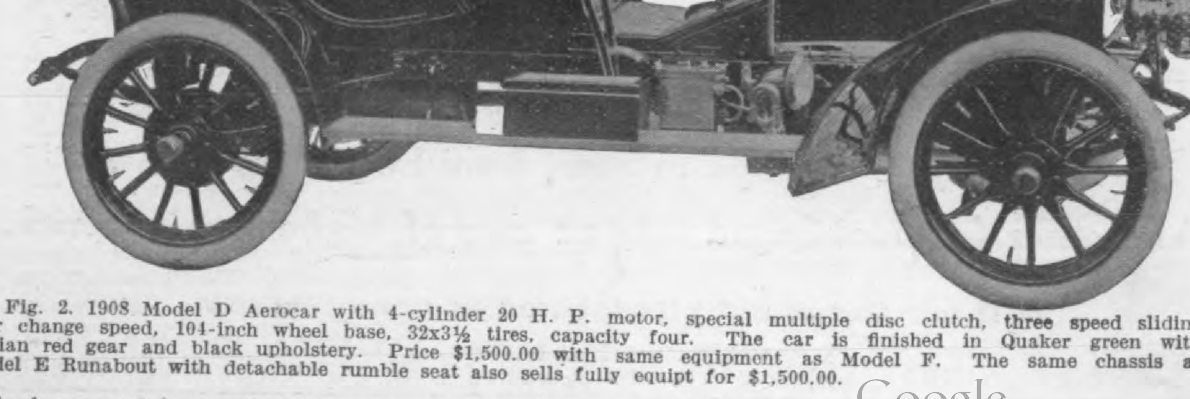

Fig. 2. 1908 Model D Aerocar with 4-cylinder 20 H. P. motor, special multiple disc clutch, three speed slidin
ar change speed, 104-inch wheel base, 32x3½ tires, capacity four. The car is finished in Quaker green wit
alian red gear and black upholstery. Price $1,500.00 with same equipment as Model F. The same chassis a
odel E Runabout with detachable rumble seat also sells fully equipt for $1,500.00.

linders and is cooled by means of 21 in-
gral discs upon each cylinder, a fan

clutch is used. It contains 30 small t
discs uniformly compressed at the cen

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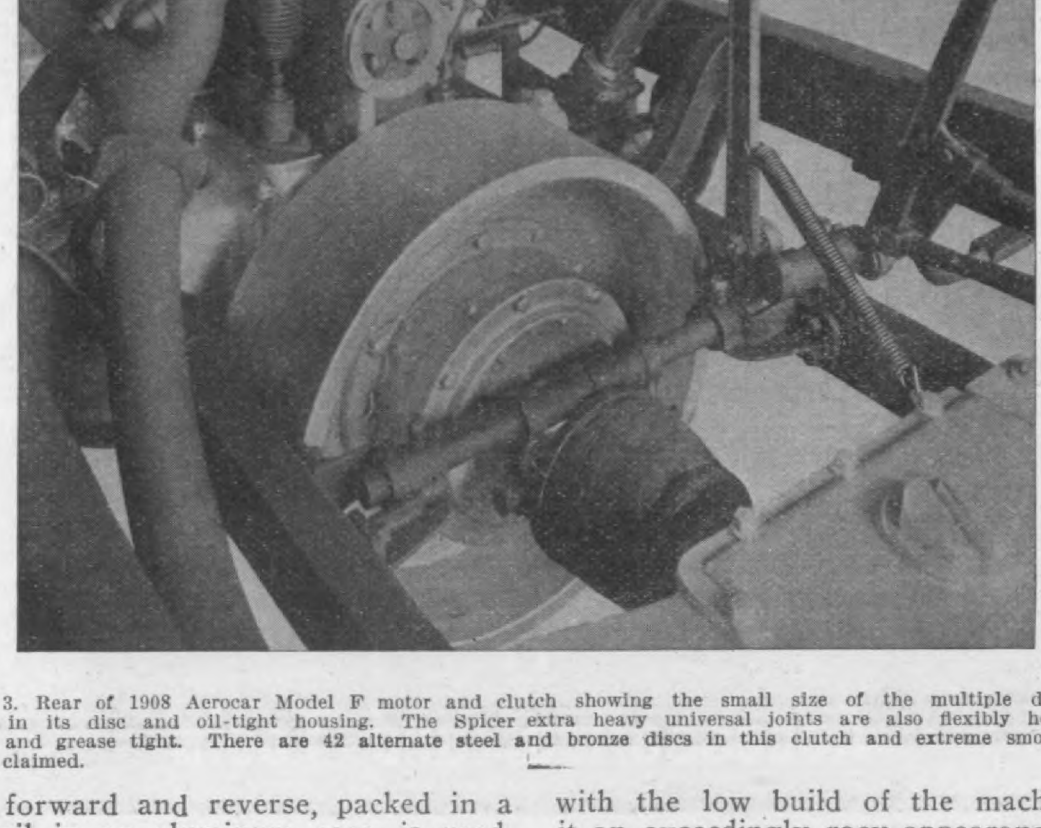

Fig. 3. Rear of 1908 Aerocar Model F motor and clutch showing the small size of the multiple disc c assembly in its disc and oil-tight housing. The Spicer extra heavy universal joints are also flexibly housed are dust and grease tight. There are 42 alternate steel and bronze discs in this clutch and extreme smoothne action is claimed.

speeds forward and reverse, packed in a heavy oil in an aluminum case, is used. From this the power is transmitted through a horizontal shaft drive to the rear axle. Two universal joints are employed merely to allow for the action of the springs. A bevel gear floating differential is contained in the rear axle.

There are two brakes, the transmission brake, which is applied with the right foot lever, and the emergency, which is of the internal expanding type with a camel's hair belt facing in the rear wheel hub-drums. The car seats four persons and is finished in Quaker Green with an Italian Red gear and black upholstering.

The Model "E" touring runabout, which was described and illustrated in our June, 1907, issue, page 90, is built upon practically the same chassis as the Model "D", with the exception that it has a wheel base of 105 inches. On this car the battery box is carried upon the right running-board and the tool box upon the left. These are covered with rubber and bound with brass, the same as the running-board, the floor of the car and the platform at the rear, which makes of them a convenient step for attaining a position in the rumble seat.

The rumble seat is of a removable design. By loosening two bolts it can be set off and enables the owner to carry considerable baggage upon the back

with the low build of the machine, it an exceedingly racy appearance.

THE MODEL "F." WATER-COOL

The Model "F" car has a 40-horse er, water-cooled, Rutenber motor w 5-inch bore and a 5-inch stroke. pump is gear-driven and the igniti

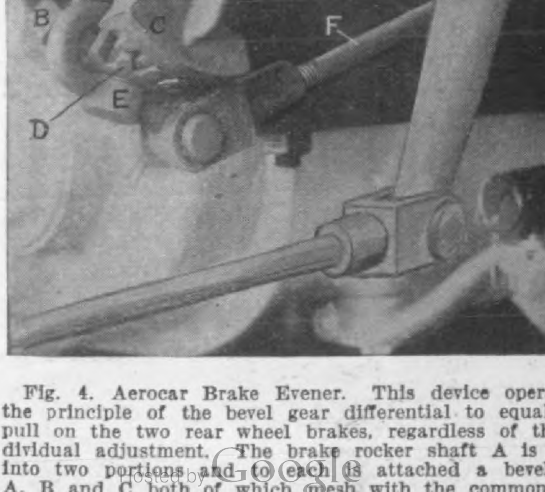

Fig. 4. Aerocar Brake Evener. This device oper the principle of the bevel gear differential to equal pull on the two rear wheel brakes, regardless of t dividual adjustment. The brake rocker shaft A is into two portions and to each is attached a beve A, B and C both of which mesh with the common D which is free to turn on its stud E which is

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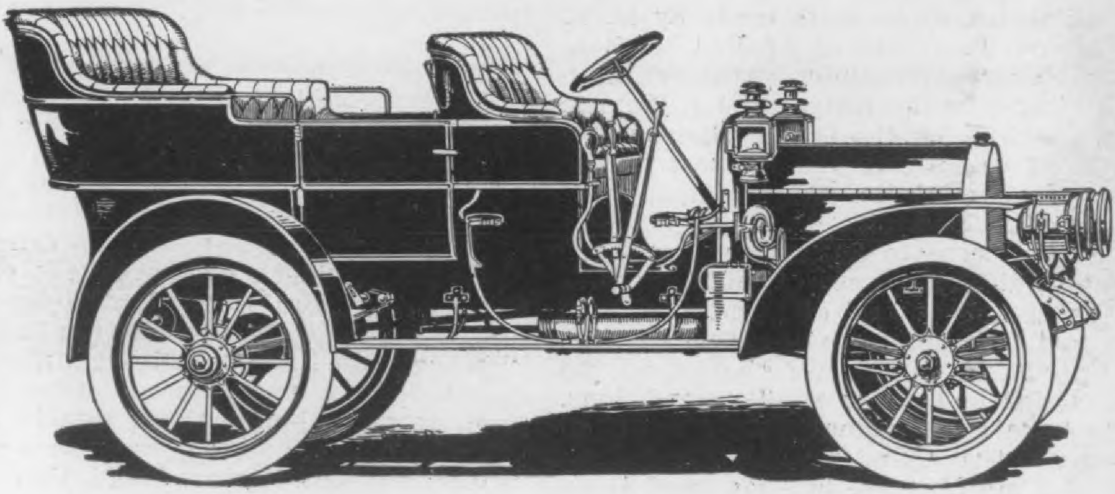
A dependable car
A responsible maker

Over half a century's reputation for honorable and orthodox business methods should appeal to every prospective purchaser of a car, and to every live dealer with an eye to the future. *The STUDEBAKER* policy may be summarized in four words

"Good, or Made Good"

It's worth much to know that the firm that makes your car is *both able and willing* to give you a square deal.



Studebaker

Automobile Co.

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multiple disc type with 42 small, thin discs alternating steel and bronze. They run in a bath of oil and are also released instantly by flat springs. It is claimed this clutch is so effective that it enables the loaded car to be started on the high gear even when stopped on a side hill and allowed to start to run backward.

The transmission is of the sliding gear type with three speeds forward and reverse, while the drive is a horizontal shaft, eliminating any unnecessary friction by constantly working the universal joints which allow for the play of the springs. The differential is of the bevel gear type as in the other models. There are four brakes, each applied upon the rear wheel hub drums. The running brake works thru the right foot-pedal and is of the contracting design. The emergency brake is applied by a hand lever and works thru an improved equalizer, the expanding bands in the rear hub drums. This Aerocar brake equalizer consists of a gear wheel between two flat gears operating similar to a bevel gear differential, and causes the brakes to be applied absolutely even upon both hubs regardless of any difference in adjustment. This practically prevents skidding. The wheel base is 115 inches, the tread standard, and the tires are 4 by 34 inches. The car seats five persons with an abundance of room for baggage in the tonneau. It is finished in Royal Blue with a Cream Gear and black leather upholstering.

One of the most striking features of the line for 1908 are the prices. These have been reduced to such an extent that at the recent Chicago Show they created almost a sensation. The Model "D" and Model "E" are being listed at $1500, while the Model "F" is only $2200. It is claimed this is the first instance in the history of the trade where a high-grade, dependable, 40-horse power car has sold for this low figure.

It is stated by C. A. Benjamin, General Manager of the Company, that still a fourth model, which is expected to make a sensation, is now being perfected.

Tests on Oil Cooling

The following brief description is taken from data sent us on tests made by H. B. MacFarland, Professor of Applied Mechanics and Thermo-Dynamics, Armour Institute, Chicago, in the Knight and Kilbourne shops, Chicago, on the Owen Thomas system of oil cooling, in the interest of the Owen Thomas Motor Car Company, of Chicago and Jonesville, Wis.

The tests were to determine the effectiveness of different types of radiators with both water and oil and different velocities of air and to compare the efficiency of the new oil cooling with water cooling on the same engine and under similar conditions. Many private individuals have used oil cooling in winter, and the Hart-Parr Company, of Charles City, Ia., has used it on its gasoline traction engines, but so far as the writer is aware the Owen Thomas is the first automobile specially designed for oil cooling. The preliminary physical and specific heat tests upon which the system is based were made on the oil used, by Professor C. M. Wilcox and Virgil Oldberg, of Armour Institute.

To obtain in a scientific manner data that would be of value, the tests were carried on for three weeks and each test lasted several hours. In all, 35 separate tests were made.

As soon as conditions were constant, readings were taken at minute intervals for at least ten minutes in order to get average results. Automobile conditions were approximated as far as possible. Air was forced against the radiator by means of a blower, with rheostat arranged to give air velocities of from five to forty miles per hour. The actual power developed by the motor was measured with a prony brake.

Using water, four types of radiators were first tested, and, it is claimed, showed 10 per cent. higher efficiency for radiators in which the surfaces were sweated together as compared to those not soldered, and that the heat dissipated by the extended surface—that is, surface not welded—is very small, so that the extended surface could be materially decreased in most radiators with little or no decrease in the cooling effect. Increasing the initial temperature of the jacket water to the radiator increased the engine efficiency and also the heat dissipating effect of the radiator. As the radiators were plugged to prevent evaporation, a continued run at much power would have boiled the water. This point did not appear when using oil, the boiling point being about double that of water. Using the same radiator with both water and oil, it was found that with a temperature drop of 16 degrees with oil the radiator gave a cooling effect of 700 heat units; when water was used only 70 per cent. as much heat was radiated, although the air velocity was raised sufficiently to give a temperature drop of 25 degrees. Another radiator gave the same cooling effect with a temperature drop of 40 degrees for water and 18 degrees for oil. All the radiators used were standard makes, designed for use with water. The results of the tests indicate that the best radiators using oil on this system are 50 per cent. more effective than they are with water under ordinary conditions. The engines also can be made more efficient because oil can be used at a much higher temperature than water in the jacket without boiling, and there is no danger of freezing or of lime depositing on the surface. It was found that the radiator which gave the poorest results with water gave the best with oil and that the best conditions of circulation for water and oil are very different.

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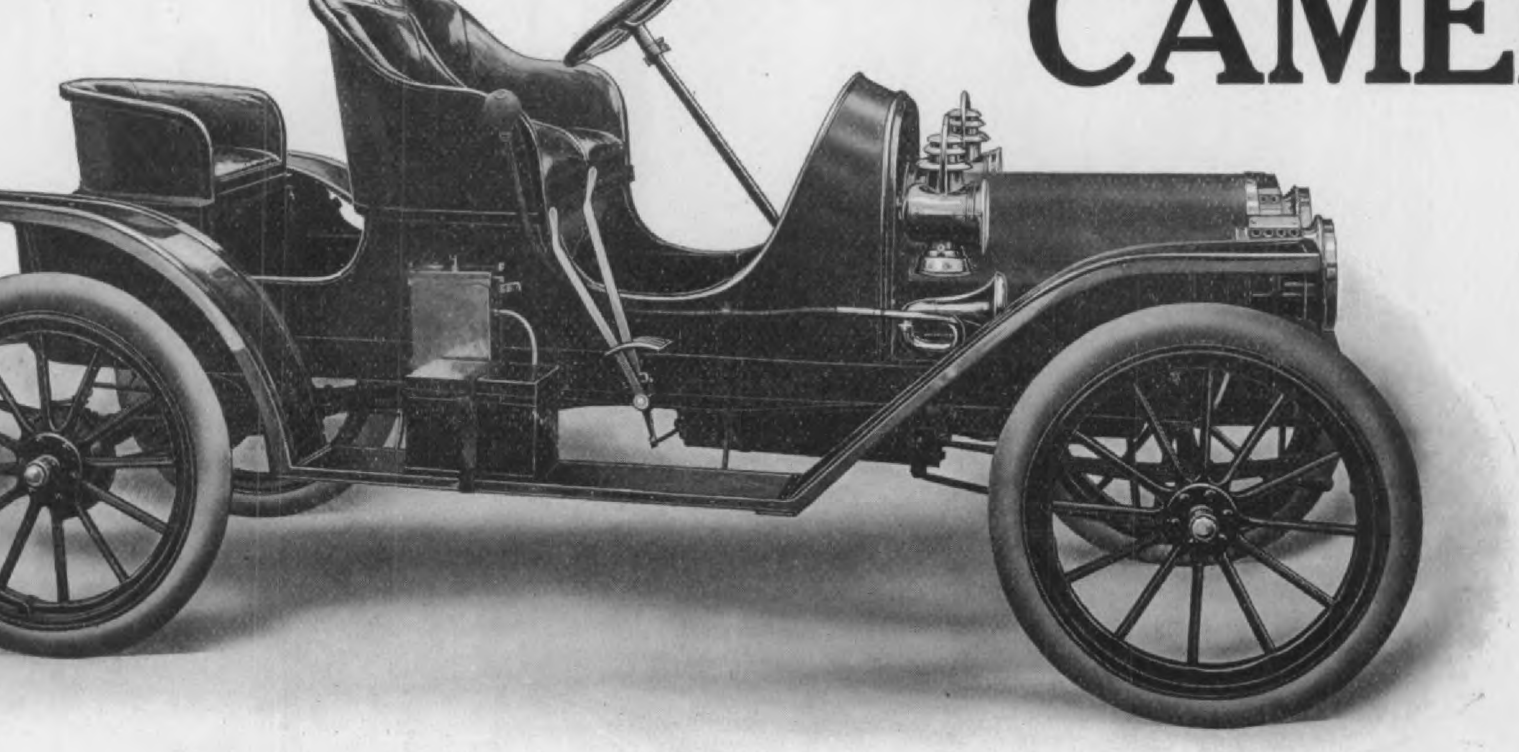

CAMERON

Light Touring Car

Model 8, Four-cylinder, 16 H. P., $1050

clusive CAMERON features, high-class design and workmanship, place it in a class ahead of any other medium-price

rfect air-cooled engine and our patented rolling selective type Transmission, three forward speeds, all direct, give our
ontrol and ease of operation that will please the most critical buyer.
greatly increased our manufacturing facilities for 1908, and can offer live agents a complete line and discounts that will

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CAMERON CAR COMPANY

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The Studebaker Automobile Company, outh Bend, Indiana, U. S. A., offers for e season of 1908 two models of touring rs, Model A, 30-H. P., with seats for passengers, and Model B, 40-H. P., to at 7 passengers, two revolving seats be- g added in the tonneau.

steel, making equal pull on the two br rockers certain, and also avoiding the p sibility of applying the brake shoes to brake drum only. The folded steel eve is full length, sliding in slots cut in chassis frame sides, permitting the ployment of straight links from the ev

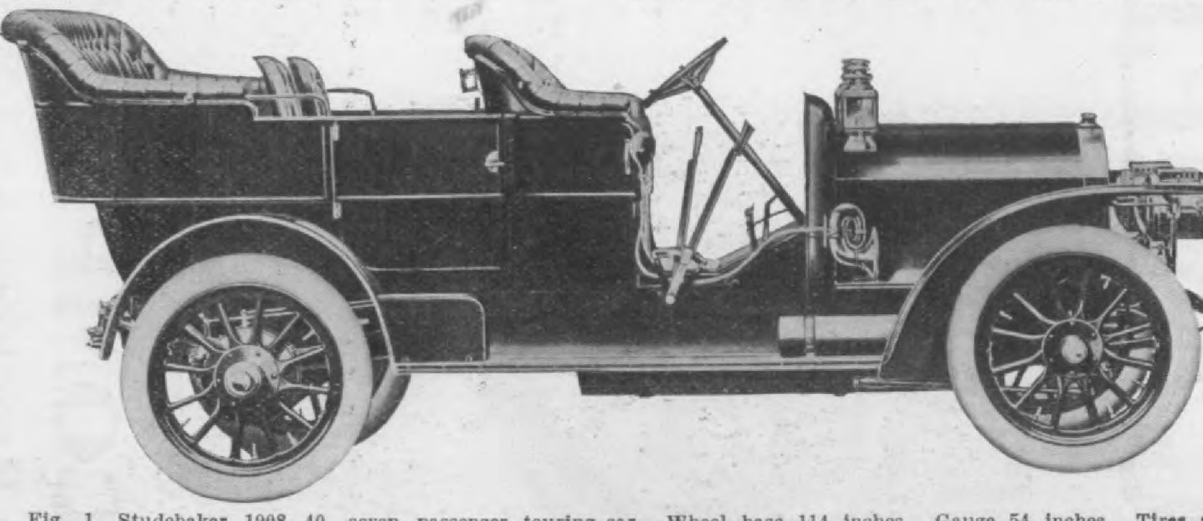

Fig. 1. Studebaker 1908 40, seven passenger touring car. Wheel base 114 inches. Gauge 54 inches. Tires 4x4½ inches. Motor four cylinders, 4-cycle, water-cooled, 4¾x5¼ inches, compression 70 lbs., hammer spa 0 Brake Horse Power at 1,000 revolutions per minute. Sliding gear, four forward speeds and a reverse, dir n third speed, selective, to bevel gear and full floating rear axles. Everything except crank-shaft and rods is r in ball bearings. Weight 3,050. Price $4,250, including 5 lamps, mats, horn and tools ready for extended tou g. Cape top $150 extra.

The Studebaker Model A is continued om 1907 with changes of importance in e rear springs and driving thrust trans- ission to the chassis frame and in the ake action. The 1907 Studebaker Mod- A was not fitted with struts and had brake equalizing device save the screw justment of the brake rod length. For

er ends to the brake rockers. These th changes, from plain half elliptic r springs to platform springs, the addit of the struts and the placing of the f length brake action evener greatly prove the riding of this Studebaker M el A, and insure correct brake action w reduced wear, thus adding materially

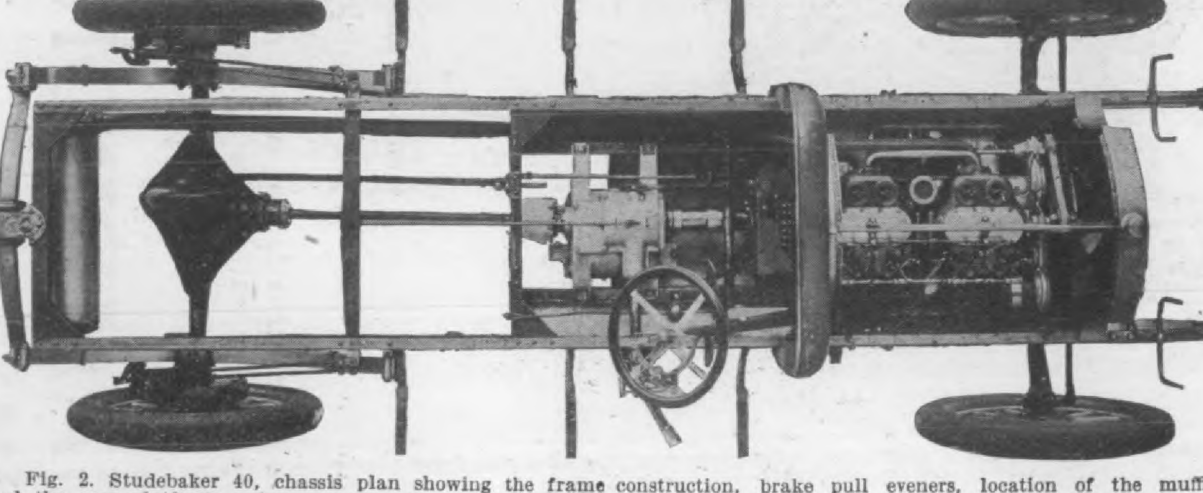

Fig. 2. Studebaker 40, chassis plan showing the frame construction, brake pull eveners, location of the muff nd the rear platform spring arrangement.

08 struts are fitted, thus relieving the ar half elliptic springs from the duty of ansferring the push of the drivers to the assis frame and the rear springs them-

both the comfort and safety of the p sengers. Any brake action which inclu the possibility of applying the brake

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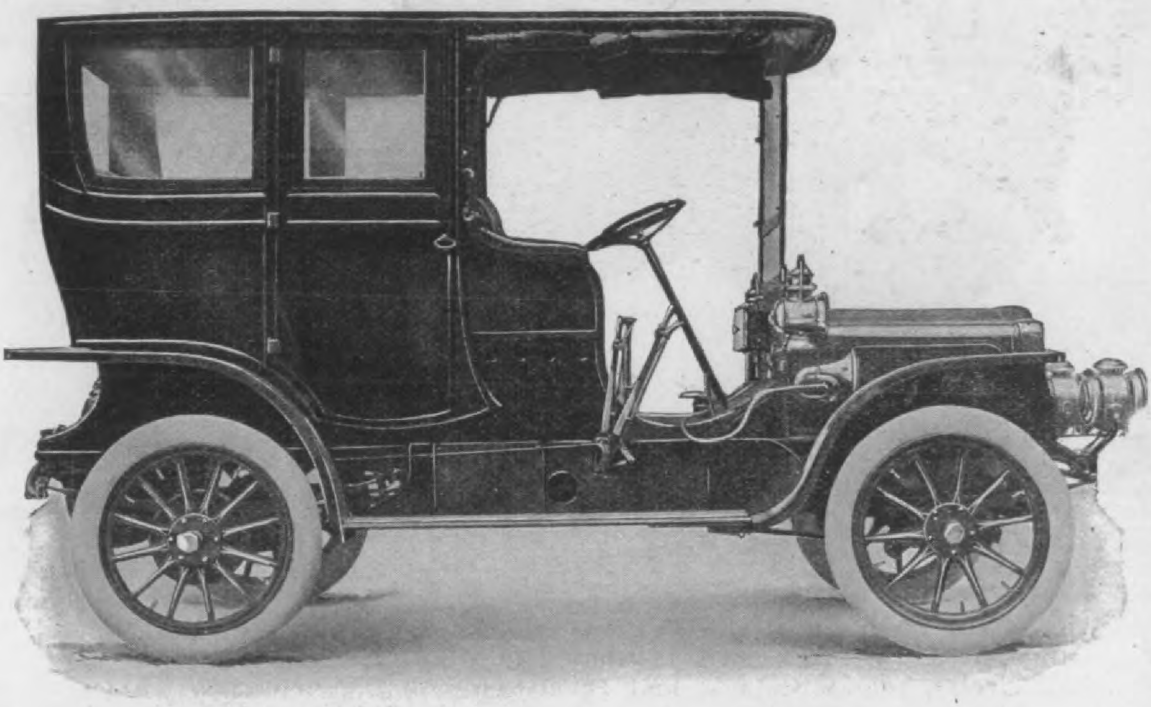
THE INCOMPARABLE WHITE

THE CAR FOR SERVICE



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The exclusive White quality of absolute noiselessness of operation is of particular advantage in a limousine because, in a car with a closed body, any noise made by the mechanism is even more noticeable and annoying than in an open vehicle.

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rake-drums are fitted with external bands nd internal shoes, the transmission brake eing omitted.

fit the hardened wheel-driving clut and the hardened balance gear eyes. squared eyes that take the axle ends

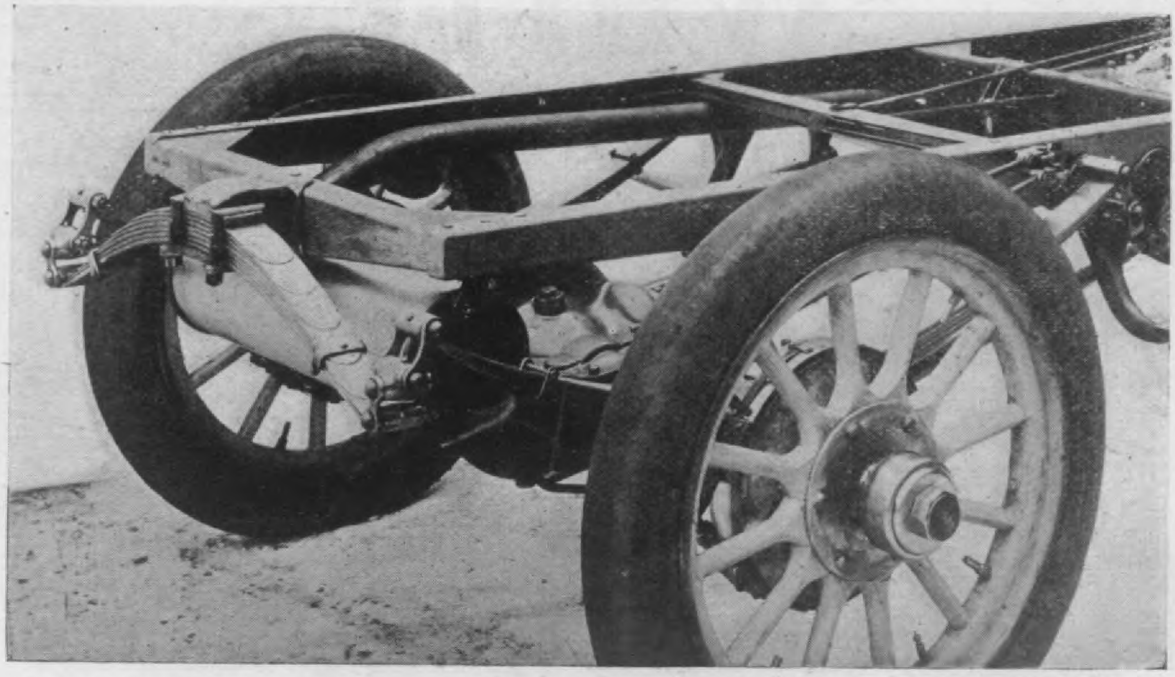


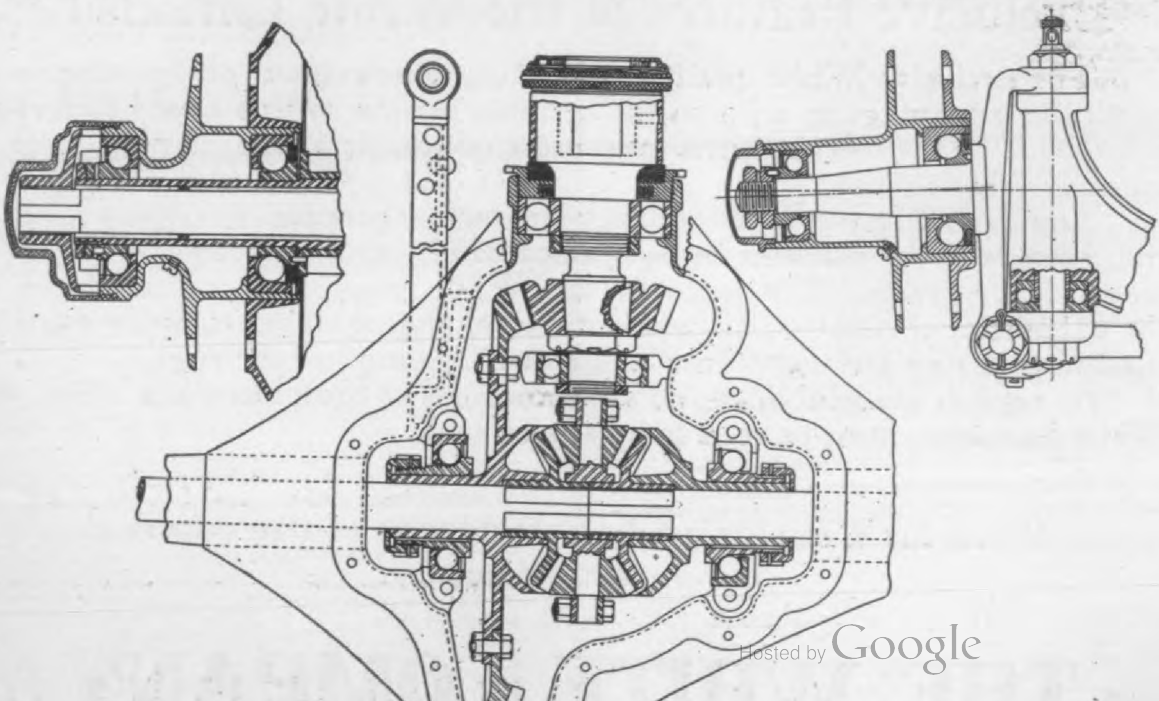
Fig. 3. Studebaker 40, chassis rear end, oblique view, showing the platform rear spring placing and construc and muffler placing. The muffler is crosswise at the rear, one exhaust pipe to atmosphere, horizontal discharge. rear placing of the muffler gives a full length exhaust pipe and reduces muffler pressure. The two folded steel length brake pull eveners are also shown working in slots, one above the other, through the chassis frame sides

NOTABLE FEATURES.

The wheels are all on adjustable 2-point all bearings, front wheels are 11-16 and ½ dia. ball circles, rear wheels ¾ and ⅝ . balls, making it possible to take up earing wear.

also hardened and finished by hand w with a carborundum stick and oil, no ror limit, a sliding fit with no shake.

The solid-jaw clutches are 4 11-16 dia ter, cut with 5 teeth, 9-16 deep by 3-16 f the co-acting clutch member is integral



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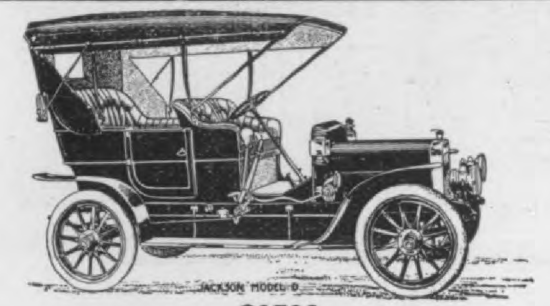
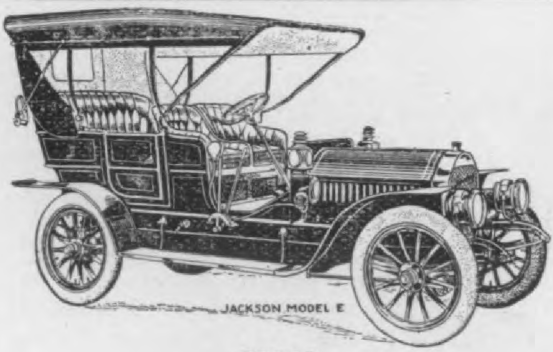
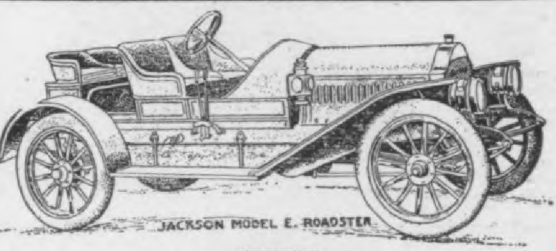


$1500



$2000



$2000

Amidst all the pomp, glitter and circumstance of the many Automobile Shows of 1907-08, surrounded by and compared with competing cars of various prices and degrees of excellence, this superb line of Jackson cars has compelled the attention of all. They are the Anti-Hard Times Cars. They are made right and sold right. They are winners.

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Jackson Automobile Co.

The bevel balance gears and pinions are
steel and hardened, the balance gears
ving 28 teeth 6, d. p., and the pinions

diameter is 1⅞ ins.

THE TORSION ARM AND STRUTS.

The body of the torsion arm is prest st
channel section, 3-16 stock, 5 ins. wide
the large end and about 40 ins. long.
torsion arm forward end takes a steel d
forging eye, fixed by pinning and brazi
This arm eye surrounds a cross-girt brac
stud, ⅝ dia. fitted with coiled cushion spri
placed above and below the torsion arm
The spring abutments are an integral fla
on top and a plain washer with screw
castelated nut and split pin below.

The driving wheel thrust is transmitted
the chassis frame sides thru steel tubu
struts, 1⅜ dia. 5-32 walls, with steel vert
flat joint ends pinned and brazed at the r

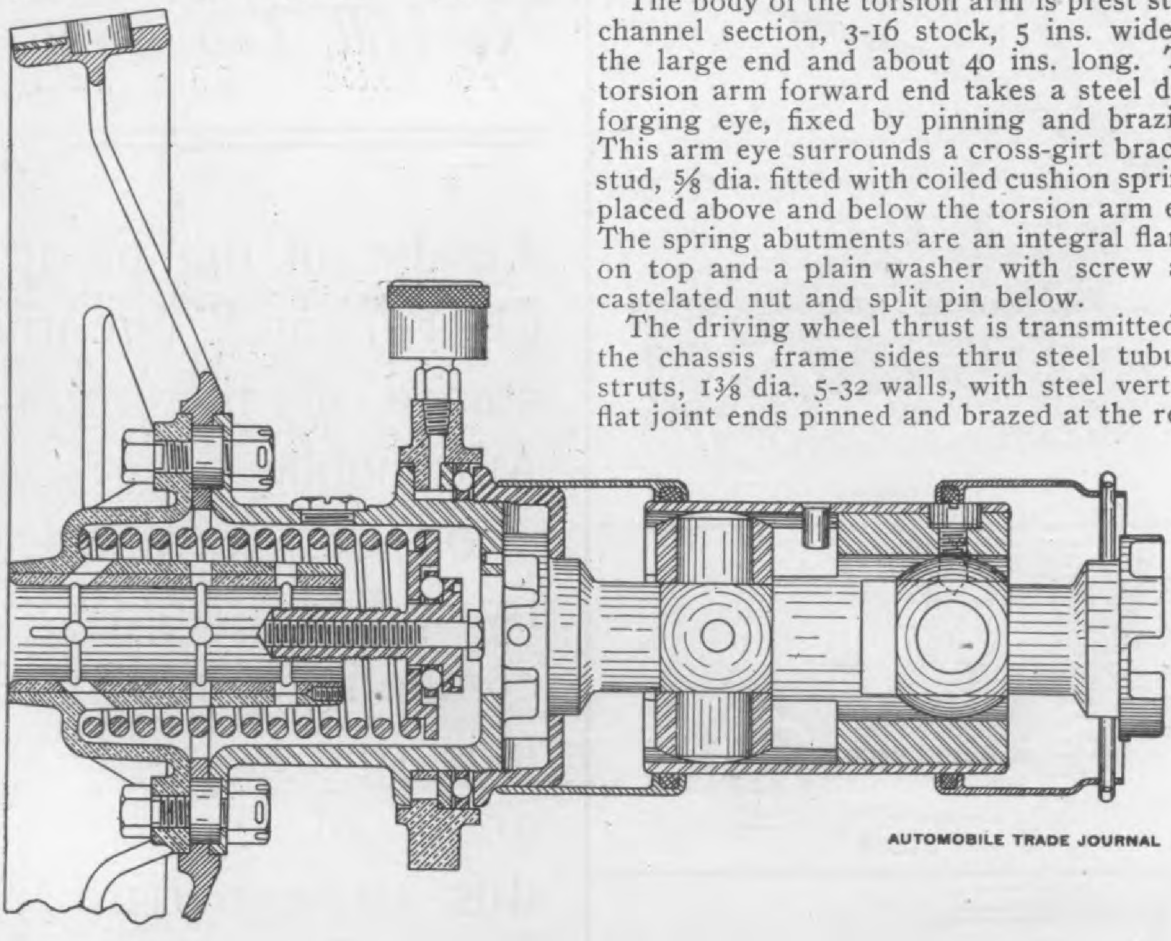

Fig. 5. Studebaker 40, clutch and forward universal joint shaft from clutch hub to line-shaft, construct
ssembly in vertical section. The two dust-sleeves, A, B, are fixed in position by removable pins. When th
pins are taken out the dust covers can be pushed together giving access to the threaded retaining cup, C, wh
s unscrewed to permit the removal first of the universal shaft and then of the clutch cone and spring assemb
The clutch cone angle is 8 deg. Seven double end springs, 14 free spring-ends in all, are placed under the leat
n front, and the leather is pierced for cork inserts seated in the metal of the clutch cone.

ving 15 teeth. The face of the balance
aring is 1⅛ inches, giving this highly im-
rtant detail abundant strength and wear-
g surface. The balance gears are on ⅝
ameter balls, 2-point bearings. The bevel
iving gear is 4, d. p., 51 teeth, 17 teeth in
e pinion, ratio 3 to 1, 1¼ inches face, steel,
se hardened, oil-tempered. No separate
rust bearings are fitted in the rear axle
iving assembly, the balance gear 2-point
ll bearings taking the work in both direc-
ons. The pinion shaft is 50 carbon steel,
¼ inches large diameter, in F and S annu-
r bearings, with no separate thrust bear-
gs.

The steel-tube axle sleeves are fixed to
e gear housing by pinning and brazing,
d are 2⅝ diameter, ¼ inch walls, swaged
own to 2 inches diameter by 5-16 thick for
e rear wheel bearing support. The bevel
ar housing is a malleable iron casting with
aluminum cover large enough to permit

The front end of the strut is swaged t
reduced diameter to take a globe wit
threaded shank. When adjusted to len
in assembling a split-pin is put thru
globe screw shank and strut end, fixing
strut length. The strut globe ends are
capped brackets riveted to the chassis fra

THE SPRINGS.

These are all tongued and grooved
banded, and are all 2¼ ins. wide. The fr
springs are perched in the middle. The
side springs are perched 3 ins. in rear
middle, with the short end to the rear.
front springs are 44 ins. long, 7 leaves, jo
ed in front and linked in rear, to the cha
frame. The rear springs are linked to
chassis frame in front and also to the cr
spring in the rear. The side springs hav
leaves and are 50 ins. long, perched 3
to the rear of the middle, front end to pe
middle 21¼ ins., perch-middle to rear

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of the spring members up and down, but

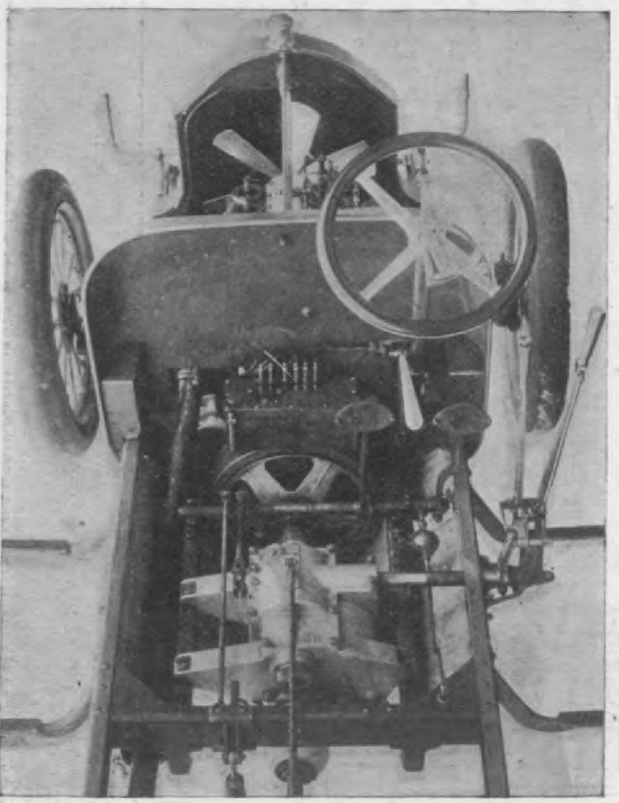


Fig. 6. Studebaker 40, middle part of chassis, from middle, looking down and forward, showing the control construction.

so arranged as to prevent side-sway of the car-body. The Studebaker 40 platform spring connection links are drop-forgings, the link pins are 7-16 dia. hardened, pinned in the split-pins.

THE CHASSIS FRAME.

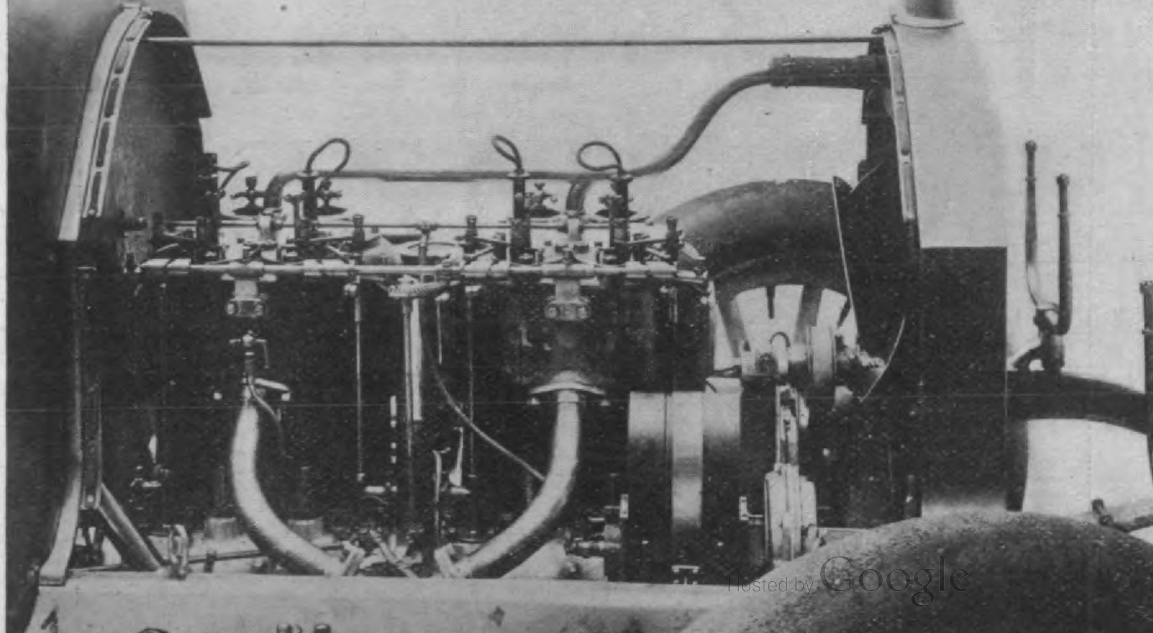
This is a prest steel channel section construction, greatest depth 4⅛ ins., un thickness 3-16, hot riveted thruout, all placed hot and pneumatic hammer he The frame length is 154 ins., front sp eye to rear end of frame. The frame are parallel, 32 ins. over all width. The frame is channel section, 1½ ins. wide ins. middle depth, end depths 1⅞ in ins. long, 20¼ ins. over all width as a bled, stock 3-16 thick, sides support each end only. The sub-frame sides ar to the chassis frame sides at the mid-p by channel section prest steel dis blocks and thru rivets. The motor and box are supported on the sub-frame by lugs each, no "3-point" support.

The chassis frame and the sub-fram heavy, are well put together, and have greater strength than is usual for ca this size. All gussets are integral wit cross-members and the frame assembl done in the car factory, the prest steel only being supplied by the frame make

THE MOTOR.

This is 4 cylinders, vertical, 4-cycle, w cooled, 4¾x5¼ ins., 70 lbs. compressio B. H. P. at 1000 R. P. M. The rods are ins. C. to C., 50 carbon steel drop fo rod-bodies.

The piston pin is tool steel, hollow, ened and ground, 3 diameters, 1 in., 1½ 1 1-16. The piston hubs are bored 2 di



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holes drilled thru from end to end.

The top ends of the rods are hardened and lapped to fit the hardened pins, no bushes whatever are used. The top of the rod has a V-groove oil catcher cut across the top. The crank-shaft wrists and bearings are all 1 13-16 ins. dia., all ground. The wrist-ends of the rods are bushed with Parson's white bronze half-boxes, capt metal to metal, marine ends, two bolts in each rod cap, castelated nuts and split pins.

The motor base and oil basin are aluminum castings. The oil basin has two oil pits, with no direct oil supply. The splash pool depth is regulated by adjusting the 6-lead mechanical oiler, gear driven from the cam-shaft, fiber gear on the oiler shaft, gear reduction 1 4-10 to 1 from cam-shaft to oiler.

The oil basin has an overflow at maximum splash pool depth, with a cock which shows oil when the pools are filled to maximum by pouring oil into the crank-box.

It is claimed the engines are built in the best manner thruout, are tested against dynamo resistance and are not passed until they show more than the nominal H. P. rating.

IGNITION.

This Studebaker 1908-forty continues the hammer spark ignition which has been so

reserve is fitted.

THE CLUTCH.

This is an 8 deg. angle aluminum leather faced, with cork inserts and 14 ual engagement springs under the l facing at the small end of the cone.

A short double universal jointed tel ing shaft is placed between the clutch hub and the line-shaft; two threaded excluding sleeves, one at each end shaft, can be unpinned, making it po to telescope this universal joint sh itself and permit its removal, wher clutch cone screw threaded casing moved, thus enabling the cone and assembly to be taken out. The clutch compression is about 180 lbs.

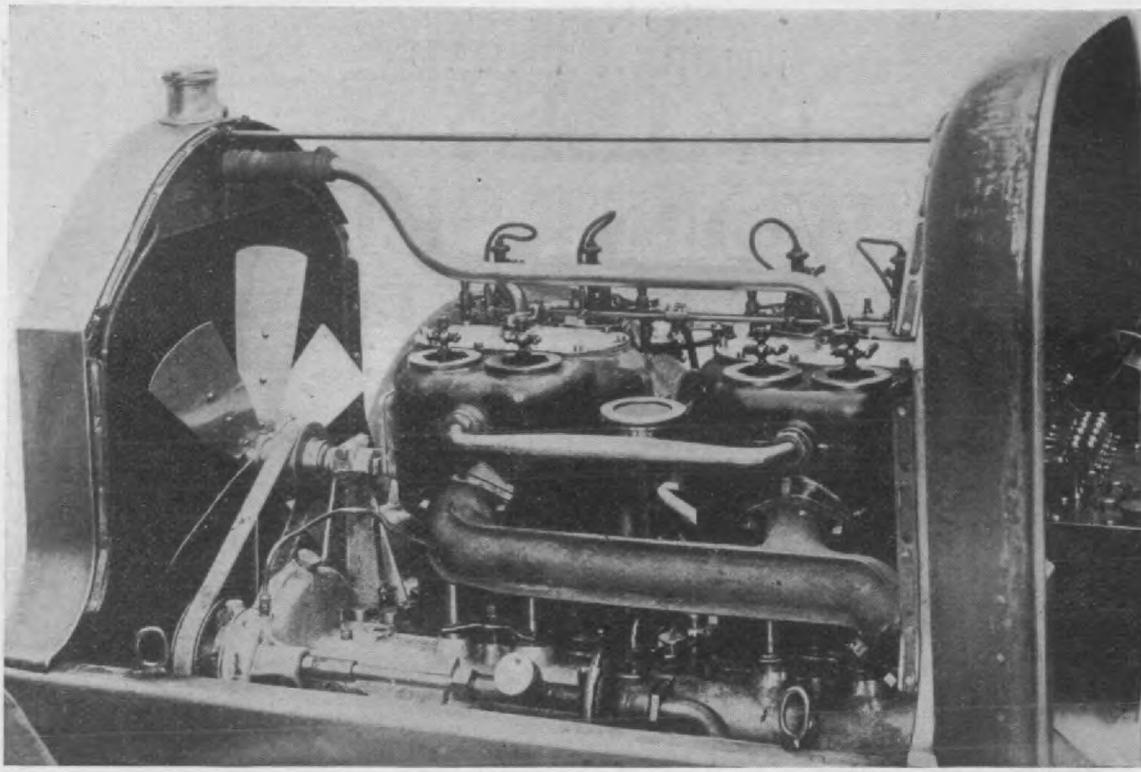

Fig. 8. Studebaker 40 chassis, left side of motor, showing the ribbed exhaust manifold, fan mounting pump tion and drive and the water piping. A vertical pipe enters the middle of the cross pipe which supplies ea the twin castings.

THE SLIDING GEAR.

This speed change gives 4 speeds fo and a reverse, direct on third speed. gears are all made from 50 carbon ste 5, d. p., all 1 in. face, all oil tempered.

The side-shaft and line shaft are on S annular ball bearings, balls about dia. and ¾ in. dia., respectively.

The reverse is obtained, not by slidi intermediate pinion, but by mountin pinion in a forked arm which is rocke way or the other to engage or dise the reversing pinion, an arrangement

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d Street, Cor. Broadway, New York City

All gears are always locked in position whether working or idle, and the shift is selective, with three sliding bars. The gear shift hand lever is in a 5-slot quadrant, entrance to the reverse slot impossible without handling the lever spring-latch. The entire assembly of gears, gear shift bars and gear shift rocker is enclosed in a two-part aluminum casing.

The propeller shaft is a one-piece steel forging dropt to finished shape, the rear joint is trunnions with square blocks, same as on the short universal shaft between the clutch hub and the line-shaft. The front joint is a 2-pin cross. The propeller shaft is forged from 50 point carbon steel, body 1 11-32 ins. dia.

THE BRAKES.

These are exterior bands, "Raybestos" lined, and internal, cam-rocker expanded, malleable casting, jointed shoes, with removable bronze faces, fitted with cork inserts, on and in steel casting rear hub drums, 12½ ins. out dia. by 2¼ ins. wide, outside. The equal application of both the internal and external brakes is made certain by plac-

This is most important, as the applicat the brake to one wheel only is likely t the car off the road.

THE CONTROL.

The steering action is a triple s thread in a nut integral with a rack, ing with a 20-tooth pinion, 8 d. p., in with the globe and steering arm rock to which the arm is applied on a tape and hex nut retention. The spark and tle levers are ratchet retained on t the steering wheel. There are two o hand levers, of which the outer one, lat is idle in rear position, and when p forward first disengages the clutch and applies the rear hub internal brake sh

The inside lever, latched, is in a guide and works the selective gear The latch must be operated to engag reverse. The sliding gear is direct on speed. There are two vertical pedals o footboard with a horizontal throttle between them. The right pedal applie ordinary external brake and the left

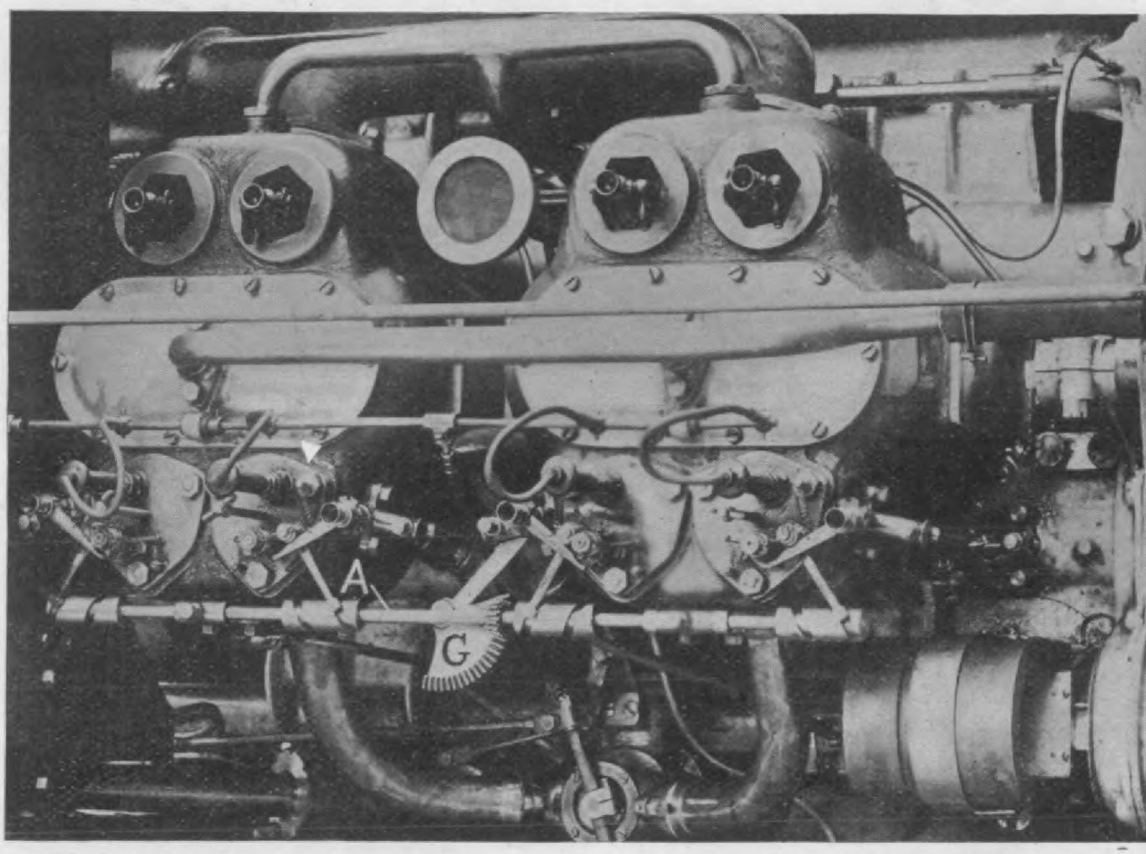

Fig. 9. Studebaker 40, plan of motor showing hammer spark action, carburetor and piping. Four small ve shafts with a short crank and pin at the top of each give motion to rods which operate rockers passing thru the combustion chamber and terminating in the contact movable arm. The rods are fulcrumed on eccentric so that almost instantly the contact is made the rod mopps off, allowing a quick brake due to a spring. The e tric fulcrum can be shifted to vary the spark time by means of arms working in the helical grooves shown i shaft A, which is rotated by the segment gear C. This entire mechanism substantially as now shown was described in our February 1907 issue, page 161.

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NORTHERN

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The Monarch Motor Car Company, Chicago Heights, Illinois, U. S. A., will offer for the season of 1908 a single model of chassis, four cylinders, four-cycle, water-cooled, 40 H. P., wheel-base 112 ins., tires all 36 ins. x 4 ins. fitted with either a five-passenger touring body or with a roadster body to seat four passengers; weight 2300 and 2200 lbs. respectively; price with either body $2500.00.

The present Monarch Motor Car Company was organized in March, 1906, to take over and exploit the patents and inventions of Mr. J. J. Boucher, Chicago, Illinois. Mr. Boucher had been designer with a former "Monarch" auto company, of North Aurora, and had brought out a previous Monarch model, a single-cylinder, air-cooled, two-passenger car, offered at $500.00. This first Boucher car looked like a success, but was managed by officers ignorant of the automobile trade, passed into bankruptcy and expired. Mr. Boucher attracted the attention of a group of Chicago financiers who formed a company with a real-money capital of $150,000.00, elected a well known Chicago lawyer, Mr. T. A. Quinlan, Jr., president and general manager, engaged Boucher as chief designer and supervising engineer and began productive operations in

16 H. P., priced at $600.00, $750.00, $8
and $900.00.

All these first four 1907 Monarch r
were two passenger runabouts, diffe
in springs and bodies making the price
tions. These cars were received with n
favor, and the company at once bega
construction of four hundred 1907 cars.

May 2nd, 1907, the first four of thes
were on the factory platform ready for
ment and 172 more almost done in the fa
which was totally destroyed by fire on
day, with a loss of $90,000.00 in excess
surance, before a single one of these firs
Monarch models had been delivered to
chaser.

At the time of the fire Boucher ha
duced a four-cylinder touring-car
motor cylinders internally air-cooled.
tory was obtained at Chicago Heights, 27
south of Chicago, and the Monarch re

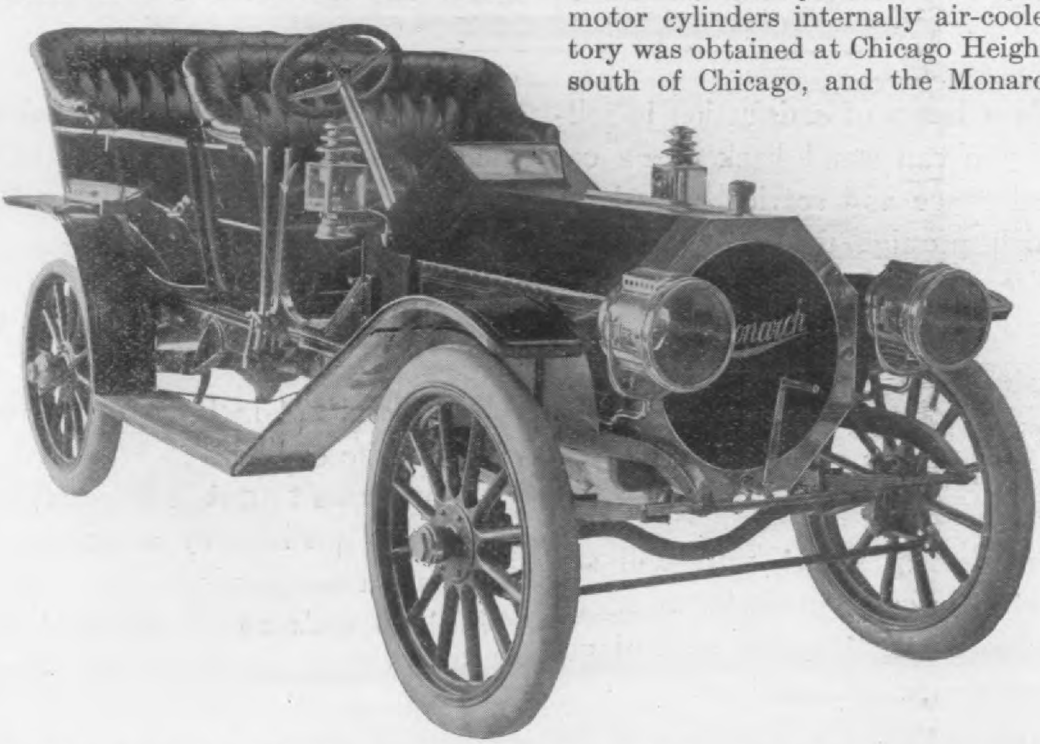

Fig. 1. Monarch 1908 5-passenger Touring Car. Wheel-base, 112 ins., gauge 56 ins., tires all 36x4 ins. Mot
cylinders, 4-cycle, water-cooled, 4¾x5 ins., 40 H. P. Friction clutch, sliding gear, three speeds forward and reverse
gear and full-floating rear-axles. Tonneau body, doors swing to rear, to seat 5 passengers.
Weight 2300 lbs. Price $2500.00, including 5 lamps, mats, tools and horn, all ready for the road.

operations about June 1st, 1907. T
ternally air-cooled motor was laid asid
Boucher proceeded to construct a fo
inder, water-cooled, four-cycle motor
tegral assembly with sliding gear, and
point support on the chassis frame.
novel design the mid-support of the
assembly is placed at the front end,
forward cross-girt of the chassis frame,
the side-frame support of the motive as

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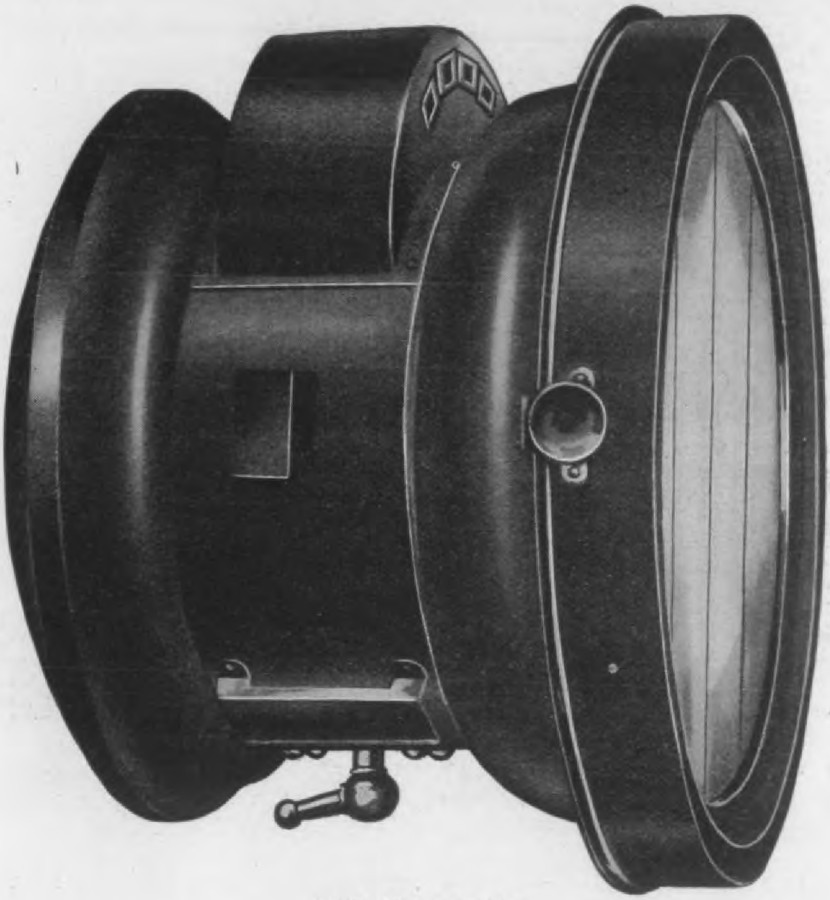

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We can furnish any of our lamps to order in our High Grade Black Finish. Not an enamel or Japan, but an electro plate. Will not chip or rust. A damp sponge and chamois occasionally used keeps it clean and bright. Beautiful and rich in appearance, durable and serviceable.

On account of labor necessary to produce this finish we are obliged to charge 15% advance over regular price.

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GRAY & DAVIS

Monarch model a new form of right-and-left-crew steering action, and universal joints of his own design, and has treated the motor-base and cam-shaft support in an original manner.

THE NEW MONARCH FACTORY.

The Monarch Company is financed by courageous and determined stockholders, who did not permit disaster by fire to delay operations. Immediate housing was obtained at Chicago Heights in an already-built factory. Chicago Heights is a town five miles square, projected 1899 as a manufacturing center, sufficiently removed from Chicago to be clear of unfavorable town influences and yet close enough to the greatest American railway center to obtain full advantage of competing lines of transportation, and now having some 13,000 inhabitants exclusively manufactory owners, operatives and suppliers.

are placed at the rear, next to the rear ing of the crank-shaft. This brings al large housings of the gears and fly-whee gether, close to the motor-base and so f the base-lugs, the cam-shaft gears-casing fly-wheel casing and the change-gear-box the least possible weight of aluminum cast The fan is placed on top of a hollow, alum casting pillar, and is bevel-gear driven the crank-shaft, 2½ to 1; placing the cam-gears at the rear leaves the whole front c motor open to the fan-blast. The cranl and gear-box ends are flanged, open diar larger than the fly-wheel diameter, anc shouldered together so as to ensure a support and correct alignment of the constructions.

The universal joints have no pins anc together, two forks going into the br casting-cross with finished grooves at angles to each other.

The bevel-pinion is fixed to the rear e the propeller shaft, with a universal joi

Fig. 2. Monarch 1908 Roadster, to seat 4 passengers. Same chassis specifications as Fig. 1. Weight, 2200 lbs. $2500.00, with 5 lamps, mats, horn and tools, all ready for the road.

This workers' town is surrounded by a belt-line railway with sidings into every factory, all switching charges borne by the trunk line railways, with a flat rate of $5.50 per car to Chicago by five competing lines of transportation. Chicago Heights gave the Monarch Company a five-acre plot and home-made bricks for a factory, the first section of which, 350x60 ft. brick walls, cement floors, saw-tooth-roof-lighted, tiled, with iron girders, all absolutely fire proof, is just finishing at the time of this writing, November 29, 1907, and will be occupied by the Monarch Company before January 1st, 1908.

NOTABLE FEATURES.

The notable features of the Boucher motive

the propeller-shaft front end. The pro shaft steel-tube casing forms the torsion is forked at the forward end and joint the gear-box brackets in the mid-plane single universal joint.

THE CARBURETOR PIPING.

In these illustrations the Schebler carb is fitted and the vertical pipe from the the carburetor opens both ways to the n of a flat horizontal intake pipe openi each cylinder, and also passes above this horizontal pipe to the middle of an u shorter horizontal pipe which opens at end into the main intake pipe half-wa tween the first and second cylinders an way between the third and fourth cyli

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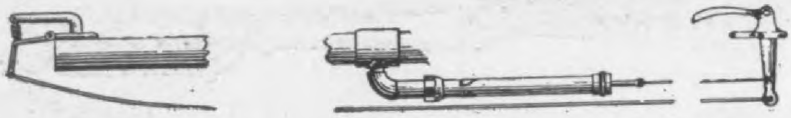
THE
'Nightingale Whistle"

vill melodiously demand the right of way over all ther warning signals. Its sound is a six-note thrill, hat penetrates for miles and does not shock the ear



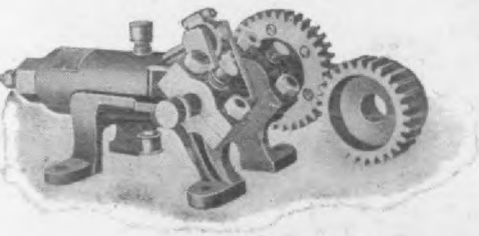
can be attached to any make of car by the chauffeur. A small standard thread bow is all that is needed. When not sounding, the whistle remains closed, eeping out all mud and dirt, and, in addition, it automatically cleanses itself after ch signal. The cap on the end of the exhaust pipe closes one second be-re the whistle opens.

It operates from the dashboard with either a hand pull, lever or pedal.

Catalog No. 24 gives all particulars and price.

For sale at all supply houses.

THE
'Tire Inflator Delpeuch"



Size 11x5 inches. Guaranteed for 3 years.

Made of Metal Throughout
No Leather Packing

Bored and fitted with a metal piston, just like a motor cylinder. It lasts for years. Automatic lubrication with grease cups. Attaches to any make of car by means of split gear on driving shaft, and is operated by a sliding pinion. Control on ashboard.

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The "Tire Inflator Delpeuch" will inflate the largest tire in one minute.

ious sheet-steel dust-pan under the motive ssembly. The single universal-joint and propeller-shaft sleeve-fork are covered by a lexible leather bag. All the dust casings are ubstantial and the fly-wheel and clutch are ully enclosed and perfectly protected. This lust protection is highly important and is vell carried out.

in capped seats, integral with the motor The forked, cylindrical valve-lifters hardened rollers, $\frac{7}{8}$ dia. on hardened $\frac{3}{8}$ the lifters, and flanged sleeve-nuts, scr into the open top ends of the lifter gu form the abutments of the lifter-springs

The valve stems and heads are int steel forgings. The ports are all $1\frac{5}{8}$ ins

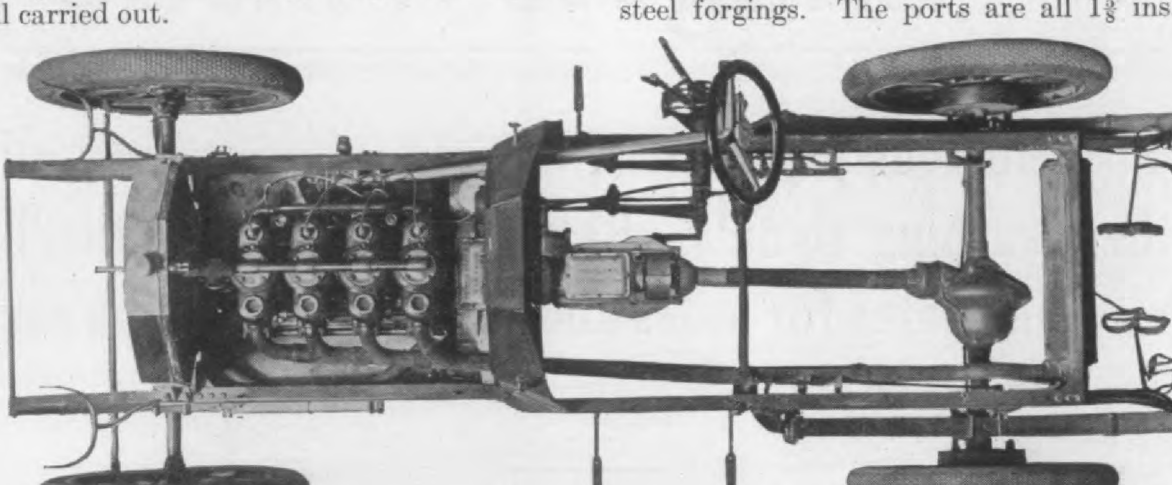

Fig. 3. Monarch 1908 Chassis plan. The chassis frame is in two widths. The assembled motive unit is sup n the middle of the chassis frame front cross-girt, and at the O G bends of the chassis frame. This supports the moti t 3 points, so that frame twists are not transferred to the motor base and sliding gear casing. It is common practice port the motor at two points in front and one point in the rear, which calls for more weight of motor base and separat orcing for the frame—side bends.

THE MONARCH MOTOR.

The cylinders are single units, symetrical, valves on each side, valves worked from two cam-shafts.

THE CAM-SHAFT.

The crank-shaft pinion fills sidewise between two crank-boxes and is held from turning by one Woodruff Key. This crank-shaft pinion has 33 teeth, 8, d. p. The cam-shaft gears are a $\frac{1}{4}$ web of steel in the middle with $\frac{7}{16}$

The top ends of the lifters and the lower of the valve stems are hardened. The no length-adjustment for the valve-action

The pistons, $4\frac{3}{4}$ ins. dia. by 5 ins. s have four snap-rings above the piston The pistons are a straight taper, $2\frac{1}{2}$-thousa small at the lower end and $5\frac{1}{2}$-thousa small at the top ends. The piston pin $1\frac{1}{8}$ dia. with $\frac{5}{8}$ holes clear through, hard and ground, held by tit-set-screws with

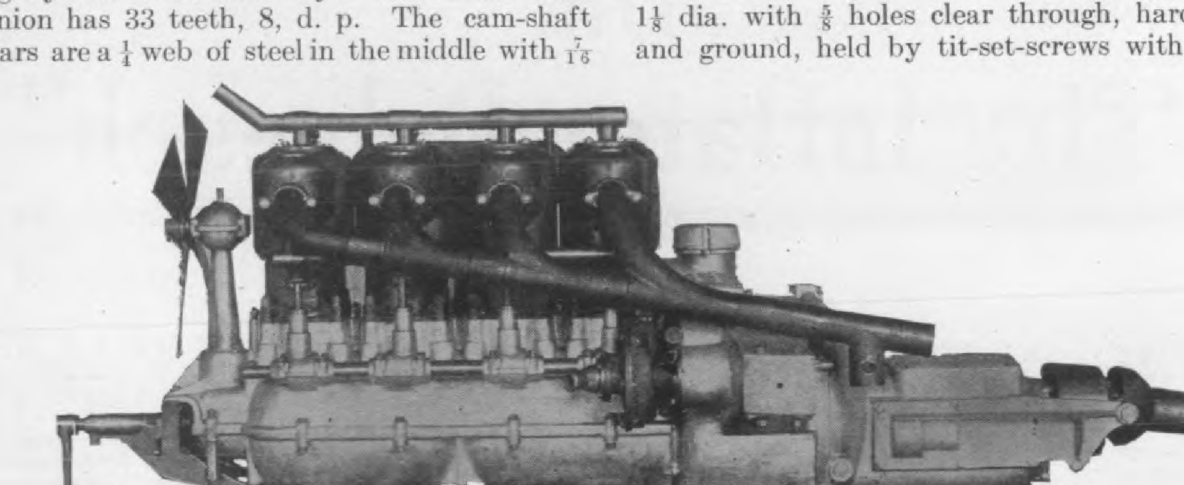

Fig. 4. The Monarch 1908 Motive Unit supported at a single point in front and by two arms in the rear. N omplete housing of all parts, the arrangement of the cam-shaft for quick removal, the positively gear driven fan and its nd the easy curves of the exhaust pipe giving a free exhaust.

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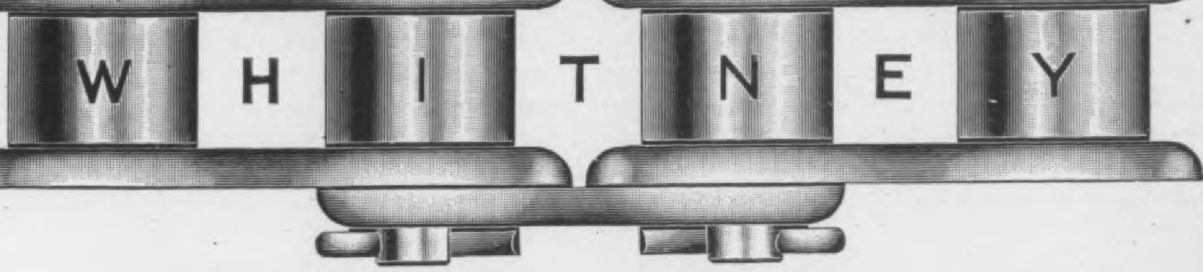

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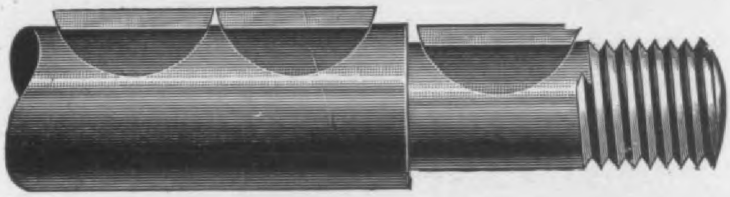
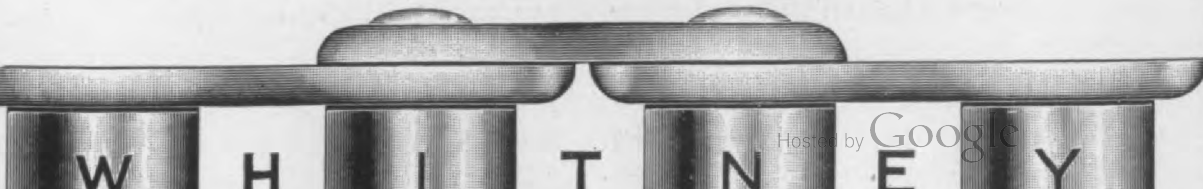


If you are not taking advantage of The Woodruff Patent System of Keying, it is high time to investigate same. It has been adopted by most of the leading automobile manufacturers, who report better results and a great saving in cost.

THE WHITNEY MFG. CO., Hartford, Conn.



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LUBRICATION.

A seven-lead mechanical oiler is used, one ead to each of the six crank-shaft boxes and ne to the centrifugal circulating pump, gear-driven from the cam-shaft, $2\frac{1}{2}$ pump turns to cam-shaft turn. The motor is, otherwise, plash-lubricated.

The water circulation is by a centrifugal ump, $5\frac{1}{2}$ ins. vane diameter. The oil-basin s divided into two pits by a mid-partition, nd is provided with a settling basin and drain-crew in the bottom.

The charge-lighting is by one jump-spark lug in each cylinder with Sims-Bosch high-ension magneto; a storage battery with a our-coil box on the front-board, is fitted as reserve.

THE CLUTCH AND CHANGE GEAR.

This is six disks of steel between brass disks aced with leather. The working annulus of he clutch disks is $13\frac{1}{8}$ outside, by $7\frac{7}{8}$ inside

2ins. dia., $\frac{1}{16}$ walls to take the rear-wheel kin bearings outside the spring-perches. front axle is steel tube $2\frac{3}{8}$ dia., $\frac{1}{4}$ walls. M able spring clips and drop-forged, reve Elliott, stub-axle fittings are applied by ting and pinching with $\frac{5}{8}$ dia. screws, thre 20 p. i. The front stub axles are steel drop ings. The steering arms are applied reach forward. The parallel rod is forke the ends and is a steel tube, 1 in. dia., wall.

THE SPRINGS.

The front springs are $46x2\frac{1}{2}$ ins., 8 le perched 20 ins. from front eye to axle ce The front springs are slotted at the front

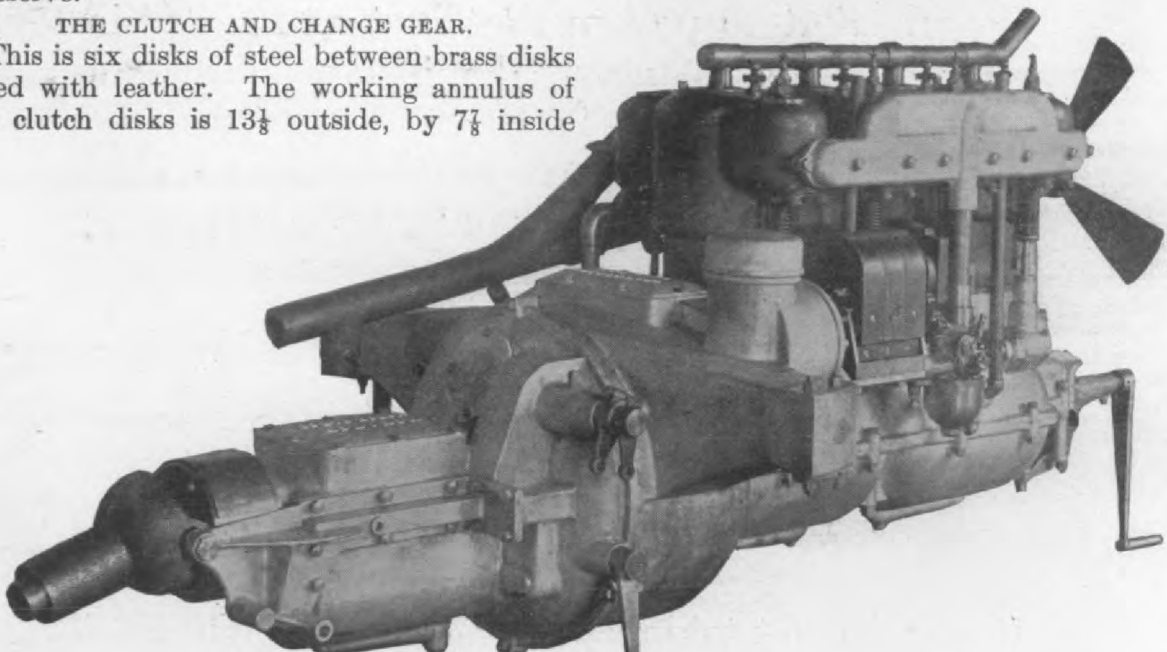

Fig. 5. Monarch 1908 motive assembly, rear end and right side. The fly-wheel is wholly enclosed in substantial um castings with short lugs to enter and reinforce the frame-side bends. Note the peculiar intake pipe described in th

iameter. The clutch action is a coiled spring, eleased by a rocking arm with a fork and runnions to a ball thrust-bearing.

The change-gears are all 8, d. p., chrome-teel, hardened, selectively operated, 3 for-ard speeds and a reverse, no gears engaged n high speed. The side-shaft and line-shaft re on Timken Rollers.

The fan is driven through a coiled spring n the fan-hub and is in plain bronze bearings. he motor bearings are Parson's White Bronze. ll the wheels and all rear axle bearings are n Timken Rollers.

BRAKES AND AXLES.

There is a line-shaft brake-drum, 8 ins. dia. y $3\frac{1}{2}$ ins. face, with a leather-lined band,

and jointed to the side-frames, and are li to the side-frames at the rear ends. The springs are half-elliptic, $56x2\frac{1}{2}$ ins., 8 le revolubly perched in the middle on the axle sleeve tubes, linked to the chassis f at the rear end, and peculiarly linked t chassis frame, rear-spring, front-end bra by bell-cranks. This rear-spring bell-c has a long rearward member, nearly pa to the spring and jointed to its rear end eye fixed to the spring-clip, so that this crank spring-link forms a parallel motion causes the rear axle to rise and fall in perpendicular to the chassis frame; to p this vertical rise and fall of the rear axl torsion-sleeve telescopes in the hub of its

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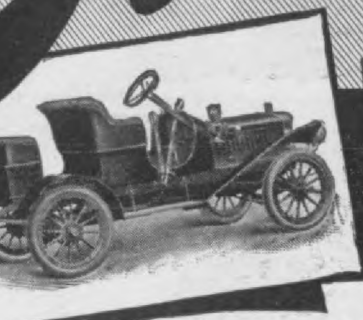
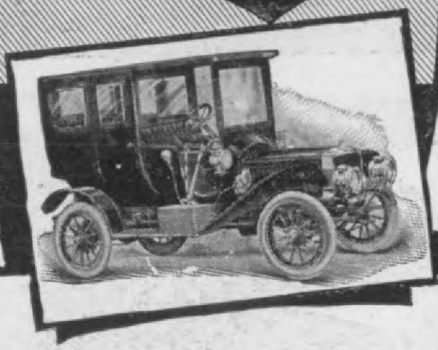
Mitchell





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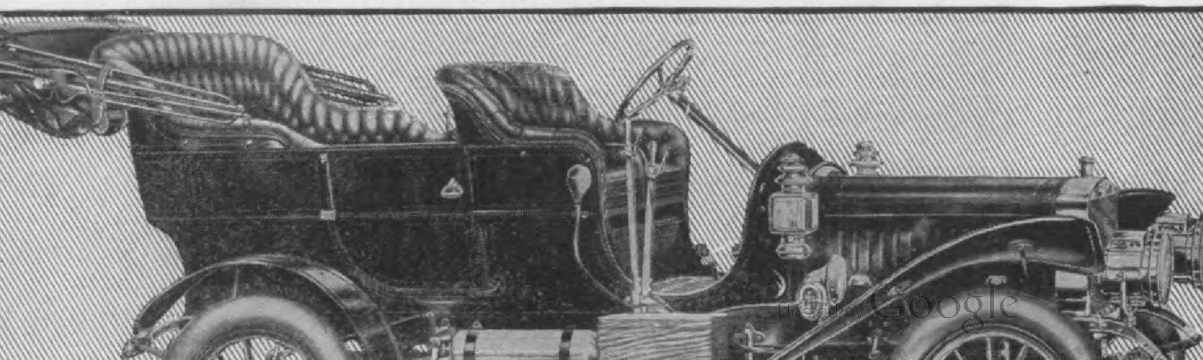

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sleeve serves as the torsion-arm.

The frame is pressed steel, greatest frame-side depth 4 ins. The frame-side width is 2 ins. The frame is flat on top, two widths, 36 ins. wide in the rear and 32 ins. wide in front.

into the solid metal of the steering-c base, and the whole action is very smal light, while lost motion can be taken u liners under the shoulders of the hard flanged, steel bearing-pins slipped into lower ends of the screws, below the pi

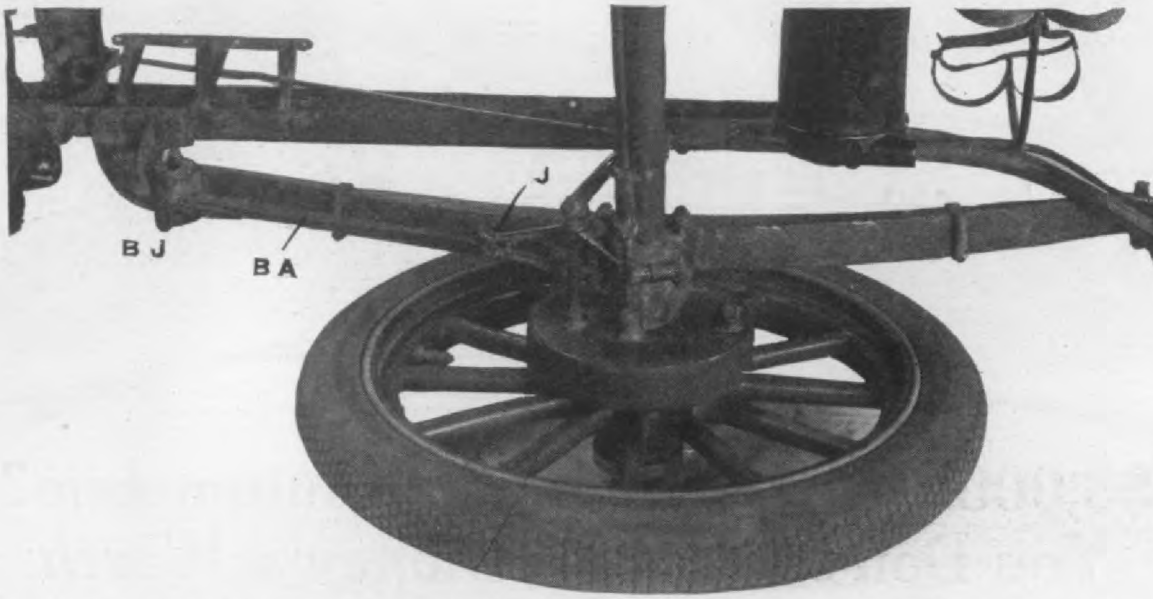

Fig. 6. Monarch 1908 rear spring front linkage to chassis frame. The rear end of the half-elliptic spring is joi the rear goose-neck, offset, as usual. The front end of the spring is not linked to the chassis frame directly, but to th crew of a bell-crank, jointed to the chassis frame bracket; the long arm, B A, of this bell-crank is carried underneath the o the rear and jointed to the forwardly prolonged spring perch at J. Manifestly, as B J descends the bell-crank will ca orward end of the spring to the front, and somewhat change the path of the axle as it approaches the chassis frame. onstruction is claimed to allow a quicker movement on the part of the axle.

The steering wheel makes $1\frac{3}{4}$ turns to the ull sweep of front wheels. The steering shaft as a 2-in. face spur-pinion, 20 teeth, 12 d. p., n its bottom end which engages two pinions, -in. face, 14 teeth, integral with two screws espectively, one screw right hand one left and, 1-in. dia. threaded 4 p. i. The lower nds of these screws extend downward below he integral pinions and are bored to take ardened pins with heads which bear on the ardened ends of the double bell-crank arms f the globe-end steering lever. This is a

The spark and throttle are regulated by rat retained hand-levers on top of the ste wheel. There are two pedals on the board. That at the left disengages the cl while that at the right applies the line-brake.

There are two hand-levers, the outer latched, is interlinked with the clutch, a pushed forward to first disengage the c and then apply the rear-hub, internal-b shoes. The inside lever is in an H-Slot, shifts the gears.

Buffalo Automobile Club elected the following officers: President, Frank B. Hower; ice-president, John M. Satterfield; treasurer, aurens Enos; secretary, Dai H. Lewis; irectors, E. R. Thomas, E. H. Butler, Charles lifton, James N. Byers and George C. Diehl.

Plans are now complete for the Jacksonille to Miami (Fla.) Road Race which takes lace the second week in March. James aughlin, 3rd, the young Pittsburgh millionire, accompanied by Vice-President George E. ebring, of the Fla. East Coast Association, and

The New York Automobile Press A ciation is located with the New York A mobile Trade Association in the M Mart, at Broadway and Sixty-se street.

In order to make touring abroad easy pleasant for its passengers, the North Ge Lloyd Steamship Co., has arranged so they may ship their cars on its steam sailing from New York on Thursdays, an taking the express steamships on the fo

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NET RESULT

F A YEAR'S TRY-OUT IN SERVICE OF THE

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Searchlight and Headlight

inst the cheap near-Rushmores and the Chinese copies has bee
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The motorist of a few years hence will buy a car as h
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day, and will require the same standard of efficiency and dura
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Rushmores are made for that kind of motorist

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The Elmore line for 1908 consists of the ollowing models: The Elmore 40, which is he 4-cylinder 35 H. P. touring car; the Elnore 30, which is the 3-cylinder, 24 H. P. ouring car, and the Elmore roadster, which s the same as the 30 except in body design.

cooled type, with the water circulate means of a positive gear driven pump. only noticeable change in the engine i use of lighter pistons and drop forged necting rods, thereby reducing the vibr to a minimum. The cylinders are 4½

Fig. 1. 1908 Elmore 40. Motor 4 cylinders, 2-cycle, water cooled 4½x4 inches, 35 H. P. Three speed select operated sliding gear on roller bearings, expanding ring clutch, shaft drive. Wheel base 109 inches, front sp semi-eliptic, rear platform. Jump spark ignition using Atwater-Kent Generator is fitted, over 2,000 miles claimed for each set of six No. 6 dry cells. Seating capacity five. Equipment two side oil lights, tail two gas headlights, tools and tire repair kit. Weight 2,550 lbs. Price $2,500.00.

The Elmore 30 and Runabout, 3-cylinder, 24 H. P., models have the same general chassis arrangements, bore and stroke are the same as the 35 H. P. car but the wheel base is 104 inches and the weight 2,050. cars with similar equipment to the 40 sell for $1,750.00.

All the distinctive Elmore features remain unchanged. The large Elmore 40 has 109 ns. wheel base and 34 in. wheels fitted with in. tires. The body seats five persons comortably, and weighs, complete, 2550 pounds, nd sells for $2500. All the models have two ets of brakes on the rear wheels and use a

by 4 in. stroke, and are capable of dr the car at an average speed of from 4 miles an hour on the high gear by t tling. On good roads these cars, it is c ed, can make 55 miles an hour, and flexibility of control has been shown t one of their strongest points.

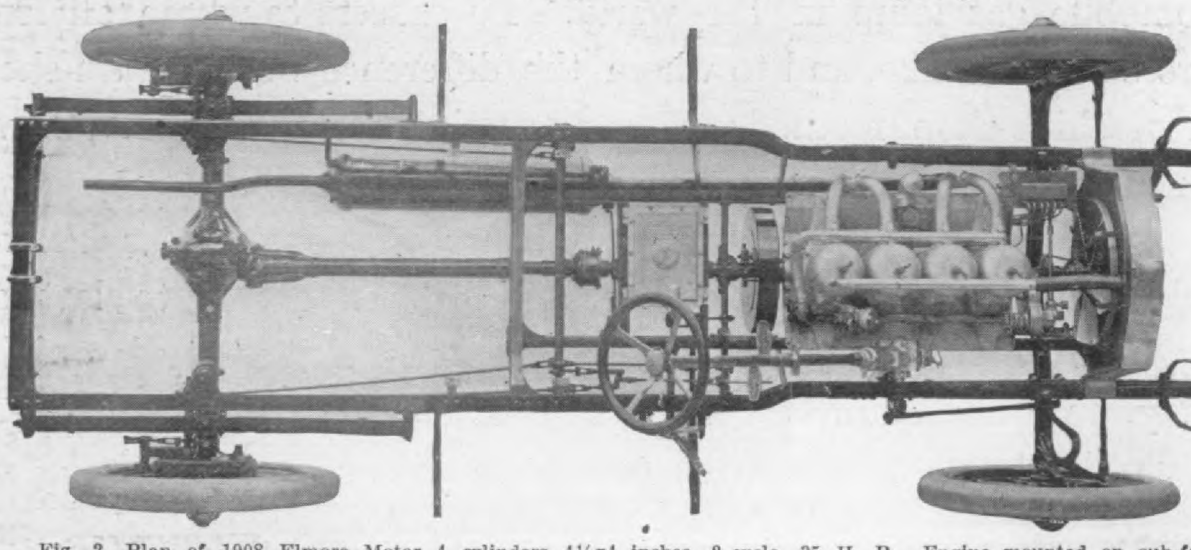

Fig. 2. Plan of 1908 Elmore Motor 4 cylinders 4½x4 inches, 2-cycle, 35 H. P. Engine mounted on sub-f by integral crank case fan construction, internal expanding ring clutch, three speed sliding change gear, d set of brakes on the rear wheels. The pistons for 1908 are lighter and the connecting rods are 1 section forgings. The ball-end arm of the steering knuckle is this year above the axle in a more protected position. S eliptic springs are used at the front and platform at the rear.

pecial expanding ring clutch which has roven very satisfactory in practice. The 3-

STEERING GEAR.

The steering gear is irreversible an constructed that every part of the

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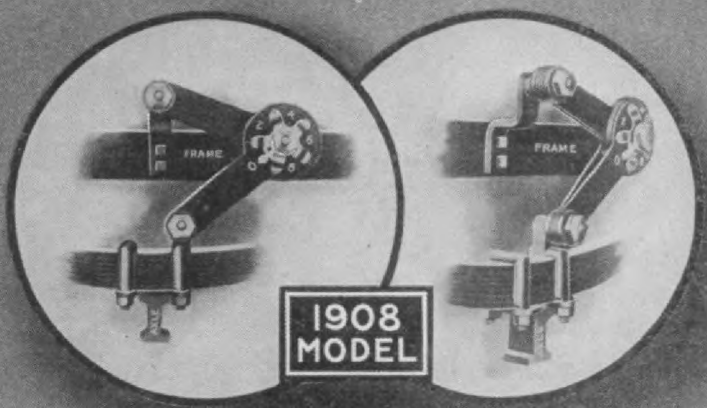

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he model 40 is mahogany and embellisht vith heavy brass molding so placed as to be ree from vibration. The toe board angle has been raised so that it forms a very much more comfortable rest than in former models.

THE AXLES.

The arrangement of the engine transmission and rear axle is such that the drive is a straight line, making the wear on the universal joints practically nil.

The live rear axle is fitted to the master gears in the differential by means of squared ends and run on Hyatt roller bearings with special ball thrust bearings thruout. The front axle is drop forged of I-section, with an extra heavy spindle with ball bearings, ¾ in. balls being used in the inside bearings and ⅝ in. ball in the outside bearings.

The springs are semi-elliptical in front and three-fourths platform suspension in the rear, with Sager auxiliary recoil springs on the rear axle as shock absorbers.

The wheels are of wood of the artillery type and are fitted with Midgley universal rims. The tires used are the same both front and rear. Two sets of brakes are supplied, both acting on the rear hubs. They are very efficient, either set being capable of causing the wheels to slide with but slight pressure.

The hubs are extremely large and the

IGNITION CHANGES.

One of the most important improven has been the adoption of the Atwater- spark generator. The introduction of th nition device, according to the company produced really startling results in mil with dry cells. In every test made by company the 1908 Elmores, fitted with ignition device, made over 2000 mile one set of six, No. 6 dry cells, which is a remarkable showing.

The gasoline tank will carry 20 gallo fuel and the oiler will hold six pin lubricating oil. The Elmore 40, it is c ed, will easily average 12 miles to the g of gasoline. The tread is standard 5 and the wheel base 109 ins. in the 4-cyl car, and 102 in the 3-cylinder car.

Special importance is laid upon the more lubrication. The oil is forced int intake pipe by the mechanical oiler, so the distribution to all the cylinders mu uniform.

The carburetor is of the float-feed matic type.

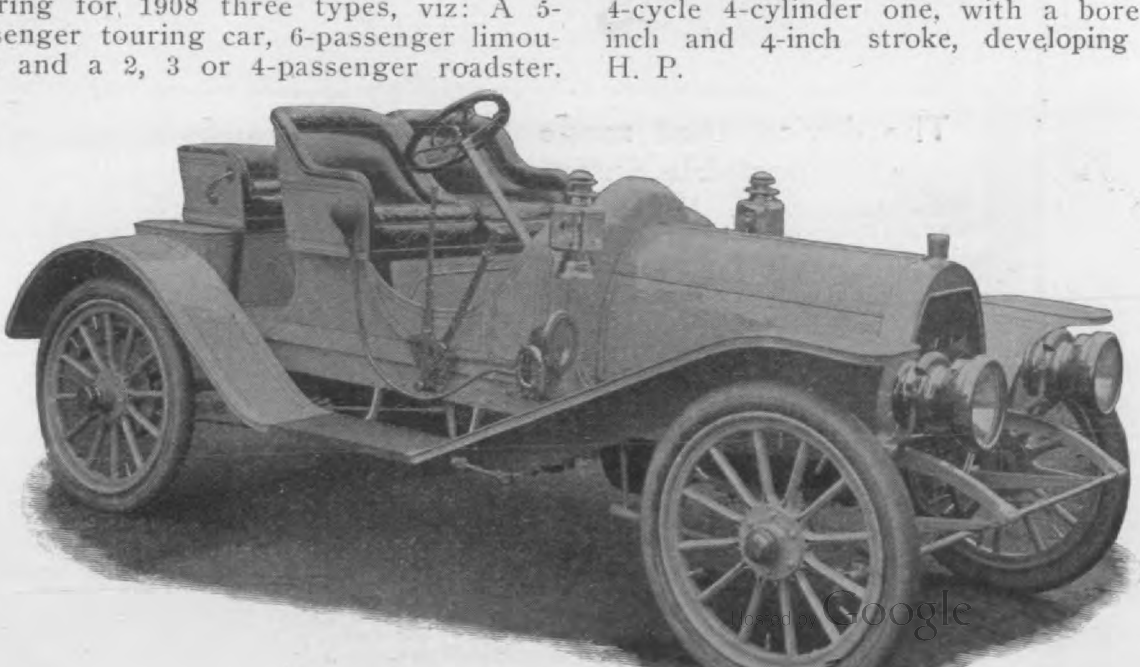
The spark and throttle control remai the top of the steering wheel, as form and the transmission used is of the sele type, three speeds forward and reverse

The specifications for the Elmore 30 for the Elmore runabout are identical embody the same excellency of design characterizes the Model 40.

The 1908 Maryland Cars

The Sinclair-Scott Co., of Baltimore, manufacturers of the Maryland Car, are offering for 1908 three types, viz: A 5-passenger touring car, 6-passenger limousine and a 2, 3 or 4-passenger roadster. The only changes for 1908 are in bod finements and general finish.

The general mechanism remains tical with that of 1907. The motor 4-cycle 4-cylinder one, with a bore inch and 4-inch stroke, developing H. P.



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IN LONDON:	*90% of all exhibiting cars in the Olympia Automobile Exhibition were equipped.*
IN PARIS:	*68% of all cars, chassis, and motors in Paris Automobile Show were equipped.*
IN BERLIN:	*74% of all chassis, motors and motorcycles were equipped.*

THE BOSCH MAGNETO

Should be on your 1908 Car—see that it is!

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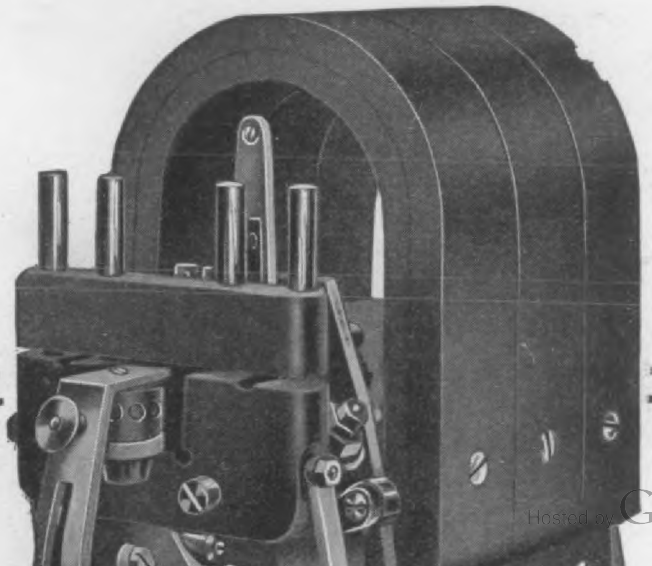
160 West 56th St., NEW YORK



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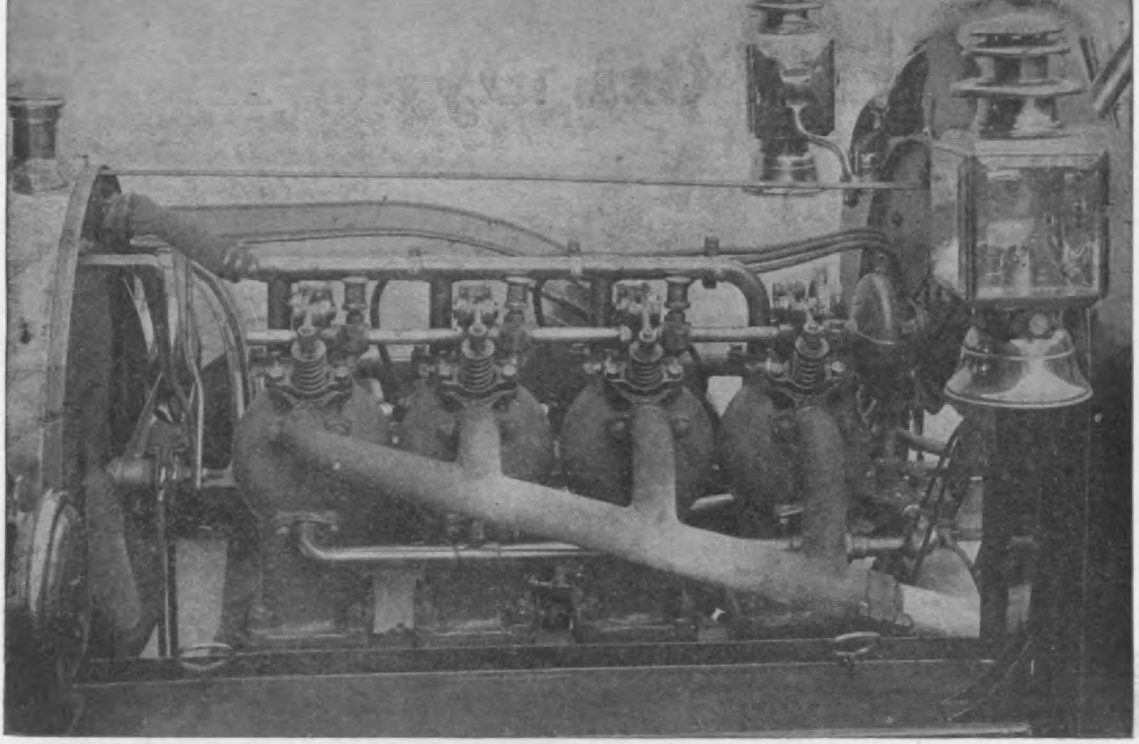
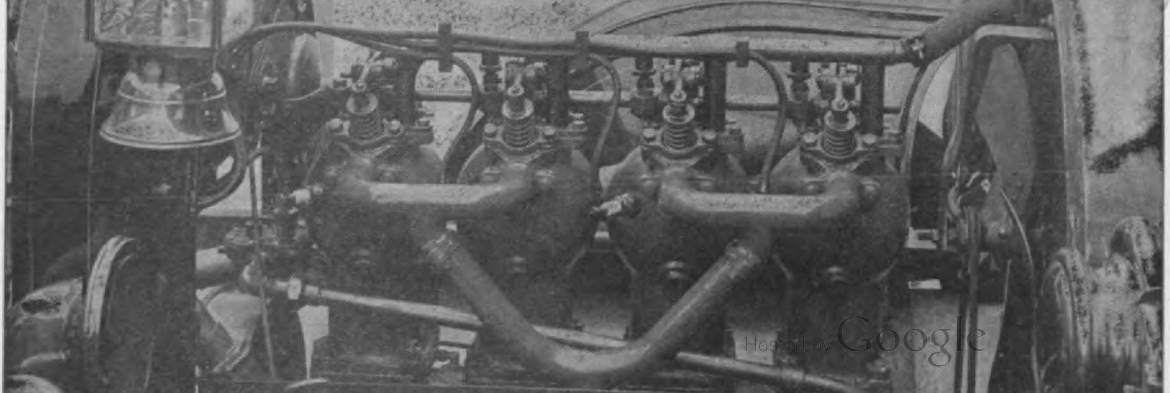


Fig. 2. Exhaust side of 1908 Maryland Motor. Bore 4 inches; stroke 4 inches; 26 H. P. Note the cylind water-jackets surrounding the combustion chamber only and providing a large volume of water, the special haust manifold with gradually increasing cross sectional area, and the overhead cam construction driven b vertical shaft and bevel gears from the rear. The end of this shaft projects thru the dash and carries timer in an accessible position under the eye of the driver. A round belt from this shaft also drives the feed oiler on the left of the dash.

Cylinders are cast separate, with valves n cages placed in the head. All valves re interchangeable and are actuated by ne overhead cam shaft, which projects hrough the dash and upon which is nounted the roller contact timer in full iew of the operator.

Cooling is affected by water throu honey-comb radiator and positive pump, mounted directly on the ver shaft which drives the horizontal shaft.

Lubrication is by splash, with cons level maintained by belt-driven, posi



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Half-Nelson Emergency Tires

ill STAND UP on any kind of roads as long as any other tire, at a COST which a NGLE EMERGENCY helped out of—will more than pay for.

The tires are made of six sections of metal and wood with a tread of solid rubber as own. The sections can be attached to each other and the wheel in less than one min-e. They can be carried anywhere about the car, together or separately. A casing car-ed upon a car deteriorates faster than when used, as anybody knows who has carried e six months or a year and then put it in service.

We have many testimonials, but space to quote two only :

"MINNEAPOLIS, MINN., JUNE 14TH, 1907.

My auto livery business compels me to have my cars ready to go and stay on the road at all times, and your emergency tires, with which my cars are equipped, have settled the tire problem definitely. Your tire is an invaluable part of every car's equipment."

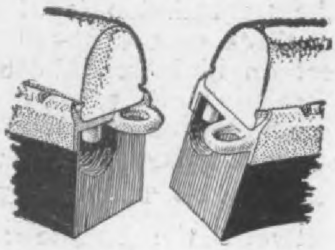
CARHART AUTO LIVERY CO.

200 E. SEVENTH ST., ST. PAUL, FEB. 4TH, 1908.

AL,F-NELSON TIRE CO.,

Gentlemen:—In regard to the Half-Nelson Emergency Tire, I wish state that I purchased one last summer and it certainly came in handy ew times. If I could not replace it I would not sell it for five times e amount I paid. Yours very truly,

ERNEST A. JACKSON.



Send for the Half-Nelson Emergency Tire. Try it. If u are are not satisfied after ten days' trial, we shall return ur money.

"Remember that the complete ruin of a punctured tire n be accomplished in a ten-yard run."

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cone clutch with cork inserts is used. The wrist pins are hardened and ground tool steel working in hard phosphor bronze

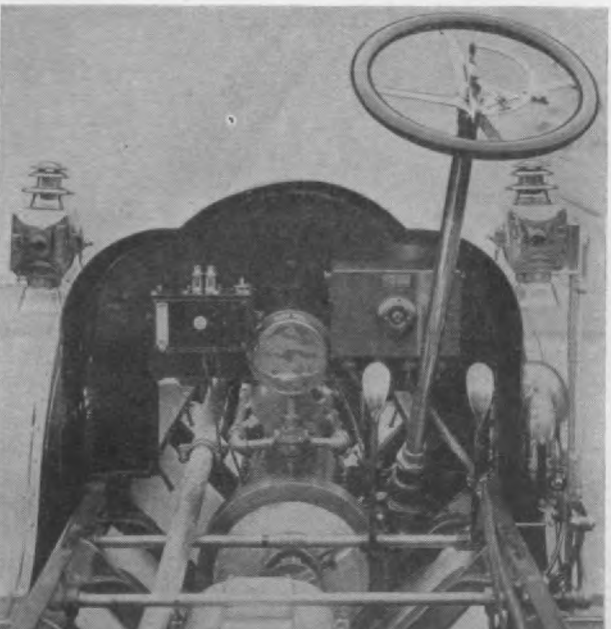

Fig. 4. Rear view of dash 1908 Maryland car showing the timer at the center mounted on the rear of the overhead cam-shaft, the coil and force feed oiler also mounted on the cast aluminum dash. The clutch is of the ordinary leather faced cone type with cork inserts. The contract levers are also shown and consist of a clutch pedal, brake pedal at the right and emergency brake lever and change speed lever at the outside. Spark and throttle are one stationary sector on the large eliptical grip steering wheel.

bushings. The main bearings and crank-pin bearings are of Parson's white brass, peaned and scraped.

The arrangement of valves in top of cylinders of motor gives the greatest efficiency of any known, and on actual test these moters run up as high as 28½ and 29 H. P.

THE TRANSMISSION.

The transmission is of sliding gear type with three speeds ahead and one reverse, direct on high gear, both shafts mounted on bearings of Parson's white brass. The whole being enclosed in an oil tight and dust proof aluminum casing.

ENGINE AND TRANSMISSION SUPPORTS.

Between the engine and transmission case is placed a full universal joint system, which allows ample freedom for any possible miss-alignment due to road inequalities. The method of suspending en-

is through a cardan shaft with uni joints at either end.

AXLES.

A semi-floating rear axle with spur differential is used, the shafts of w run on six "Maryland" solid conical er bearings. No torsion or strut rod used, drive being entirely through elliptic springs which are secured to frame by broad spring pads, with spring clips. Front axle is I section forged steel with Timpken roller bea and steering knuckles.

The steering gear is of the irreve type, which prevents any jar or vibra incidental to travel over rough road ing transmitted to the hands. Upon steering wheel is mounted a static sector, around which moves the thr and spark levers.

The front springs are semi-ell rear-full elliptic, and are all 38 inches The wheel base of the touring car limousine is 112 inches and the roa 106 inches. The touring car and roa tires are 32 inches by 3½ inches around, and the limousine has 32 i by 4 inches all around.

The manufacturers of the Marylan far as possible, make their own parts abling them to know just what ma and workmanship goes to make up

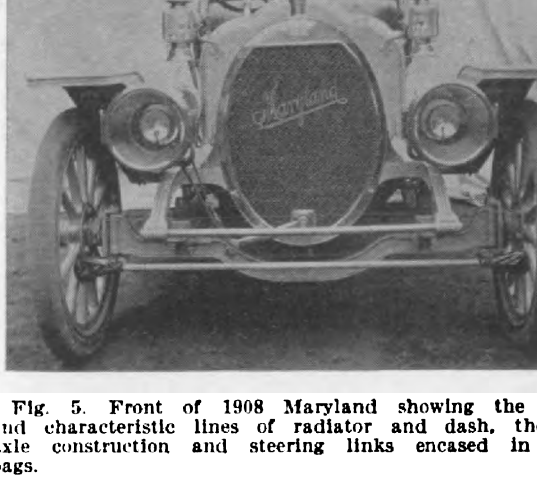

Fig. 5. Front of 1908 Maryland showing the and characteristic lines of radiator and dash, th axle construction and steering links encased in bags.

finished product. The unqualified cess which it is claimed this car met during the past season has pron the builders to continue it without mechanical changes.

A. P. Morrow and J. E. Morrow of E N. Y. have formed the Morrow Mfg. Co fill the offices of president and sec

For Pleasure Cars

Every good argument you hear in favor of better tire service is just one more reason why it will pay you to use the best-made tires—

"Firestone"

Pneumatic Tires for Pleasure Cars
Solid Tires for Commercial Vehicles

FIRESTONE TIRE AND RUBBER CO.

The Largest Exclusive Rubber Tire Makers in America

Factory and General Offices:

AKRON, OHIO

BRANCHES:—New York, Boston, Philadelphia, Chicago, St. Louis, Detroit, Buffalo, Pittsburg

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The Okey Motor Car Company, Columbus, hio, U. S. A., capital stock, $25,000.00, was rganized in January, 1907, to exploit the -cycle motor and various motor-car detail ventions of Perry Okey, who has made a udy of the small gas-engine since 1894, and the writers opinion has built some of the ost notable car-motors ever produced anyhere, both 2-stroke and 4-stroke cycle. key has built only a very few cars, but these ave covered a large range, including two rge 7-passenger 6-cylinder cars to private rder as well as small 2-cycle runabouts, the -cycle being his favorite type, the 1908 odels having such motors.

All Okey cars have been on wood chassis ames and have other notable features testiying to the strong convictions of the designer, ho decides only after extended experiment nd consideration and pays no attention to hat anyone else thinks or believes.

cylindrical aluminum casting bolted to rear end of the crank-box to complete assembled propulsion unit. The fly-w is placed in front and the cylinders are thre in the top opening to take a threaded fla top which is tapped in the middle for spark-plug and caps the cylinder water-ja

THE OKEY MOTOR.

The cylinders and crank-box and integral gray-iron casting, is $\frac{3}{16}$ in. ge thickness, and this casting only weighs, finis 116 lbs.

The three cylinders are each $4\frac{1}{8}$ bore b ins. stroke, and the completed motor shown 3000 R. P. M., unloaded, on the te stand, and 22 H. P. at 1300 R. P. M. weight of the entire propulsion assembl shown, is 370 lbs.

The crank-box sucks from the carbu through a third port, $\frac{9}{16}$ long, open for s thing like 90 degrees of crank-shaft an

Fig. 1. Okey 2-cycle motor runabout, wheel-base 92 inches; gauge 54 inches. Tires all 34x3½ inc Motor 3 cylinders, 2-cycle, water-cooled, 4⅛ bore x 3½-inches stroke; 22 B. H. P. at 1,300 R. P. M. Plane gear to bevel gear and divided rear axles, with spur balance gear. Runabout body to seat two passen only, with side doors to foot space, right hand door fixed shut, left hand door swinging to front. 20 gallon tank elevated in rear of seats. Weight about 2,250 lbs., tank filled. Price $1,400.00 including mat, horn, and three oil lamps.

Every detail of this 1908 Okey Runabout an original design and construction, except he planetary-two-forward-speeds and a reerse change-gear.

Okey first decided on a cylindrical fuel tank o avoid leakage, placed high up in the rear f the runabout seats for two, but as it cuts ff all possibility of placing rumble seats it ill probably be placed in the usual place in uture models, that is, under the drivers seat.

Both front and rear axles are original. The prings are three-quarter-elliptics in front and croll-head full-elliptics in the rear. The drive bevel gear, ratio $3\frac{1}{2}$ to 1. The steering is

advance, giving, say 45 degrees crank intake, and of course 45 degrees of downw piston travel in which the third port is and the descending piston forces mix from the crank-box downward through carburetor throat. If the carburetor th were open, this returned charge would be To avoid this mixture loss, a 2-inch air-in horizontal tube is coupled to the carbu air-intake and is carried back horizon 36 ins., to the space under the driver's where it is turned upward for 9 ins., and open top end of this long air-intake is f with a swinging flat cover, operated

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IT FITS THE POCKET

Just issued: an encyclopedia of the automobile trade, in handy pocket size, containing over 100 pages brim full of illustrations and detailed description of all kinds of supplies for all kinds or cars. It is the most attractive book of its kind ever issued and a postal card will bring it.

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Every item we sell is of good quality—that's certain, and yet our prices are no higher than you pay for indifferent or ordinary supplies. We want you to send for our book and let us show you that we can serve you well in quality and price.

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Are described also, and many novelties are shown. We sell the most complete assortment of goods for the motorist to be had anywhere, and we would like every motor cycle dealer and rider to write us for our prices.

BICYCLES ARE SELLING

Don't overlook the fact that the bicycle business increased in 1907 and there is every indication of a big demand in 1908. We carry a most complete stock and do, by far, the largest trade in this line in the East. We are prepared to take care of your requirements and are offering special inducements for early orders. Write for our catalog No. 40—pocket edition, and ask us to tell you about the bicycle we can sell the trade low enough to be retailed at $20.00 with coaster brake.

NEW YORK SPORTING GOODS CO.

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the swinging cover, to screen the air going to the carburetor. The downward stroke displacement of the piston before closing the third port is about 10 cubic ins., and this volume of mixture is forced downward through the carburetor throat into the horizontal 2-inch dia. air-intake tube. The result is that a corresponding bulk of pure air is discharged from the turned up end of the air-intake pipe with no loss of mixture or fuel from the down stroke of the piston while the third port is open.

The cylinders are offset $\frac{9}{16}$, and the connecting rod is $6\frac{3}{4}$ ins., center to center. The intake ports are $\frac{7}{16}$ long by 3 ins. circumferential width, and the exhaust ports are $\frac{3}{1}$ long by $3\frac{1}{2}$ ins. wide. The crank-box intake port is $\frac{9}{16}$ long by $3\frac{3}{8}$ circumferential width. The water circulation is thermal, large pipes and no circulating pump.

The exhaust is carried into a large grey-iron expansion chamber, cylindrical in form, piped to a long large-diameter muffler, the exhaust silencing scheme depending on constant and rapid increase of expansion room.

THE CARBURETOR.

This is Okey's design, Fig. 12, float-feed and stand-pipe, nozzle $\frac{3}{8}$ dia. with a No. 41 drill-hole in the center of a throat $1\frac{1}{16}$ least diameter, enlarged both above and below the stand-pipe nozzle-top, $\frac{3}{16}$ above fuel-level in the float chamber. This carburetor has no auxiliary air-intake nor automatic valve. The 36 ins. long, horizontal air-intake pipe, as previously described, is coupled to the under face of the 2 ins. dia. air-intake at the right.

There are three rocking cocks placed in the side-pipes, to act as throttles. The hollow cock-shells are fitted with gauze cones to prevent back-firing. All the throttle cocks are linked together so as to be operated together by one rod from the throttle rocker.

IGNITION.

This is by jump-spark plugs, storage battery and 3-coil box on the front-board. The commutator is on a short horizontal shaft, bevel-gear driven from the line-shaft in the change-gear box. The bevel gears are of bronze, and are of large diameter.

LUBRICATION.

No lubricating system whatever, is used, the oiling method being to first partly fill the 20 gallons capacity fuel tank and then add from $\frac{1}{24}$ to $\frac{1}{20}$ the gasoline volume in lubricating oil, poured directly into the gasoline tank. The gasoline at once "cuts" the lubricating oil, and the colorless transparent mixture of lubricating oil and gasoline goes through the carbureter to the crank-box and cylinders, depositing the lubricating oil on the walls of the crank-box and cylinders and oiling every part of the motor except the crank-shaft forward bearing, which is not exposed to the mixture drawn into the crank-box and is therefore fitted with an oil cup and wick to the front-bearing oil-lead. This method of oiling has been used by Okey in all of his 2-cycle motors and during several years of employment has never failed to give entire satisfaction.

BEARINGS.

The crank-shaft, rods and the change-gear shaft have plain babbitt bearings. The front wheels are on 2-point ball-bearings, $\frac{3}{4}$ and $\frac{1}{2}$-in. dia. balls. The rear axles and the pinion shaft are on F and S imported, annular bearings.

The front axle is an I-section bronze casting,

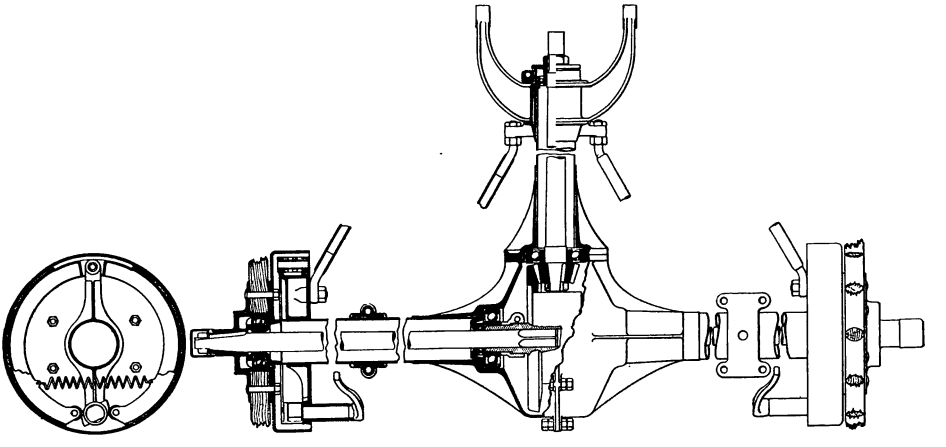

Fig. 2. Okey rear axle, complete. The bevel pinion shaft on F and S annular bearings, is cased in a steel tube sleeve with annular braces to the axle ends. The front end of the sleeve has one member of a large universal joint revolubly mounted thereupon, this sleeve joint being concentric with a Spicer universal joint from the line shaft to the bevel pinion shaft. All gears are of chrome nickle steel, very large, coarse pitch and hardened. The rear wheels are on annular bearings in the plane of the wheel spokes. The gear box is a steel casting, and the pinion shaft sleeve is joined to it by a flange of abundant diameter. The rear wheel brakes are also shown. Hub drums 12 inches diameter, steel casting internal shoes. Gandy-belting faced, applied with a sliding pin having hardened ends, beveled, working on hard rollers in the shoe-ends. This sliding pin is passed through the brake rock-shaft and must apply the shoes equally.

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eplace it—in less than a minute b
he watch. Nothing could be easie

Read how simple it is—and how saving of time and trouble

Look at the illustration.

Get out your little monkey-wrench. Don't ste time trying to find any *special* tool—u probably left that home—just use any all *wrench* to loosen nut "A."

Your fingers do the rest easily, like this—Push valve stem "B" up into the tire. ess outer flange ring "C" inward—lift locking ring "D," slide ring "C" off and n the tire. Put it back same way. Sixty onds either way.

No *special* tool—to lose, get bent up rusty so that the tire is on for good.

All *other* detachable tires on all *other* Qu Detachable rims *require* one.

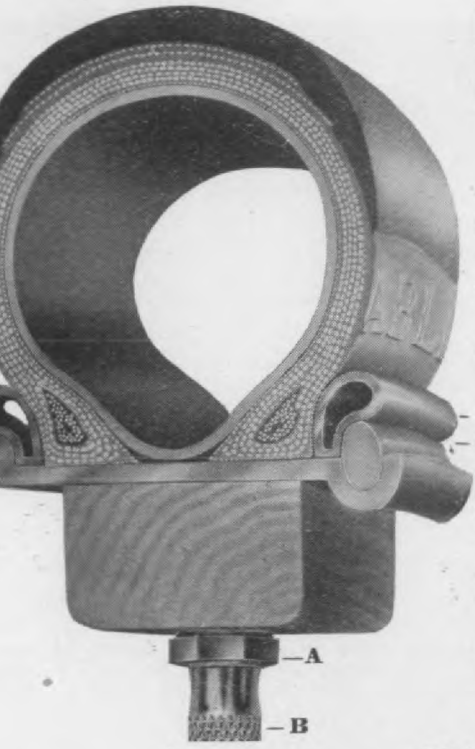
The Goodyear Detachable absolutely ca come off, ever—unless you take it off yours

If you ride it *deflated*—it can't come

Skid around curves at 70—80—100 m an hour—it stays on.

That's the way of the

GOOD YEAR



Detachable Auto-Tire c Goodyear Universal Ri

Professional Track Racers who have used this on this rim in daring, whirling races, have never a single tire or rim accident.

You can't *rim cut* this tire—it won't *creep*, deve sand or mud boils, or do anything a good tire shouldn't

It's 90 per cent. puncture proof, too, though the easi riding, liveliest tire made.

Know *why*. Find out the reasons—they're wo much to you.

Ask anyone at any of the following addresse 'prove up"—or write us today for free booklet, "How Select an Auto-Tire"—it tells a mighty interesting st

Let us tell you all about Auto-Tires, Detachable Ri etc. Compare the Goodyear with the rest—

And judge for yourself.

The Goodyear Tire & Rubber C

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the bevel pinion shaft casing. The line-

double sliding wedge working against for
with an outside screw adjustment for regulat

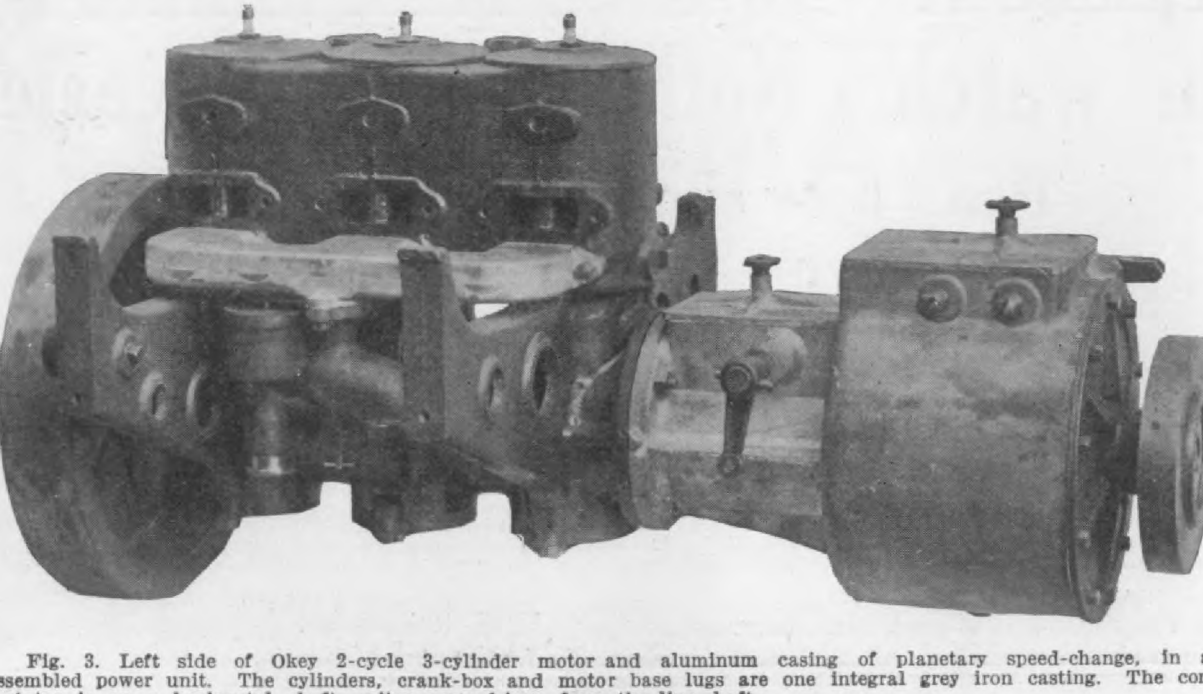

Fig. 3. Left side of Okey 2-cycle 3-cylinder motor and aluminum casing of planetary speed-change, in
ssembled power unit. The cylinders, crank-box and motor base lugs are one integral grey iron casting. The co
utator is on a horizontal shaft, miter gear driven from the line-shaft.

ft and bevel-pinion shaft, which is on
nular bearings, are connected by a single
icer joint, placed concentric with the large
nt fixed to the pinion-shaft sleeve,
Fig. 4 shows the bevel-gear and live-axle
nstruction. The wheel hubs are on the
pered axle ends, key and nut retention.

the brake-band tension. The change-g
housing is two cylinders in general form, w
two cap-plates, giving access to the chan
gear brake drums and the miter-gear co
mutator drive. The change-gear shift is s
locking, everything enclosed and running
oil.

Fig. 4. The rotary throttle cocks are linked together as seen in the upper figure which shows the rig
le of the assemblage, fly-wheel in front. The crank-case, integral with the water-cooled cylinders, is bor
t. The crank-shaft is in babbitted bearings, split between the cranks to assemble, turned to fit the crank-cas
d packed at each end with one snap-ring.

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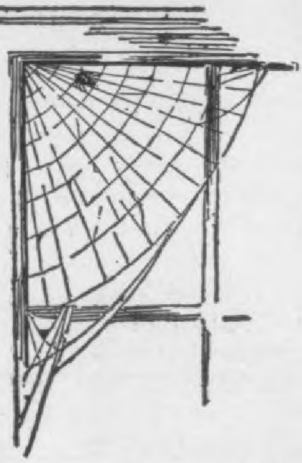

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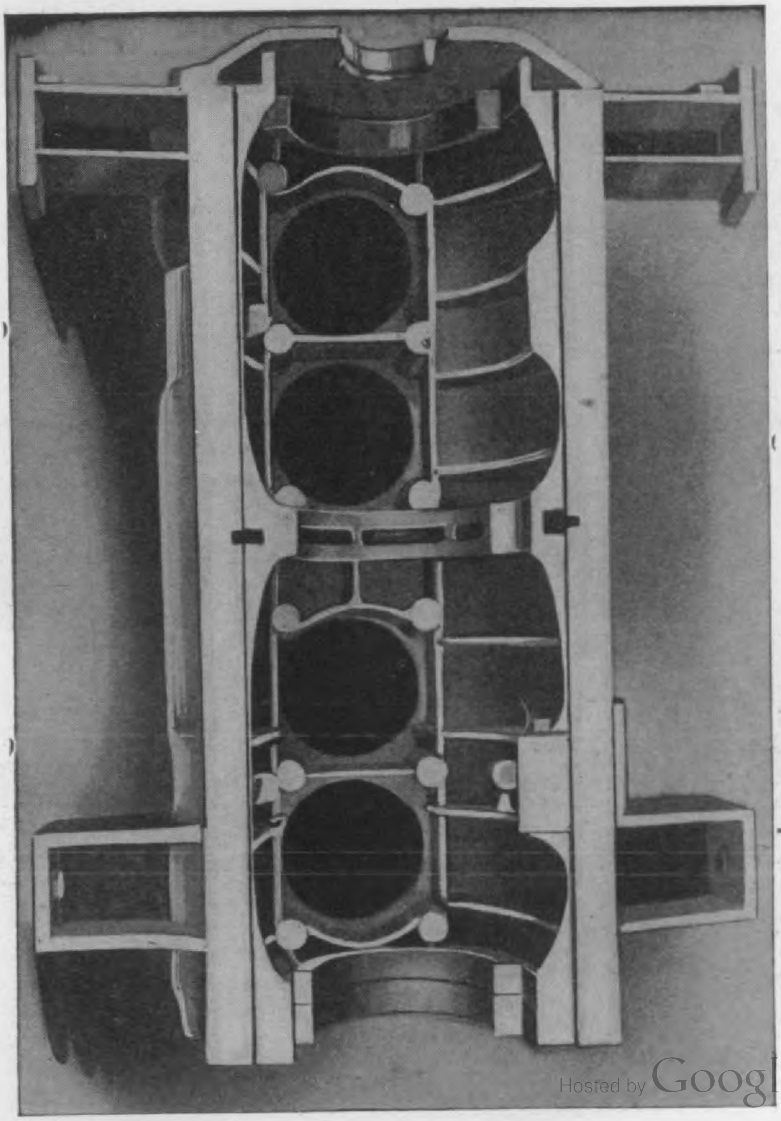
Aluminum Castings

Are the best from CAUSE, not accident. Good patterns help the cause.

Webs and Ribs are nature's method of producing great strength with economy of weight



When designing patterns for aluminum castings, cut out thick sections where possible using webs and ribs to distribute the strains

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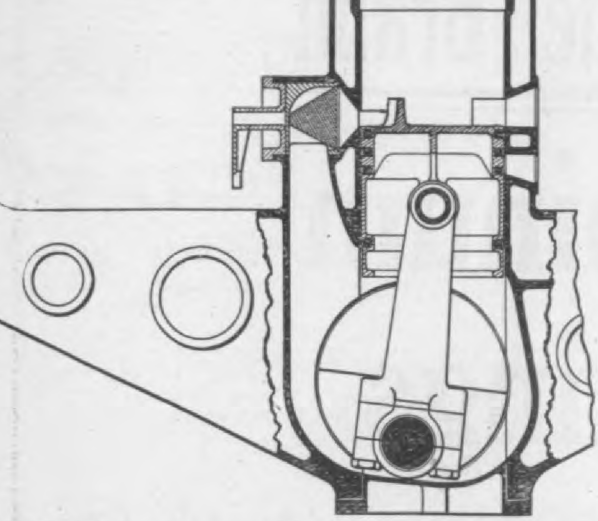


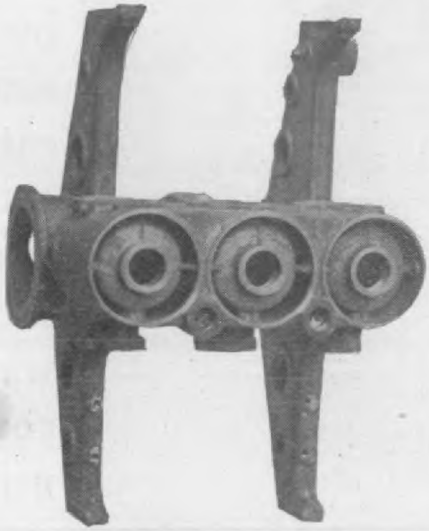
g. 5. Okey motor construction, one cylinder shown vertical section. The cylinder bore is 4⅛ inches; on stroke 3½ inches. Intake port length 7-16, width ches. Exhaust port length 13-16 and circumferential h 3½ inches. Crank-box intake 9-16 long. Cylinders t 9-16. Rod 6¾ inches. C to C. The 3-throw k-shaft is of usual form, cranks at 120 deg. The k space is filled with applied shells of type-metal, to form and fixed to the crank with one screw. deflector is a straight line with the ends curved, plan. The ends are also rounded over to clear the der head round corners, and the deflector does not h the cylinder walls, being cleared about 1-32. The pression is about 80 lbs. cold air pressure.

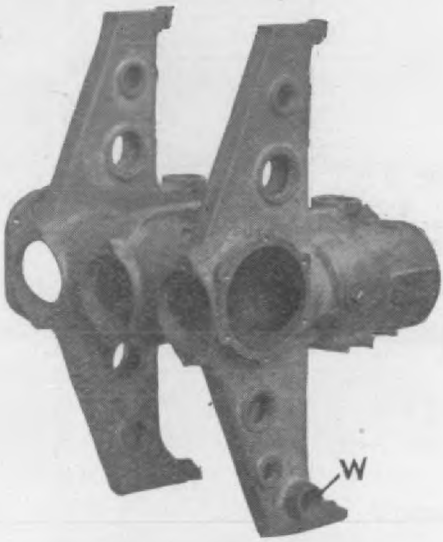
One of the Okey runabouts, is fitted with ee plain air-cocks, having their plug levers ked together so that all can be opened or

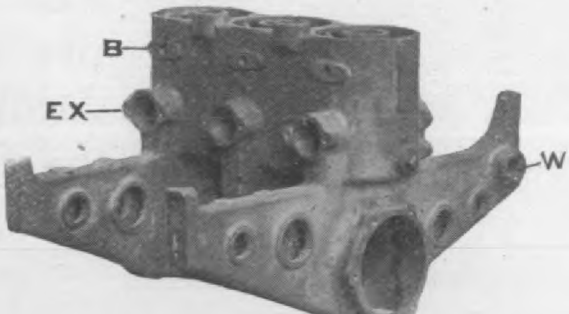
Fig. 5, so that the cock-plugs, $\frac{1}{16}$ diam opening, can place the compression space each cylinder in open communication w the atm sphere, or can close the compress chamber, and are opened when the motor not working and the car is coasting down with the planetary speed change engaged, t making each motor cylinder act as either exhauster or a compressor, with the result perfectly controlling the descent of the with no application of friction brakes hills any grade or length. This motor air-br of course, avoids all friction-brake wear, as brake-shoe or bands are applied, and is v much liked by both Okey and the owner a driver of the one Okey runabout fitted w these air-cocks. The hissing of the air muffled by a branch pipe which takes cock-nozzles.

PURE AIR CHARGE WITH INJECTED FUEL

Okey is aware of the many advanta gained by discarding the carburetor a taking pure air only into the crank-box w no throttles in the side-pipes and carburiz the charge by injecting more or less fuel i the charge after it reaches the cylind This fluid fuel may be injected into the p air charge at varying points. Okey pref







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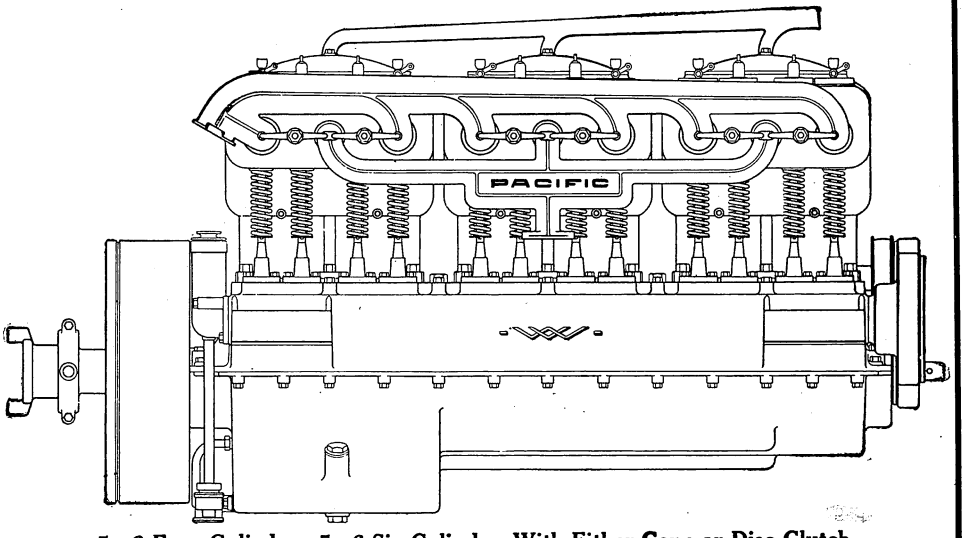
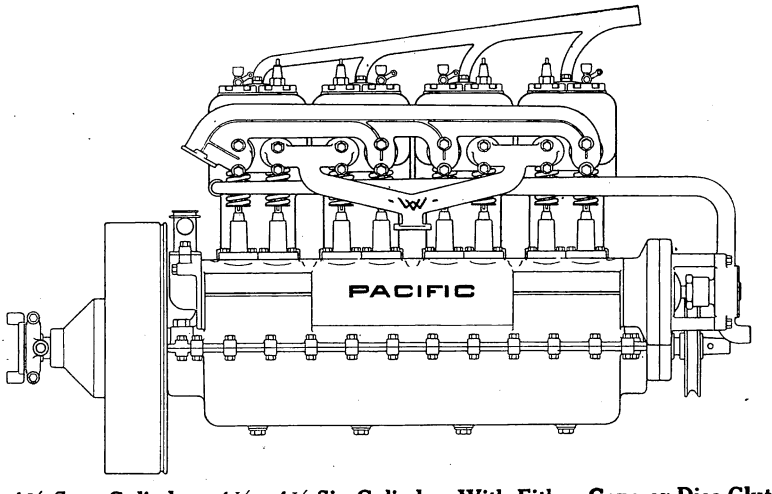
TWO NEW MODELS

PACIFIC AUTOMOBILE MOTORS

DURABLE—ACCESSIBLE



5 x 6 Four-Cylinder—5 x 6 Six-Cylinder, With Either Cone or Disc Clutch.



4¼ x 4½ Four-Cylinder—4¼ x 4½ Six-Cylinder, With Either Cone or Disc Clutch.

We also make one size air-cooled motor, 4¼ x 4½. All our motors are built with plain oil pan and driver for lubricator, or with self-contained lubricator in pan. Water-cooled motors equipped with magnetos. We make our cylinder and other castings. Can we make yours?

PACIFIC IRON WORKS, Inc.

Established 1853 **Bridgeport, Conn.**

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course this method of fuel supplying calls for variable delivery pumps or liquid fuel-feeders of some description.

The pure air charge can be of constant volume, and may be in excess of the cylinder capacity so as to scavenge the cylinder before

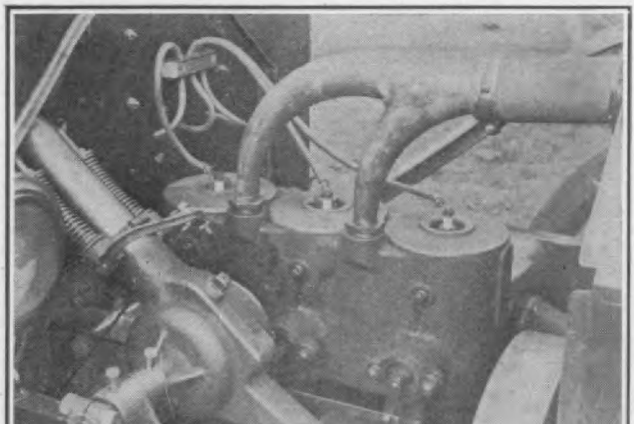


Fig. 7. Okey runabout, right side of motor and foot of steering post. The spark and throttle rocker friction is had by coiled spring pressure and fibrous washers, construction indicated by this illustration. Note the form of the water pipes to the radiator.

the exhaust port closes, and fuel injection can begin at any time after the ascending piston closes the exhaust port, and it is possible to internally air-cool a 2-cycle cylinder by passing cold air in sufficient volume through a port in the side of the piston and a short side-pipe into the cylinder out through the exhaust port. Any of the pure air charging methods ensures constant compression, which is highly desirable. The pure air charge with liquid fuel injection has been fully considered by Okey, who favors this method.

CONTROL.

There are two outside hand leverr, and one pedal on the foot board, with a plunger pedal for the muffler cut-out. The outside hand lever is pushed forward to apply the rear-hub ordinary brakes and is latched in forward position; when pulled to rear, it gives high speed forward.

The inside hand lever is pulled to rear for low gear, and pushed forward for the reverse, self-retained in both positions.

The one pedal is pushed forward to apply the emergency, line-shaft brake.

The steering action is Okey's design; a quadruple thread, 1 p. i., is cut on the top end of the steering column, 2 ins. dia. steel tube,

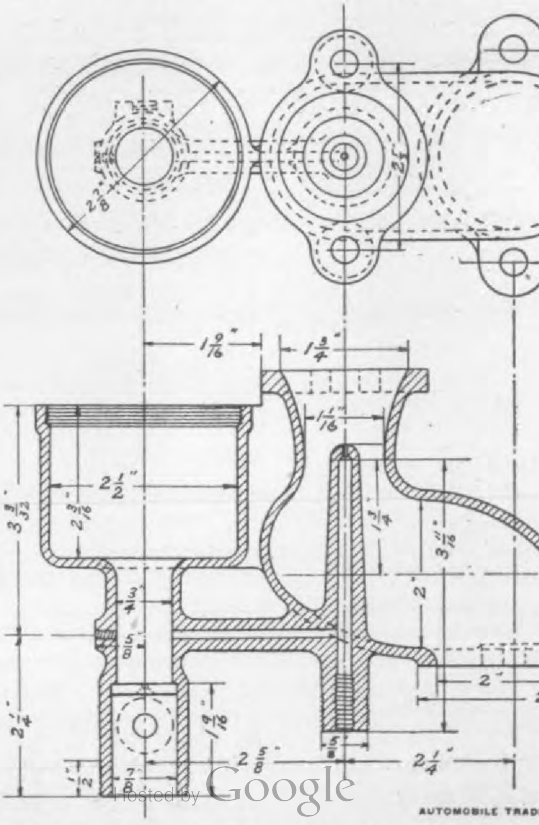
levers, one on each side, under the st wheel, which is 16 ins. diameter.

The steering action is not locked, bu friction and leverage are enough to p the front wheels from sensibly turnin steering wheel.

ON THE ROAD.

Tuesday, Jan. 7, an Okey Runabou the Okey factory, Homer Chandler dr Hugh Dolnar passenger, and proceed Franklin Park, 3 miles distant, where driven 38 laps on a $1\frac{1}{8}$ mile circular 44.33 miles, which with the 6 miles fro to the factory made a total of 50.33 The whole route was nearly level, over ment to Franklin Park track, which is smooth gravel. The level course and ci track were unfavorable to high mileage. 44.33 miles on the Frankiln Park circular were covered in 105 minutes. 3.08 g of gasoline were burned, giving 16.3 travel per gallon. The weight of the ca the two passengers up and tank full, wa lbs., giving about 21 ton-miles to the of gasoline. The time on the circular was 2.37 minutes to the mile.

The level course and circular track wer unfavorable to high mileage, as the had to work all the time. The best m



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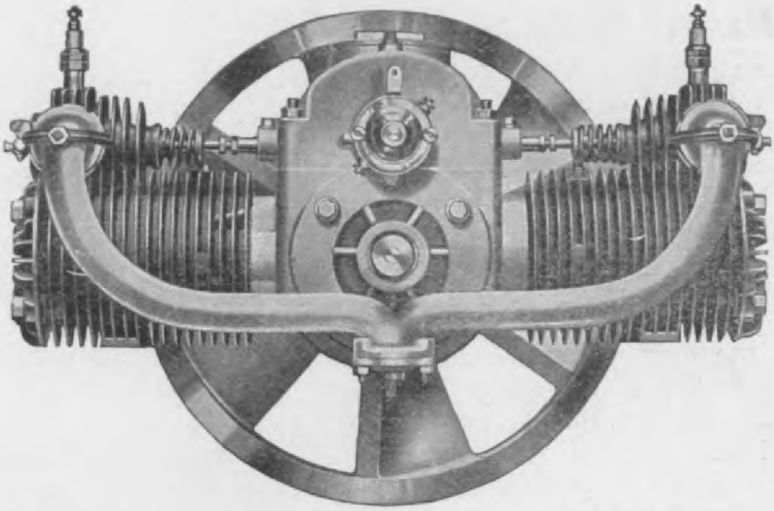
AUTOMOBILE TRAD

DeTamble Buggy-Type ENGINE

Prompt
eliveries



Attractive
Prices in
Quantities

Opens a Profitable Field For Automobile Manufacturers

The lack of a suitable, reliable engine, until this season, has greatly retarded advance of the buggy-type automobile.

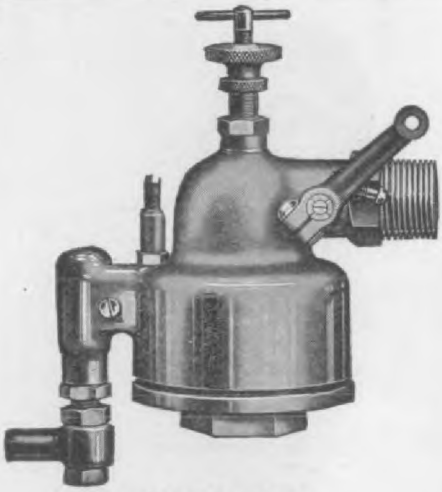
The success of the DeTamble assures immense progress in this new and ile field of automobile construction. Its heavy sales indicate that manufacers appreciate this.

It is a high-grade, carefully constructed ngine, perfectly balanced and free from viration. We strongly warrant each engine o deliver the rated power and keep cool. t is compact, powerful and thoroughly reable. Suitable also for any light runabout r light delivery wagon.

Specifications:—Two cylinders, 4 x 4, double opposed. Air cooled. 10-12 H. . (conservative rating). Weight including flyheel, 180 lbs. Overall dimensions, including spark lugs: length, 30 in.; width, 16¾ in.; depth, 19½ n.; depth without fly-wheel, 11½ in.

We also uild the amous

CARRICO *Air-Cooled* ENGINE



SPEED Carburetor

Positively Guaranteed to produce *greater* power, speed, flexibility and economy in the engine than *any other carburetor*, or purchase

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noise or perceptible vibration, the motor being at all times under perfect control by either spark or throttle adjustment. In fact, the performance of the Okey Runabout on this occasion was ideal in every particular, perfectly smooth propulsion, no noise and prompt

was 7 miles, but we had the circular t ourselves sometimes and the car better than 40 miles without a full ope the throttle. Mr. Chandler said it coul show 45 miles on a straight-away, fair

Another Maxwell Model

A new member has just been added to the Maxwell line. This new Model K Maxwell Roadster follows, in general construction, the Model D, whose chassis has been utilized with the minor modification of the frame arches, and the dash, which became necessary on account of the greater angle of the steering column.

THE MOTOR.

The motor is of the four-cylinder vertical four-cycle type, $4\frac{1}{4}$ x $4\frac{1}{4}$ ins., and the cylinders are cast separately, so that five main bearings can be used, the inner three of which are formed by the compartment walls of the crank case. Easy access to the connecting rods, main bearings, etc., is afforded by handholes, four of which are located on either side. The valve chambers and water-jackets are cast integral with the cylinders, and the valves are mechanically operated.

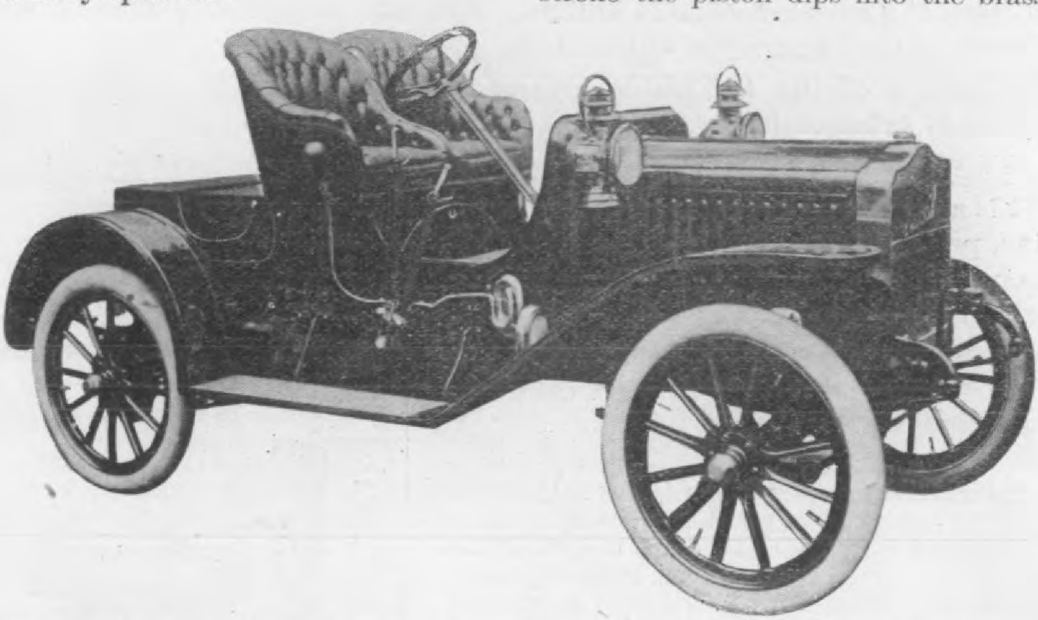
type, the gear sets being enclosed in tight case.

The drive is by shaft, and two cardan possessing the Maxwell self-oiling a ment, to a divided rear axle. A special bearing in the differential takes up side preventing at the same time all backlas

The frame is of pressed steel; tread 56 wheelbase, 96 inches; wheels, 32 inch

LUBRICATION.

Lubrication is effected by a positive feed oiler, in connection with which t automatic lubrication to the engine ca to the transmission. Rather novel manner in which the piston is given effective lubrication. The piston c bears at its lower end a grooved bra which holds a quantity of oil and i filled from the main oiler, with the o going into the crankcase. With every stroke the piston dips into the brass



Model K, 24 H. P. Maxwell, the latest addition to the Maxwell-Briscoe line. Motor $4\frac{1}{4}$x$4\frac{1}{4}$ inches, cy cast separately, three point motor and sliding change speed gear mounting. Shaft drive. Sheet metal body special folding chauffeurs seat of extra width. Ample carrying space is also provided under the rear dec a large tool chest is also incorporated in the construction. Wheel base 96 inches, wheels 32 inches. Equi two side lamps, one tail lam, tools, horn and tire repair kit. Price $1,750.00.

The three-point suspension, which has been a prominent Maxwell feature in the past, is retained, as also are the multiple-disc clutch, the single-unit construction of engine case and

and obtains in this way an even lubri around the entire circumference of the The lubrication is controlled through a feed located on the dash.

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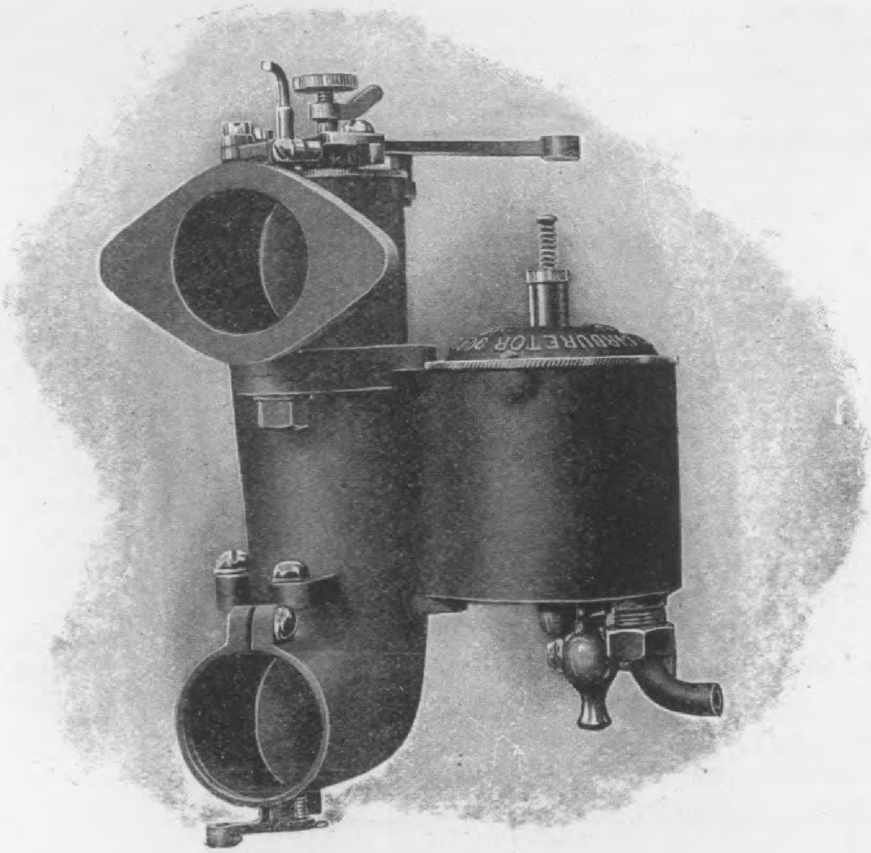
nder Favorable Conditions

most "any old carburetor" will produce the required mixture.
takes a REAL SCIENTIFICALLY CONSTRUCTED one
"make good" UNDER ALL SORTS OF CONDITIONS.
That is just what the

BUFFALO CARBURETOR

is made for.



It comes to your relief when you are about to condemn
very carburetor that was ever made. Let us demonstrate why
e BUFFALO is the one you want.

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out toward the hubs for the purpose of placing the entire load as near as possible to the point where the rear axle enters the wheel hub.

The brakes are similar to those used in Model D, the external one being a fibre-lined steel shoe of clam-shell pattern, hinged at the bottom, and the internal brake being pieces of well-seasoned hickory, boiled in oil.

The carburetor is of special Maxwell design, float-feed type, and provided with means for automatic compensation. Control of the spark is by a horizontal hand lever located immediately under the steering wheel, and a similar lever controls the throttle. Besides the throttle-control lever under the steering wheel a pedal is provided which also controls the fuel supply independent from the hand throttle.

BODIES.

All Maxwell bodies are made of sheet metal, with stamped mouldings, a construction as light as wood and stronger than aluminum, but not liable to breakage, since dents may be hammered out, while in the case of a paneled wooden body the substitution of an entire new panel is necessary to repair damage. The upholstery is of fine quality leather and hair.

The chauffeur's seat in the rear is of an unusually clever construction, more spacious than the customary rumble seat, and will accommodate two persons, if desired. This back seat may be folded down, and when in this position, leaves the car with a smooth rear deck under which ample carrying space may be found. A large tool chest is incorporated in the extreme rear of the deck, the hinge of the tool-box cover serving at the same time as the hinge upon which the rear seat folds up or down.

The equipment consists of two side lamps, one tail lamp, tools, horn, and tire-repair kit

Price, $1,750 f. o. b. factories.

Creditors In Charge of Knox Automobile Co.

Knox Automobile Co. of Springfield, Mass., is now in full control of officers elected by the creditors who accepted preferred stock in settlement of their claims. The officers are: Chas. L. Goodhue, president and treasurer; Wm. E. Wright, Vice-President; Chas. H. Beckwith, Secretary; Albert E. Smith, Assistant Treasurer. Alfred N. Mayo, the former receiver is on the board of directors. The factory was kept in operation by the receiver from the date of the assignment July 22, 1907, to February 1, 1908, when the new officers took charge. Five hundred thousand dollars worth of preferred stock was issued to the creditors. During the receivership the total sales of cars and parts amounted to $178,883 and the total income from all sources $232,368, while the total expenditures amounted to $224,000.

Albany Automobile Club's Tour

The Albany Automobile Club will hold its 1908 tour, beginning June 20, over the following route: Saturday (the 20th), Albany to Greenfield, Mass., 87 miles; Sunday, to Providence, R. I., 109 miles; Monday, to New Haven, Conn., 126 miles; Tuesday, to New York City, 80 miles; Wednesday, spent in New York; Thursday, to Waterbury, Conn., 92 miles; Friday, to Albany, 103 miles; total mileage, 597

Grout Reorganization

Grout Bros. Automobile Company, of Orange, Mass., has arranged with Mr. Rossell Drisko, late of the Bay State Automobile Co. of Boston, Mass., to take the position of manager of their factory. Mr. W. L. Grout, the wealthy sewing machine manufacturer of Orange has purchased the interest of his sons, who previously had charge of the automobile manufacturing business and has arranged with the new manager to enlarge the business which will include an aggressive selling campaign. This move, no doubt, will be of interest to Grout agents and owners who have been expecting a radical change in the affairs of the Grout Bros. Automobile Company.

Midland Motor Car Company Succeeds Deere-Clark Company

The Midland Motor Car Company, East Moline, Ill., has been incorporated with a capital stock of $100,000, to continue the business formerly carried on by the Deere-Clark Motor Car Company. The assets of the defunct concern were purchased for $35,000. The incorporators are C. H. Pope, A. E. Montgomery and E. H. Guyer.

Mr. Wm. E. Biddle, president and treasurer of the Biddle & Smart Company, aluminum-body builders, died recently at Amesbury, Mass.

H. W. Meyer of Auburn, Ind., until recently in the automobile department of W. H. Kiblinger Co., is now connected with the Zimmerman Mfg. Co. of Auburn.

E. L. De Camp, formerly with the Packard Motor Car Company, has recently taken charge of the Continental Tire Co.'s western interests. He will establish his headquarters at San Francisco.

The Maxwell-Briscoe Motor Company announces that the advertising details will hereafter be handled by Frank Seaman, Inc., 41 West 34th street, New York City, and that Mr. H. A. Grant is no longer connected with the company.

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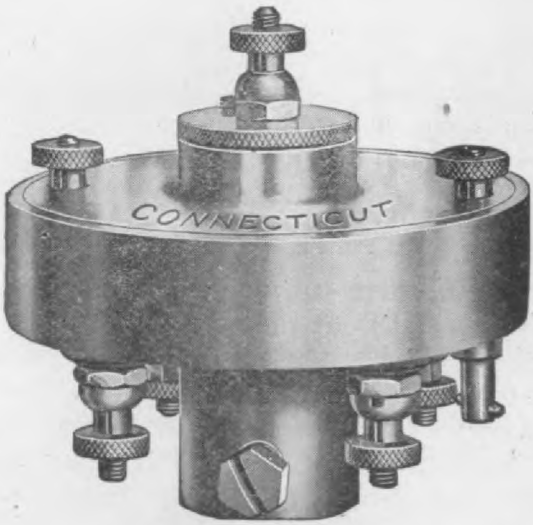
THE UNIVERSAL SATISFACTION

being secured from the use of

CONNECTICUT

COILS

Timers and other ignition appliances of the highest grade, makes it the most desirable line for dealers to handle. Get in line for early delivery, as the active demand is near at hand. Send for catalog No. 13-C.



The Connecticut Telephone & Electric Co., Inc.

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BRITANNIA ST. MERIDEN, CONN.

been made, chief of which is the making of the terminals non-corrosive. The manufacturer, Northwestern Storage Battery Co., Milwaukee, Wis., has made this improvement possible by the use of a special connection which conducts the current from one end of the battery to the other before it enters the binding post. This connection is buried and

The 1908 "Northwestern" Storage Battery.

completely insulated with a sealing compound that will stand 183° F. before running and is absolutely acid and water proof. All connections are solid lead-burned and none but the best materials are used in the construction. Another feature of the Northwestern batteries is that each battery is given three bench tests before leaving the factory to insure its being up to standard requirements. The jars containing the plates are made of hard rubber and are set in a nicely finished quarter-sawed oak case, which is put together without nails or screws, the joints all being dovetailed.

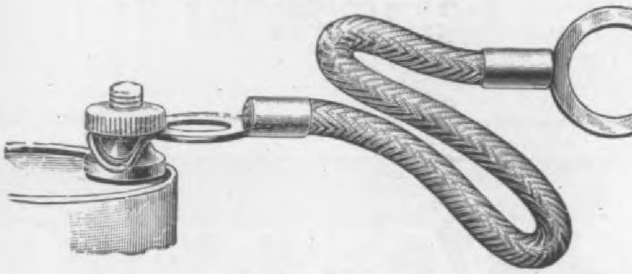
"Reliance" Volt and Ammeters

To meet the demand for a cheaper grade of switchboard instrument the Reliance Instrument Co., Chicago, Ill., has recently brought out a line of volt-meters and ammeters, one of which is here shown.

instruments have no permanent magn
can be made for alternating or direct c
All connections for wiring are placed
back unless otherwise ordered. A spec
count is given to the trade.

The "Snap-on" Battery Conne

One of the latest types of battery con
is the "Snap-on", recently placed
market by Barcy & Nicholson, 967 F
St., Detroit, Mich.



Bolton's "Snap-On" Battery Connector.

The illustration clearly shows its co
tion and the manner in which it is s
onto the binding-nut. The conne
made from high-grade spring brass.
claimed that it will not rattle off or
loose, and that it gives positive el
contact.

Delphos Oil and Gasoline Supply Oily Waste Cans, Etc.

The Delphos Can Co., Delphos, Ohio,
factures a line of galvanized sheet met
for oil, gasoline, etc. All Delphos ca
made of sheets that are galvanized a
nealed to this company's special ord
are all double-seamed top and bottom.
company's "Never-Leak" spout ca
made of heavy galvanized iron, hand-so
They are furnished in a large number o
Styles 65 and 65F are especially sui
motor-boat use as oil and gasoline suppl
These styles hold 5 gallons each and N
has a ½-inch solid brass lever faucet,
No. 65 is without faucet. They have
shaped heads at the apex of which are
1¼-inch cast screw-filler plugs with
washers. The Delphos oily waste ca
used in garages, machine shops, factori
They are made of 26-gage galvanized ir
have self-closing tops. Handles are pr
at the sides and heavy galvanized stra
feet at the base.

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BRUSH

Runabout

More people want, and ave the money to buy, the rush Runabout than any her car in America.

A Prediction: Inside of year, the single cylinder ertical will be as great a craze this country as it is now France and Europe.

The Brush is the first of e new style singles. Com- on sense always wins.

Brush Runabout Co.

Matheson

One Year Guarantee

The technical opinions of the best critics of Europe and America, reviewing the general tendencies of automobile construction in the world's leading cars, are given in a book we have just published and which will be sent to any address upon request. This book gives also **some unusually interesting letters of prominent men** of affairs who tell in their own words of the exceptional service qualities of their Matheson cars. These letters are especially instructive, as their authors represent the most experienced class of buyers who have, in many instances, abandoned their foreign cars for the Matheson.

Dealers

are wanted in all localities where Matheson cars are not now represented—write for our very attractive dealer's proposition.

Matheson Motor Car Co.

MAKERS

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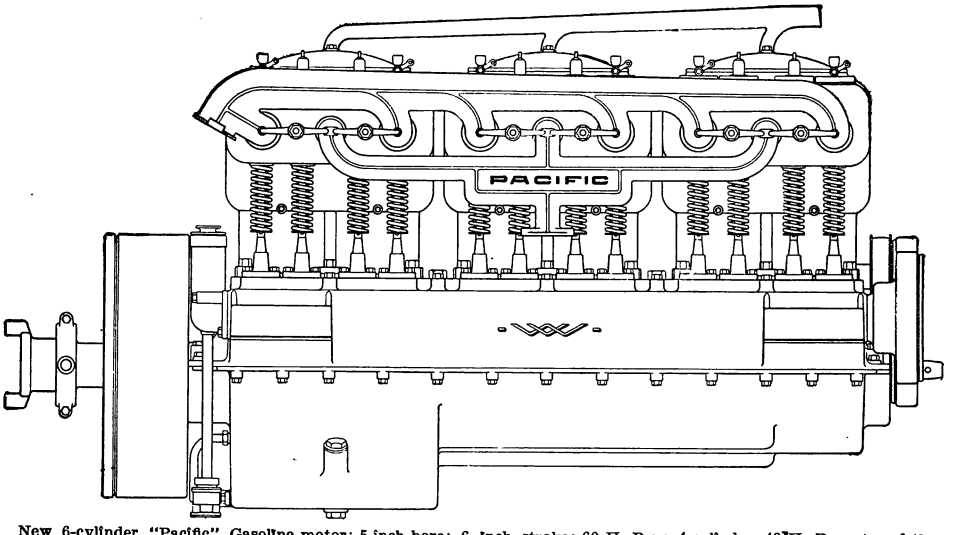
New 4 and 6 Cylinder "Pacific" Gasoline Motors

The Pacific Iron Works, Bridgeport, Conn., have recently brought out new model 4 and 6 cylinder motors designed by their engineer, William Van Wagoner. The new motors have five-inch bores by six-inch strokes, and are conservatively rated 40 and 60 horse power respectively. The connecting rods are 11 inches centre to centre, with crank shaft wrists and main journals 1⅞ inches diameter. The fly-wheel is 17 inches diameter by 5½ inches face, and is put on either by bolting to the flange of the crank shaft or forced on a taper seat on the crank shaft with key, lock nut and pin.

near the fly wheel, the lower end of this shaft being extended to drive the oil pump when one is used. This vertical shaft is driven by hardened steel mitre gears. The crank case and oil pan are aluminum alloy castings.

The crank shaft in the four-cylinder motor has five bearings, and in the six-cylinder seven bearings of Parsons' white bronze, flanged, finished all over, split, retained in position by both flanges and bodies of the bolts, which are screwed down hard on the brass liners.

These bearing bolts go up thru the crank case, the heads being between the cylinder flanges and support the working load, not depending on the rigidity of the crank case to carry the bearings. The



New 6-cylinder "Pacific" Gasoline motor; 5-inch bore; 6 inch stroke; 60 H. P.; a 4-cylinder, 40 H. P. motor of the same design has also just been brought out.

The cylinders are cast in pairs with the valves all on one side, and the cylinders, valve chambers and valve stem guides are all water jacketed. The cam shaft is driven from the crank shaft by hardened steel gears, no intermediate gear being used.

The pump and magneto on the left side of the motor are gear driven, also with hardened gears. The entire cam shaft with cams and bearings can be taken out without removing the main body of the gear case, and the pump and magneto drive shaft can be removed in the same manner.

Annular ball bearings are used on the cam shaft, pump shaft, magneto shaft and the intermediate gear driving the motor, as well as the bearings and yoke ring of the clutch are all ball bearing.

The valve lifters are plain, round, hardened and ground, the ends bearing directly on the cams and the valve stems, no cam rollers being used on any "Pacific" motors.

The timer, or distributor when used, is placed on the top of the vertical shaft

pistons, similar to those in all Pacific motors, have four eccentric snap rings with flat lap, and are all above the piston pin.

The water circulation is by a gear pump, mounted in the center of the shaft that drives the magneto, attached by finger-locked slip couplings that allow of its removal or replacement without interfering with the gear or magneto sections of the shaft. The entire water circulating system is so designed that opening one plug or valve at the cooler will drain the entire system, including the cooler.

The Jeffery-Dewitt Co. of Newark, N. J., have reduced the list price of their "Reliance" spark plug from $2.50 to $1.50, the large demand for this novel plug having reached such proportions that the increased output has decreased the cost of manufacture. This plug was described in our January issue, page 168 and attracted a great deal of attention at the recent shows by its ability to spark in water.

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HARLAND'S ENGLISH VARNISHES
DIEU ET DROIT
ESTABLISHED 1791

Harland's English Varnishes

Specially manufactured to meet the requirements of the automobile trade

Auto Body Finishing

Auto Gear

Auto Rubbing

hese varnishes have all the well known characteristics of our world re-
owned Coach Builders' Varnishes, with special drying qualities which
nder them unique in their value to automobile manufacturers. Their quality
standing up under the severe conditions to which they are subjected
unsurpassed.

WM. HARLAND & SON

FACTORY

MERTON LONDON S. W. ENGLAND

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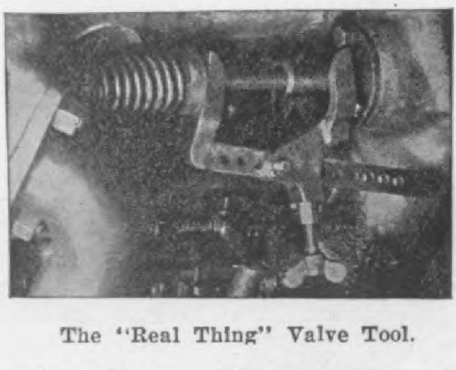
York City, has placed a new valve remover and replacer on the market which he calls the "Real Thing." It is quite simple in construction and is made of bronze. The forks can be widened or narrowed without breaking. It can be placed in position and operated with one hand and, it is claimed, can be conveniently used behind piping if necessary.

This tool consists mainly of three parts, a lever of right angle form (bored with a number of holes along the upright arm and forked at its upper end) and another forked member hinged to the first mentioned lever by means of a pin which can be placed in any one of the holes in



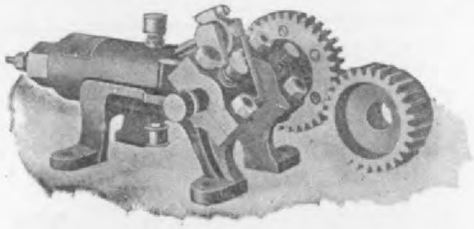
The "Real Thing" Valve Tool.

the upright lever. There is also a thumb screw in the lower forked member, the inner end of this screw bearing against the upright lever. To use the tool it is placed in position with one fork under the collar of the valve spring and the other fork resting on the push rod bushing, the two forks being properly distanced by moving the pin up or down in the upright lever. After this adjustment is made and the upper fork so placed that the cotter pin in the valve stem is between the fork prongs, the thumb screw is tightened up, thus bearing on the upright lever and pushing its lower end toward the engine, which increases the distance between the two forks and so compresses the valve spring, after which the cotter pin can be removed from the valve stem and the pressure on the valve relieved, allowing the removal of the valve. To replace the valve the above operation is reversed.

"Delpeuch" Tire Inflator and "Nightingale" Whistle

Several well designed automobile accessories have lately been introduced to the

made entirely of metal, even the p



The "Delpeuch" Tire Inflator.

being of metal and being provided three split piston rings. No packin used. The cylinder is bored and fini like a gas engine cylinder. Conne with the driving shaft of the car is by a split gear which engages with a ing pinion. Automatic lubricatio maintained by means of grease cups

A larger size is made for marine garage use. This larger size is of si design, but is fitted with a water ja

The "Nightingale" whistle is an important product of this concern produces a 6-note thrill, which, while ble at a great distance, is said to be monious and pleasing to the ear, not or screeching. When not being sou this whistle remains closed, excludin dirt and dust, and after each operatio automatically cleansed. It is attach the exhaust pipe by means of a co iron elbow, and may be operated hand pull, lever or pedal.

Excelsior Supply Co., 233-237 Ran street, Chicago, Ill., is now sole distri of the "Acme" anti-freezing solutio scribed in our February number, page

After much delay on account of terference, a very broad patent w sued February 4, to The Autocoil C 136 Seventh Street, Jersey City, New sey. Seventeen claims are allowed ering the feature of interchangeabil induction coils, which permits the re of any unit without disturbing the trical connections of the others. features such as the single and mu battery switch, etc., are also broadl ered.

The Factory Sales Corporation, N Randolph Street, Chicago, Ill., have appointed Sales Managers for the U States for the "Auto Cle" wrench a "Q & C" Standard automobile step by Quincy, Manchester, Sargent Chicago. Geo. T. Briggs, who has associated with the Quincy, Manch

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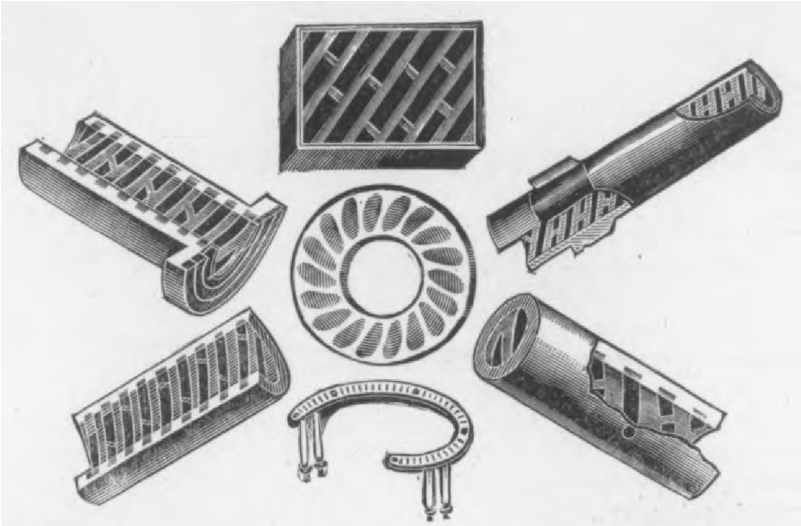
hite and bronze bushings and bearings



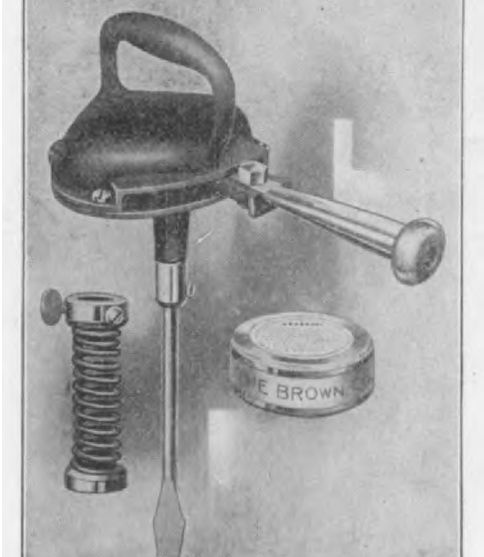
Group Illustrating Various Types of Graphite-Bronze Bearings.

many years, and for five or six years been furnishing this type of bushing to motor car trade. Our illustration shows ings for different kinds of work and variety of applications of this type of ing is almost if not entirely unlimited. vill be seen by reference to the illus- on, these graphite-bronze bushings are uced by milling rectangular grooves lain bronze bushings and filling these ves with graphite. The graphite pro- s lubrication, and further provision for cation is in nearly all cases unneces- . However, should more lubrication equired, a very little will suffice. It aimed that this type of bearing, by iding thoro and continuous lubrica- prevents wear to both shaft and bear- thus increasing their life and at the e time the smooth running obtained s power. The bearing surface pre- ed by these bushings is half metal and graphite. Very few stock sizes are ed, nearly all bearings being pro- d to order and made to specifications.

e "Brown" Valve Grinding Set.

e Brown Co., Syracuse, N. Y., has placed on the market a very complete e grinding outfit, consisting of a valve , a valve grinding tool and a box of ling compound. The lifter consists of avy brass spiral spring fitted at each with a bearing and a clamp fixture. nake it adjustable to various stem di- ers the clamp is provided with two crews, which when once set to fit are

simply constructed. It is operated by horizontal lever which allows easy manip ulation without interference with adjacen parts. The screw driver blade is give a semi-rotary motion thru the medium o a pinion and rack. The lever is operate



The "Brown" Valve Grinding Set.

with the right hand, while the valve i held to its seat with the left. The leve is removable, so that the device can b packed in small space. The tool is fin ished in black enamel and trimmings ar in nickel plate.

"C. O. T." Gum Gum, made by Chas. O Tingley & Co., Rahway, N. J., and de scribed in our November, 1907, number

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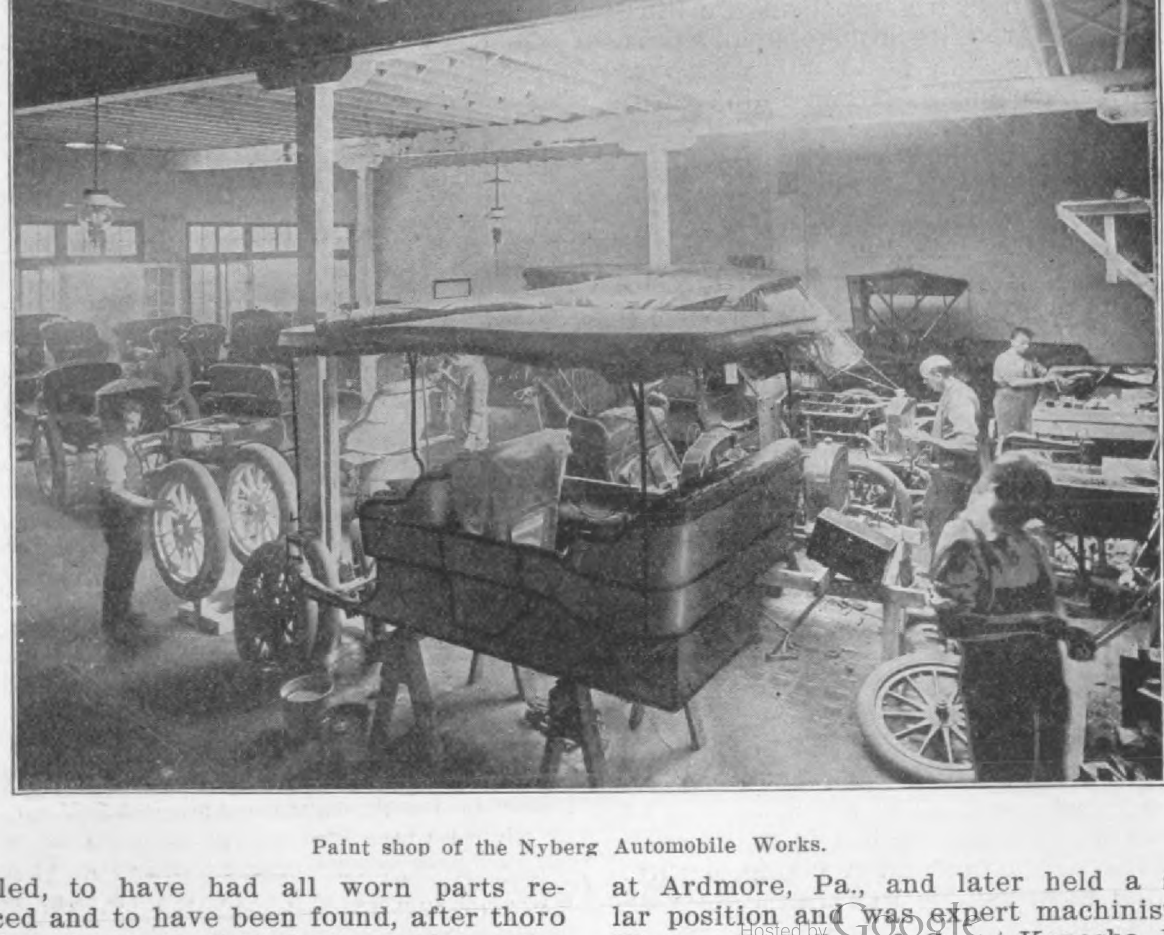
The Nyberg Automobile Works—Overhauls and Sells Second Hand Bars Under A Guarantee

A unique second-hand car business has een established at 2437-2439 Michigan venue, Chicago, Ill., by Henry Nyberg ho transacts business under the style, yberg Automobile Works. It is unique that every car sold is guaranteed to ave been selected with care and good dgment, to have been thoroly over-



Paint shop of the Nyberg Automobile Works.

auled, to have had all worn parts re-laced and to have been found, after thoro esting, to be in first-class running order ith no defects. A stronger guarantee

to supervise the reconstruction of and makes the guarantee valuable.

Mr. Nyberg is president and active erintendent of the Nyberg Automo Works and he has been connected with automobile business since its inceptio this country. In the early days he foreman of the Autocar Company's p

at Ardmore, Pa., and later held a lar position and was expert machinis Thomas B. Jeffery & Co. at Kenosha, makers of the Rambler cars. He has

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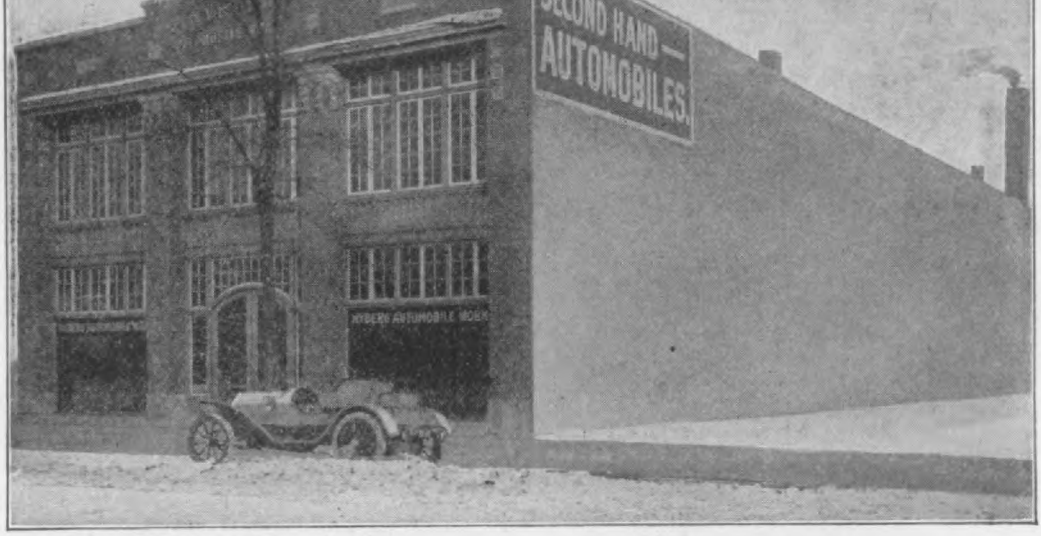
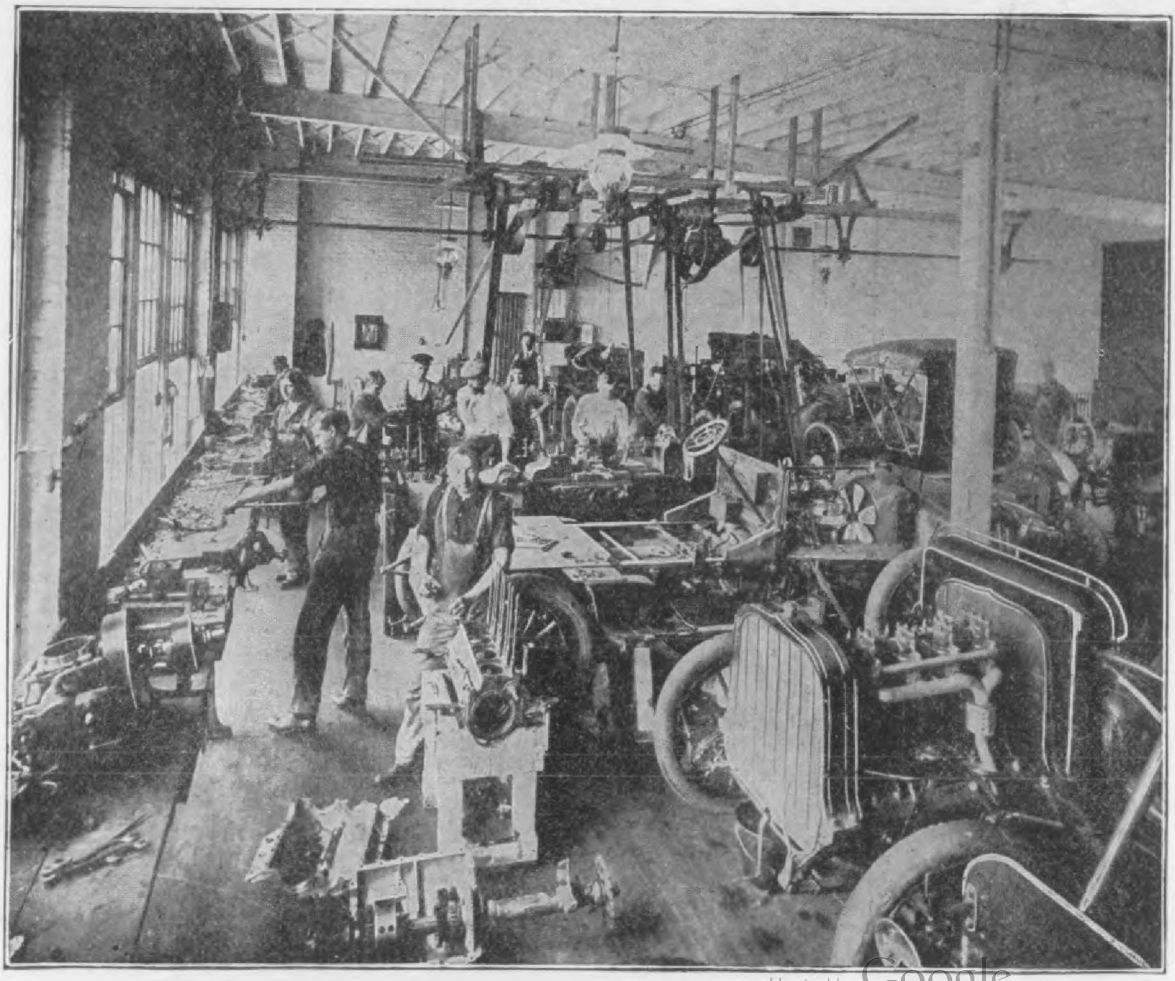


terior view of the Nyberg Automobile Works, where second-hand cars are overhauled and sold with a guarantee.

has been due largely to the fact that purchases only such cars as can stand rigid inspection and are therefore able of satisfactory overhauling. With pendable machine and are willing to sa rifice style and other immaterial featur for economy's sake. As the bodies of t cars sold by Nyberg are all re-finish



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rking on motors and change speed gears at the Nyberg Automobile Works in overhauling second-hand cars.

arts, every nut and bolt as well as every mportant piece of mechanism, are as ompletely dis-assembled as they were beore the car was originally assembled in he factory. Every part is then carefully xamined and bearings, working surfaces nd shafts are all critically inspected for efects. Defective parts are discarded and eplaced by new parts which are obtained n quantities from the various car makers nd kept in a large stock room a glimpse

The Nyberg company issues a catal every 30 days containing illustrat specifications and price of each car sale at the time. During the past ye has issued an average of 3,000 copies month, each one of which is sent to s one who specifically requests it. A l mail order business has been built up altho the Nyberg company are always to have prospective customers call an thru the plant, the fact that many tomers never see the plant nor the pe

Forging Department and New Parts Stock Room in the Nyberg Automobile Works. New parts, tained from the various car makers, are substituted for any that are too far gone for repair, so when a machine leaves the Nyberg Company's hands it is in first-class condition.

of which is given in one of the illustrations of the plant herewith. The forging department adjoins the stock room and is suggestive of the thoroness with which the overhauling of motor cars is done in this unique establishment.

The Nyberg company does not sell on commission and is not offering cars that have been taken in trade. It buys secondhand cars outright and, after putting them n condition, sells each one at a certain, definite, catalogue figure. Hence the pur-

back of it, attests the satisfactory se that is being rendered by correspond only.

The Nyberg plant contains over 2 sq. ft. of floor space. On the first is a salesroom in front, the offices i rear of the salesroom and, back of offices, the garage and washroom. A vator runs from this floor to the one a on which are the machine shop, b smith shop, stock room, assembly and ing room, woodworking department,

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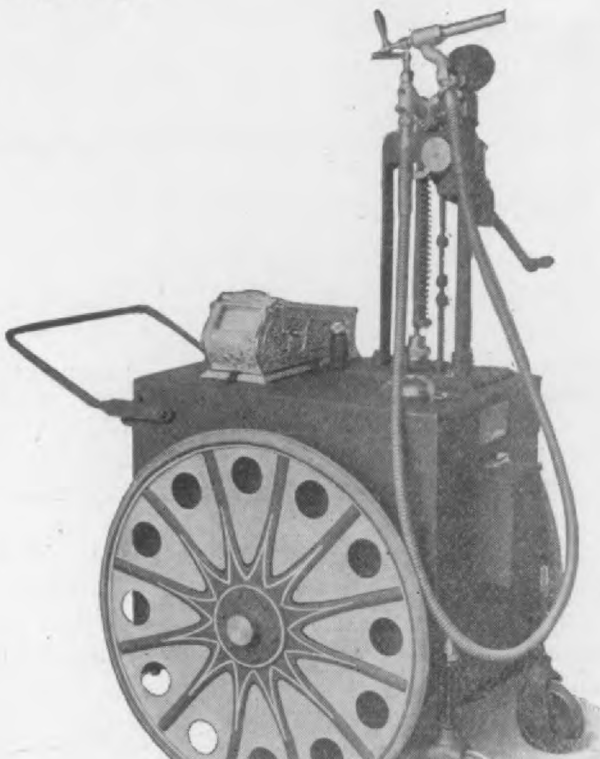
utomobile dealers thruout the state. several car manufacturers in Indian- is will also keep open house and efforts be made to get out-of-town dealers ring their prospective customers to anapolis. A parade will be held on opening day and a prize will be offered the town having the largest repre- ation in the parade exclusive of Indian- is. A hill climb, obstacle races and r contests will also be included in the ram for the week. On the closing night nner will be given.

Indestructible" Steel Wheels on Bowser Portable Tanks

F. Bowser & Co., of Ft. Wayne, In- a, manufacturers of the Bowser Port- Wheel Tanks which are now so ex- ively used in garages for filling auto s with gasoline, are now fitting these s with "Indestructible" Steel Wheels, e by Indestructible Steel Wheel Co., Michigan Avenue Boulevard, Chicago, ois. They have contracted for the pment of their entire output of tanks "Indestructible" steel wheels. These e wheels on the tanks enable one to e the tanks about very easily, and advantage.



Bowser Portable Tank with "Indestructible" Stee Wheels.

BROWN-LIPE GEARS

SELECTIVE AND PROGRESSIVE SLIDING GEAR TRANSMISSIONS

DIFFERENTIALS AND STEERING GEARS

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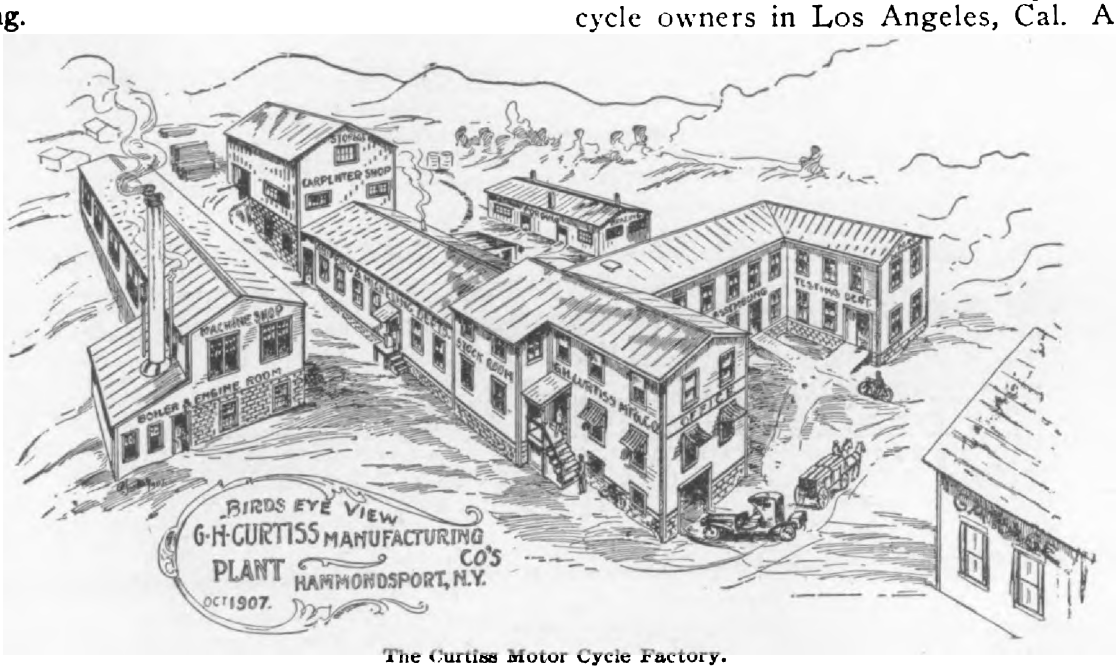
irect Factory Salesmen:—K. FRANKLIN PETERSON, 166 Lake St., Chicago. THOMAS J. WETZEL

Substantial Enlargement of Curtiss Motor Cycle Plant

The first building of the G. H. Curtiss Mfg. Co's. plant at Hammondsport, N. Y. was built n 1903 when the motorcycle business was conucted on very modest lines. The increase of he business has made it necessary to add to the acilities, until now the large plant here illusrated is in full operation and running 22 hours day.

There are 25,000 sq. ft. of floor space. The ffices occupying a central position and are conected directly with the stock and shipping ooms which occupy the lower floor of the main uilding.



The Curtiss Motor Cycle Factory.

The frame building, nickel plating and nameling departments are under this roof, as lso is the tin shop. The right wing is used for ssembling motorcycles, while the motors are ssembled in the wing to the extreme right.

Another addition is now in the course of contruction for a testing department. The forge nd brazing shops are in a separate building nd a very complete carpenter shop with power aws, etc. is attached in the rear.

The machine shop on the left is one of the ewest buildings. It is high, airy and well ghted. Its equipment consists of two rows

plied with steam power and heat from boiler room while there are auxillary eo ments of gasoline engines and ordinary s heating plants.

The Curtiss Company not only build its engines and frames but even the frame crank hangers and other small fittings are n in its shops, as well as the carbureter, gaso and oil tanks, handle bars, battery boxes, bags and belts. The plant as it now st has a maximum output of eight com machines per day.

The Leading Motor Cycle City

It is estimated that there are 3000 mo cycle owners in Los Angeles, Cal. A posted Eastern manufacturer of moto cles, to whom the figures were shown, that tho the statement seemed large, he no reason to doubt its truth. "Los Ang is unquestionably," he said, "the gre motorcycle city in the United States, a is probable that there are more mach there than in any other city in the w And next in order in this respect, co San Francisco. The reason is not har find. The Pacific Coast is the wheeln delight, with a season that literally lasts year around. There are more bicycle California cities, in proportion to their than in any other American cities, and

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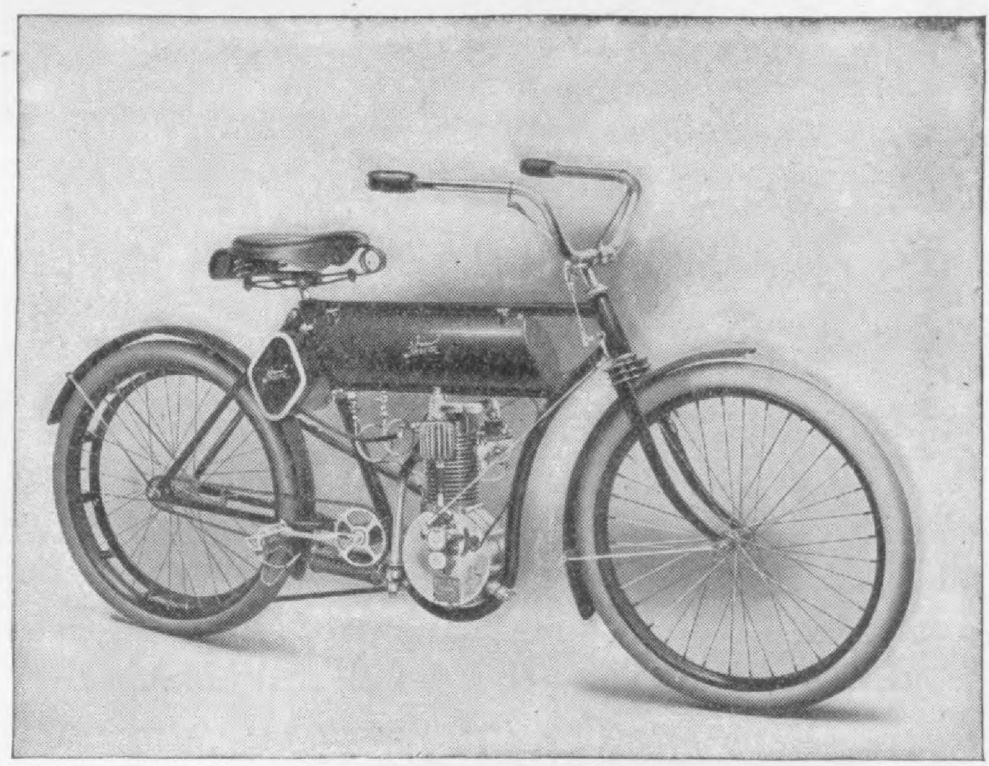
Minn., has turned to the making of plete motor cycles and has lately ed its first model on the market after extended period of development and ing. In order that it might devote its re energies to the production and mar- ng of the Thiem motor cycle, the em Company has disposed of its toe business to Stevens & Co. of 99 Cham- Street, N. Y. City, having previously ed over its grease cup business to Winkley Co. of Detroit, Mich.

ne Thiem motor cycle has a 20-inch ne of seamless steel, 16 gage tubing the wheelbase of model A is 52 es; of Model B is 54 inches long. Its dle bar is made of ⅞-inch seamless l tubing and double grip control is em- ed. Most of the joints in the control em are of the ball and socket type are adjustable. The right hand grip ances the spark, makes automatic tric connection and lifts the exhaust e. The left hand grip controls the ttle only.

special grey iron; have plenty of coolin flanges. The cylinder is finished by bo ing, reaming and then grinding to actu size, and to a true and smooth finis Piston and piston rings are accurate fitted and ground. Bushings are all mad from hard bronze, true to size and smoot Shafts, crank pin, piston pin and gea are all made from special steel and a hardened, ground and polished to a ve high finish. Gears are all made from th solid bar, or integral with the gear shaft there being no gears keyed on. The e haust valve is made from a nickel ste drop forging; receives heat treatment aft it is partly finished and final finish is b grinding the stem and seat. The exhau valve guide is separate and interchang able and has a radiator to keep the sprin cool. The connecting rod is drop forge of approved design and of ample size. Th intake valve dome has a guide and se for the intake valve and is self-containe and complete. Exhaust and intake valv springs are held in place by simple co



The "Thiem" Motorcycle.

ne motor rests in a neat loop formed he main frame tubes and is held by clamps at the base and one at the The horizontal cross tube, to which head of the motor is attached, ngthens the frame as well and be- en it and the top tube the heavy copper

lars and pins and can be removed withou the use of tools.

The motor base is made from speci nickel alloyed aluminum.

The timer case is made from hard bras the binding nut from steel and hardene insuring years of wear without wearin loose.

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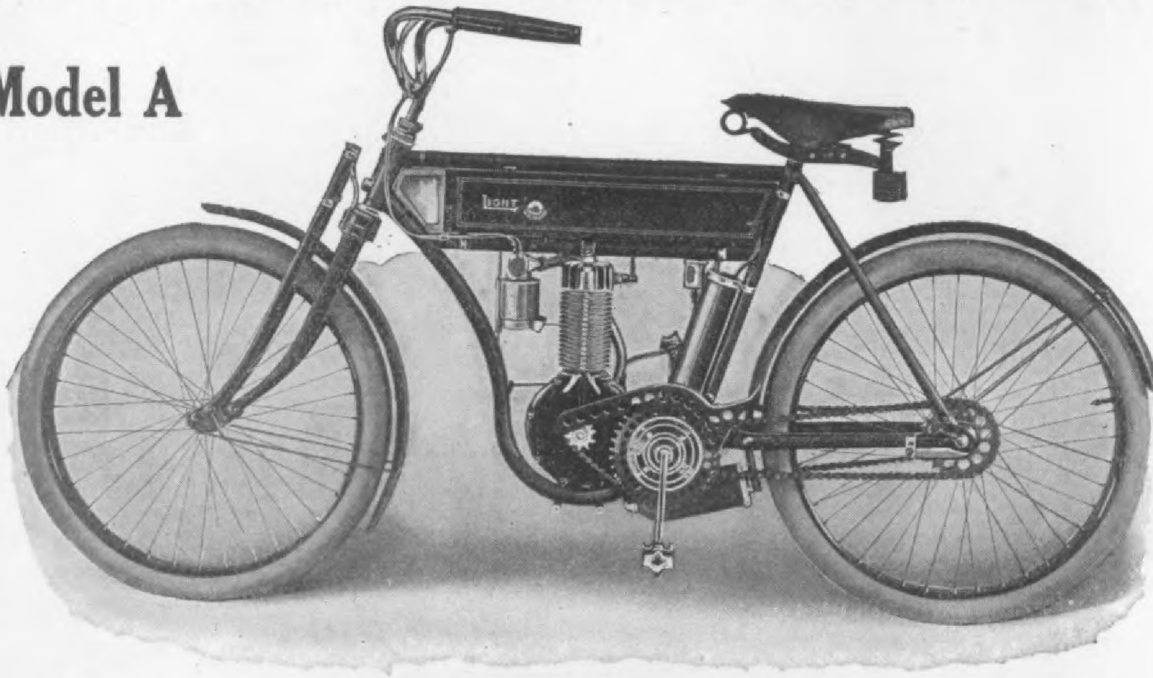
"LIGHT"

That Cannot be Hidden Under a Bushe

Model A



$185 $\frac{00}{100}$

IT'S PLAIN COMMON SENSE

That a customer will demand the "LIGHT" when *Quality* and *Price* are the factors. You can defy your competitors, *increase* your bank account and satisfy your customers by selling this wonderful machine.

WE CAN PROVE THAT *IT* HAS NO EQUAL

THE

LIGHT MFG. & FOUNDRY CO

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MOTORCYCLE DEPT.

The Dealer Who Has the

"LIGHT"

MOTORCYCLE AGENCY

HAS EASY WORK

With Greater Chances of Large Profits Than With Any Other Line

WHY?

QUALITY, PRICE and a COMPLETE LINE of Single and Twin Cylinders make it so. CHAIN and GEAR Transmission, Thor Motors, Thor Carburetters, Spring Forks, Up-to-date Frames, Double Grip Control, 5-8 Pitch Chains.

Model B

$225 $\frac{00}{100}$

THE

LIGHT MFG. & FOUNDRY CO.

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The equipment includes G & J or Dunlop tires, Morrow coaster brake, and front hub, Troxel, Persons or Mesinger saddle. Model A is fitted with a 2¾ H. P. Motor and lists at $175, while Model B has a 3 H. P. Motor and lists at $200.

The "Buffalo" Power Outfit for Motor Cycles

In response to the demand for a high grade, high powered motor set, the Auto-Bi Co. Buffalo, N. Y., are putting on the market their new set named the "Buffalo." This consists of a 3 H. P. motor complete tested ready to run, tanks, enameled ready to use, carburetor, belt, idler and handle bars ready to use. Other parts, less batteries and wheels, are furnished not machined.

The idea has been to keep down the cost and let the purchaser do the fitting himself. A complete set of working drawings is furnished with each set of parts. The entire outfit is guaranteed by the Auto-Bi Company.

Hendee Mfg. Co. has established a western branch for the sale of "Indian" motor cycles at 1251 Michigan Avenue, Chicago, with J. F. Fisher in charge.

The American Motor Co. Brockton, Mass., has opened a branch at 218 Clarendon Street, Boston, which has been phenomenally successful as more M. M. motor cycles were sold from the new branch in the first ten days than had been sold previously in Boston altogether.

Los Angeles Motor Cycle Club, Los Angeles, Cal., is a very active organization and at its last business meeting admitted ten new members, bringing up the total to 100. It claims to be the largest motor cycle club in the country, and to be the only one holding regular bi-weekly pleasure trips thruout the year.

"Minerva" Motor Cycles

The Geo. V. Lyons Motor Co., of 87th Street and Broadway, New York City, have secured the American agency for the Minerva motor cycle, a product of the Minerva Motors, Ltd., of Antwerp, Belgium. A full line of the four models, 2¾, 3½ single cylinder machines, and 4½ and 8 H. P. double cylinder machines are kept in stock. We show the 8 H. P. Racer herewith.

The engines on all models have mechanically operated valves. The single cylinder motors have the Eisemann high ten-

A separate luggage carrier and s included in the regular equipment. wheel base on all models with the tion of the 8 H. P. is 54 inches; on H. P. 56 inches. The round clearan all models is 4½ inches.

The 8 H. P. Model won the 1907 des Ardennes, the oldest Motor cycle sic of Europe. The distance of th dennes course is 108 miles, the ti

The "Minerva" 8 H. P. Racer.

the winning Minerva, 2 hours, 37 mi 33 seconds, averaging 40½ miles an on a hilly course. The regular 8 model is a duplicate of the Ard Racer, having a speed range of 10 miles an hour. This model weigh lbs. and lists at $350. The other models are illustrated in the cor motor cycle review in this issue.

FOREIGN AND DOMESTIC PATENTS

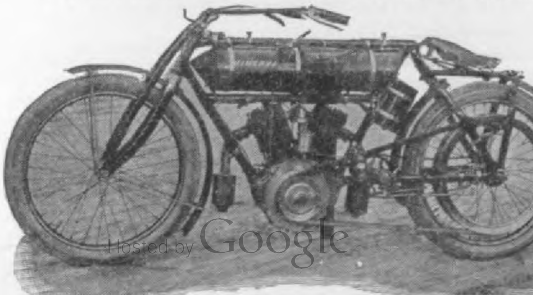
MAKE NO MISTAK

DEALERS AND JOBBERS, BE SU AND HANDLE OUR LINE.

SPONGE RUBBER GRI

MATTSON RUBBER CO., LODI, N

STANDARD OF EUROPE FOR SPEED AND RELIABIL



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To Be A Success In The Motorcycle Business, You Must Handle A Machine That Makes Good.

If you, as motorcycle dealer, want to extend your trade, you must sell a motorcycle that will prove so economical and satisfactory in every respect that your customers will recommend it to their friends and make sales for you.

The 1908 MERKEL

is just that kind of a machine. Its Spring Frame and extra long Wheel Base make it extremely easy to ride; its 3 H. P. Motor gives perfect satisfaction, and may be had with Magneto Ignition if desired.

"All roads are smooth on a Merkel, and every ride is a pleasure ride."

When you sell a Merkel, you boost your business.

It will pay you to write for information concerning the construction and record of this little giant motorcycle.

There is a cause for the phenomenal success which is greeting the Merkel at every turn. It is not a matter of chance that the Merkel sales are increasing relatively faster than those of its competitors.

The Merkel makes good—that's the reason

And because the Merkel makes good—stays sold when it is sold—you should investigate it.

But the Merkel does more—it makes new sales. Time and again, we receive orders which are due to no other salesman than the Merkels in every day use.

Remember to write for our illustrated catalogue.

Price, $210.00 With Spring Fork, $225.00

Magneto Ignition, $40.00 additional

You may become our agent if you are located in territory where the Merkel is not already represented.

MERKEL MOTOR CO., 1098 26th Ave., Milwaukee, Wis.

REPRESENTATIVES:

Pacific Coast: Ollier & Worthington, 1030 So. Main St., Los Angeles, Cal.

Brooklyn: John Pfleiger, 1604 Bushwick Ave., Brooklyn, N. Y.

New York, Jersey City and Long Island: E. J. Willis Co., 8 Park Place, New York City.

Cook County, Ill.: L. H. Whipple, 260 W. Jackson Blvd., Chicago.

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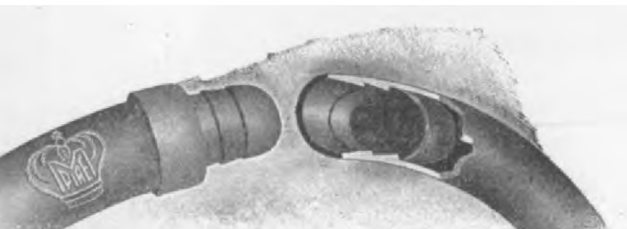
Empire Automobile Tire Co., Trenton, N. J., has lately added to its line a motor cycle tire which has been designed and is constructed for withstanding hard service. This tire is made to fit the regular clincher rim and is easily handled so that pinching the inner tube is not likely to occur. The prices for casings are $8.50 for the 26 x 2¼ size; $8.25 for the 28 x 2;

The "Empire" Motorcycle Tire.

$8.75 for the 28 x 2¼ and $10 for the 28 x 2½. These cases are furnished with standard weight gray tubes or extra heavy red tubes either in endless or butt-end types.

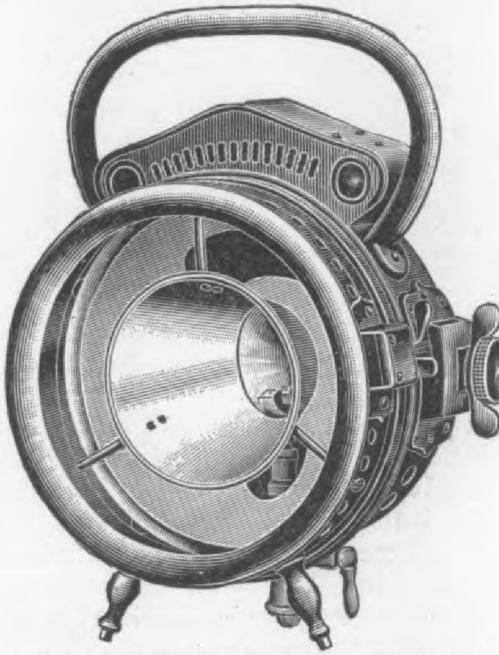
The butt-end tubes are new and are especially desirable for quick insertion without removing the wheel from the frame. These butt-end tubes have interlocking ends. Both the endless and butt-end tubes are furnished in two grades. The gray tubes are of standard thickness and weight and are made from fine Para rubber. The red rubber tubes are very



The "Empire" Butt-end Inner Tube.

much thicker, heavier and stronger as they are put thru a special process that prevents deterioration. Prices of the endless gray tubes range from $2.50 to $3.25

is an exact miniature headlight that be used on Motorcycles and small tou cars. The lamp is finished in either n or brass and is made of a special, but very strong metal so as to save we It is riveted thruout and will stand amount of shaking.



Motor Car Equipment Co.'s Imported Headlig Motorcycles.

It has a nickel-plated inside flange a small mirror lens, in the rear foc exactly in the centre and back of the ner. The light projected by this m passes thru an extra highly polishe cusing attachment and sends a pow magnified single ray while the refle around the inside of the lamp thr wide spreading ray. This lamp is o inches high, 4 inches in diameter an inches in depth and can be used carbide.

H. H. Thorp & Co., 1221 Michigan Chicago, sales agents for "Armac" m cycles, have put up seven prizes ra from $25 to $400 each which are t awarded to agents for being quick in ing 10 Armac motor cycles, the first going to the first agent disposing machines, the second prize to the dealer selling 10 machines and so These prizes are in addition to the re agents' commission and they will be tributed July 1, the contest ending 15.

Thirteen motor cycle makers, users dealers met in Chicago on Feb. 6 an cided upon the formation of a we

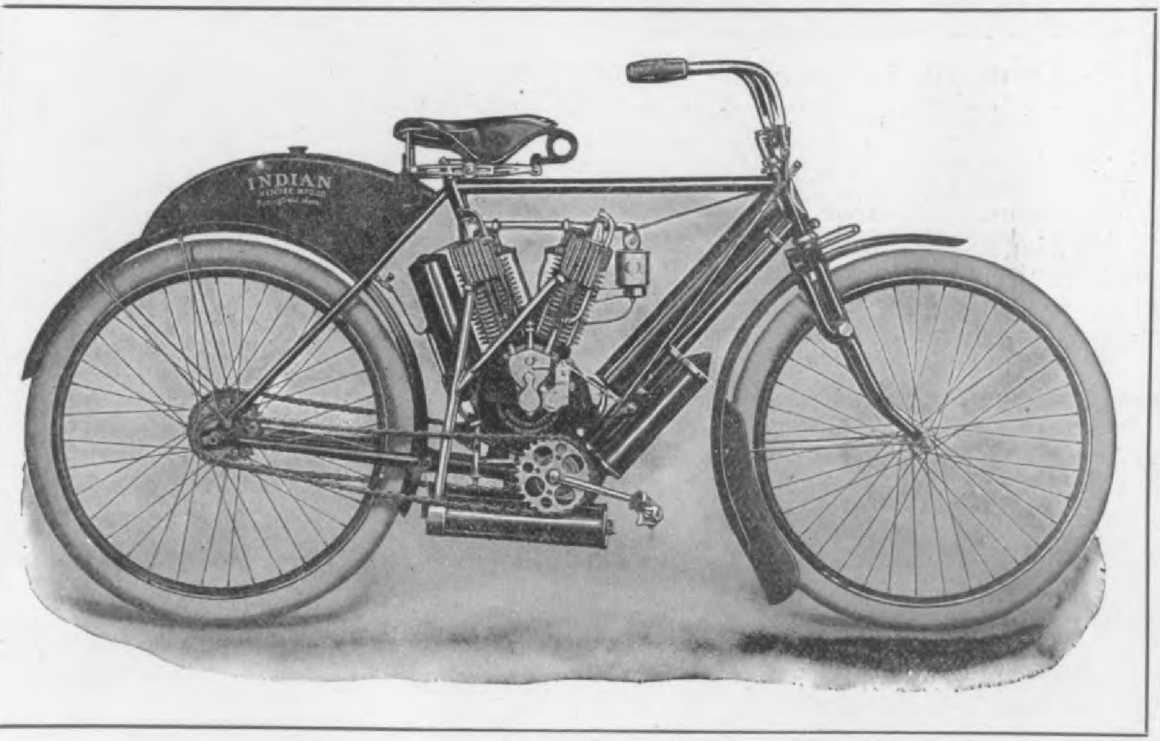
ONE HUNDRED A WEEK

We are now turning out one hundred of the

TWIN CYLINDER INDIANS

each week.

That will give you some idea of the popularity of this model, which has met with instant favor from motorcyclists all over the country.



TWIN CYLINDER INDIAN

5 H.P.—38.61³ Price, $250.00

THE TWIN CYLINDER INDIAN is just as much an improvement over the single cylinder model as the model six-cylinder car is over the four-cylinder auto. The even, smooth pull of the twin cylinders; the reserve power; the flexibility of control; the wide range of speed, —from very slow to as fast as is consistent with safety,—whether up hill, on a level, or in soft going; combined with the fact that it weighs only 10 lbs. more than the single cylinder model and is just as easily handled, make it ***the*** motorcycle of the year, and the "bright, particular star" of the INDIAN tribe.

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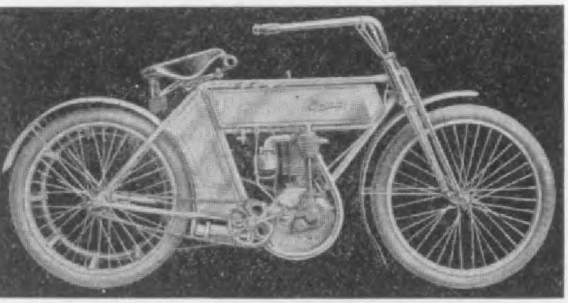
If you are interested in motorcycles, either as an individual or dealer, you

lustrations and Specifications of All Models of All Makes of Motor Cyc on the American Market for the Current Year

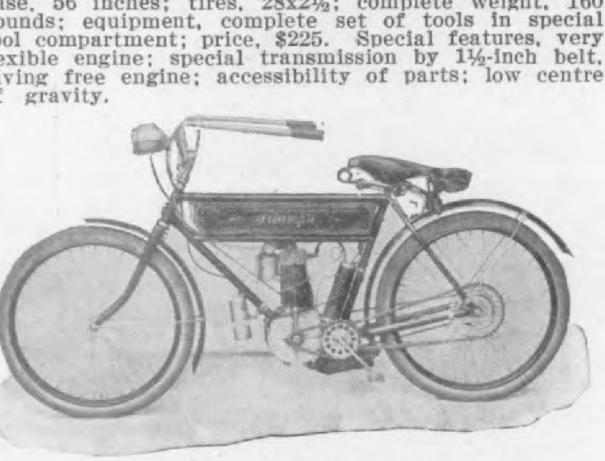
Excelsior Motor Cycles.

Made by the Excelsior Supply Co., Chicago, Ill.



EXCELSIOR MODEL A, MOTOR CYCLE, $225.

Excelsior Model A, motor cycle; Excelsior 3¼ H. P. otor, 3⅛x3½; frame of 1⅛-inch tubing, 21 inches gh; Excelsior forks; motor, vertical, hung low and rward; special carburetor; spark and throttle con- ol and valve lift from grip; Morrow extra wide akes; battery equipment 3 dry cells; fuel tank, 2 allons; oil capacity, sufficient for 600 miles; wheel ase, 56 inches; tires, 28x2½; complete weight, 160 ounds; equipment, complete set of tools in special ool compartment; price, $225. Special features, very exible engine; special transmission by 1½-inch belt, ving free engine; accessibility of parts; low centre gravity.



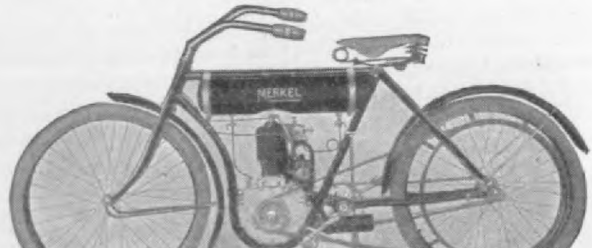
TRIUMPH MODEL B MOTOR CYCLE, $185.

Triumph Model B motor cycle; Thor 2¼ H. P. otor, 2⅝x3¼, placed in a vertical position and low the frame; frame 1¼-inch tubing, 20 inches high; ontrolled by throttle and spark and valve lift from rips; Thor brakes; solid forks; battery equipment, 3 ells; fuel tank, 5 quarts gasoline, 1 quart oil; 53- ch wheel base; tires, 2¼ inches; complete weight, 40 pounds; price, $185; special features, special bat- ery, accessibility, long handle bars, low seat so that et touch the ground.

1908 Excelsior motor cycles described in our De- ember, 1907 issue. Page 294.

1908 Merkel Motorcycle.

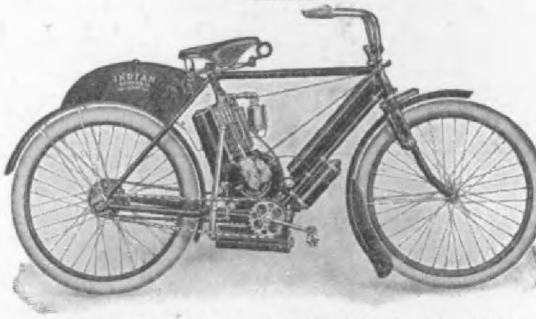
ade by the Merkel Motor Co., 1098 26th Ave., Mil- waukee, Wis.



inches; tires, 28 by 2¼-inch front and rear; high sion magneto at $40.00 extra; drive by 1⅛-incl 2-ply belt. Described in our December, 1907, page 304.

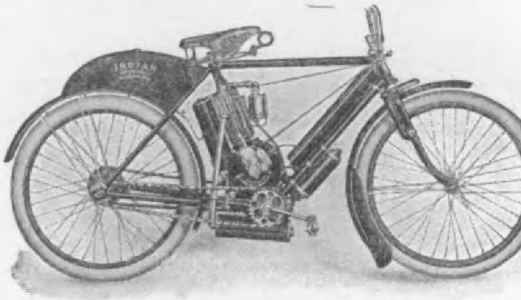
Indian Motor Cycles.

Manufactured by the Hendee Mfg. Co., Spring Mass.



INDIAN MODEL 19.30, 2¾ H. P., $200.

Indian 2¾ H. P. motor cycle; weight, 125 frame height, 22 inches; frame of seamless tubing; Indian cushion front fork; Brooks saddle 4; Hedstrom motor, 2¾x3¼-inch, 2¾ H. P.; clamped by seat mast; Hedstrom improved carbu double grip control; Corbin brakes; Indian specia tery equipment; fuel tank capacity, 5 quarts; oil 1 quart; wheel base, 51 inches; tires, front and 28x2¼-inch G & J; distinctive features; mechan operated inlet valve, oil gage at base of motor. $200. Magneto ignition, $40 extra.



INDIAN 3½ H. P. MODEL 26.96, $225.

The Indian 3½ H. P. motor cycle; weight com 130 lbs.; seamless steel tube frame, 22 inches cushion front forks of Indian type; Brooks s size 4; Hedstrom 3½ H. P., 3¼x3¼-inch motor, cl to the seat mast; double grip control; Corbin special Indian battery; fuel tank capacity, 5 q oil tank, 1 quart; 51-inch wheel base; tires, fron rear, 28x2¼-inch G & J; distinctive features chanically-operated inlet valve; oil gage at ba motor. Price, $225. Magneto ignition, $40 extr

INDIAN 5 H. P. TWIN-CYLINDER, MODEL $250

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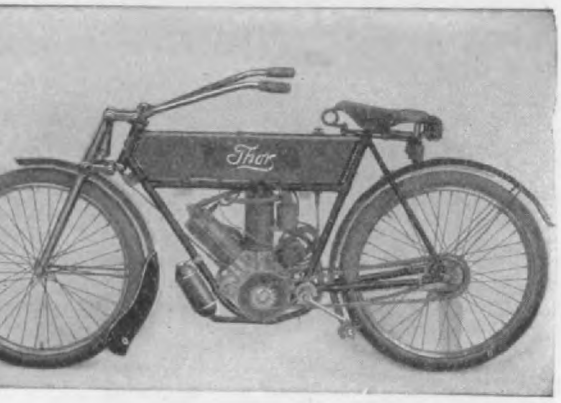
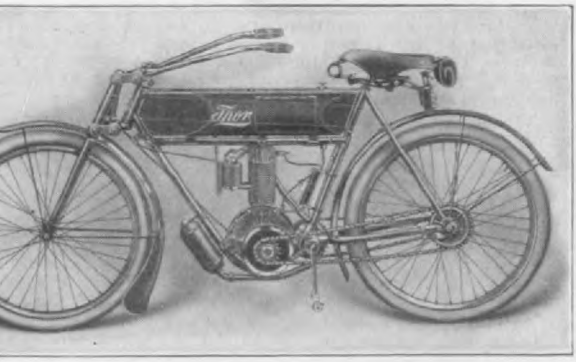


THOR MODEL 8 C. $300.

r Model 8 C; weight, 170 lbs.; 21½-inch frame, ⅝-inch, 14-gage tubing; Thor cushion front fork; n's saddle; 5 H. P., 2¾x3¼ Thor motor, in loop ame; Thor carburetor and brakes; double grip ol; 1½-gallon gasoline tank; 2-quart oil tank; l base, 52½ inches; G. & J. tires. Distinctive re: ball-bearing geared transmission. Price, $300; eto, $60 extra.

THOR MODEL SEVEN. $200.

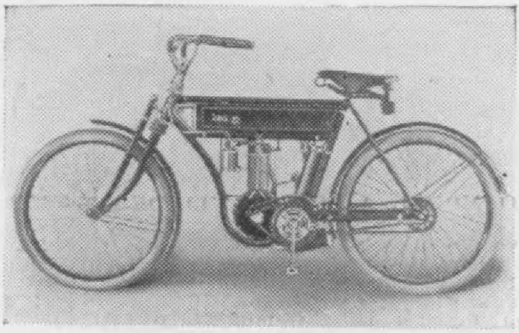
r Model Seven; weight, 110 lbs.; 21-inch frame, ⅝-inch, 16-gage tubing; Aurora cushion front Person's saddle; 2¼ H. P., 2⅝x3¼ Thor motor, l diagonally in frame; Thor carburetor and s; double grip control; fuel tank capacity, 5 s; oil tank capacity, 1½ quarts; wheel base, 5? s; equipment, G & J tires, rubber motor cycle s, full complement of tools; price, $200. Dis- ve feature: Battery case arranged so that one y is in receptacle in front and two tandem in



THOR MODEL 8 B. $250.

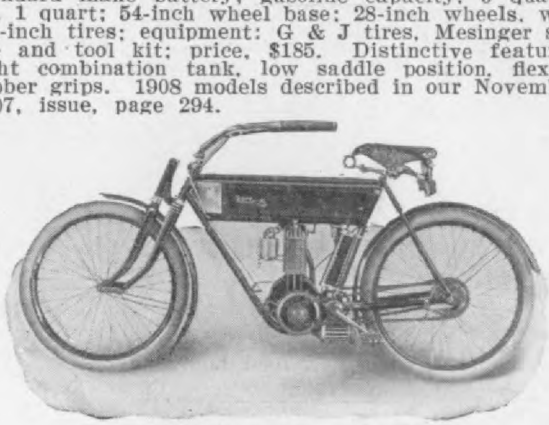
Light Motor Cycles.

Manufactured by the Light Mfg. and Foundry Co Pottstown, Pa.



LIGHT MODEL A. $185.

Light Model A; 22-inch loop frame of 1¼ and 1½ inch tubing; Yesitisa front fork, Mesinger saddle; 2 H. P. Thor motor, vertical in loop; 2⅝ bore, 3 stroke; double grip control; Thor coaster brake; ar standard make battery; gasoline capacity, 5 quart oil, 1 quart; 54-inch wheel base; 28-inch wheels, wit 2¼-inch tires; equipment: G & J tires, Mesinger sa dle and tool kit; price, $185. Distinctive feature light combination tank, low saddle position, flexib rubber grips. 1908 models described in our Novembe 1907, issue, page 294.

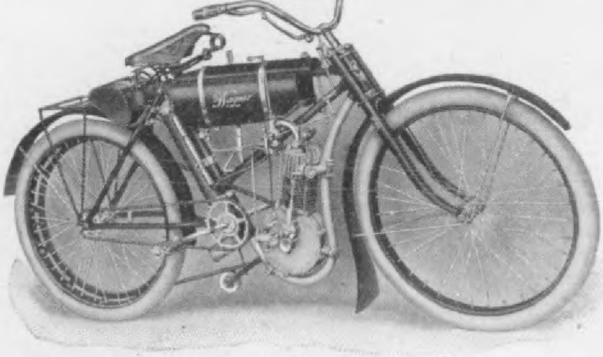


LIGHT MODEL B. $225.

Light Model B motor cycle; complete weight, 1 lbs.; 1¼x1⅛ tubing; frame height, 22 inches; fran of loop type; Yesitisa front forks, Person's saddl 3¾ H. P. Thor motor, 2¾ by 3¼, motor placed ve tically in loop; double grip control; Thor coast brakes; any standard make battery; gasoline capacit 5 quarts; oil, 1 quart; wheel base, 56 inches; 28-inc wheels, 2¼-inch tires; equipment: G & J tires ar complete tool kit; price, $225. Distinctive feature gear drive, combination tank, long V handlebars ar low saddle position.

Wagner Motor Cycles.

Made by the Wagner Motor Cycle Co., St. Paul, Min



WAGNER NO. 6 1908 MOTOR CYCLE. $200.

Wagner No. 6 1908 motor cycle; weight, 135 pound 20-inch frame of Shelby seamless tubing; Perso or Mesinger saddle; 3 H. P., 2¾x3 inch Wagner m

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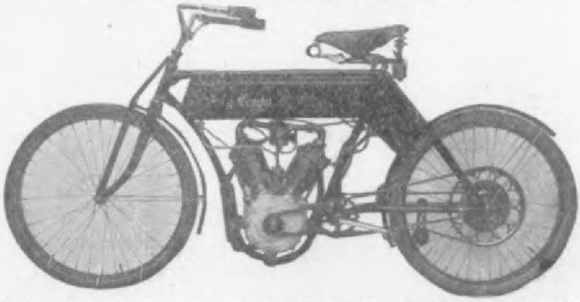
AYO MODEL A SINGLE-CYLINDER MOTOR CYCLE, $175.

Mayo Model A Single-Cylinder Motor Cycle; 2¾ H. ., 2¾-inch bore, 3¼-inch stroke; price, $175; weight, 00 lbs.; 22-inch frame; Mayo cushion front fork; erson's saddle; 1⅛x14 and 16-gage tubing; motor laced forward with frame; Mayo carburetor; grip ontrol; Corbin coaster brake; battery equipment, 3 olumbia standard dry cells; 9-pint gasoline tank and -pint oil tank; 55-inch wheel base; tires, 28x2¼ ches front and rear; complete tool equipment.



AYO MODEL B DOUBLE-CYLINDER MOTOR CYCLE, $275.

Mayo Model B Double-Cylinder Motor Cycle; 5 H. ., 2¾-inch bore, 3¼-inch stroke; price, $275; weight, 25 lbs.; 2-gallon gasoline tank; all other specifications same as for Model A.

Mayo 1908 models described in our February, 1908, sue, page 170.

Reading Standard Motorcycles.

Made by the Reading-Standard Co., Reading, Pa.

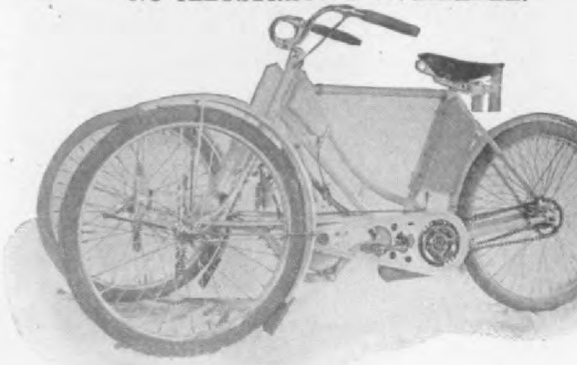
-S. MODEL A, SINGLE CYL. MOTORCYCLE. $200.

R-S. Model A., single cylinder motorcycle; price 200; weight 145 lbs.; frame height 22-inch; 1⅛-inch nd 1¼-inch tubing; R-S cushion fork; Persons, Trox- or Mesinger saddle; 3-3½ H. P. motor; 2 15-16-inch ore by 3¼-inch stroke, placed in line with seat mast t an angle of 20 degrees; double grip control; R-S arburetor; Corbin, Bell and Morrow brakes; 3 dry ell battery equipment; 5-qt. fuel tank and 1-qt. oil

R-S QUICK DELIVERY MOTOR TRICYCLE.

R-S Model D, twin cylinder 6 H. P. Motor 2 15-16-inch bore by 3¼-inch stroke; 54-inch base; 22-inch frame; weight 165 lbs.; price $2 all other specifications same as for Model C.

NO ILLUSTRATION AVAILABLE.

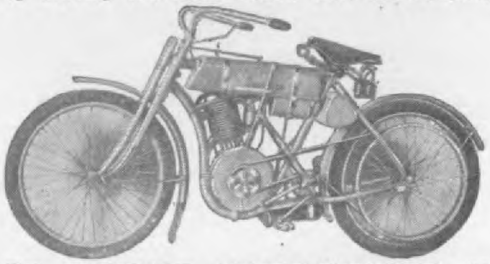


R-S, MODEL E, TRICYCLE. $290.

R-S Model E, Tricycle for lady or gentleman; $290; weight 190 lbs.; height of frame, 21 inche 1¼ and 1¼-inch tubing; 56-inch wheel base; al er specifications same as for Model A. 1908 mode scribed December, 1907, page 293.

Harley Davidson Motorcycles.

Made by Harley Davidson Motor Co., Milwaukee.



HARLEY DAVIDSON SINGLE-CYLINDER M CYCLE, MODEL N, $210.

Harley Davidson Model M Single-Cylinder Cycle; price, $210; weight, 148 lbs.; 20-inch f tubing, 1¼ inches, 14 and 16-gage; Sager s cushion front fork; Person's motor seat; moto H. P., 3⅛-inch bore and 3½-inch stroke, plac loop of frame; grip control; coaster brake on wheels; battery equipment, 3 No. 6 dry cells gallon fuel tank and 1-quart oil tank; wheel ba inches; tires, 28x1½ inches front and rear; belt Special features: extra wide mud guards of s design, large muffler with cut-out, low frame. ment, leather toll case and full set of tools.

HARLEY DAVIDSON TWO-CYLINDER MOTO CLE, $275.

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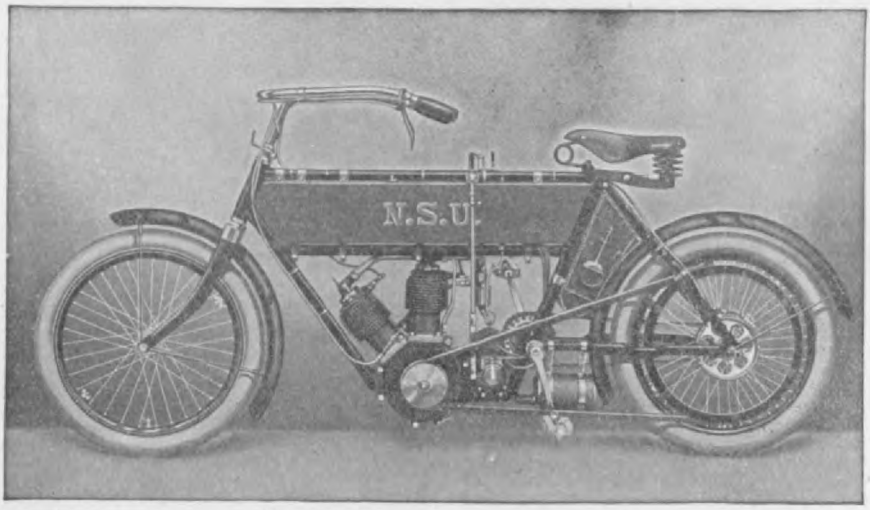
What Does N. S. U. Stand For?



The N. S. U. Motor Cycle represents the product of many years' experience, and its merits are known in all parts of the globe.

If you are desirous of getting a real comfortable and reliable machine for 1908, you should decide upon the N. S. U.

N. S. U. stands for Perfection in Motor Cycle Construction

There Is "Nothing So Unique" In the World

Our 1908 Models are now ready for immediate delivery. Write for particulars.

N. S. U. Motor Company

206 West 76th Street, New York

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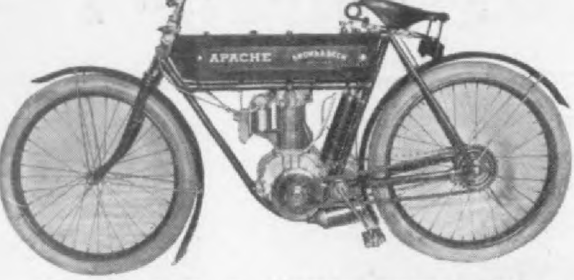
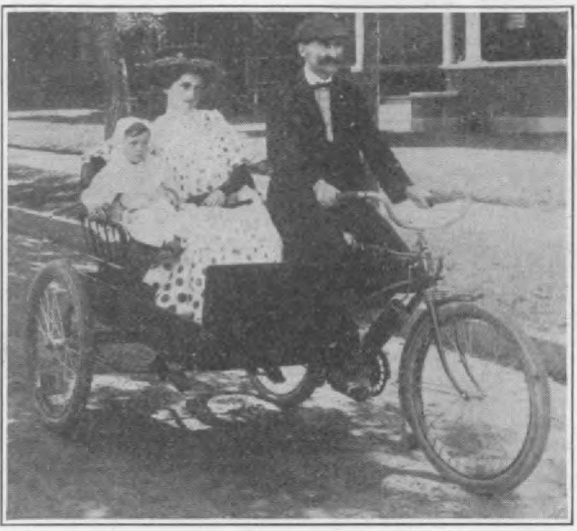


APACHE 3 H. P. MOTOR CYCLE. $225.

Apache 3 H. P. motor cycle; Thor motor; Apache yle frame; Thor spring forks furnished at extra st; Persons American motor cycle saddle; automatic rce feed lubrication; Thor coaster brake; 2½-inch G J tires and rims; 52-inch wheel base; 2 gallons soline, ½-gallon lubricating oil in single tank; ig-tion, jump spark from three dry cells; double grip ntrol; special internal gear transmission, doing ay with short chain from motor to front sprocket. ice, $225.



APACHE, WITH BUGGY ATTACHMENT, $300.

Apache buggy attachment; seamless steel tubing; ood body; upholstered cushion seat; leather dash; rrying capacity, 200 lbs.; finish in dark blue; price the machine with this attachment is $300.

Thiem Motor Cycles.

Made by the Thiem Mfg. Co., Minneapolis, Minn.

THIEM MODEL A MOTORCYCLE. $175.

Thiem Model A motorcycle; complete weight, 134 s.; 20-inch seamless tube frame; Troxel saddle; hiem 2¾ H. P. motor, situated vertically in a low sition in the frame loop; 2¾ bore, 3-inch stroke; hebler carburetor; spark and throttle control; Mor-w brake; battery equipment, 3 No. 6 Columbia cells; el tank capacity, 1½ gallons, oil tank, 1 qt.; wheel

Made by the Fowler-Manson-Sherman Cycle Mfg. 4345 Fulton St., Chicago, Ill.

MANSON SINGLE CYLINDER MOTORCYCLE.

Manson single-cylinder motorcycle, price weight, 130 lbs.; 21-inch frame; Shelby tubing, and 1¼-inch; Sager cushion front fork, with ened bearings; Persons motor seat; 3 H. P. Thor tor, 2¾-inch bore, 3¼-inch stroke, placed vertic three-point suspension; Thor carburetor; double control; Thor brakes; 3 standard dry cell battery e ment; 11-pint gasoline tank and 2-pint oil tank; inch wheel base; tires, 28 by 2¼-inch front rear; distinctive features: extremely narrow gas and battery tank; independent chain adjustment; frame construction, wide mud guards; equipmen & J tires, Standard rubber pedals, shock abso grips, tools and tool roll.

MANSON PLEASURE SIDE CAR. $65 EXTR

Manson side car for pleasure purposes; 28 by 2¼ G & J tires; steel mud guards, leather cushion; be attached or detached in 5 minutes time and be adjusted for country roads and city street standard gages; price $65 extra.

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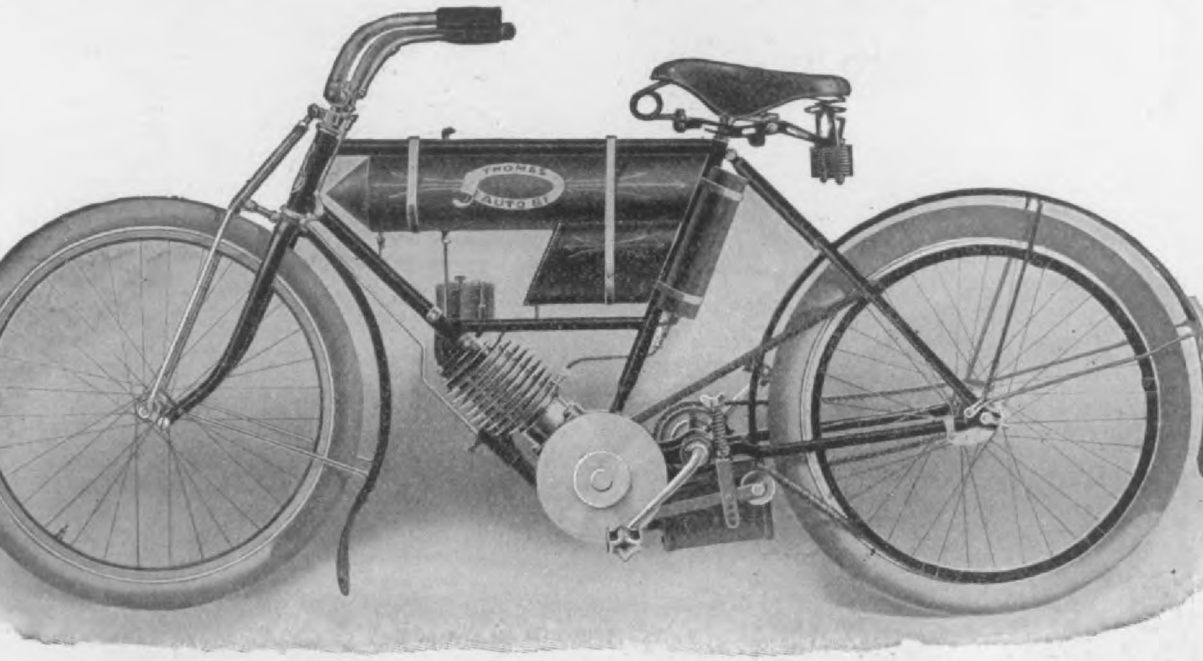
THE AUTO-BI



A Successful Motor Cycle

Should have plenty of power to climb hills easily.

Should have a practical (tried and tested by the public) method of transmitting pow n engine to rear wheel.

Should have a grip control which will not tire the wrists by hanging on to a loose gri yet be under the instant control of the rider.

Should be equipped with an auxiliary exhaust port to keep motor cool, and add ver and speed, by getting rid of exhaust gases quickly.

Should have motor hung as near the center of machine as possible and very low to ma chine steer easily and so the rider does not have to *straddle a hot motor*. Motor should ced as near horizontal as possible so that explosive force and vibration is exerted on a li n momentum of machine and rider, thus doing away with vibration.

Motor should have solid forged crank shaft *hardened and ground* to *size* (all automobil one piece shafts; why?) inside of motor should be easily accessible without removi tor from frame. Cases split horizontally, as in the Auto-Bi, allow this.

Truss spring cushion forks are indispensable for safety and comfort.

It should be equipped with flusher valve for easy starting at all times.

It should have ample tank capacity for touring purposes.

It should present a graceful pleasing appearance with each part in harmony and bu the particular purpose to which it is put.

A SUCCESSFUL AGENT

Will insist on securing a motorcycle which includes each of the above features. T assure him of a machine which will be easily sold, and will stay sold, and a motorcy ch he can recommend and build up a business with.

A SATISFIED CUSTOMER

The buyer of the 1908 Auto-Bi will get a machine that is guaranteed for the year. It , comfortable, powerful, speedy, can be easily controlled by the novice, and is a stric

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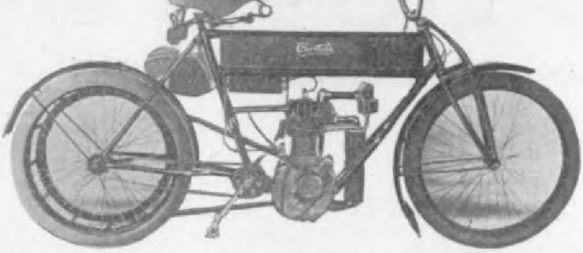
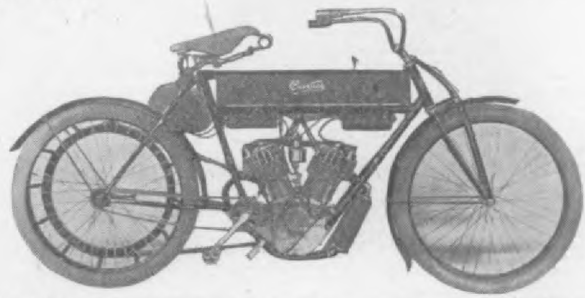
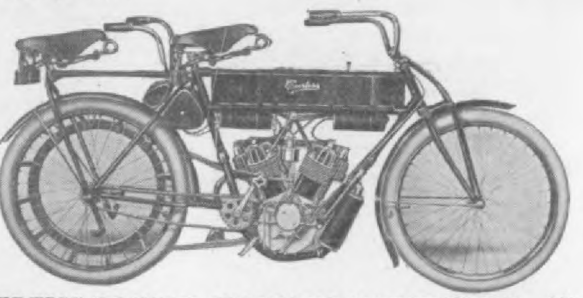


URTISS SINGLE CYLINDER MOTORCYCLE. $200.
Curtiss single-cylinder 8 H. P. motorcycle, price 200; weight, 125 lbs; 20 or 22-inch frame; tubing ¼-inch; Persons motorcycle saddle; cushion front rk, $5 extra; cylinder, 3¼-inch bore and stroke, aced vertically; Curtiss carburetor; double grip con-ol; special Morrow coaster brake; battery equip-ent, three standard dry cells; 2-gallon gasoline tank; gt. oil tank; wheel base, 58-inch; 2¼-inch tires ont and rear; patented 28 degree mineral tanned elt; glass oil gage incased; magneto ignition at $40 xtra; roller bearing engine thruout; equipment in-udes No. 3 Standard rubber pedals; G & J or Good-ch tires.



URTISS DOUBLE CYLINDER MOTORCYCLE.$275.
Curtiss double-cylinder motorcycle; 6 H. P.; weight, 50 lbs.; price $275; frame height, 20 or 22-inch; 1¼-ch tubing; cushion front fork, $5 extra; Persons im-roved saddle; bore and stroke, 3¼-inch; cylinders aced at 50 degree angle; double grip control; Curtiss rburetor; special Morrow coaster brake; three Stand-rd dry cells, battery equipment; wheel base, 58-inch; ¼-inch tires front and rear; roller bearing engine thru-ut; patented 28 degree mineral tanned belt; glass oil ge incased; magneto ignition at $40 extra; equip-ent includes No. 3 Standard rubber pedals; imported arburg tires.



URTISS DOUBLE CYLINDER MOTORCYCLE. $290.
Curtiss double-cylinder motorcycle, price $290; eight, 160 lbs.; 22-inch frame; other specifications me as the $275 machine. Curtiss 1908 models de-ribed in our December, 1907, issue, page 289.

1908 Erie Motorcycle.

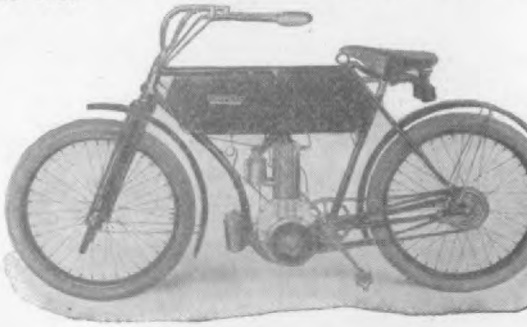
ade by the Motorcycle Equipment & Supply Co., Hammondsport, N. Y.

cushion, front fork, $3.50 extra.

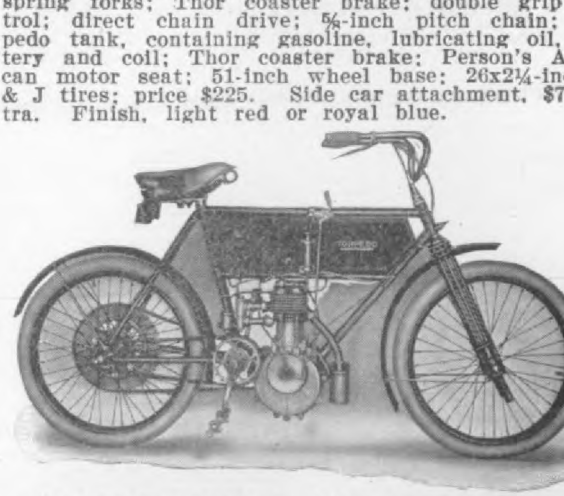
Torpedo Motor Cycles.

Made by the Hornecker Motor Mfg. Co., Whiting,

TORPEDO MOTORCYCLE MODEL B. $190
Torpedo Model B, motor cycle; 2¼ H. P.; w 125 pounds; seamless steel tube frame; doubl bar; low loops; Torpedo patent spring fork; E imported saddle; bore, 2 19-32 inches, stroke 3¼ i Thor coaster brake; battery equipment, 3 sta dry cells; double grip control; transmission, c chain drive on compensating sprockets; ⅝-inch chain; Thor coaster brake; Torpedo tank, co ing 5 quarts gasoline, 1 quart oil; wheel bas inches; tires, 26x2¼ clincher; price, $190. F light red.



TORPEDO MODEL C., $225.
Torpedo Model C, 3 H. P. motor cycle; w 125 pounds; bore, 2¾ inches; stroke, 3¼ inches; pedo low loop frame, height, 20 inches; To spring forks; Thor coaster brake; double grip trol; direct chain drive; ⅝-inch pitch chain; pedo tank, containing gasoline, lubricating oil, tery and coil; Thor coaster brake; Person's A can motor seat; 51-inch wheel base; 26x2¼-in & J tires; price $225. Side car attachment, $7 tra. Finish, light red or royal blue.



TORPEDO MODEL D, MORTOR CYCLE, $2
Torpedo Model D motor cycle, 4 H. P. Antoin tor; bore, 3⅜; stroke, 3¼; motor hung low, 5 i from the ground; Torpedo spring forks; exhaust and throttle from handle bar; direct chain dri compensating sprocket, ⅝-inch pitch chain; To 3 in 1 tank, holds 1½ gallons gasoline, 1 quar 3 standard size batteries; Thor coaster brake;

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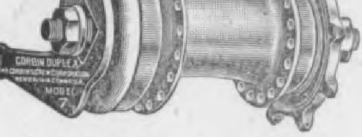
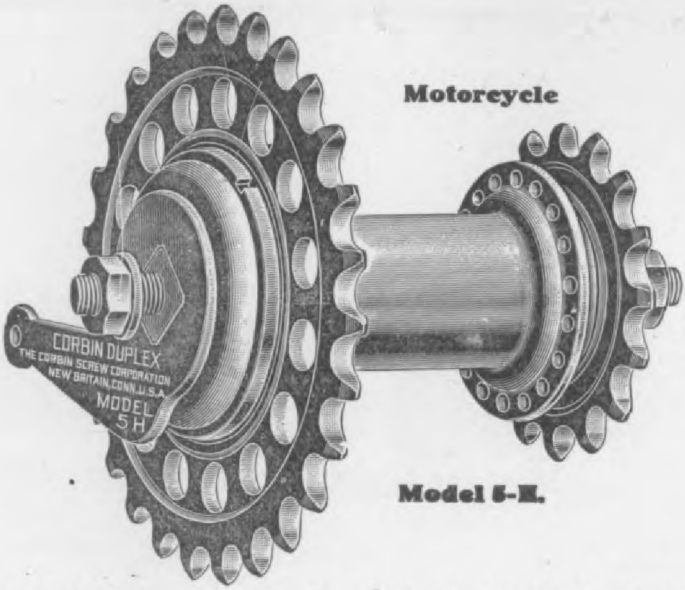


1908

Corbin's Duplex Brake. **Corbin's Two-Speed Brake.**

CORBIN HUBS



Motorcycle

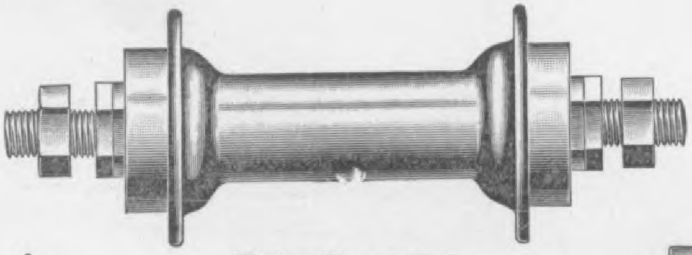
Model 5-H.

Any size Driving Sprocket ⅝ or 1 inch pitch Spoke Holes, button-holed on drive ide allowing the replacement of spokes without taking wheel from frame or emoving driving sprocket.

Driving Sprocket is fastened by six lugs that fit corresponding slots in hub shell.

NO STRIPPING OF THREADS

Made in Three Widths for either Belt or Chain Drive Motorcycles.
Heavy Front Hubs to match.



Motor Front Hub.

Front Hub.

Plain Rear Hub.

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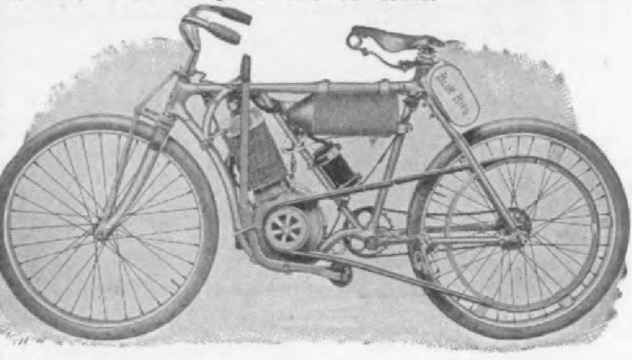
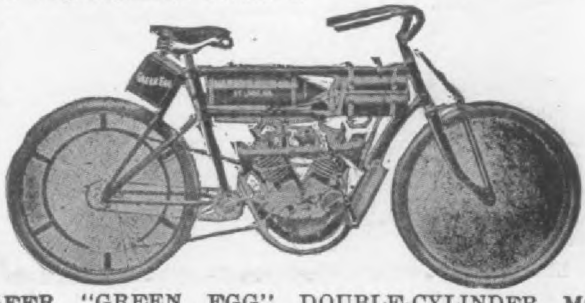
nd stroke; Schebler carburetor; lever control; Corbin uplex brakes; 2-gallon fuel tank and 1 qt. oil tank; heel base, 52-inch; equipment: steel mud guards and ool roll, with complete set of tools.



EER "BLUEBIRD" SINGLE-CYLINDER MOTOR-CYCLE. $200.

Geer "Green Egg" double-cylinder, 5 H. P. motor, -in. bore and stroke; weight, 155 lbs.; grip control, bat-ery or magneto ignition current; 1½-qt. oil tank; 6-inch wheel base; V-belt; truss fork enameled reen; price, $225.00; other specifications same as for e single-cylinder Model 4.

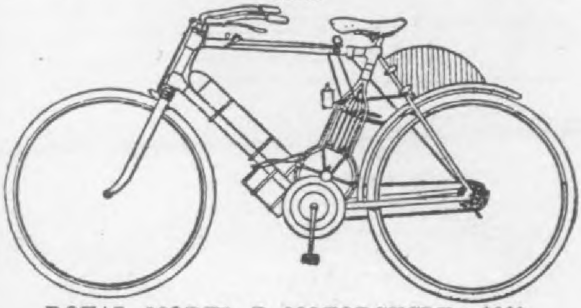


EER "GREEN EGG" DOUBLE-CYLINDER MO-TORCYCLE. $225.

Geer Model "Bluebird" motorcycle; single-cylinder, H. P., 3½-inch bore, 4-inch stroke; 22 or 24-inch ame; 1¼-inch tubing; 1½-gallon gasoline tank; wheel ase, 55 inches; V-belt; price, $200; weight, 140 s.; other specifications the same as for Model 4.

Royal Motorcycle.

ade by the Royal Motor Works, Suc. Worcester, Mass.



ROYAL MODEL B MOTORCYCLE. $200.

Royal Model B Motorcycle; price $200; weight 135 s.; V-belt drive; height of frame 23 inches; Shelby amless steel tubing; double straight front cushion rk; Persons American Motor Seat; 2¾ H. P., 2¾-inch re by 3¼-inch stroke, single cylinder motor, placed inclined position in frame; double grip spark and rottle control; Morrow coaster brake; 3 standard y cells; 6 qts. gasoline tank and 200-mile oil tank! ½-inch wheel base; 28 by 2¼-inch double clincher ont and rear tires; equipment, complete tool kit in ersons top-bar tool box. Described November, 1907, ge 292.

Armac Motor Cycles.

ade by the Armac Motor Co., 472-478 Carroll Ave., Chicago, Ill.

Armac Model A Motor Cycle; price, $200; weight,

ARMAC MODEL A MOTOR CYCLE. PRICE $2

tion; weldless steel tubing; V-belt, patented rim, fork crown double steering post; 26x2½ tires are furnished on option; the standard are black and dark blue; any other color can be plied.

ARMAC MODEL B MOTOR CYCLE. PRICE $2

Armac Model B; same general construction as A, with the following exceptions: Weight, 138 wheel base, 52 inches; Model A has the old s of drip feed oiling while Model B has the oil res on the rear upright tube and a force feed pun provide positive lubrication. Both models list at

Auto-Bi Motor Cycles.

Made by the Auto-Bi Co., 1453 Niagara St., Bu N. Y.

AUTO-BI MODEL 47. PRICE $210.

Auto-Bi Model 47; price, $210; weight, 140 frame, 21 inches high; tubing, 1¼ inches; Auto-B ent spring truss front fork is fitted; Persons motor seat; 3 H. P. motor; 3¼-inch bore and st motor is incorporated as part of lower frame float feed carburetor; Auto-Bi single grip contr quart fuel tank; 1-quart oil tank; finished in Auto-Bi red or silver gray; wheel base, 54 in tires, 28x2½ inches front and rear; Auto-Bi chain and leather belt transmission. Described uary, 1908, page 238.

AUTO-BI MODEL 46. PRICE $185.

Model 46; price, $185; weight, 120 lbs.; tires, inches front and rear; all other specifications ar

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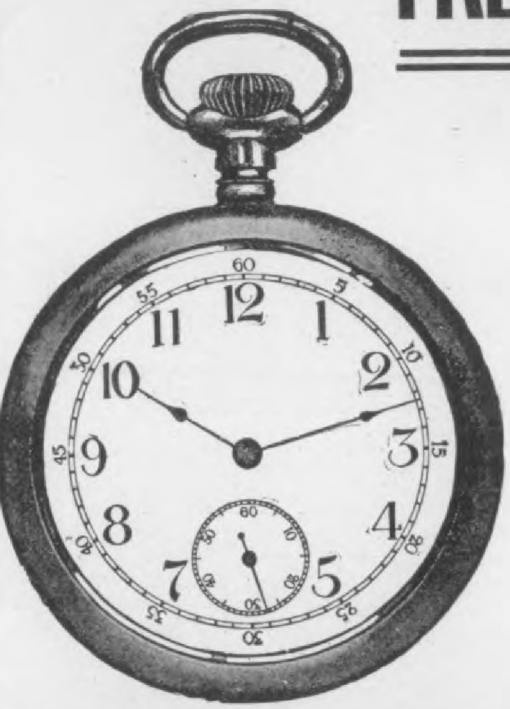
FREE! FREE! FREE!



Send us thirty-six "Neverleak" Certificates if you want this elegant solid gold-filled watch, free. It is fully guaranteed for ten years, is a number 12 size, very latest thin model, and has a fine, 7-jewel American movement. It is fitted with the bridge model and is stem-winding and stem-setting, and is equal both in appearance and for accurate time to a $100 solid gold watch. Any certificates received with "Neverleak" will be accepted on the watch. Twenty-four certificates will entitle you to a Regulator Clock, or twelve certificates to the Brass Sign mentioned in previous ads. Send certificates direct to

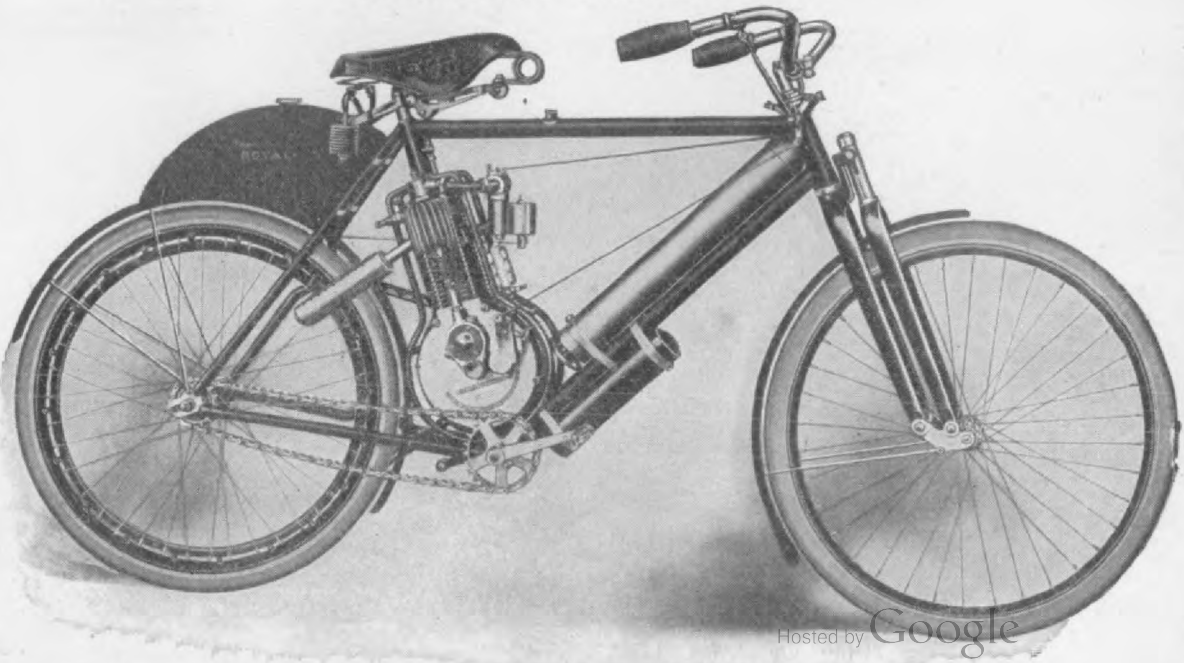
BUFFALO SPECIALTY COMPANY

BUFFALO, N. Y.

ALWAYS—THERE IS A HAPPY MEDIUM

One that avoids extremes—one that is not overdone or undone—one that is not half right and half wrong, but which is exactly right and which because of the fact

APPEALS TO THINKING MEN



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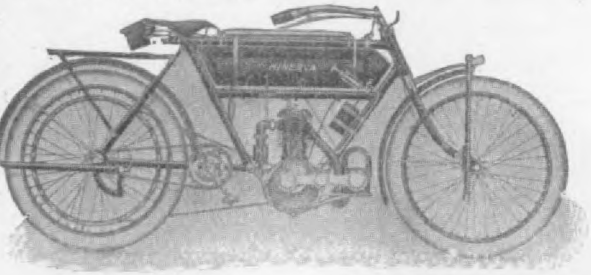
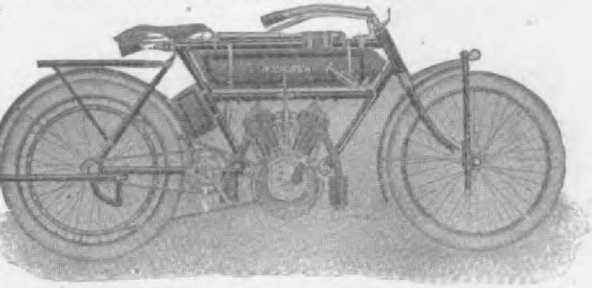
ycett saddle, 2¾ H. P. Minerva motor, bore 3 and troke 3; motor placed vertically; control by grip; attery equipment, 2 accumulators; 2 sets of brakes; uel tank, 2¼ gallons, oil tank, 3 pts.; 54-inch wheel ase; wheels, 26-inch, with 2¼-inch Continental tires; rice, $210. Distinctive features: mechanically op- rated valves, Eisemann high tension magneto used n connection with Minerva patent drive, $30 extra. Equipment: detachable foot rests, luggage carrier and ull tool set with box.



MINERVA MODEL B MOTORCYCLE. $240.

Minerva Model B 3½ H. P. motorcycle; complete veight, 135 lbs.; seamless steel tubing; 23-inch high rame; cushion front forks optional; Lycett saddle; ore, 3 7-25, stroke, 3 7-25; Minerva motor, placed ertically; grip control; 2 brakes; general specifica- ions same as Model A; price, $240.



MINERVA MODEL C. $275.

Minerva Model C motorcycle; Minerva twin engine, ½ H. P., 2¾ by 3; complete weight, 160 lbs.; seam- ss steel tubing frame, 23 inches high; cushion front orks optional; grip control; two brakes; general spec- ications same as Model A. Price, $275.

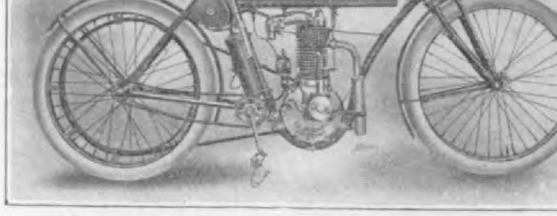
MINERVA ARDENNES RACER. $350.

Minerva Ardennes Racer; weight complete, 190 lbs.; H. P., Minerva twin motor, cylinder 3 1-5x3 3-5, 45 deg. angle; grip control; gasoline capacity, 4 allons; oil, 2 quarts; 23-inch seamless tubing frame; rder forks; 56-inch wheel base; 26-inch wheels, ith 2½ Continental tires; V leather belt drive; ound clearance, 4½ inches; speed, 10 to 70 miles hour; equipment, detachable foot rests, luggage rrier and stand, $350.

Hilaman Motor Cycles.

Built by A. H. Hilaman Co., Moorestown, N. J.

Hilaman 7 H. P. Twin Cylinder Motor Cycle; eight, 180 lbs.; 20-inch frame; 1¼-inch 11 and 14- ge tubing; Hilaman bridged cushion front fork; ddle as ordered; Hilaman twin-cylinder 7-8 H. P. otor, 3¼x3½, placed vertically and carried low in

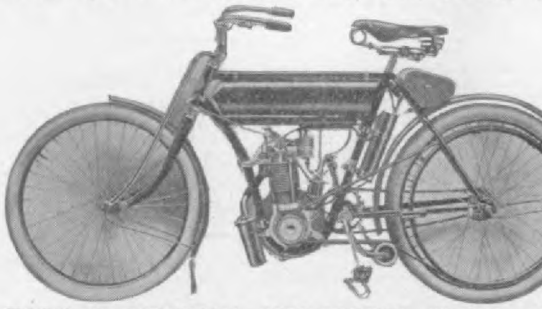


HILAMAN 3½ H. P. MOTOR CYCLE. $21

Hilaman 3½ H. P. Motor Cycle; weight, 170 frame height, 21 inches; frame of 1¼ and ⅞ 1 14-gage tubing; Hilaman cushion front fork; Pe saddle; 3½ H. P. Hilaman motor, 3¼x3½, place tically in frame loop; Hilaman carburetor; grip control on Bowden wire; Corbin-Duplex b 3 No. 6 Columbia dry cells; fuel tank capac quarts; oil tank, 1 quart; 56-inch wheel base; 28x2¼ inches; special features: long wheel base motor position, extra large valves and heavy fly equipment, Corbin brake, Splitdorf coil, tools, rich tires; drive by 1⅛-inch V or 2-inch doubl belt; price, $210. Described in our October, issue, page 236.

Yale California Motor Cycles.

Made by the Consolidated Mfg. Co., Toledo, O



YALE CALIFORNIA 1908 MOTOR CYCLE. $

Yale California 1908 Motor Cycle; weight, 120 20 in. frame of 1⅛ in. tubing; cushion front Empire saddle; 2¼ H. P., 2¾x3¼, Consolidated placed vertically; Universal carburetor; grip co Corbin or Morrow brakes; battery equipment, 6 dry cells; fuel tank capacity, 1½ gal.; oil capacity, ⅛ gal.; wheel base, 51½ ins.; 28x2¼ & J tires; price, $200. Distinctive features; o fly wheel, perfect cushion fork, sight force lubrication, absence of vibration, special tanned good for 5000 miles riding, 1 piece drop forged shaft. Described December, 1907, page 292.

N. S. U. Motor-cycle.

Made by the N. S. U. Cycle & Motor Co., 20 76th St., New York City.

N. S. U. Single Cylinder Motor Cycle furnished 3, 3½ and 3¾ H. P. motor; 20-in. frame; wheel 53 in.; 2 brakes; magneto ignition; ¾-in. V-belt H. P. machine and 1-in. V belt for 3½ and 3¾ machine; 2¼-in. tires; weight of 3 H. P. mac 150 lbs.; 3½ H. P., 160 lbs. and 3¾ H. P., 17 Other N. S. U. models are as follows: N. S. U. Cylinder Motor Cycle, fitted with twin cylind H. P., 5½ H. P. and 6 H. P. motors; 59-in.

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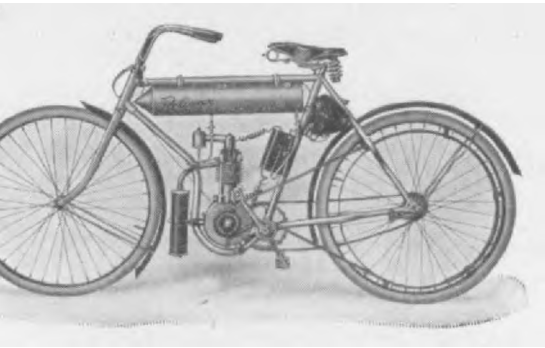
ler Motor Cycles are fitted with fore-carriage side-car attachments. 1908 models described ry, 1908, issue, page 229.

Reliance Motor Cycles.

e by The Reliance Motor Cycle Co., Owego,



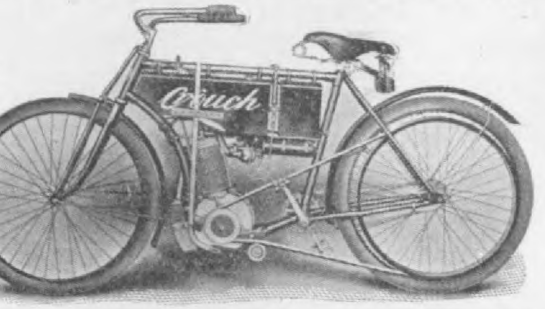
ELIANCE JUNIOR MOTOR CYCLE, $125.

ance Junior motor cycle; weight, 80 lbs.; frame t, 20½ ins., 1⅛ in. 19 gage tubing; rigid front cushion fork, $5.00 extra; Mesinger light motor e; 2 H. P., 2 9-16x2⅞. Reliance motor, placed nt in loop; float feed carburetor; grip control, en wire; Morrow brakes; battery equipment, 3 r dry cells; fuel tank capacity, 75 miles; oil capacity, 150 miles; wheel base, 52 ins.; 1¾ ngle tube tires; steel rims; price, $125. Special res: very light weight, but high grade through- with speed of from 5 to 25 miles an hour and ance of power, being geared 8½ to 1, so it will 12 to 15 per cent. grades. Furnished in en- d black, lake blue or crimson.

ance Regular motor cycle; weight, 110 lbs.; height, 21 ins., 1⅛ in., 18 gage tubing; cushion fork; 3-H. P., 3x3 in. Reliance motor, placed nt in loop of frame; Breeze carburetor; grip l; Morrow brakes; battery equipment, 3 regular ells; fuel tank capacity, 75 to 100 miles; oil capacity, 200 miles; wheel base, 56 ins.; 28x2 & J clincher tires; enameled black, Yale blue mson; distinctive features; motor low in frame; e grip control; hardened Non-Gran bronze motor ngs, sight feed constant lubrication.

Crouch Motor Cycles.

le by The Crouch Motor Co., Stoneham, Mass.



OUCH MODEL A 1908 MOTOR CYCLE, $175.

uch Model A 1908 motor cycle with tandem at-

Columbia batteries; fuel tank capacity, 100 miles; oil tank capacity, 100 miles; wheel base, 43 ins. tires, 28 ins., Goodrich; price, $175. Distinctiv features: belt tightener operated from the saddl while riding.

Marsh & Metz Motorcycles.

Made by the American Motor Co., 715 Center St Boston, Mass.

M. M. SPECIAL, $200.

M. M. Special Motor Cycle; price $200; weight, 1 lbs.; 20-inch frame; 3⅛ H. P. motor, 3¼ bore, 3 stroke, placed at 45-degree angle; battery equipmen 3 Standard cells and 1 coil; 5-quart fuel tank an 1-quart oil tank; wheel base, 53 inches; other specif cations same as for the M. M. 2-cylinder model.

M. M. ROADSTER, $175.

M. M. Roadster; price, $175; 22-inch frame; weigh 140 lbs.; 3 H. P., 3¼x3¾ motor; 28x2¼-inch Goo rich or G & J tires; 51-inch wheel base; other spec fications same as for the 2-cylinder model.

1908 models described in December, 1907, issu page 300.

The M. M. Twin Cylinder Motor Cycle; price, $25 weight, 155 lbs.; 20-inch frame; patent spring cushi front fork; special Mesinger saddle; 6 H. P. moto 3¼ bore and 3¾ stroke, placed at a 90-degree ang in frame; M. M. float feed carburetor; double gr control; New Departure coaster brakes; battery equi ment, 4 Standard dry cells and 2 coils; 7-quart gas line tank and 1½-quart oil tank; 56-inch wheel bas 26x2¼-inch wheels front and rear.

The Royal Motor Works, Worcester, Mass announce that they have secured Eveleth W Hill, formerly with the Worcester Presse Steel Co., to act in the capacity of sal manager of their product.

IDEAL HANDLE BARS AND STEMS

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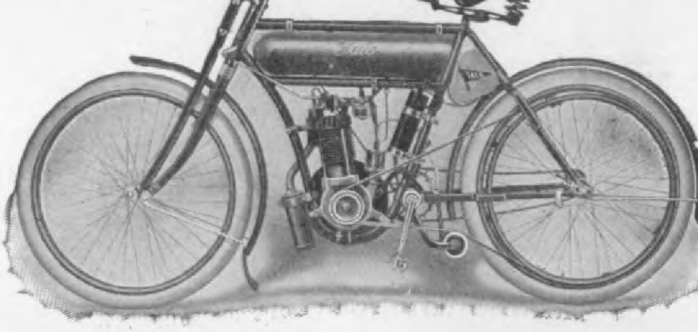
Yale-California MOTOR CYCLE



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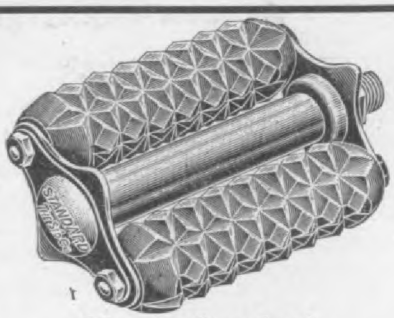
The Consolidated Manufacturing Co.
TOLEDO, OHIO



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is the choice of the wise manufacturers because their unvarying excellence. Invariably eith "BRIDGEPORT," "STAR," or "STANDARD PEDALS are found on all high-grade bicycles; while for motorcycle use nothing can surpass the No. 3 "STANDARD" PEDAL. We also manufacture SPOKES and NIPPLES in the following grades: "Diamond E," "Sunbeam," "No. 2 and No. 6," "A," "Special" and "Special A." These are boxed 100 in a box. Our "SAGER" and "STAR" TOE CLIPS are noted for their special finish and

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CYCLE AND

AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 10. PHILADELPHIA APRIL 1, 1908

March Edition 20,462

14,456	Copies mailed.
5,226	Copies Delivered to News Company.
1,060	Copies to Philadelphia and foreign, etc. under stamps.
2,964	Copies to the Boston Show.
150	Copies held in reserve.
23,856	
3,394	Back numbers sent out.
20,462	Total copies March edition.
	Of these.
12,782	Were paid subscriptions.
5,226	Delivered to News Company.
18,008	
1,029	Returned by News Company, to March 14, 1908.
16,979	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the March issue was 20,462.

Of these, 21,233 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 23½ ounces, representing 14,456 copies, and 3,394 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Charles J. Glidden, the well-known automobile tourist, and his party from Boston arrived March 13 at Jerusalem. It is said this was the first automobile ever seen in that city and a sensation was created.

Twenty cars have already been entered in the first annual road contest of the Norristown Automobile Club, which will be held on April 28th. The route will be from Norristown to Lancaster, to Reading and to Norristown, and will be covered in one day. Only members of the club will be admitted.

Coming Events

April 4-11—Pittsburg, Pa., Automobile Show, Duquesne Garden, Automobile Dealers' Association of Pittsburg.

April 5-12—Third Annual Automobile Show and Sportsmen's Show, Montreal, Canada, Arena, R. M. Jaffray, manager.

April 6-8—Annual Automobile Show, Mammoth Rink, Denver, Col., G. A. Wahlgreen, manager.

April 6-11—Carnival Opening Week of New York City Automobile Dealers, General Cutting, of New York Automobile Trade Association, chairman of committee in charge.

April 16-18—Automobile Show, Auditorium, Memphis, Tenn. Automobile Dealers' Association of Memphis.

April 24—Stock car road competition for the "Briarcliff" trophy, Westchester County, N. Y., Robert L. Morrell, chairman committee in charge.

April 25-May 25—Industrial Motor Car Competition, A. C. of F., Paris, France.

April 26—Automobile race in Lyons, France (Automobile Club of Rhone).

April 28—Endurance Run, Norristown, Lancaster, Reading, Norristown. Norristown (Pa.) Automobile Club.

May 1-31—Taxicab Competition, Paris, France. Automobile Club of France.

May 4-5—150 Mile Endurance Run, Harrisburg to Philadelphia and return. Motor Club of Harrisburg.

May 6-20—International Automobile Exposition, Moscow, Russia, Automobile Club of Moscow.

May 10—Targa Florio Contest, Sicily, Automobile Club of Italy.

May 15—Algonquin Hill Climb, up Phillips and Perry Hills, Chicago Motor Club, C. P. Root, chairman contest committee.

May 16—200 Mile Endurance Run, Automobile Club of Hartford (Conn.).

May 17-June 2—International Automobile Exposition, Moscow, Russia, Automobile Club of Moscow.

May 30—Hill Climbing Contest at Sport Hill, Easton, Conn., under direction of the Automobile Club of Bridgeport.

June 1-8—Pleasure Car Reliability Trials, Automobile Club of Great Britain, London, England.

June 9-17—Touring Competition for Prince Henry of Prussia, Germany, Imperial Automobile Club of Germany.

June 20-26—McClure Cup Contest in conjunction with annual run of the Albany, N. Y., Automobile Club, John Randerson, chairman of committee in charge.

June 24-27—1200 Mile Reliability Run, Chicago to outlying points and return, Chicago Motor Club, C. P. Root, chairman contest committee.

July 6—Grand Prix Contest for Voiturettes, Lieppe Circuit, France, Automobile Club of France.

July 6-8—National Convention of the A. A. A., at Buffalo, N. Y.

July 7—Grand Prix Contest, Dieppe Circuit, France, A. C. of F.

July 8—Start of Glidden Trophy Tour from Buffalo, N. Y. American Automobile Association, F. B. Hower, Buffalo, N. Y., chairman committee in charge.

July 13-17—International Race Meet, Ostend, Belgium, Automobile Club of Ostend.

September 14—Annual Economy Run, Chicago Motor Club.

July 20-30—Ardennes Circuit Races and Coup de Liederkirke. Automobile Club of Belgium.

August 29-30—Mont Ventoux Hill Climb, France. Vaucluse Automobile Club.

September 1-8—L'Auto's Contest for Voiturettes, Paris. 1909.

January 18-23—Annual Automobile Show in Madison Square Garden, under auspices of Association of Licensed Automobile Manufacturers, 7 E. 42d St., N. Y. City.

February 1-6—Chicago National Automobile Show; National Association Automobile Manufacturers, N. Y. City, S. A. Miles, Manager.

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World's Record for 300 Miles by Cedrino in a Fiat at Ormond

The star event of the Ormond-Daytona race meet proved to be the 256-mile race for the A. C. A. cup, in which Cedrino in a Fiat, Bernin in a Renault, E. B. Blakely in a 120 H. P. Christie, and R. G. Kelsey in a 60 H. P. Christie participated. In accordance with a previous arrangement, Cedrino, after completing the scheduled 256 miles, continued until he had covered 300 miles, which he did in 3 hours, 53 minutes, 44 seconds, creating a new world's record for the distance. This magnificent run figures out an average of 77.015 miles per hour, or 46.746 seconds per mile, a wonderful average for such a long run. His time for 256 miles was 3 hours, 21 minutes, 27 2-5 seconds, and for 250 miles, 3 hours, 16 minutes, 48 2-5 seconds.

A new record for 100 miles on this beach was made by Maurice Bernin with his Renault, his time for the distance being 1 hour, 12 minutes, 56 1-5 seconds. The previous record was made by Clifford Earp, who covered 100 miles at Ormond in an 80 H. P. Napier in 1906 in 1 hour, 15 minutes, 40 2-5 seconds. Bernin's speed averaged 88.2575 miles per hour. Bernin's new record was made in a match race with S. B. Stevens driving the Fiat Cyclone.

A new amateur one-mile record was established by Bruce Brown, a lad of 17, who played truant from school to attend the races and begged for a trial at the amateur record in the Fiat Cyclone with which Cedrino broke the 300-mile record. Obtaining the permission of Cedrino and the approval of the officials, Brown covered the mile in 35 3-5 seconds, thus supplanting the former amateur record of 39 seconds, made by Wm. K. Vanderbilt, Jr., in 1904 with a 90 H. P. Mercedes.

The Fiat Cyclone, Cedrino driving, also placed the one-mile middleweight record to its credit, covering the mile in 35 seconds flat, 40 3-5 seconds being the former record, made by Vaughn in 1906 with an 80 H. P. Darracq.

Louis J. Bergdoll, driving a 60 H. P. Benz car, won the 150-mile stock car race on the first day of the meet, his time being 2 hours, 40 minutes, 33 seconds. The next day in the invitation race for amateurs he covered 125 miles in 1 hour, 53 minutes, 30 2-5 seconds. These respective times are records for Ormond beach for the distances mentioned.

In the mile trials against time Bergdoll made the distance in 45 3-5 seconds, and R. G. Kelsey (60 H. P. Christie) covered the distance in 42 4-5 seconds, but Bergdoll protested his record on the ground that the Christie was not a stock car. The race officials ruled against Bergdoll, who will appeal to the A. A. A. Racing Board.

July 8 Start of Glidden Tour

The Board of Directors of the A. A. A. have finally decided that the Glidden trophy tour of 1908 will be started from Buffalo on Wednesday, July 8. This will follow a two-day legislative and good roads convention in that city on July 6 and 7, to which all the clubs in the Association are to be invited to conduct runs. The route of the tour has not been finally determined upon, though an itinerary including Cleveland, Pittsburg, Baltimore, Philadelphia, New York and Boston, with termination in the White Mountains, is favored.

The suggestion of permitting manufacturers to bid for the privilege of furnishing the pathfinding car for the A. A. A. touring contest, has been well received on all sides. It is probable that the touring board will invite such bids and that plenty will be forthcoming. The full expenses of the car, including those of the touring board's officials, will be paid by the one supplying the car. Dai Lewis, secretary of the touring board, will chart the route again this year.

Entries for the Glidden tour may be made with Chairman Hower, of the A. A. A. touring board, at any time now, as it is not necessary to name the driver and observer to go with the car until July 3.

The desire of manufacturers to form club teams of one make of car, for the Glidden Tour, the objection to the gamble involved in having to make up time lost through tire troubles, and a daily report on the supply of spare parts carried are among the things being dealt with by Chairman Hower in revising the 1907 A. A. A. touring rules, before submitting them to his associates of the Rules Committee.

New York to Paris Race

On March 16, the Thomas car, representing America, was reported as still ahead and pushing on from Ogden, Utah; while the Italian car, the Zust, had just arrived at Rawlins, Wyoming, 300 miles from Ogden. The De Dion, French car, was laid up three days for repairs and was just leaving Omaha, Neb., while the other French car, the Moto-Bloc, was in the neighborhood of Ames, Iowa. The German car, Protos, was reported stuck in the mud near Nevada, Iowa.

In a note on page 132 L of our March, 1908, issue, under the heading of Trade changes, a mistake was made regarding the purchase of the interest of Frank Wilcox in the Louis E. Rice Mfg. Co. It should have read that Mr. Wilcox's interest has been purchased by Mr. G. R. Dayton, and that the firm is now Rice and Dayton Mfg. Co., of Cedar Falls, Iowa, not Ft. Dodge, as stated.

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Additional indexes will be found at the back of the book; a "Buyers' Classified Index" of the entire contents of the book, both reading and advertising pages, and an alphabetical index to the advertisements.

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Grand Prix Entries

One hundred and five automobiles are officially engaged for the Grand Prix races to be held over the Dieppe course, July 6 and 7. Of these, 45 are entered for the Grand Prix and 60 for the small voiturette contest on the preceding day. The 45 champions are distributed among six nations, France having 20, Germany 9, England 6, Italy 6, Belgium 3 and America 1.

S. A. E. Boston Meeting

The first quarterly meeting of the Society of Automobile Engineers was held at Boston during the Show. A visit to the laboratories and factory of the Heinze Electrical Co., in Lowell, was made, the members being conveyed by automobiles from the Bay State Automobile Association headquarters to Lowell, where dinner was served at the Country Club before proceeding to the plant. In the evening a dinner was served at the Bay State Automobile Association and after the business meeting, the following papers were read and discussed: "Perfecting Automobile Ignition," by J. O. Heinze; "Design of Automobile Crankshafts," by P. M. Heldt; "Heavy Goods Transportation Systems," by Joseph A. Anglada; "Automobile Forgings," by Richard W. Funk.

It was decided to hold the next meeting in the latter part of June in Detroit, in conjunction with the American Society of Mechanical Engineers.

Dealers' Associations Unite

The recently organized Association of Automobile Dealers of America has been absorbed by the National Automobile Dealers' Association, which was recently formed during the Chicago show, thus making a strong national association.

E. V. Hartford, president of the Hartford Suspension Co., has made an offer of $200 in cash or in the form of a trophy, to be awarded the driver of the winning car in the Briarcliff race, provided the same is fully equipped with Trauffault-Hartford shock absorbers.

In the March Review, page 49, the description of the roadster was incorrectly used under a cut of the 4-cylinder Earl, the price of which is $1250.00, while the 4-cylinder description was under the cut of the smaller car.

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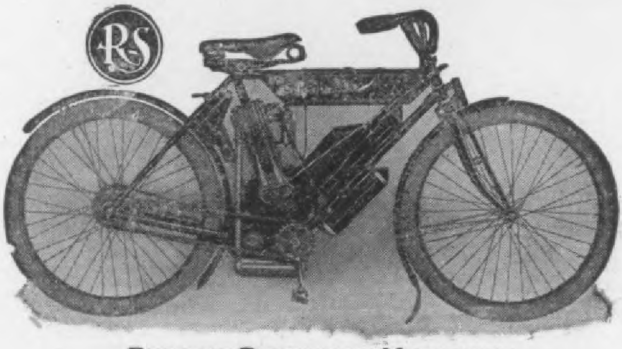

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Change of advertising copy must reach this office not later than the 10th of each month. New advertise ments will be accepted as late as the 20th.

Philadelphia, April 1st, 1908

Contesting Cars Should be Technically Examined

In several editorials in our columns we have endeavored to bring out the fact that the only fair method of conducting touring, sealed bonnet or other endurance tests is to have each and every competing car technically examined by a competent committee at the finish, this examination resulting in suitable penalization, to be counted in the final score of the car.

Several comparatively recent competitions have been conducted along these lines and in some instances the rulings have been criticized as too severe. Doubtless, mistakes may have been made in certain cases, but, nevertheless, these competitions were all the more strenuous, owing to this technical examination, and there is no question as to the added glory and value to the winner in a competitive event run under such trying regulations. Certainly when, as has been the case, competitions have resulted in fifteen or twenty ties, each car with a score practically as good as the other, it is time that the conditions governing such contests should be changed to reduce this number to one or two legitimate winners. This is particularly true, as many of the so-called "perfect score" cars were really in very poor condition at the finish and yet were given exactly the same credit as cars which not only finished with perfect scores, but finished in perfect condition. However, it is an extremely difficult matter to so arrange a schedule of penalizations that justice will be done to every type of car in the competition, but it is only by repeatedly holding such contests that a system of penalizations which will be satisfactory, can be devised.

It certainly is not fair to the legitimate winner of a contest to have his car classed with others which, altho they have finished with perfect scores under the restrictions imposed, are yet known, not only to their drivers, but to many others, to be fit subjects for the repair shop or junk pile. These facts can only be brought out by examination, and we consider that penalization for broken parts, loose adjustments and other defects which point to improper construction or material, are just as important as penalization for not complying with the rules on the road.

As the season for renewed activity in track and road competitions is now on, we feel that this matter of suitable examination and penalization of cars at the end of contests, by means of a well-informed technical committee cannot be too strongly urged upon the association and clubs in charge of such contests. We also believe that as the present automobile constructions are showing themselves to be exceptionally reliable and efficient, it is only by such differentiation that actual winners can be determined, and it is due to the purchasing public to make them acquainted with the real facts in regard to the condition of cars at the completion of such contests.

Trend of Motor Car Body Design

The automobile has very rapidly passed thru its successive metamorphoses from a strictly summer vehicle to be used solely for pleasure purposes when weather and road conditions are ideal to that of an all-year-round vehicle, not only for pleasure, but for utilitarian purposes. Of course, the wonderful development of the power equipment has to a great extent made this rapid change possible, but, aside from this, one of the most pertinent factors has been the remarkable development in closed and convertible body design.

Limousine and landaulette bodies are now seen in large numbers, where recently very few were in evidence. These bodies are now arranged that the windows can be easily lowered, converting the car to all intents and purposes into an open body machine, the change requiring but a very few seconds. The landaulette and combination types are rapidly superseding the large cape top cars, particularly in the more expensive models, while the cape top, the cheapness and utility of which so highly recommend it, is more largely used than ever on cars which are not so luxuriously fitted. These bodies make it possible to

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ride with comfort in almost all kinds of weather, and even in small runabouts there is a growing tendency to use enclosed bodies, the operator being warmly housed within glass walls and the car can be perfectly controlled and the driver still remain in comfort. Some of these bodies are even now being supplied on what might be termed low-priced cars, and are specially offered for the use of physicians, so that at the present time the automobile is looked upon as an all-year-round vehicle, capable of traveling when almost all other means of transportation have been driven from the streets. In fact, in some of our larger cities a remarkable decrease in the number of sleighs has been noticed, due in a large measure to the winter use of enclosed body cars which are more comfortable than sleighs, and even in comparatively deep snow are capable of better speed.

The suburban resident of the larger cities also demands a car of this general type, as by its means the family can be comfortably transported even in cold winter evenings to the city for theatre parties, concerts or lectures, while to ride to the depot in an ordinary carriage, change to a railroad train and repeat the performance again in the city, would now appear to many of these residents as an extremely roundabout and laborious process.

There seems to be a general trend toward the convertible type of body, and some well-known makers are supplying either convertible bodies or a chassis upon which with comparatively little difficulty several different types of bodies can be placed. In the lighter, lower-priced vehicles, particularly those which are supposed to be runabouts, there is what might be termed a retrograde movement toward the folding rear seat, or, more correctly speaking, rear seats, as in nearly all cases accommodations can be supplied to more than one person. These convertible types, however, all show a tendency to keep within weight limitations and are not of the clumsy, massive type which were in evidence formerly. The entire line of bodies are gradually assuming more definite and, in most cases, lighter, more artistic proportions, and it is expected that in the near future it will be possible to purchase cars of moderate price and weight, which can be made to answer either as runabouts or family cars, thus materially increasing the field of usefulness of a single machine.

Lack of Two-Speed and Free Engine Devices on American Motorcycles

To those who are familiar with the development of the motorcycle abroad, the increasing demand for two and three-speed gears cannot but have forced itself upon their attention. For several years it was considered that the light weight of a motor-drive would answer under every and all conditions. However, as these machines came into more general use, and instead of being a plaything became a necessity and were used for business purposes, it became evident that under certain circumstances considerable inconvenience might be caused the rider, owing to the fact that whenever a stop was necessitated the motor must also be stopped, as is so often the case when negotiating streets where the traffic is heavy. Under such circumstances the rider is compelled to get off and push unless his machine is so low that he can place his feet upon the ground. In either case, pedalling has to be resorted to when starting, but the chief difficulty lies in the fact that in climbing a fairly stiff grade when the road surface is muddy or comparatively rough, the direct drive puts too much work upon the motor, which either slows down and stalls or the rider is again compelled to assist by means of the pedals. Hills are often encountered which the motor could easily take provided a reasonable start could be had, but very often teams and pedestrians get in the road at just the wrong time as far as the motor cyclist is concerned, the hill is attempted from practically a standing start with the usual result that again the rider is compelled to assist by means of the pedals. All of this is obviated by the use of a two-speed gear and a free engine.

Owing to these difficulties a gradual demand has been growing for two-speed, and at the present time many are even calling for three-speed gears. This has resulted in the placing upon the market of numerous devices for this purpose, some of the early ones necessitating a dismount and the shifting of a belt, and others, altho not so crude, were found to wear out rapidly or were so heavy as to be considerable of a burden to both machine and engine. Now, however, designers abroad are gradually incorporating in the construction of the motorcycles, two-speed and three-speed hub or pulley devices, which are essentially a part of the machine, and as such give better satisfaction and are much longer lived than the earlier applied speed change mechanisms.

The peculiar part of this entire matter, however, is the fact that in our own country almost no attempt has been made to place upon machines anything but a direct drive. That the eventual motorcycle will not only have a two-speed or three-speed gear, but also a free engine, is not questioned by us. In view of the fact that machines have been in general use for several years longer on the other side than with us, it would seem that the American makers should take time by the forelock and prepare now for now for the inventible demand which must of necessity spring up for these devices in our own, country

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Good Going at Savannah

American and foreign cars divided honors at the Savannah race meet, March 18 and 19, an Isotta Fraschini, driven by Louis Strong winning the star event the 342-mile race, and American cars taking honors in the shorter races.

Herbert Lyttle, driving an "Apperson 30" Runabout, drew first blood in the fight for honors on the Savannah course, March 18, winning the 10-lap race for runabouts, the first event of the meet. He covered the 17.1 course ten times, as per schedule, in 3 hours, 35 minutes, 41 seconds. His actual running time was ten minutes less than his elapsed time as he stopped twice, once to replace spark plugs and once to take on fuel When he discovered that one of his spark plugs was missing, he immediately replaced all four instead of wasting time ascertaining which one was not working.

An official survey of the course was made after the first days races showing that the entire distance measures 17.1 to a lap. In the twenty laps called for in the big race the total distance is therefore 342 miles, and for the smaller races, 131 miles.

The scene at the start was one of the gayest Savannah has ever seen. The grandstand, which held 3,000 spectators, was so placed that it commanded a view of 3 miles of the course which was lined with spectators who occupied positions on house and tree tops, on fences etc. The band played "Dixie," and thousands of stunning costumes added brilliance to the scene.

The start of the runabout race was made at 10 A. M., the "Pennsylvania 50" being the first car off. On the second lap it broke an axle, three miles out from Savannah. The third car in this event, a "Thomas-Detroit" had several mishaps which put it out of the running although its driver, J. B. Larrimer, kept gamely at it to the end. Another "Thomas-Detroit" which was entered in this event, blew out a cylinder head on the day before the race in practice and could not participate.

The second event, a 171-mile race for cars of over 575 cubic inches cylinder capacity, started at 2 P. M., but only two cars participated, one a "Thomas Six" driven by George Salzman and the other a "Stearns Six" driven by F. W. Leland. On the second lap a connecting rod in the Stearns' engine broke and part of the rod was driven thru the crank case, so badly damaging the engine that the car had to be withdrawn. The Thomas car finished the 171 miles in 3 hours, 2 minutes, 25 seconds, an average speed of 59.2 miles per hour.

But the big event of the meet, the 342-mile race, was won by the Isotta Fraschini, its time being 6 hours, 21 minutes, 20 seconds. Thirty thousand was the estimated number of persons who witnessed this race, among the spectators being Hon. Hoke Smith Governor of Georgia, who for a time acted as honorary referee. The start was made promptly at 10 A. M., the Apperson driven by Lyttle being the first car sent off. The winning Isotta Fraschini car was second and the others followed in the order named: American (F. I. Tone); Lozier (H. Michener); Apperson (McCulla); Isotta Fraschini (Al Poole); Stearns (F. W. Leland); Acme (M. Newstetter).

During the third lap McCulla's Apperson, which was making good headway, turned completely over in an attempt to pass Poole's Issotta on a turn. The accident wrecked the car but the driver and his assistant landed in a marsh and were not hurt. The "American" car met with several delays and withdrew during the eighth lap. Lyttle's Apperson finished second, time 6 hours, 44 minutes, 37 seconds and the Acme third, time 6 hours, 47 minutes, 5 seconds.

The Savannah people deserve much credit for the thoro manner in which preparations were made. The roads, broad and smooth as asphalt city streets were perfectly oiled. The ten bad turns on the course were adequately banked. The patrols were on the course with red and yellow flags during pracice hours for a week before the race. The grandstand was both the largest and the most advantageously constructed of any similar stand. The score boards were rightly placed. Military patrols were provided and they patrolled. The course was not merely a track as many had supposed from the fact that it was level. The turns were hard and intricate. There was an "S" and a "hair-pin" turn which kept the drivers working. But the notable features of the course were five straightaways on any of which, for greater or shorter distances, unlimited speeding might be indulged in.

Albert L. Pope, who was recently retired as co-receiver for the Pope Motor Car Co., has filed a claim against the company for $787,987.84, which he is said to have advanced to enable the receiver to keep the Toledo plant in operation.

The Hartford Suspension Company, makers of the Truffault-Hartford shock absorbers, have been granted an injunction against the Motor Car Equipment Company, restraining them from manufacturing, selling or using Hercules shock absorbers which the Hartford Company declares is an infringement of its well-known device which carries letters patent, No. 803,589.

We are informed by the J. V. Lindsley & Company that their correct address is not as given on page 128 and 105 of the March Review but is 1139 Monadnock Bldg., Chicago.

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A. C. A. Bureau of Tours

The Automobile Club of America's Bureau of Tours has extended its activities very materially and now has included with it in its work the Map Committee and the Sign Post Committee, thereby considerably increasing the facilities offered its members. A new plan has been adopted which places the benefits and services of the bureau at the disposal of any automobilist at a yearly fee of $10. Among the most important benefits derived from subscription are a copy of the Bureau of Tours year-book, containing a list of officially appointed hotels, garages and repair, attorneys, physicians and surgeons thruout the touring regions, route cards and special route information on file covering contemporaneous data on condition of roads, police traps, etc.; assistance and expert advice in planning trips, procuring of licenses, etc., etc.

A. C. A. Leaves A. A. A. Ranks

At a recent meeting of the New York State Automobile Association it was announced that the Automobile Club of America had resigned its membership in the State organization, and therefore renounced its affiliation with the national body, the American Automobile Association. This disruption came about on account of an amended due law, which required all clubs to pay dues on their full membership. This amendment particularly affected the N. Y. Club, which has about 1250 members of all classes—life, active and non-resident or associate—but has been paying but a lump sum of $500 a year in dues.

Colgate Hoyt, President of the Automobile Club of America, disclaimed that the return to the old system of payment had anything to do with the club's withdrawal, and said:

"We simply withdrew because, in the opinion of the Governors, it did not seem to the best interests of the club to remain in the State Association of the A. A. A. We think we can do better work by ourselves. We are not fighting the A. A. A., as our present action was simply one of club policy."

The question of "raising the dues" was not known to the Board when it decided to withdraw, and so had no bearing on the decision.

At the recent Directors' meeting of the A. A. A., at the New York headquarters, the Vermont A. A. and the West Virginia A. A. were elected to membership; also arrangements were made with Victor Breyer, of Paris, France, to become European Consul of the Association for the year 1908. The dates for the Buffalo A. A. A. National Convention were also selected, the same being July 6 and 7.

Mechanical Branch Standardize Rod Ends and Levers

At the meeting of the Mechanical Branch of the Association of Licensed Automobile Manufacturers, on March 10 in New York, standards for 3-8, 5-16, 1-2 and 7-16 rods were adopted and will be known as the A. L. A. M. Standard Adjustable Rod and Yoke Ends. After careful consideration the Branch adopted a uniform modified I section gear shift lever, which the drop forge makers will carry in stock, making these levers interchangeable.

The Committee appointed to report on the standardization of rims felt that the time was not ripe for a universal adoption of the standard rim, owing to the fact that it was impossible to tell whether the clincher or demountable rim would be in vogue.

At the afternoon session, Dr. Charles Edward Lucke of Columbia University, who has been making some very exhaustive tests with alcohol as a fuel for internal combustion engines, delivered an address and E. R. Hewitt who has been experimenting with alcohol for commercial purposes gave some interesting data on the results of his work.

The session closed with the annual election of officers. This resulted in a unanimous reelection of the present encumbents.

1908 A. M. C. M. A. Committees

Committees for 1908 were announced March 18, by Benjamin Briscoe, Chairman of the Committee of Management of the American Motor Car Manufacturers' Association. There are few changes in the committees over last year.

Following are the committees:

Show Committee: H. O. Smith, Premier Motor Mfg. Co., Chairman; S. H. Mora, Mora Motor Car Co.; R. M. Owen, Reo Motor Car Co.

Tours and Races: W. C. Marmon, Nordyke & Marmon Co., Chairman; H. O. Smith, Premier Motor Mfg. Co.; A. C. Newby, National Motor Vehicle Co.

Good Roads: Chas. E. Lewis, Jackson Automobile Co., Chairman; James Couzens, Ford Motor Co.; R. E. Olds, Reo Motor Car Co.; H. B. Krenning, Dorris Motor Car Co.

Legislation: R. E. Olds, Reo Motor Car Co., Chairman; C. G. Stoddard, Dayton Motor Car Co.; A. C. Newby, National Motor Vehicle Co.; R. A. Palmer, Motorcar Co.; R. E. Graham, Acme Motor Car Co.

Membership: W. H. Van Dervoort, Moline Automobile Co., Chairman; Morris Grabowsky, Rapid Motor Vehicle Co.; E. K. Burroughs, Abendroth & Root Mfg. Co.

Advertising and Publicity: Barney F. Everitt, Wayne Automobile Co., Chairman; Harry Fosdick, Moon Motor Car Co.; G. B. Louderback, Buckeye Mfg. Co.; Theo. P. Bailey, St. Louis Car Co.; Leon Myron Bradley, New York Office; Charles E. Duryea, New York Office.

Finance: James Couzens, Ford Motor Co., Chairman; W. G. Morse, Atlas Motor Car Co.; J. B. Bartholomew, The Bartholomew Co.

Standardization and Technical: John D. Maxwell, Maxwell-Briscoe Motor Co., Chairman; Henry Ford, Ford Motor Co.; R. S. Crawford, Crawford Automobile Co.; L. P. Mooers, Moon Motor Car Co.; R. E. Olds, Reo Motor Car Co.

Freight and Transportation: Harry Knox, Atlas Motor Car Co., Chairman; H. W. Mack, Mack Bros. Motor Car Co., R. Harry Croninger, Pennsylvania Auto-Motor Co.; J. N. Willys, Overland Auto Co.; G. D. Wilcox, Gearless Transmission Co.; C. C. Hanch, Nordyke & Marmon Co.

Tires: G. V. Rogers, Mitchell Motor Car Co., Chairman; James Couzens, Ford Motor Co.; Frank Briscoe, Brush Runabout Co.; O. Stevenson, York Motor Car Co.

Agencies: W. H. Van Dervoort, Moline Automobile Co., Chairman; A. R. Welch, Welch Motor Car Co.; H. S. Leyman, De Luxe Motor Car Co.; Frank L. Pierce, Gaeth Automobile Co.; H. B. Larzelere, Chadwick Engineering Works.

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BRUSH

Runabout

¶ More people want, and have the money to buy, the Brush Runabout than any other car in America.

¶ A Prediction: Inside of a year, the single cylinder vertical will be as great a craze in this country as it is now in France and Europe.

¶ The Brush is the first of the new style singles. Common sense always wins.

Brush Runabout Co.

—POST—
CARDS

¶ *Did you ever use them in your business? We have many catchy ones. Send for price list.*

Chilton Printing Company

Market and 49th Streets
Philadelphia

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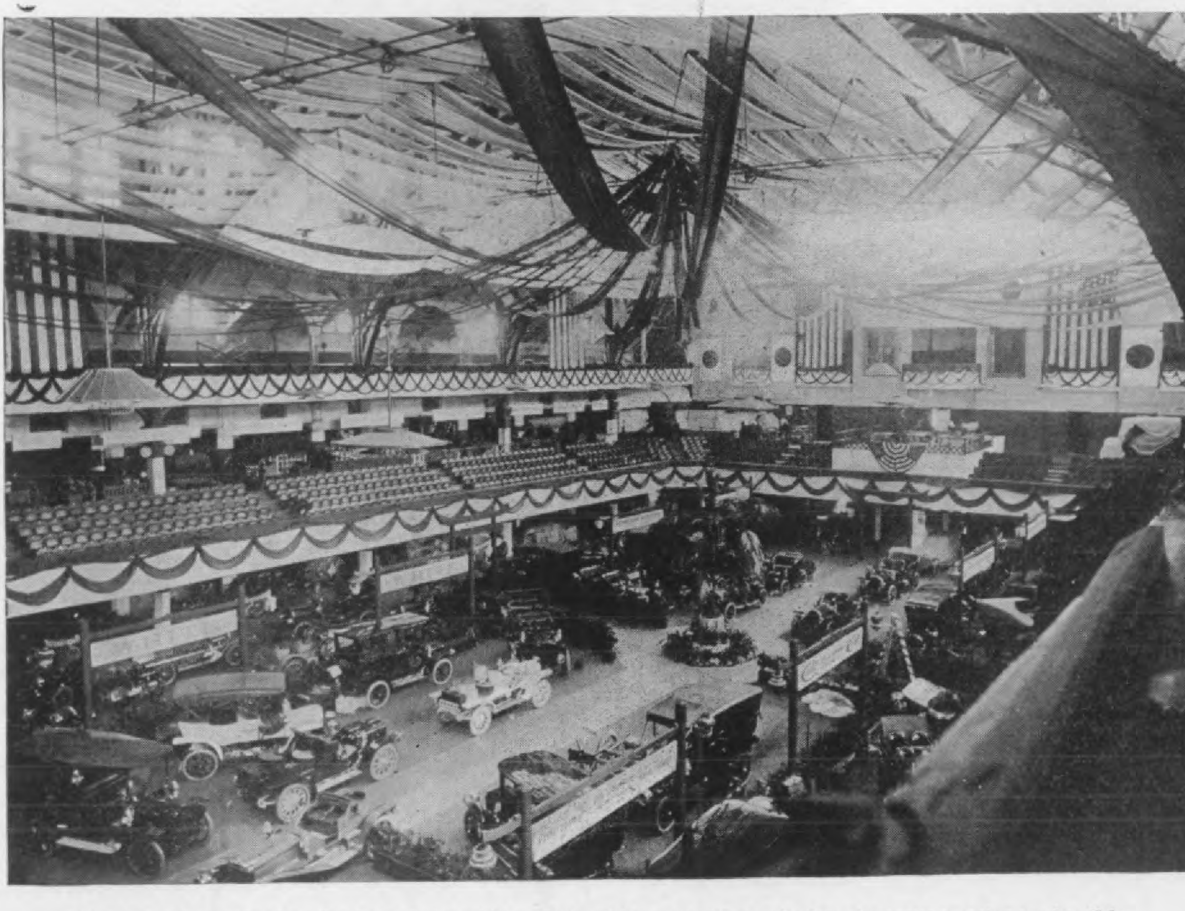
ealers' show in the country, opened its oors to the public on March 7th, the at-endance the first night, as usual with utomobile shows, being such as to crowd he enormous Mechanics' Building, the argest exhibition building in New Eng-and, to its limits.

The scheme of decoration of this Sixth nnual Exhibition, which was under the anagement of Chester I. Campbell, was aken from the far distant land of Japan. he character of the decoration was ap-arent before entering the building, for n front of each of the main entrances on untington Ave. extended a large Jap-nese temple gate of carved wood, painted

richness of the scene. In the eve numerous small electric lights interwo in this canopy added to the effect.

To further carry out the garden the exhibition spaces thruout the buil were carpeted with grass green mat and divided by hedges of natural grow privet, which made it possible for salesmen to work in quiet and al complete privacy at the rear of any of spaces, which has always been im sible with the previous forms of dec tion, especially when the spaces were vided by simple fences or ropes a some former exhibitions. On all sides Japanese colors, red and white, wer



General view of the Boston Automobile Show, giving an idea of the decorative scheme in this part of the building.

right red and hung with gigantic Jap-nese lanterns. Along the entire front of he building were also strung fancy Jap-nese lanterns. The interior was com-letely transformed, representing a Jap-nese outdoor scene. Extending from the ntrance of Exhibition Hall thruout the ntire length of the building over the isles was an arbor covered by wistaria n full bloom, the dark colored leaves

evidence, the girders of the roof screened effectually by long streame diating from a large gilt chrysanthe in the centre in the form of a sun and appearing from below very much the Japanese war flag. This form of oration in contrast to covering the tire ceiling with bunting was finally a ed, as it allowed of very thorough ve tion.

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Brief Mention of Some New Thi

fices 23 Motor Mart, Park Square, Boston, showed for the first time the new Crown Motor Vehicle, a high-wheel carriage type, with two-cylinder opposed air-cooled motor in the rear of the body and a combination of planetary and dog or lug clutch change speed mechanism, giving two speeds ahead and two reverse.

The Blomstrom Mfg. Co. showed a two-cylinder opposed motor car, with the engine cylinders lengthwise under the hood and fly-wheel horizontal, or in such a position that what gyroscopic effect it produces tends to steady the car when negotiating curves at high speed. The under side of the fly-wheel serves as a friction disc, against which a vertical traversing friction wheel on the propeller shaft acts. The car starts from the seat by means of the lever, also used for the change speeds.

The Boston High-Wheel Auto Mfg. Co., office 179 Clarendon St., Boston, showed a new high-wheel buggy, with a two-cylinder opposed air-cooled motor in the rear of the body and a belt drive over two adjustable sized pulleys to the countershaft, chains driving to the wheels.

Frederick E. Randall Co., 245 Columbus Ave., Boston, exhibited the "Stilson Six," a recent six-cylinder entrant for honors in the automobile field.

A novel innovation was shown in the M. M. Motorcycles of the American Motor Co., Brockton, Mass., in the use of an aluminum piston.

The Percy Fort Co., 226 Columbus Ave., showed a new combination device for caring for tire valve caps and making it possible to quickly clean out the threads or true them up when damaged.

The Ciglia Shock Preventer Co. showed a new shock eliminator of original design, which gives free play to the normal spring action, but prevents excessive motion.

The Ball Bearing Tire Co., 159 Aborn St., Providence, R. I., exhibited a new combination tire, having a crescent-shaped inner tube next the rim and pneumatic rubber balls held by rubber separators placed between the inner tube and outer shoe.

The Pettingill-Andrews Co. showed the new Jacobson Brandow or J. & B. spark coils, made up in separate units and fitted with micrometer adjustment in such a way that either contact point can be removed and replaced without losing the adjustment. J. & B. switches, spark indicators and plugs were also shown.

The Stuart-Howland Co. showed several novelties, as the Treco electric whistle, attachable to any horn; Empire miniature car lamps and a magneto for supplying current for wipe spark ignition.

The Windsor Mfg. Co. showed the Sterling Auto Vice and Spark Plug, the latter being fitted with a vibratory electrode which is self cleaning.

The Massachusetts Automobile Co. showed a new tire filling compound, "Resilicol."

Duncan Robinson, 89 State St., Boston, showed the new Du-Ro shock absorber, which is of entirely new design, using, however, the time-tried principle of the flat spring in its construction.

The Park Square Automobile Station, 18 Columbus Ave., showed the Chandler Non-Skidding Chain, which consists of individual chains passed over the tire and secured to the spokes.

A new electric tail lamp, made by Holt & Beebee, 40 Sudbury St., Boston, was also shown by this company.

H. O. Fletcher, of Hyde Park, Mass., showed for the first time the Fletcher automatic meshing transmission gear, designed to eliminate shocks in gear changing and stripping of the teeth.

John J. Greene, Hope Valley, R. I., showed the Barber motor safety starting device, to prevent injury to an operator when cranking in case of a back kick.

The Ovington Motor Co., 2234 Broadway, N. Y., showed a new low 20 in. frame F. N. four-cylinder motorcycle with large road clearance, and also the Ovico Motorcycle Stand.

The Pittsfield Spark Coil Company, Dalton, Mass., showed the new Acme igniter, which, with a single non-vibrating coil, in combination with distributor, will ignite any number of cylinders. Economy of current is one of its strong features.

E. Flentje, 1643 Cambridge St., showed a new shock absorber of hydraulic type, the fluid used being glycerine. It controls the upward movement only, leaving the springs practically free on the down stroke.

H. F. Campbell showed a separable automarine spark plug and the Duplex spark coils.

The Concord Motor Car Co.'s method of converting ordinary lamps into electric lamps, and also a new electric tail lamp were shown, in connection with the exhibit of Orient cars in the basement.

The F. Kenney Mfg. Co., 360 Dorchester Ave., Boston, showed Kenney's Olivine Non-Alkaline Compound for washing automobiles, a soap of the consistency and transparency of vaseline, its base being olive oil.

The Melrose Automobile Co., Melrose, Mass., exhibited a National Kerosene Burner, adapted for White steamers; a new two cylinder horizontal steam engine for use in steam automobiles, and steam apparatus.

Owing to a very large increase in its business the Autolight & Motor Supply Company, 506-8 North Broad Street, Philadelphia, which carries the largest and most varied stock of automobile accessories and tools in the state, have recently been compelled to erect a large addition to their building.

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Trade News Items

In the advertisement of the Star Speedometer by George W. Nock Co., in the March issue, page 291, that company was incorrectly stated as the maker of this instrument instead of its distributor.

Mr. John C. Spiers, formerly factory manager of the Autocar Company, Ardmore, Pa., has been appointed factory manager of the Standard Roller Bearing Company, Philadelphia, Pa., and has full charge of the manufacturing department of that company.

The Chase, air-cooled, 2-cycle, business runabout made by the Chase Truck Co., Syracuse, N. Y., is $750 as correctly stated in the March Review, page 126, under the cut, and not $2,500.00 as incorrectly stated at the end of the paragraph.

The Arlington Co., of 725–727 Broadway, New York City, informs us that it is having an immense call for its Pyralin Transparent Sheeting among the automobile trade. This material is used instead of glass in wind shields, curtain windows, etc., and is made in all thicknesses.

Samuel G. Rigdon, who has been connected with the Goodyear Tire & Rubber Co., of Akron, Ohio, for many years, as general representative, has recently gone with the Republic Rubber Co., of Youngstown, Ohio, to act as general representative of their tire department.

A 2-cycle motor and power outfit for attaching to pedal cycles has been placed on the market by the Motorcycle Equipment & Supply Co., of Hammondsport, N. Y., which is also furnishing a complete motorcycle using this outfit. The outfit will be described and illustrated in an early issue of the Journal.

The Puritan Gas Tank Co., of Boston, Mass., recently purchased the property of the Old Colony Light Co., of Boston. In order to settle the outstanding indebtedness of the old concern, the Puritan concern voluntarily has offered the creditors shares of its six per cent. non-cumulative preferred stock on a basis of 100 cents on the dollar.

William F. Ormsby, Boston, Mass., has published a booklet containing what he calls "universal automobile safety road signals," being a set of horn signals to be used by automobilists in communicating their intention to pass another car, cross street, turn to right or left, ask for more room, etc., etc. Alongside the explanation of the signals appear dashes and dots to illustrate the same.

All arrangements are now about completed for the Duquesne Garden Show at Pittsburg, Pa., April 4-11, under the management of the Automobile Dealers' Association of that city. Much time and money have been expended on decorations and a full line of autos as well as motorcycles and motor boats will be on exhibition.

Since the fire which visited the plant of the Dayton Motor Car Co., Dayton, Ohio, rumors have been constantly circulating to the effect that the concern is badly disabled, etc. This, however, is not the case, the actual facts being that only two departments were damaged, the upholstery and final assembly departments, causing a loss of $100,000, fully covered by insurance. Two days' time were lost in the departments, and about ten days' time lost in shipments. The company will push its business more actively than ever and announces that it is as strong financially and every other way as ever.

It is said that the failure of The New York Car and Truck Co., of Kingston, N. Y., will not affect financially the Allen-Kingston Motor Car Co., of New York, distributor of the cars made by the former company, which also made car trucks. The Allen-Kingston Motor Car Co. is independent of the New York Car and Truck Co., and is not involved in its failure. The automobile plant will probably be bought from the receiver's hands and the manufacture of Allen-Kingston cars continued.

At a recent meeting of the Executive Committee of the N. A. A. M., in New York, the date of the Chicago show was definitely settled as February 6 to 13 inclusive. At a meeting of the A. L. A. M. Executive Committee held on the same day the resignation of Marcus L. Brock as associate manager was received and accepted with regret. In consequence of his resignation there will be some rearrangement in the staff of the licensed body, as a result of which it is understood that H. T. Clinton will look after the agency interests and to some extent the traffic affairs, as well as have charge of the advertising department.

The Equitable Trust Company and Samuel C. Myers have been appointed receivers of the Dragon Motor Company, Thirty-first Street, below Chestnut, Phila., by Judge Holland, in the United States Circuit Court, upon petition of John C. Calhoun, of New York, who has brought suit on a claim of $2400, $2000 of which is represented by note, for money loaned. While the Dragon Company agreed to the receivership, its officials deny its insolvency. The J. G. Brill Company has a claim for five months' rent due from the Dragon Automobile Company, the predecessor of the Dragon Motor Company, which has undertaken to indemnify the Motor Company against the rent claimed, and it is declared that the Brill Company agreed to look to the Dragon Automobile Company for payment.

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Fires, Failures, Judgments, Etc.

Receivers Robert H. Carr, Jr., and William S. Bansemer have been appointed for the Auto Supply & Storage Co., 1416 Madison Ave., Baltimore, Md., under a $5000 bond.

American Auto Brass Co., Columbus, Ohio, recently passed into the hands of a receiver.

Fred T. Francis, who has been acting as permanent receiver of the Berkshire Motor Car Co., of Pittsfield, Mass., for some time, has recently been named as permanent receiver.

The American Trust and Savings Bank, trustee for the Biddle-Murray Mfg. Co., of Chicago, bankrupt, has filed its report, which shows $2,675.49 in the treasury.

The Darracq Motor Car Co., 1989 Broadway, New York City, has been petitioned in bankruptcy by its creditors. The liabilities are reported to be $100,000.

The receiver of the Electric Vehicle Co., of Hartford, Conn., has been instructed by the Superior Court of Hartford to pay to George B. Selden, of Rochester, N. Y., and the Association of Licensed Automobile Manufacturers the moneys due to them from time to time; also to appoint a member of the Executive Committee of the Association to deliver sub-license and to institute actions at law under the Selden patent.

The Elyria Machine Parts Co., of Elyria, Ohio, has been placed in the hands of a receiver.

Jordon Auto Co., Minneapolis, Minn., which filed bankruptcy papers last November, has made satisfactory settlement with creditors and will soon resume business.

Hopewell Brothers, of Cambridge, Mass., have brought suit against the Boston branch of the Post & Lester Co., of Hartford, Conn., for selling the Perfect tire case, manufactured by W. H. Wiley & Son, of Hartford, Conn., and which is alleged to be a direct infringement of their patent. The suit against the Allen tire case has been discontinued, a satisfactory settlement having been reached.

The N. N. Hill Brass Co. and the Gong Bell Mfg. Co., both of East Hampton, Conn., were included in the failure of the Hardware and Woodenware Mfg. Co.

The Mercedes Import Co., 590 Fifth avenue, New York, has gone into bankruptcy. John S. Primrose, Henry S. Colwell and Eugene L. Bushe were appointed temporary receivers under a $25,000 bond.

Frederick S. Dickinson, of New York City, is suing the Matheson Motor Car Co., of Wilkes-Barre, Pa., to recover $40,000, which he claims as his share of the capital stock of the company.

The New York Car & Truck Co., of Kingston, N. Y., has filed a petition in bankruptcy. Mr. Robert Wilkinson, of Poughkeepsie, has been appointed receiver under a $40,000 bond.

The Overland Automobile Co., Indianapolis, Ind., is making a 40 per cent. settlement with its creditors, a number of whom have accepted. It is intended to reorganize the company, giving the larger creditors stock in payment of their claims.

Perfection Auto Co., South Bend, Ind. Several creditors have filed a petition in the U. S. Court at Indianapolis, Ind., asking that the Perfection Co. be declared a bankrupt.

At a recent conference of the creditors of the Pope Motor Car Co. and representatives of the receivers it was decided to release Albert L. Pope as receiver and to place George A. Yule, co-receiver, in full charge of the Toledo plant and the affairs of the company in that locality.

The Reliance Motor Car Co., Detroit, Mich., which is in the hands of receiver Victor U. Gurney, will be reorganized. Parties interested are the Reo and Olds Companies, of Lansing, Mich., who, it is claimed, will put $100,000 into the concern.

A petition in bankruptcy has been filed against Leon Rubay, 1697 Broadway, N. Y. Peter Zucker, receiver; bond, $2500.

St. Louis Motor Car Co., Peoria, Ill. A 15 per cent. dividend has been declared. Mr. and Mrs. Jesse French, Sr., withdrew their claim for $61,287.21 against the bankrupt company, on the conditions that a certain touring car in the factory be surrendered to them and that the estate waive all claims for balances alleged to be due for unpaid stock subscriptions.

The Shoemaker Automobile Co., of Elkhart, Ind., filed a petition in involuntary bankruptcy and application for a receiver was granted. T. H. Hollister, of Freeport, Ill., was named as receiver. Liabilities are $50,000; assets, unknown.

Toledo Auto Parts Mfg. Co., Toledo, Ohio.—Frank J. Cheney has made application for a receiver, and asks judgment for $700 alleged to be due him for rent.

Trade Changes

The American Die-Casting Co. recently moved into its new plant, at Garden Lane and White Rivers, Indianapolis, Ind.

American Motor Car Sales Co., wholesale distributors of the American, Marion and Overland automobiles, have removed their main offices from 2230 Broadway, New York City, to Indianapolis, Ind.

The Ampere Mfg. Co., 408 West 13th St., New York City, manufacturers of dry batteries, have applied for a voluntary dissolution of the corporation. Mr. Marcel Levy has been appointed receiver under a $2000 bond; liabilities, $1727, and assets, $1283.

G. W. Cole Co., 42 Broadway, New York City, well-known manufacturers of the 3-in-One oil, has changed its name to the 3-in-One Oil Co.

The Capitol Auto Co., of Lansing, Mich., has purchased the Smith Clawson garage, at 422 Michigan avenue, and is moving the entire equipment and stock to its own garage, at 313 Michigan avenue.

David O. Eaton, 326 North Broad street, Philadelphia, Pa., local agent for the Rapid Delivery Wagon and Trucks, has recently moved to larger quarters at 312 North Sixteenth street.

The Gearless Transmission Co., of Los Angeles, Cal., has moved from the Westlake garage to East Ninth street.

The Gilmore-Edwards Co., of Detroit, Mich., bought out the stock, machinery and good will of the Delray Motor Works, of the same city.

J. C. McFerran, of Louisville, Ky., has given up repair work and opened an office at 721 Paul Jones Building, where he will represent the Pope Motor Car Co., and sell automobile sundries.

Morgan & Wright have discontinued their Cleveland branch, owing to arrangements made with the Ohio Rubber Co., 2048 East Ninth street, for the exclusive sale of M. & W. automobile, vehicle and bicycle tires in Cleveland and vicinity.

Palmer & Singer Mfg. Co., of New York City, agents for the Simplex, Isotia Fraschini and P. & S. cars, recently moved into their new four-story garage at 1620-1624 Broadway.

The Rathbun-Lacy Co., of Toledo, announces that it has disposed of its entire business, including accounts, to the S. M. Jones Co., of the same city, who will continue the manufacture of the Rolaco marine engines.

The Reliance Motor Cycle Co. recently moved from Elmira to Owego, N. Y., where it has taken the Decker Building, on East Main street.

The Supplementary Spiral Spring Co., St. Louis, Mo., has removed its New York office from 52 West Sixty-seventh street to the Motor Mart, 1876 Broadway.

The White Garage Company, Baltimore, Md., recently moved from 1010 Morton street to new quarters at Park avenue and Biddle street.

The Witherbee Igniter Co. moved from 541 West Forty-third street, New York City, to larger quarters on the third floor in the Motor Mart Building, 1876 Broadway.

The Waverly Cycle Co., 200-202 North Tejon street, Colorado Springs, Col., has recently been purchased by C. A. Price and A. H. Lewis from L. H. Skinner, for the sum of $4000.

Wayne Automobile Co., Detroit, Mich.—A managing interest has been purchased by W. E. Flanders and Thomas Walburn, both formerly connected with the Ford Motor Co., and B. F. Everett, who has been connected with the Wayne Company. Mr. Everett is now president and sales manager and Mr. Flanders is general factory manager.

Legislative and Legal

Hearing on the A. A. A. Federal Registration Bill

There was a hearing before the Committee of the Judiciary of the House of Representatives at Washington, D. C., Thursday, March 12th, 1908, on the Federal Registration bill, providing for the registration and numbering of automobiles when engaged in interstate travel. The bill was introduced by Congressman Cocks, of New York, early in the present session of Congress, and the hearing was largely attended. It was opened by President Hotchkiss, who briefly pointed out the necessity for such a bill. The principal argument was made by Charles Thaddeus Terry, Esq., chairman of the Legislative Board of the American Automobile Association and representative of the National Association of Automobile Manufacturers.

It was practically conceded by the committee that legislation of the kind asked for was necessary, but it was apparent at the outset that the problem to be solved was whether Congress could in any way regulate the use of a pleasure vehicle when operated on the highways of a state other than the state of the owner's residence; in other words, when engaged in interstate travel, and many of the members of the committee had grave doubts as to the powers of Congress in the matter. However, after a two hours' presentation by Mr. Terry several members of the committee stated that, while they had been very doubtful, they had been either wholly or almost convinced that Congress had the power. It is not likely that final action will be taken on the bill for some weeks, but it is confidently expected by Mr. Terry and his associates that

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by such committee, the bill will pass without substantial amendment or opposition.

Automobiles and Carriages

An important decision affecting automobilists of Massachusetts was recently handed down by the Supreme Court. It is in effect that the automobile is not a carriage within the meaning of the statute and towns are not required to keep their highways in condition for automobile travel provided they are maintained in condition reasonably safe and convenient for travel in other vehicles.

Judge Holt, of the United States Circuit Court for the Southern District of New York, decided against the A. L. A. M. in its suit against the De Dietrich Import Company and Walter C. Allen in the matter of selling the Allen-Kingston car. He concludes that on the papers submitted there is sufficient doubt whether the Selden patent is a pioneer patent to deny the motion to punish the defendants for contempt of Court, this motion having been made as Mr. Allen paid no attention to the injunction brought against him by the A. L. A. M.

treated, and any one desiring to obtain infor
automobile and marine engine ignition will find
of interest. Several sectional illustrations are em
explain the very ample reading matter.

A new catalog has been issued by The R.
Mfg. Co., of Springfield, Mass., exploiting the 190
meter," a speed indicator made by this conce
book is bound in a red and primrose cover and
is presented in the form of pithy paragraphs,
out the important features of this widely know
A separate announcement is enclosed in the ca
ferring to a reduction in price made possible by
that no radical changes have been made, and t
tool and machinery equipment can still be used,
the loss incident to the production of new to
when new designs are adopted.

New York Sporting Goods Co., 17 Warren
York City, are ready with their 1908 catalogs o
bile accessories, pedal cycle and motor cycle line
arate catalog being issued for cycle goods. Net
price lists are sent, also, to legitimate dealers

Adam Cook's Sons, 313 West St., New York
sending out a new booklet on "Automobile Lu
which contains a good deal of general informat
the subject which forms its title, and incidenta
out the adaptability of Albany Grease to automo
cation.

One of the most elaborate calendars issued
is that sent out by New England Motor Co.,
Mass. This calendar represents a motor car lo
pansies and carrying on the door, in gold, a
which the company uses in advertising "Rex" ig
teries. On the side of the front seat an illus
the battery itself appears. The figure is out
printed on a rectangular hanger, and the effe
striking.

The Zimmerman Auto Runabout

The Zimmerman Mfg. Co., of Auburn, Ind., U. S. A., after continued experiments have perfected and placed upon the market a high wheeled motor buggy known as the Zimmerman Auto Runabout. The features claimed for this machine are simplicity, durability and absolute reliability and every machine is sold under a guarantee to be all and do all that the company represents.

GENERAL DESCRIPTION.

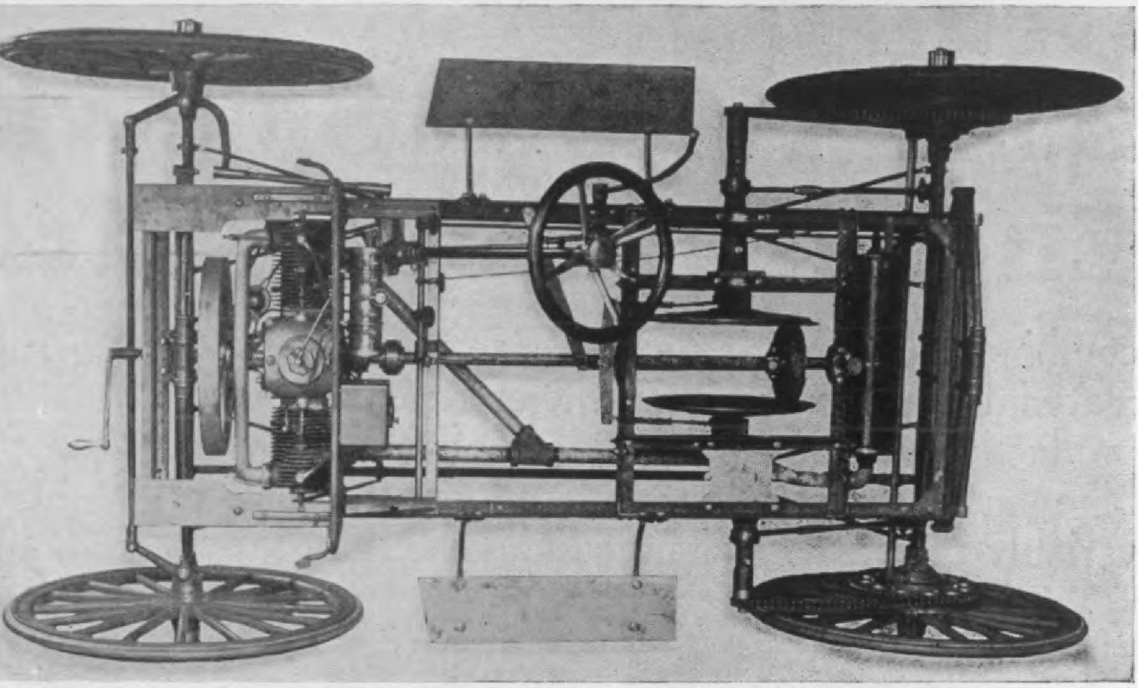
The motor is of the two-cylinder, opposed air-cooled type, rated as 10-12 H. P. The change speed mechanism is of the friction drive type, using double discs, a special device gotten out by the makers, which drives both rear wheels separately without the use of a gear differential. The car is said to be capable of speeds from 3 to 25 miles per hour. The accompanying Fig. 1 gives a general idea of the external appearance of the car. The motor is located crosswise under the hood at the front with the flywheel at the forward end. This motor is 4 x 4 and fitted with bronze bearings of extra size and length. Crank shaft and connecting rods are steel forgings and each engine is tested on the block as to whether it properly

tator is of ball bearing roller type
float feed carburetor is used. Fr
engine a shaft leads backward to t
of the chassis as shown in Fig. 2, t
view of the chassis. On this shaft is
the driving friction wheel running
two discs. This friction wheel slides
shafting but is keyed to it and eng
is brought about by means of a fo
which draws the two discs together
the friction wheel. A single han
controls the movement of the frictio
and therefore all the speeds, both
and reverse, this form of drive, of
providing any number of speeds i
direction. The slow speed is obtain
the friction wheel at the outside of t
as shown in the plan view, while the hi

Fig. 1. Zimmerman Auto Runabout; motor, 2 cylind
opposed, air-cooled, 10-12 H. P., float feed carburetor,
ignition from double vibrating dash coil and dry cells; artil
36 ins. in diameter, ball bearing, fitted with 1½ in. solid r
wheel base, 78 ins.; tread, 56 ins.; frame, 1½ x 2 x ¼ ins. a

ack shaft sprockets to the rear wheel kets. These chains are of the roller $\frac{3}{4}$ in. pitch and $\frac{3}{8}$ in. wide. The spark

and each has five leaves. The frame is $1\frac{1}{2}$ x 2 x $1\frac{1}{4}$ angle iron and mounted on a 3 point suspension and is reenforced by three inter-



. 2. Plan view of the Zimmerman Auto Runabout, showing the location of the motor at the front, shaft running to , double friction discs with movable friction wheel between them and side chains to the rear wheels. Barnes steering nd gear are used with friction retained spark and throttle levers on top. The rear wheel brakes of the expanding type rolled by foot lever and the speeds both forward and reverse by single side hand lever.

hrottle control levers are friction re- on top of the steering wheel. The ng wheel is of the Barnes standard type. teering gear consists of a split nut work- n a square thread and ball and socket are used in the linkage connecting the ng arm to the front wheels. The cross s in front of the axle, but as the road nce is large this position is in reality ected one.

wheels are of artiliery type, 36 ins. meter, fitted with large ball bearings $\frac{1}{2}$ in. solid rubber tires. Each of the vheels is provided with a brake drum n internal expanding ring operated by of a foot lever. The wheel base is . and the tread 56 ins. The axles are mediate cross members, which carry the bearings for the shaft drive.

A large muffler which it is claimed is very quiet and without back pressure is located at the rear of the frame in a transverse position, a long pipe connecting it with the left cylinder of the motor, while a branch runs over to the right cylinder. A 6-gallon gasoline tank is provided in the body. These bodies are of auto type, 32 ins. wide, with very roomy seats and a large carrying space in the rear under the boot. The seats are upholstered in leather.

These machines, equipped with a pair of side lamps, horn, tools and oil can, sell for $650 f.o.b. Auburn, Ind. Tops are furnished at $25 extra.

Autocar's Price Has Not Advanced

the March number of this Journal, the of the 30 H. P. Autocar touring car, XIV, was given as $3,750 in the page isement of the Autocar Co. This mistake in figures, which should have 2,750, the price of this popular car for st two years. The price of the Autocar Pa., which informs us that prices of its different types of cars have not been advanced.

Packard Acquires Columbia Factory

It is understood that the transfer of the Columbia plant and the business of the Electric Vehicle Company, of Hartford, to the Packard Motor Car Company, of

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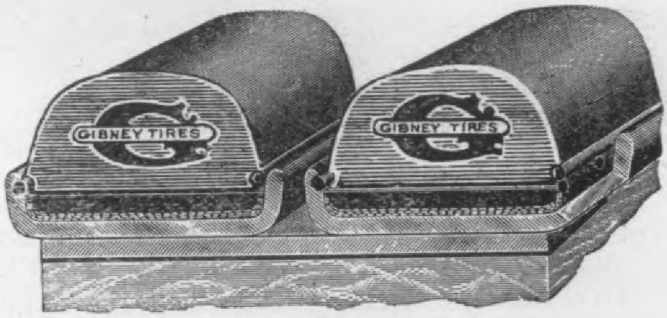
GIBNEY

Solid Tires and Sidewi
Endless Motor Tir

combine manufacturing experience with quality of material and the result is therefore excellence of production. Those wise buyers of tires who combine knowledge with the desire for the best invariably select those branded **GIBNEY.**



Our many years of experience in handling, marketing and repairing the leading makes of American and European tires place us in position to learn the good and bad points of all makes. That we have profited by the experience and taken adva of the opportunity is clearly demonstrated by the superior the GIBNEY tire which has established a new world's ard. No tire could be better made and no other tire is a made. This is a guarantee which means that if you seek factory service, the GIBNEY tire will be your choice.

N. B. We are also distributors of

CONTINENTAL PNEUMATIC TI

The cost per mile tire. Get our prices.

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GIBNEY

AUTOMOBILE SUPPLY

CATALOG

Ready April 10th

The latest and best catalog of automobile sundries and supplies ever issued. Every automobile dealer and owner in the United States should have a copy and use it for making his purchases, as it is the safest buying guide obtainable. It contains illustrations, descriptions and prices of all standard accessories. It is noticeable for the fact that it does not list any unreliable, untried and freakish devices. This handsome book will be sent free upon request.

PHILADELPHIA, PA., U. S. A.

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have passed very rapidly thru the successive stages from building $750.00 runabouts up through the course of light touring cars, both single and double cylinder, and the medium weight four-cylinder touring car to the construction of large, luxuriously equipt 7-passenger cars. One of the 1906 models was noted for having made one of the longest automobile journeys over a new route from the Pacific to the Atlantic Coast in the hands of W. S. Gehr, and it is stated that it is now running and giving active and satisfactory service.

The Glide line for 1908 consists of three cars: the Model "G" four-cylinder 40 H. P. touring car at $2500.00; the Model "G" Special, four-cylinder, 45 H. P. touring car at $3000.00, and the Model "H," six-cylinder, 60 H. P. touring car at $5000.00.

tiple disc brakes in the rear whee
and also the camel's-hair lined cont
external brake, either of which i
ciently powerful to bring the wheels
absolute control of the operator ar
the car in the shortest possible
This car is a noted hill climber,
built in the hills and tested for th
of service, and not only has power t
tiate hills, but has brakes to cont
car in going down hills.

THE MODEL "H."

The Model "H" six-cylinder Glide
popular type of high-powered, long
based touring car which is inten
meet the demands of those who
large, roomy, powerful machine
wheel base is 132 inches, and the

Fig. 1. 1908 Glide Model G Special; motor, 4 cylinders, water-cooled, 4¾ x 5, 45 H. P., located front on a sub frame; special die cast babbitt crank shaft and cam shaft bearings are used; ignition Bosch magneto and also from storage batteries; 3 speed and 1 reverse sliding change gear is mounted on axle and operated on the selective principle; wheel base, 120 ins.; 34 in. wheels on roller bearings; 4 front and rear; semi-elliptic springs front and rear, front springs, 40 x 2 ins., 7 leaves, rear, 58 x 2 leaves; double set of brakes on the rear wheels, the torsion of the brakes being taken by the long strut not by the axle; seating capacity, 5 or 7; weight complete, 3200 lbs.; with an equipment of horn, oil la tools, the price is $3000.

THE MODEL "G."

The Model "G" touring car was marketed very widely and with minor improvements will be sold during the season of 1908. This car is equipt with a 40 H. P. Rutenber motor, multiple disc clutch in the fly-wheel, sliding gear, selective type transmission, located on the rear axle and the rear axle itself, which is a special Glide feature, has won favor be-

are 36 x 4½. It is provided with th
rear axle, the sliding gear, selecti
transmission and multiple disc clut
engine is the well known 4½ x 5 s
der Rutenber. In general body de
is similar to other Glide cars, and
ranged to seat five or seven passen

The Glide Model "G Special," h
illustrated, is the latest production
by this company, and its special f

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RANKLIN

The less dead weight a otor-car has, the more al work it can do.

It is because Franklins have no unnecessary weight to lug the power can do what it ought to do—carry passengers climb and go.

Take the 5-passenger Franklin Type D for example. It weighs 2200 pounds. verage 5-passenger automobile weighs fully a third more; and it takes 37 horse- to do the work that Type D does with 28 horse-power. The Franklin six- er, 7-passenger Type H weighs 2600 pounds. Other six-cylinder, 7-passenger nes average about 4000 pounds. Think what a difference this makes in gasoline and tires worn out—to say nothing of comfort.

There's no question of strength. There are no stronger mobiles than Franklins. And Franklins have no plumbing em. All that weight is saved.

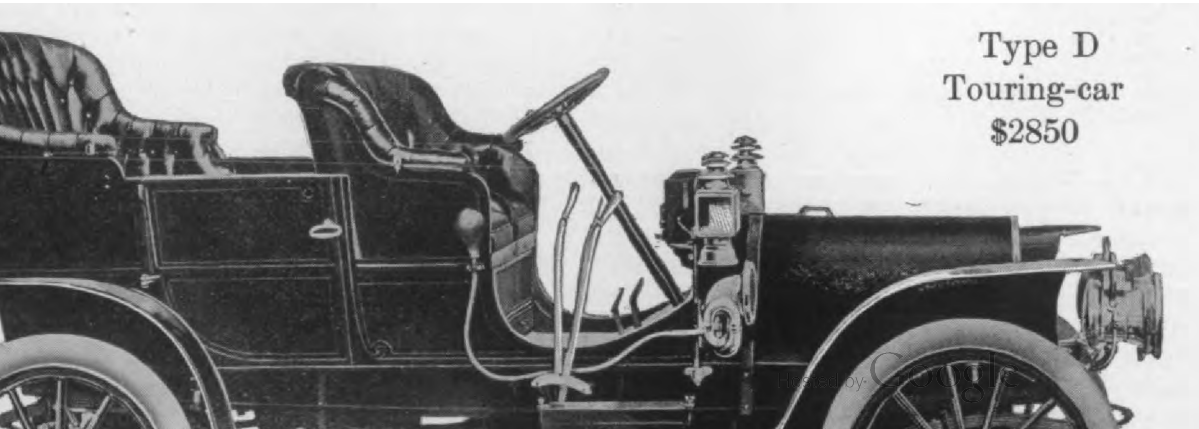
The Franklin laminated wood-frame is lighter than the nary steel frame; yet it is stronger; and it makes much er riding.

If there's one most important question about an auto- ile it's the weight question. Before you buy any auto- ile you ought to see it weighed—with your own eyes.

Write for catalogue of Franklin models.

I H FRANKLIN MFG CO Syracuse N Y

Member Association Licensed Automobile Manufacturers



Rutenber, 45 H. P. The clutch is the multiple disc type. The driving shaft has an angularity of but four degrees, and the universal joint is in front, instead of at the rear, of the transmission. The change gear is of the selective type, three speeds forward and one reverse, being attached to the rear axle housing so that the entire construction forms a unit. The rear axle has specially large gears, 2½-inch face, and the differential is hung on large Timken roller bearings, one on either side, the axle shafts being supported at either end near the wheels by two additional Timken roller bearings, making six roller bearings in the rear axle assembly. The rear wheel brakes are double-acting, both internal expanding, metal to metal and external camel's-hair lined contracting. Being mounted as the car is upon ample Timken roller bearings in front and rear axles, the engine is given every advantage to use its power without a large per cent. being lost in friction.

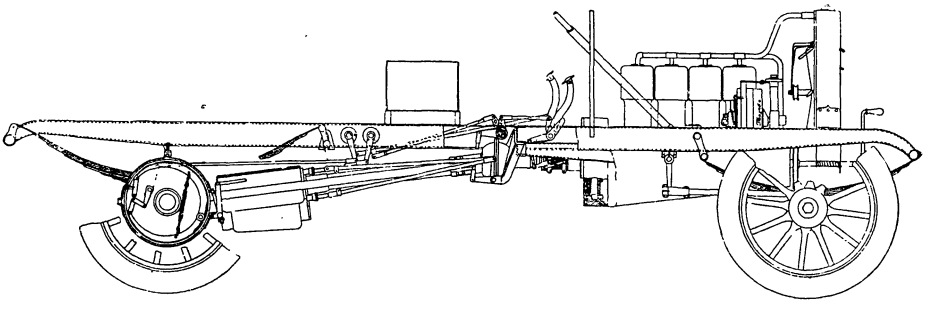


Fig 2. Side elevation of the Model G Special chassis, which shows the pedal and brake arrangements and also the position and mounting of the change speed gear case on the rear axle. The driving shaft housing extends forward and is mounted at the front end in a ball joint which rests on a cross frame member. This ball contains a universal joint which is also arranged to act as a slip joint. The shaft housing and two rods running from the ball to the ends of the rear axle constitute the torsion members and as the brake anchors are mounted on this triangular construction and simply slipped over the rear axle casing but not fastened to it, the re-action of the brakes is taken by these rods and does not tend to rotate the rear axle casing, which, of course, relieves the springs. The thrust is transmitted through this triangular system to the ball on the heavy cross frame member.

The Rutenber motor is one of the oldest produced in this country, and still holds the record of having made the greatest number of miles in 24 hours, namely, 1093¼ miles. This record was made with the motor fitted with a Schebler carburetor, which the company is prepared to furnish with this engine, claiming it to be a combination that cannot well be excelled. This motor is so well known that the details of its construction need not be given, as the new models were described in the January, 1908, isue of the Cycle & Automobile Trade Journal, page 128. The bearings and general construction are so well carried out that it has not been excelled for durability or power. After the severest tests to which it has been subjected, in running continuously on endurance runs, etc., when examined it is claimed to have been found as perfect as when it started.

GLIDE MULTIPLE DISC CLUTCH.

The multiple disc clutch used in the fly-wheel consists of a series of alternate plates or discs about 13 inches in diameter. Six are attached to and carried by the fly-wheel and the alternating five plates are attached to and carried by the clutch shaft. These discs are engaged by the usual spring pressure, and disengaged by a foot lever. Inasmuch as the plates run in oil and become coated with a film when the clutch is released, it is readily seen that when the pressure of the spring forces the plates together, this oil must be forced out between the plates into oil recesses before the plates finally become closely prest together, thus acting as a cushion to relieve the sudden strain upon the motor and preventing the objectionable jerking of the car and strain upon the change speed gears. This clutch is shown in the accompanying drawing. The company state it has performed its work so perfectly that one word of complaint has never been heard about it.

THE UNIVERSAL JOINT.

At the rear end of the clutch shaft, as shown, there is interposed between it and the transmission shaft a universal joint of large proportions. Inasmuch as this joint is ahead of the transmision instead of back of it, as is the case in many automobiles, it does not receive the same heavy strain that is produced in a joint in the usual position when suddenly changing to a lower gear. It is telescoped not only on to the clutch shaft, but on to the transmission shaft sliding on milled key-ways, thus eliminating any loose keys that might cause trouble. By reference to the plan view of Model "G" Special chassis it will be seen that the universal joint is encased in a large ball joint. The housing of this universal joint forms a pocket at the lower side which carries a certain amount of oil into which the universal joint dips and is thus always thoroughly oiled. The ends of the clutch and propeller shafts which receive the universal joint knuckles are provided with three integral keys, the stock between them being milled away. The knuckles of the universal joint are fitted to these ends, a nice sliding fit, forming a coupling of the most flexible and

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durable type. The rear axle is held in position by means of two very heavy strut-rods which are attached to the brake flange at the rear and to the ball joint at the front. These strut-rods are ample in size to readily stand any amount of strain that is likely to be put upon them in keeping the rear axle in its true position, and the ball joint allows a freedom of motion in a rotating direction so as to relieve the prest steel frame and the rear axle alike from any cramping or any undue stress.

the bolt the caps can be quickly removed. The gears are interchangeable and are fastened to the counter-shaft by means of dowel pins and cap screws, while the reverse and low speed pinions are held by means of Woodruff keys. The gears are straight 6-pitch, which the company considers better than using any form of stub tooth. The shaft carrying the sliding gear member is milled so as to form integral keys and four key-ways, ½ x ¼ inch deep, transmit the load.

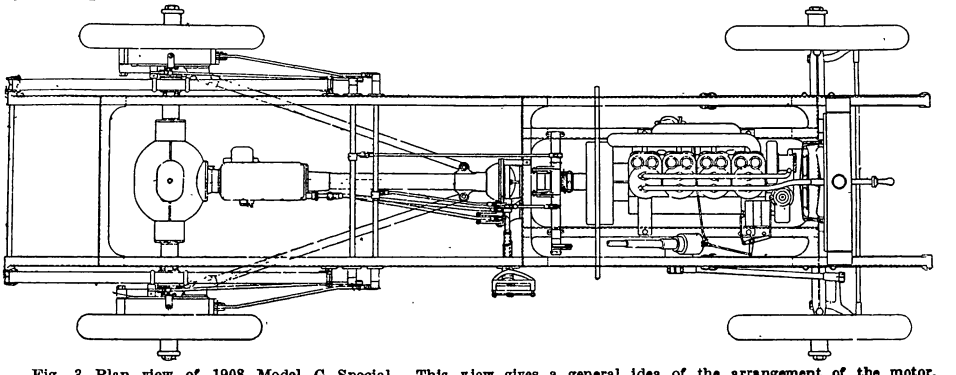

Fig. 3. Plan view of 1908 Model G Special. This view gives a general idea of the arrangement of the motor, change gear, etc., in the frame. It also shows the triangular strut rod assembly and the very large brakes on the rear wheel hubs, also the extreme length of the rear springs.

BRAKES.

Particular attention is called to the new and novel features of the brake arrangements. The brakes are anchored in position by means of the strut rods which run forward to the ball universal joint. Consequently the rear axle is relieved from torsional strain which would tend to separate the rear axle from the transmission gear box. These brakes are arranged so that one is independent of the other. The internal, metal to metal service brake is controlled by means of the pedal at the feet of the operator and is not latched. The braking surface is of sufficient size to cause the rear wheels to slide, if occasion should require. The external camel hair lined contracting band brake is operated by a hand lever with ratchet, so that it can be locked in position if it should be desirable to hold the car on a grade. The hub drum on the rear wheel has 3-inch face and is 16 inches in diameter, giving ample braking surface to control the car absolutely with load on any kind of hill.

THE CHANGE SPEED GEAR

The transmission carries the counter-shaft below the main driving shaft, thus allowing it to be completely submerged in oil without the oil flowing into the rear axle and being wasted, as before stated, the transmission is incorporated as a part of the rear axle construction. This counter-shaft is hollow and a bolt is put thru the entire length of the case holding the covering caps in place at the ends and giving the transmission considerable rigidity and also making the parts accessible, as by unscrewing the nuts at the ends of

The gear change is of the selective type, there being two individual rods, these rods being retained in their proper positions by a ball check lock. These rods are interchangeable and are slightly separated so that when one is moved there is no tendency to carry the other along with it. By means of the locking device, when the gears are once placed in mesh in their proper position, this alignment cannot be lost. The entire change gear and rear-axle construction forms a compact unit and special attention is called to the fact

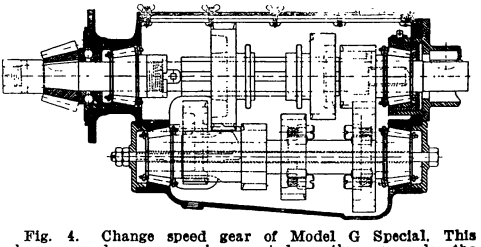

Fig. 4. Change speed gear of Model G Special. This change speed gear case is mounted on the rear axle, the counter shaft or lay shaft being below the main shaft. These shafts are mounted on large Timken roller bearings. The lay shaft is hollow and the bolt is passed thru it from end to end, which holds the front and rear cover plates. On the top of the case, in fact, the entire top of the case forms a large hand hole plate which is held by winged thumb nuts as shown. The gears are 6-pitch of liberal face, give 3 speeds forward and one reverse and are operated selectively. The main shaft is milled, forming integral splines upon which the sliding gear members move. The thrust of the bevel pinion is taken by a ball thrust bearing as shown.

that the stay-rods are attached to the brake anchors, which are slipped on to the rear axle, but are not fastened to it, and that the forward end of these rods is fastened to the ball joint in the centre of the machine and this rests in a socket on a cross bar of the prest steel frame. By means of this construction the torsion of the axle,

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as well as its thrust, is taken by the strut-rods and delivered at the ball joint, which is well forward of the centre of the car. This construction is probably responsible for the entire absence of broken springs in the 1907 Glide cars.

The rear axle is of the semi-floating type, the axle shafts being 2 in. in diameter, the inner ends being milled with four integral keys so that they are perfectly inserted into corresponding key-ways in the two large differential pinions at the centre of the axle and they are held in position by the roller bearing adjustment nuts and by merely loosening same the rear axle shafts can be withdrawn at will without loosening any other part of the rear axle or its housing.

SUMMARY OF SPECIAL FEATURES.

Attention is called to the following features which are claimed as novel in the Glide Special construction:

The universal ball joint and coupling at the centre of the car, which prevents any undue strain upon any portion of the construction and relieves the gears and shaft in the transmission and rear axle from any backward lash or jam, which might disable the gears. The exceptionally large and perfect working internal and external brakes are so arranged that there is absolutely no torsion on the rear axle or possibility of twisting it out of its anchors when the brakes are operated. The unit construction of the transmission and rear axle mechanism where the greatest work is performed in propelling the car. The unusually large and strong gear teeth in both the transmission and the driving gears. The Rutenber motor used in the Glide Special car is provided with an internal, self-contained oiling device, which keeps the oil at a constant oil level and thus regulates the oiling of the motor to a certainty and prevents over-oiling and sooting spark plugs. The motor is fitted with a double system of ignition, both the battery and the magneto, the Bosch magneto being geared to the timer shaft and the gears encased. The car is finished in automobile red, Brewster green or automobile gray. The price complete, with headlights and extension top, is $3150.00.

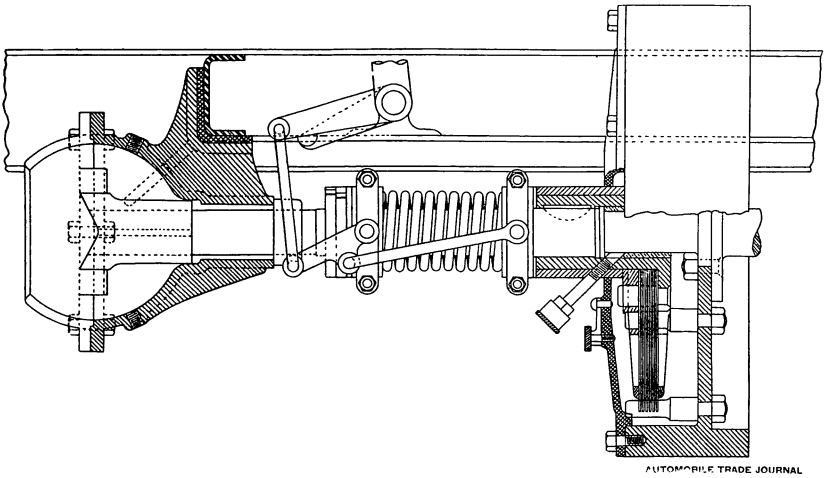

Fig. 5. Partial sectional view of Model G Special multiple disc clutch and universal joint. This clutch as shown is entirely encased in the fly wheel and consists of a series of discs 13 inches in diameter. Six discs are attached to the fly wheel and the five alternating discs are carried by the clutch shaft. The clutch is engaged by the usual spring arrangement and disengaged by foot levers. The plates run in an oil bath. The ball shaft housing at the left encloses the universal joint and carries the supply of oil into which the joint dips as it rotates. This housing is rigidly attached to the cross frame member and supports the forward end of the propeller shaft housing and transmits the thrust of the rear wheels to the frame.

According to figures received by the American Motor Car Manufacturers' Association the exports of automobiles during 1907 total 2,894 with a value of $5,120,963 against a total of 1,155 cars and a value of $1,792,308 during 1906. This is a gain of 1,730 cars and $3,328,655 in valuation.

W. O. Foster & Co., Newton, Ia., expect to bring out a light-weight, high-wheel, rig fitted with a double cylinder, air-cooled motor, and friction drive, doing away entirely with differential and transmission gears and not even using any chains or sprockets.

The French Automobile Club is trying an interesting experiment in Paris. It has enlisted and will provide for the expense of maintaining a bicycle auxilliary force, whose chief duty will consist in warning motorists who may be unconsciously infringing municipal regulations. Each bicycle policeman carries three small flags, meaning respectively "smoke," "too fast," and "smell." The squad now devotes its attention to the Champs Elysees, but if the service is found effective, it will be increased to include all principal thoroughfares.

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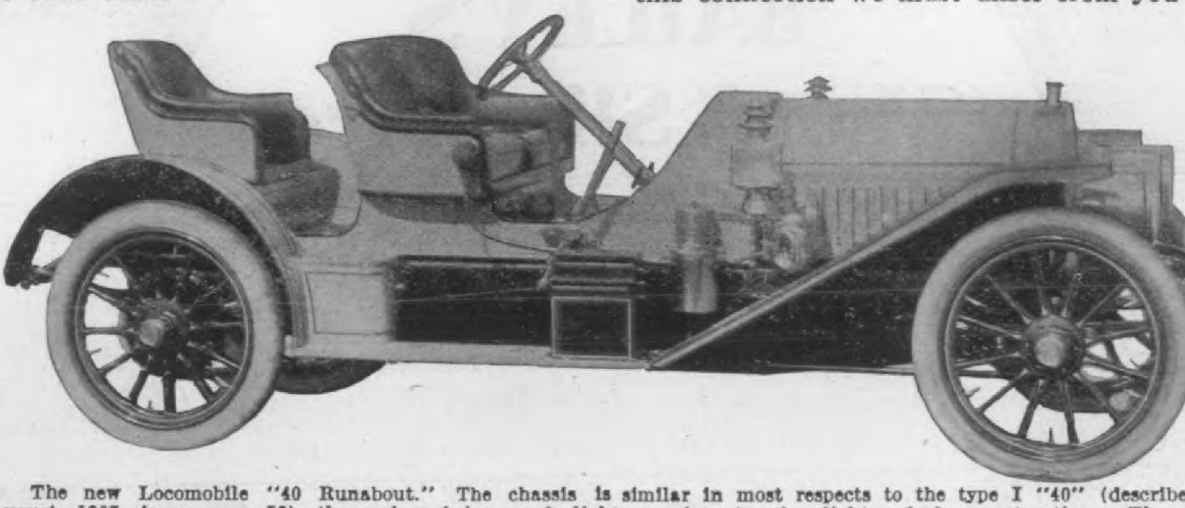
bout. This car was exhibited at the re-
cent Boston show for the first time. The
chassis resembles the type I "40," made
by the same concern, Locomobile Co. of
America, Bridgeport, Conn. In most
particulars, only the springs are lighter,
owing to the use of a much lighter body,
and the seats being lower, give a very
low appearance, altho the Locomobiles
ordinarily have this effect. The steering
column is inclined at a sharper angle than
on the ordinary touring car, and the steer-
ing wheel is increased in size. Other
minor changes have also been effected, al-
tho the power plant with its 40 H. P. motor
remains unchanged.

A strong effort has been made to secure
in this car a combination of style, con-
servatism and comfort, the company be-
lieving the average runabout to be rather
an extreme vehicle, and the seats ordina-
rily far from comfortable, as on many run-
abouts the driver's seat is nearly over
the rear axle.

compilers of the articles. We, being th
neers in the manufacture of articles for
erly inflating tires and determining th
flation of pneumatic tires, naturally
very carefully what is said in that co
tion. On page 45 under a scale of size
more hints which read, "Proper Inflatio
termined by Flattening." In this conn
we feel that our experience in tire inf
teaches us that there is absolutely no m
or means for determining the interior
sure of a tire without a gauge and mea
dislodging the valve so as to allow the
the tire to communicate directly with a
sure gauge.

Your article states that when a c
loaded the tire should flatten about 2
an inch, but should never be depressed
than 3-5 of an inch. If the person who
this portion of the article would stop to
sider, he would find, that a new tire
thick heavy walls will not flatten near
much as an old tire whose walls are thi
whose fabric has been thoroughly lim
up.

You state that by means of the bread
that part of the inflated tire which com
contact with the ground that one ca
whether the tire is well inflated or not
this connection we must differ from you



The new Locomobile "40 Runabout." The chassis is similar in most respects to the type I "40" (describe
August, 1907, issue, page 56), the springs being much lighter owing to the lighter body construction. The
are low and the steering column is inclined at a sharper angle than on the touring car. The rear seat or
as desired rest up on a military box and one, both and also the box can be removed if desired, leavi
large platform carrying space for touring.

In the new "40 Runabout" the seats are
arge and luxuriously upholstered and nor-
nally are four in number—two in front
and two behind, the rear seats being placed
on an artillery box. The seating arrange-
ment is quite elastic, for if desired, one
eat may be removed and the remaining
one placed centrally over the artillery
box, making a three-seated car. Or, if de-
ired, both seats may be removed and the
rtillery box alone left in place. There
s sufficient room between the artillery box
nd the front seat to carry a trunk or a
arge wicker hamper, and if desired, the
rtillery box may also be removed, leav-
ng a large platform.

Mr. McIntosh of the firm of Morrison

cally. We say positively that no perso
tell what the interior pressure of a t
by the flattening of the same. We fi
our experience that there will be a var
of from 20 to 35 lbs. in the inflation of
standing side by side under the same w
while they may both show the same flat
condition.

On page 46: "Do not be afraid of bu
the tires, that most tires will stand a
sure of 170 lbs. per square inch." If you
to inflate a pneumatic tire with a soft
tube to 170 lbs. and try to run this ti
the road, we feel safe in saying that 15
would be the limit of your journey. We
found that tires inflated to 125 lbs. wil
bed the soft rubber tube so into the
lining of the case that it will be squ
until it became porous and will not hold

Note on the same page what you say
"Summer and Winter Inflation Press
This statement is right. The write

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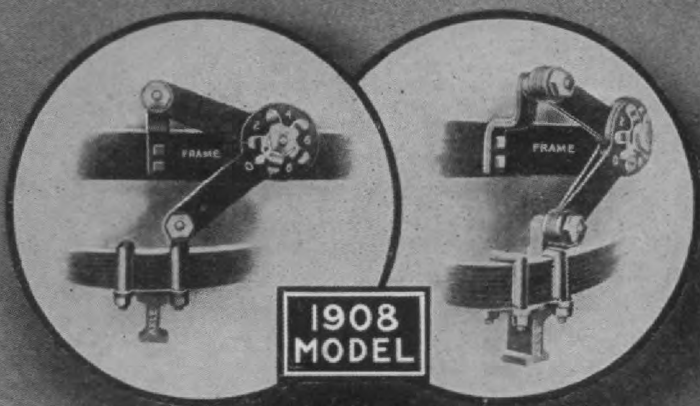
TRUFFAULT-HARTFORD

SHOCK ABSORBER



The device that made Safe, Speedy and Comfortable automobiling possible

Increases speed. Doubles the life of tires. Prevents lost traction. Absolutely prevents breaking of springs. Makes cobblestones and rough roads seem like asphalt.

Style S-2, for cars over 1800 lbs.....$60.00
Style R-2, for cars under 1800 lbs.... 40.00
Junior model for small runabouts..... 25.00

Write for copy of Ruff Road booklet. Dept. B

HARTFORD SUSPENSION COMPANY

68 VESTRY STREET, NEW YORK

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ade by the H. H. Franklin Mfg. Co., Syra-
ıse, N. Y., has been increased to ten by
ıe addition of the G brougham and the
landaulet, two of the lightest closed body
achines on the market. Both are built
ı the chassis of the G model, the smallest
the Franklin types. The wheel base of

Company, which makes exclusively
cooled automobiles, now makes two lan
lets, a limousine, a brougham and a t
meter cab. These models all retain
characteristic Franklin features of l
weight, air-cooling and large horse-po
for the weight.

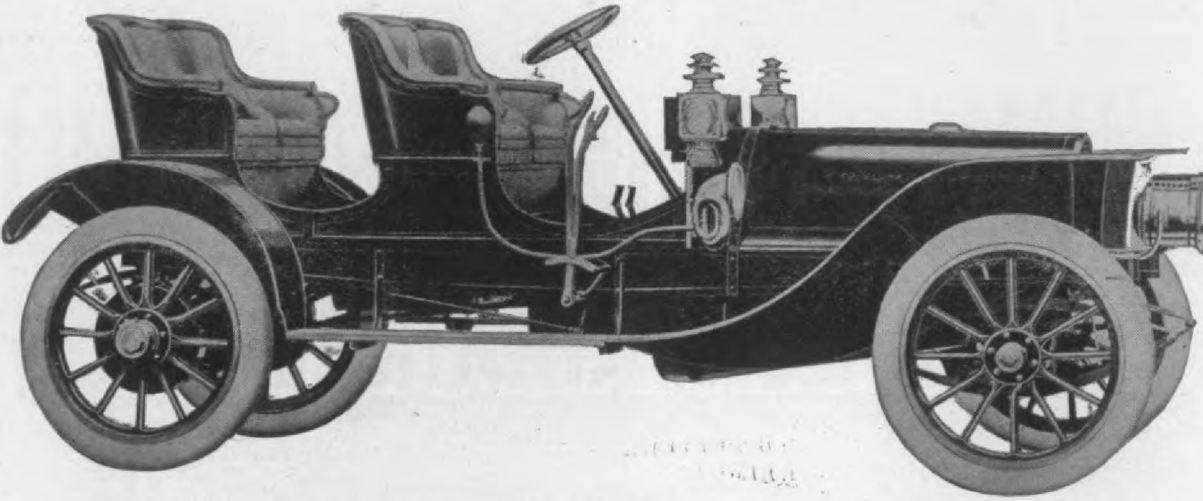

Fig. 1. 1908 Franklin Model H. This car has a 6-cylinder 42 H. P., air cooled motor, 4¼ x 4 inch
Double ignition from Bosch high tension magneto and dry cells. Multiple disc clutch; selective sliding th
peed change gear; shaft drive; floating rear axle. Tires 36 x 4 front and 36 x 4½ rear ash frame; 119 inc
heel base and full elliptic springs; weight complete 2,350 lbs., seating capacity four; gasoline capacity 14 gallo
rice as a touring car or runabout $4,000.00, and as a limousine $5,200.00.

e brougham is 76 inches and that of the
ndaulet is 92, making them extremely
ndy vehicles for use in city traffic. The
ougham, which weighs only 1700 pounds,
controlled from inside the body, and is

The most important change for 190
an increase in horse-power on all
models. The engine which formerly
veloped 12 H. P., through refinement
change has been increased to 16 H. P.

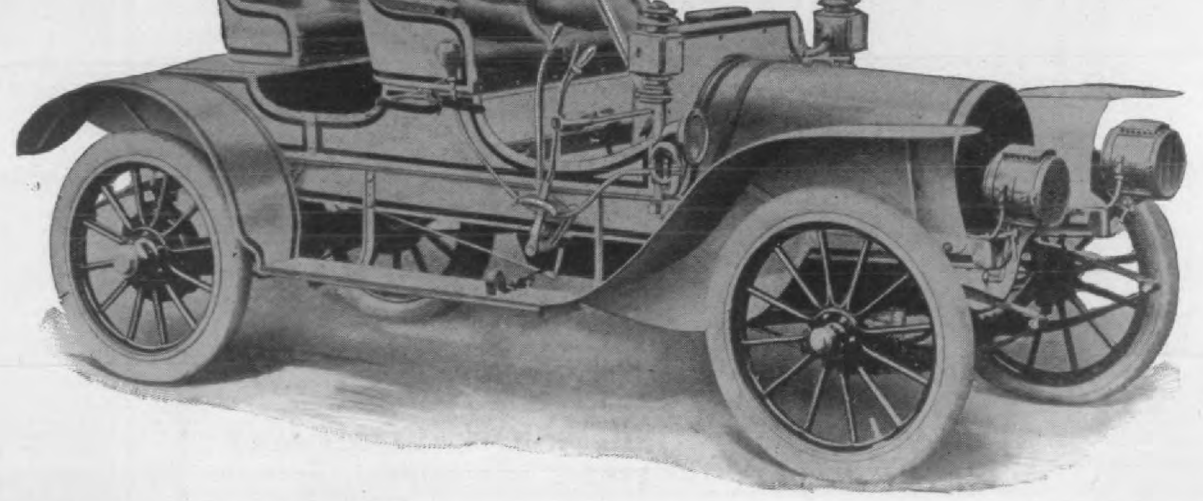

Fig. 2. The 1908 Franklin Runabout. This machine is built with the chassis and engine of the Model D. It has
our-cylinder, 28 H. P. engine, has selective transmission, 105-in. wheel base, a speed of 50 miles an hour a
eighs 2,000 lbs. It sells for $2,850.

ideal machine for the use of physicians
d ladies. The landaulet, which follows
osely the lines of the Franklin model D

fection in construction and a slight
crease in the size of the cylinders has
creased the power of the four-cylinder

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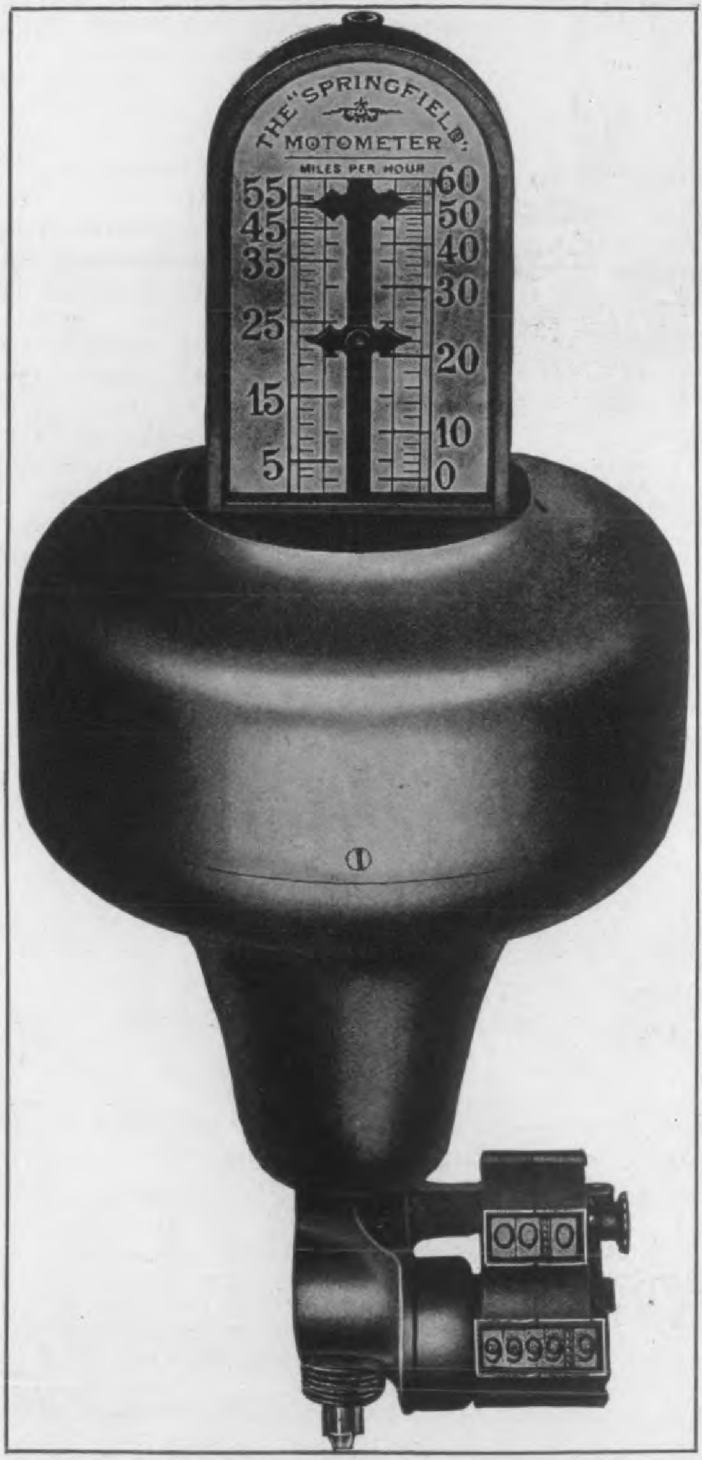
THE MOTOMETER
1908 Models and Prices



The Speedometer for the Man Who
(1) Wants Absolute Accuracy.
(2) Wants to **Know** He is Getting It and
(3) Wants to Pay **a Fair Price** For It.

All of Which is a Matter of RECORD, not ASSERTION

50 mile Model, $35.00
60 mile Model, $40.00

1908 PRICES

Maximum Speed Hand on Either Model,

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particular volume. Thus the cubic charge volume content is a maximum with the minimum amount of internal cylinder wall,

Fig. 3. 1908 Franklin Model G Brougham. This little car has the Model G chassis, the smallest of the Franklin line. Motor 16 H. P. air cooled; 3¼ x 3¼ inches; wheel base 90 inches; tires 30 x 3 inches front, and 30 x 3½ inches rear; weight complete 1,800 which makes it one of the lightest enclosed body cars built. Price $2,250.00.

while the external cooling flanges remain the same; also raises the power by allowing the incoming gases to be kept at a lower temperature than otherwise.

procurable from a given size cylind
also adds to the cooling ability of the
by insulating the exhaust valve fron
cylinder, the exhaust passing out th
the centre valve.

By this method the mean temperatu
the main exhaust is greatly reduced
the chance of this valve needing re
ing, due to heat, is largely eliminated.
construction is also particularly
adapted to use on Franklin motors c
count of their auxiliary exhaust
which carries off 71 per cent. of the bu
gases immediately upon completion c
downward stroke of the piston.

OILING.

The oil baffle plate which is place
tween the engine base and each cyl
is used on the 1908 models. By reas
this plate the oil in the engine base i
ineffectively splashed upon the wo
parts, but is drawn up by the piston
tion through an opening on the wo
side of the piston, and from there it
ually works around to all points.

AIR COOLING.

The cylinders of the 28 and 42
power engines are equipped with fl
made from high elastic limit pho

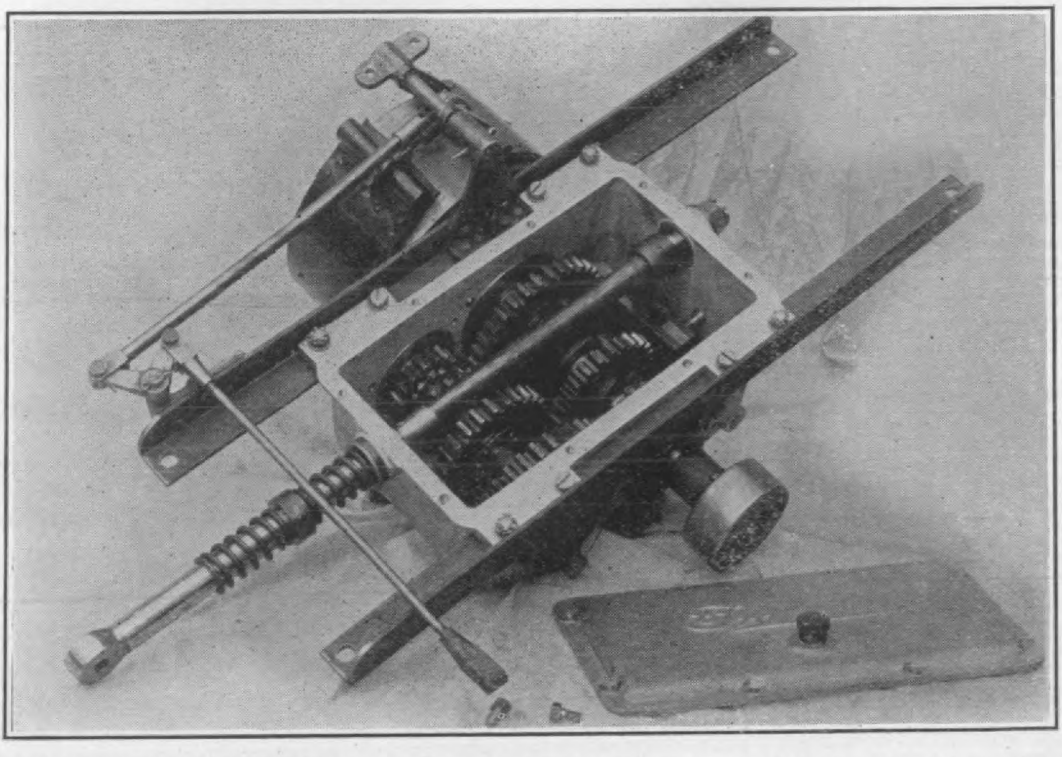

Fig. 4. 1908 Franklin Change Speed Gear. Three speeds forward and one reverse, operated on the sel system. This gear complete weighs but 65 pounds and it is claimed will transmit the tongue of a 90 H. P. e

The intake and exhaust valves having a common centre, are concentric in their construction, and being arranged in this

bronze. These flanges are shrunk
a special process, and when the cy
becomes heated it causes their c

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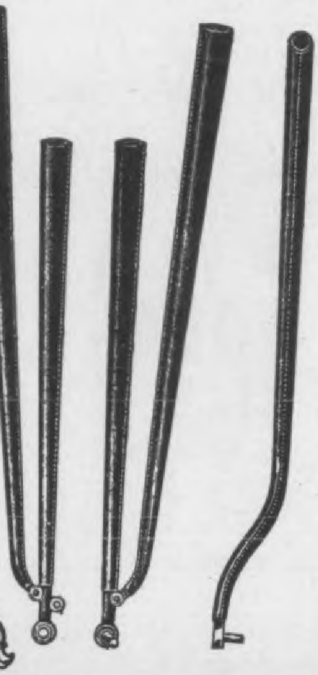
Finished Joints

For LANDAULETS and TAXICABS

SIZE

1 inch x $\frac{1}{2}$ inch oval
1 inch x $\frac{5}{8}$ inch knuckle

Cortland Forging Co.
Cortland, N. Y.



AJAX AUTO BOW SOCKETS
CORTLAND FORGING CO.
CORTLAND, N. Y.

SPECIAL SHIFTING RAILS for AUTO RUNABOUTS

FRONT GOOSENECK IRON

REAR GOOSENECK IRON

PROP IRON

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the minimum expenditure of power. The

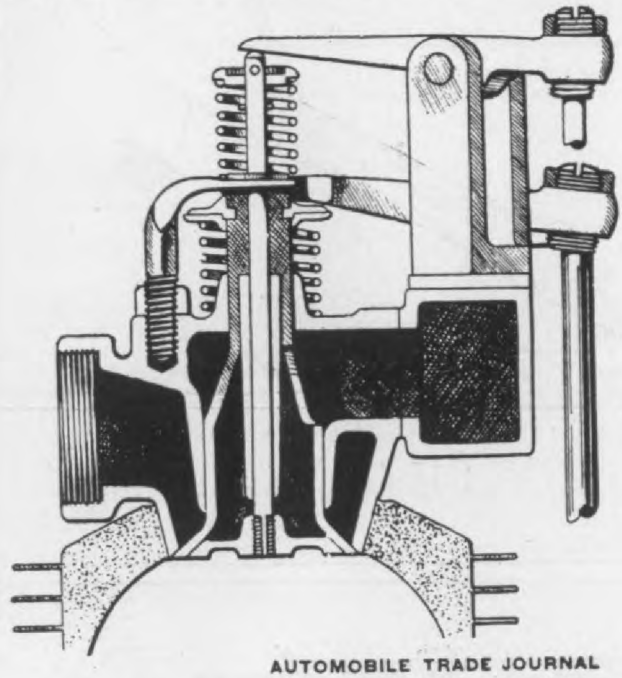

Fig. 5. The Franklin Concentric Valves. The inlet and exhaust valves are concentric and fit into the center of the domed head, making a very neat and compact construction with many advantages as enumerated in the text

cam shaft gear is made from specially prepared raw hide, and is placed in a dust-tight case at the rear of the engine, and is driven through direct connection with a gear attached to the fly-wheel.

delier, allowing the air to more thord mix with the gasoline as it comes the nozzle. The float and the chamber have also been changed. Th ing chamber is like a venturi tube, secures the maximum effect from the ity of air going by the jet. Warm transmitted to the carburetor by enci the exhaust pipe with a heat collecto passing the warm air so accum through a pipe to the carburetor.

IGNITION.

A new timer is used, this being a invention of Mr. John Wilkinson, Engineer for the Franklin Compan construction it is non-adjustable, made of hardened steel segments roller of the same material. The seg are insulated by air gaps, instead fibre, as in other makes of timers. ignition system has been greatly dev by using the Bosch high-tension m on models D and H; the 16 horse- model being equipped with batteries.

The same clutch and oiler arrang as used in the last season's cars app the new models.

The transmission used on the 28 horse-power models is entirely new, ing of a selective type, and while it light, is extremely strong, efficien simple to operate. One of the pr features is the leaving out of the "H usually appearing in the selective gear change, and the use of a com ing spring, both of which tend to tate the changing of gears.

As in the past season's models, T roller bearings are used in the

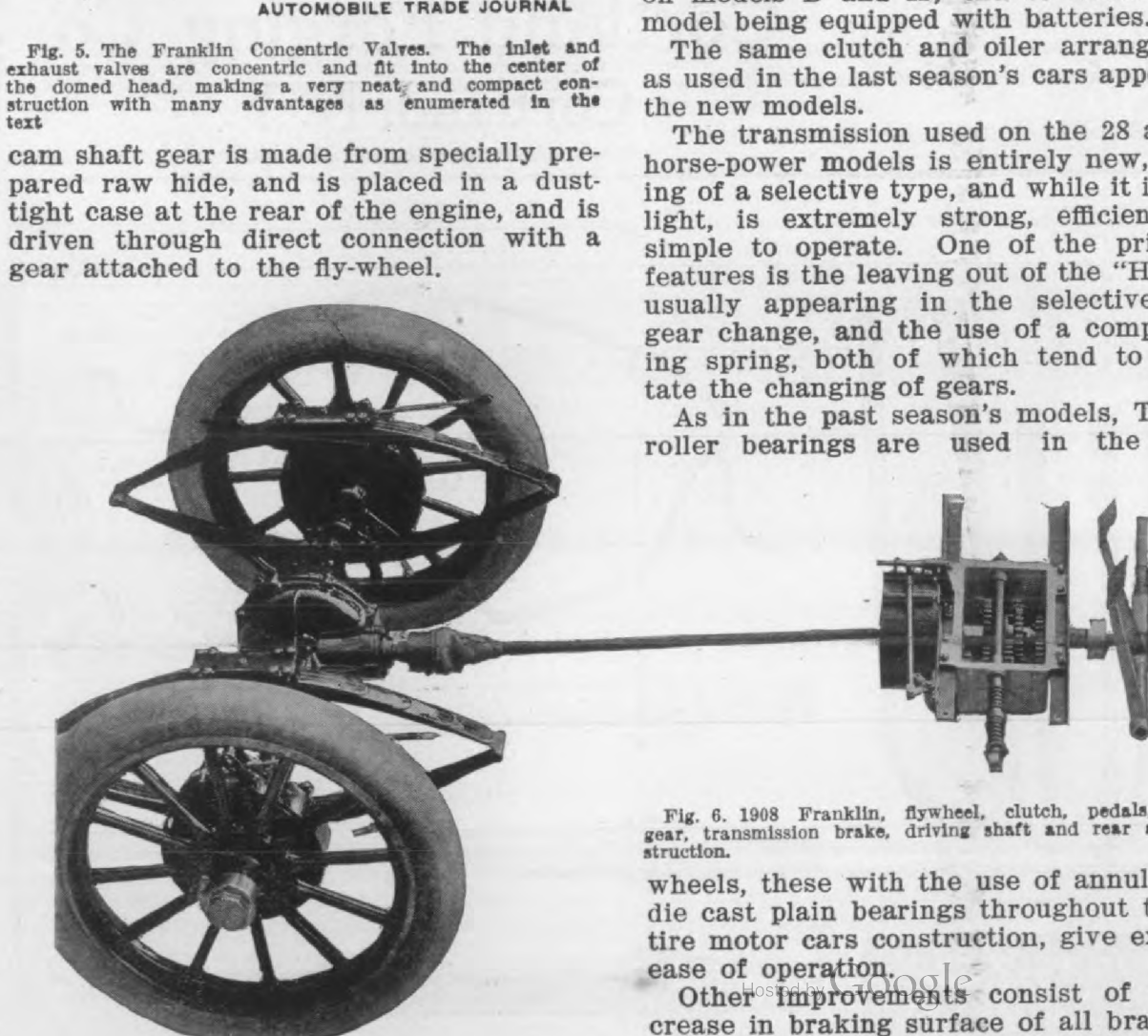

Fig. 6. 1908 Franklin, flywheel, clutch, pedals gear, transmission brake, driving shaft and rear struction.

wheels, these with the use of annul die cast plain bearings throughout tire motor cars construction, give e ease of operation.

Other improvements consist of crease in braking surface of all bra

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Hints on Care of Tires

BY WELL-KNOWN MAKERS.

(Continued from page 46, February number.)

LEAKAGE OF THE VALVE

A leakage may be ascertained when the tire is mounted and inflated.

To do so, have the valve cap screwed tightly down, then turn the wheel round so that the valve may be at the highest point of its circumference that is to say, with its cap pointing directly towards the ground; then take a glass filled to the brim with water and place it under the valve raising it so that the valve dips into it. It may sometimes happen that air-bubbles will adhere to the metal; this is not necessarily a leak.

The small spring plug is not supposed to be absolutely air-tight; it is there to act as a valve during pumping and to assure a relative air-tightness until the cap be screwed down. No complaints should be made if it lets one or two air-bubbles escape. If the valve whistles there must be a little dirt or dust in the valve. Clean the plug; if it is worn out or damaged, change it for another, which you should have in your repairing outfit.

If the cap leaks, examine the rubber cap which is inside the head of the metal cap; if it is too damaged or worn which may happen after a certain time, replace it with another which you should have in your repairing outfit. If you have nothing better put in a small washer of leather, soft wood or cloth smeared with tallow solution.

LEAKAGE AT JUNCTION OF VALVE AND TUBE

The hexagonal nut at the base of the valve ought never to be unscrewed not even to take out the tube from the rim; and furthermore it ought always be screwed up tightly. Many inner tubes cease to be air tight solely because the nut has been interfered with.

The following is good advice. Never put oil in the valve All greasy substances have an injurious effect upon rubber; the little plug would soon swell, adhere to the inside and it would no longer be possible to move it. Good valves work perfectly when directions are carefully followed.

CASING INJURIES

It is possible to injure the casing severely without hurting the inner tube and again a slight casing puncture by a nail or similar small article may put the inner tube out of service at once. In most cases, however, where the casing is severely injured, the inner tube suffers also.

TEMPORARY REPAIRS

First, block the wheels of the car with anything handy then jack the axle up so the proper tire will be clear of the ground. If the trouble is a small puncture, only, which has gone through the casing, it can be temporarily fixed up by applying a cloth and leather patch to the inside with solution carried for that purpose. This will keep the inner tube from coming in contact with the rough edges of the canvas.

Many drivers make no effort to fix the tread in case of a small puncture but any cut which penetrated to or through the canvass should be vulcanized as soon as possible to keep moisture from entering and rotting the canvass. A temporary repair in the tread may be made by first opening and cleansing the cut with gasoline on a rag or waste, and then applying a liberal coating of good rubber cement in the cut and on the exposed fabric. The cut should then be held together for a short time until the binding is effected.

For a larger cut the proceeding is much the same, but in addition the tire should then be inflated to 14 lbs. pressure and a leather gaiter firmly laced on it. The gaiter should also be anchored to the spokes to prevent creeping, this will prevent foreign matter from entering the cut. The tire can then be inflated to full pressure and used.

For a blowout the following are the best expedients:—

1. Insert a blowout patch such as are now on the market, inside the casing which will hold the inner tube safely without friction and apply also a rubber protector outside underneath the gaiter or hood and between rim and tread, or

2. Cut a piece of prepared canvas larger than the hole and carefully cement in place inside the casing. After giving it time to dry insert inner tube and pump to about 14 lbs. pressure, then attach the rubber protector and gaiter as previously instructed after which fully inflate the tire.

Much tire trouble can be avoided by having demountable rims and carrying two extra inflated tires in similar rims.

Morgan and Wright Rubber Works also lay stress upon the importance of proper inflation in the following terms:

The proper inflation of tires is a point which cannot be watched too carefully. A tire under-inflated will not stand the wear and tear that a properly inflated tire will. Under service conditions there is a distinct action of the threads upon one another. This is equivalent to one thread sawing another, and it may be largely obviated by proper inflation. Heat is generated by this action or internal friction, analogous to the heat developed by rapidly bending a wire. The heat will destroy the

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friction coating, then the threads will saw one another apart and a fabric rupture is the result. This adds to the wear and tear at the points of expansion and contraction which extends nearly through the entire circumference of the tire.

Under inflation is the great cause of fabric ruptures. Observe the inflation of you tires not only under usual load but when every seat in your car is filled. When tires are properly inflated they should stand up round under the full load the car is designed to carry. All fabric stretches, whether it be a thread or a hawser, hence after a new set of tires has been run several days they will need additional air. Keep giving them attention until the stretch has disappeared.

SAND BLISTERS

An important point is to have a perfect rim. Rim cutting is altogether too frequent and would seldom be seen were rims perfect and tires properly inflated. Sand blisters and loose treads are caused by small cuts in the cover which allow dirt and moisture to penetrate to the fabric. Unless removed and the cuts cemented this dirt becomes powdered and as the friction stock is softer than the thread stock the dirt follows the line of least resistance and is slowly pushed between these layers causing their separation. Most tire manufacturers use four sizes of lugs, a four inch tire takes a "C" lug, and a four and a half inch tire a "D" lug. It is not infrequent to see them changed about, neither lug can properly seat itself and will surely be a cause of trouble.

To sum up the great causes of tire trouble and dissatisfaction under inflation and lack of attention to the small cuts and punctures allowing moisture and dirt to get in. We cannot impress upon the public too strongly the necessity of keeping their tires well inflated. If all tires were well and properly inflated the cost of tire main enance would be reduced fifty per cent.

The Diamond Rubber Co., Akron, Ohio, in reference to the effect of speed on tires, say:

"We would not undertake to make any definite statement as to the comparative length of the life of tires driven at different speeds, but of course no tire can stand up a great while at 70 miles an hour, and the man who drives at an average of 20 miles an hour or less will get more than twice as much service from his tires as the man who averages from 30 to 50 miles an hour. First, last and all the time, it is the user who gives his tires attention, keeps them well inflated and minor injuries repaired, who gets maximum economy and satisfactory service. We find that the user who habitually gives his car proper attention, keeps it well lubricated and all that, is the man who also looks after his tire equipment, and for this reason gets the best results. But to so great an extent does the element of luck and chance enter into any proposition involving the probable life of a tire, that it is impossible to predict just the extent of mileage any user will obtain." They also add their warning against using improperly inflated tires, the effect of which is constant contraction and expansion of the tread and a constant bending of the walls, neither of which occurs to any considerable extent when the tire is pumped up sufficiently hard so that it will not flatten even under a fully loaded car. Furthermore, a tire run partially flat is constantly bunching up a fold of rubber and fabric, just ahead of the point of contact with the ground and it is safe to say that half the trouble the user is likely to experience, provided he has tires of proper construction and proper sizes, is due to their being allowed to run insufficiently inflated.

USE LARGE TIRES.

The sizes of tires to use under given loads will have much to do with comfort and ultimate economy. It is really wise to use tires of a size larger than usual requirements call for, that they may safely bear an excess load at any time. The difference in initial cost will be repaid many times under average conditions. A point to bear in mind, also, is that for a car carrying four persons tires should be 3½ inch or larger. Too much economy in initial cost of tires, becomes the grossest extravagance—to say nothing of trouble and annoyance, when the tires are put into service.

The question is often asked, if the conditions of service are the same and the size and make of tires the same, why should one automobile owner find his tires badly worn while his neighbor's are still in good condition? What investigation has always shown to be the fact is, that *conditions of service are not and cannot be identical in any two cases.*

One machine will strike a bit of glass that the car just ahead of it missed. The damage is not noticed, but in a short time a sand blister has formed, moisture has penetrated to the fabric of the tire, and its period of usefulness is greatly shortened. Or it happens that the wheels of one car have come to be a very little, or a great deal, out of true. The result is obvious.

One man habitually applies brakes with too much force, takes corners at speed, locks his wheels for sharp curves, or, it may be from sheer ill-luck, encounters a world of trouble that his neighbor, traveling the same road at the same time and at the same average speed, escaped entirely.

CAUSES OF BLOW OUTS.

The Diamond Rubber Company cites three principal causes of blow outs.

"First of these three, and perhaps the most dangerous, as it is the most difficult to discover, is the "stone-bruise." This consists of an internal injury to the casing, due to a violent

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collision with the street curbing or some other obstruction. One or more plies of fabric in the casing are broken and a weak spot is the result. The strain of service is largely centered in this spot, for the reason that any article will give most at its weakest point. In time a blow-out occurs. It may happen on a perfectly smooth road. The tire user in many cases, considers the accident capable of only one explanation, and that is that the tire was defective.

Unfortunately a stone-bruise does not show itself either inside or outside the tire casing. If there is reason to believe that a casing has been bruised sufficiently to rupture a ply of fabric it is wise to remove the tire and examine it. The weak spot, if one exists, is usually apparent by the unnaturally easy bending of the casing at the damaged spot. The inserting of a new section at this point, a repair which requires the most expert handling, is the only remedy.

A "jab" or deep cut, or it may be a severe puncture, is quite likely to be followed by a blow-out in just such a manner as that which a stone-bruise produces if a repair is not made. In the case of a cut or bad puncture, however, the danger is increased because moisture is admitted to the fabric. A vulcanized repair is the remedy, and as deep cuts and punctures reveal themselves if the tire is carefully examined, it is usually possible to repair the damage and eliminate the danger.

Still another form of blow-out is due to excessive wear of the tire or deterioration of its strength due to long service. Or it is possible that a defect in the casing itself may be responsible. An injury of this kind may be called a "Clean blow-out," and it may be guarded against by having tires retreaded in reasonable season and keeping them in repair generally.

Very rarely if ever is a blow-out due to excessive inflation. On the contrary, it is most often the case that tires are not inflated enough."

ABOUT RIMS.

It is as important that tires should fit the rims properly as it is that they should be well inflated when in use. A rim in which the bead or clincher of the tire is not perfectly seated will cause rim cutting as surely as will the running of a tire flat. Similarly, rims bent or badly indented will cause trouble. Injuries to the rim can often be repaired, but in any event, bear in mind that tires are much the more expensive of the two.

None but inspected rims should be used. They should be kept free of rust. Paint will do this effectively and cheaply. All inspected rims are stamped with the mark herewith shown.

Rough surfaces, projecting screw heads, spoke heads or similar sources of injury in the rims may do great damage to inner tubes, and unless the cause is removed repairs are of little use. It is on account of the likelihood of damage to the tube that we advocate the use of protection strips on one-piece clincher rims.

Wire wheels are especially apt to give trouble and some of the wood wheels on the market are scarcely better. If the screws which hold the rim to the felloes are not properly countersunk trouble is certain.

The best remedy for difficulties of this nature is to make certain that the inner surface of the rims are perfectly smooth and true, and that they are free of dirt and rust, and then apply a protection strip.

TRANSPOSING TIRES.

In ordinary wear it is usually true that tires on the right side become worn more quickly than those on the left. This is due to their being run into ruts and stones, when the car is turned out of the traveled roadway, and because the tires of the right side suffer most from curbings and the like as the driver uses the right side of the street.

Ruts, curbings and similar tire destroyers may wear the outer wall of a casing nearly to the fabric but if the position of the tire is reversed, and that side which has been most exposed and most worn, placed nearest the car, it will still be serviceable.

As the rear tires sustain more than half the burden in every movement of the car they will wear more rapidly than the front tires. For this reason it is not infrequently advisable to change the rear tires to the front and vice versa.

(*To be continued.*)

W. B. Pearson, president of the Standard Screw Co., Chicago, reports he has driven his Winton Six-Teen-Six 1876 miles without a single repair item or delay.

Mr. J. R. Bradford, formerly of the advertising department of the National Cash Register Co., Dayton, Ohio, is now connected with the Inland Auto Company, Walla Walla, Wash., as advertising manager and salesman.

Robert C. Hupp who has been connected with the Ford Motor Co., for a number of years in the purchasing department has resigned to accept a position with the Regal Motor Car Co. as manufacturing manager. He has been associated with the industry for a number of years, and has had a wide practical as well as theoretical experience in all branches of automobile construction.

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Are you in earnest about wanting to cut down your tire expense? If you are, buy an

If you really want to know what the Elmore saves in tire wear watch a heavily loaded street car vainly endeavoring to start up a slight incline when the tracks are slippery or icy.

If you want to know just what wear and tear on the tires the Elmore does not cause, watch those same wheels to which the power from the motor is applied whirl helplessly around and send forth a shower of sparks while the ponderous car barely moves.

To still further realize what an economical car on tires an Elmore is, watch another car on similar tracks slide along for many feet after the brakes have been applied to the wheels to keep them from rotating.

When you've seen these examples of wear and tear on car wheel tires you've seen wear and tear which is analogous to the wear and tear on the tires of any four cycle automobile. Perhaps not to so marked a degree but analogous, nevertheless.

This wear and tear in a four cycle car is simply unavoidable because the inherent principle of the four cycle car is at fault. It is caused by the uneven and broken application of power.

In any four cycle car first there is a power stroke and then there follows an idle stroke causing a scuffing and jerking on the tires that hastens their annihilation.

The only possible remedy to this condition is the two cycle principle, as exemplified in the Elmore two-cycle valveless car.

In an Elmore such wear is impossible because the power application is continuous, and the wheels rotate at the same speed as the car moves.

Any agent will verify these statements---see one at once. In the meantime write to us for literature.

The Elmore Mfg. Co.

904 Amanda Street, Clyde, Ohio

MEMBERS A. L. A. M.

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EDITORS

Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.

Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

A BAD CASE OF OVERHEATING.

Kingston, N. Y.

I have a single cylinder motor, 4¾ bore by 6 stroke. When cool the compression is strong and holds well for five minutes. When hot it can be cranked over easily with the relief cock closed. It also gets so hot it pounds and I am obliged to stop and cool it. The water boils. I believe the rings are faulty. Would it be better to put in new rings or attempt to expand or enlarge the old rings? There are four of these rings, which look bright when removed. The upper side of the cylinder is dark and has a color that looks as though it had been overheated, but the direction of rotation is such that the greatest friction would come on the under side and the weight of the parts would also add to this. What is your opinion in regard to this? Is it the rings or some other cause? The engine hasn't the power nor speed it formerly had for it was once very strong for its size. The overheating is what gives most trouble. When running fast with but little load it does much better than when heavily loaded, in which case it quickly heats up. You may answer this thru the Journal and oblige.

C. B. COONS.

I am of the opinion your trouble is with the oil you use on your cylinder walls. When cool the oil is thick and stops the cracks so that it holds compression well, but when hot it is so thin it blows away or possibly it smokes away and leaves the wall dry. If the rings are bright they are all right. Where the cylinder is black would indicate a warpt spot. If this is very large, you may have to rebore the cylinder and fit new piston and rings, but before doing this I would try the virtue of a high-fire test cylinder oil. You can get oils that will have good body when the usual oil has smoked away. Put an oil cup on the top of the cylinder and feed oil to the black spot. If it gets dry here it not only gets hot by friction, but the gases rush out and leave their heat in the walls. Many a poor engine has been blamed for overheating and more radiator been supplied when there was nothing the matter but too low fire test oil. A thin oil is nice for starting on a cold morning, but if you want power and pull at low speeds you must use an oil that will pack the piston when it is hot. And such oil is the most economical for it not only gets more power out of the fuel, but it stays where wanted and does not need to be fed so freely. Better pay three times the price for a good oil than take a poor one. On the other hand, it is possible to use oil so thick that the friction due to pushing the piston thru the thick oil is a big loss and cuts the power way down. I have supplied oil to a motorcycle user and had him say that it added 25 per cent. to the power while the next man found he had lost power. Study your conditions and get what you need. Never mind the other fellow. His ideas or needs may be different. C. E. D.

HOW TO SET VALVES FOR GREATEST H. P.

Kearney, Wyo.

Can you tell me how the valves and cams should be set on a two-cylinder opposed motor to get the most power? ALBERT HINKLE.

If you have been reading this Journal long you have seen your question answered several times. The hardest problem in connection with marketing the automobile has been to educate the public. I fear many makers do not fully appreciate this. It seems to me much better to spend money showing people how simple the motor vehicle really is when stript of all unnecessary features than to spend it showing them how fast it can go. Many a buyer has not yet bought because it is a big mystery to him which he fears because he does not understand it. To overcome this lack of knowledge we are trying to make this department as plain and easy as we can and gladly answer questions over and over again. If your sole object is to get the greatest H. P. from the motor without caring how it behaves at slow speeds, then see that your muffler pipe is long and large and your muffler ample. Open the exhaust valve about 25 degrees of the crank shaft movement before the dead center and leave it open till 10 degrees after. Open the inlet at dead center and keep it open till the next. With this overlapping of the valves you can get some new mixture pulled in by the momentum of the outgoing gases and so will wash out the cylinder before beginning to draw in the new charge. This not only gives a clean new charge of great power, but by getting new mixture in the compression space which is usually left filled with burnt gas you add about 25 per cent. to the available quantity of explosive charge with a corresponding increase in power. For usual service close the exhaust at dead center or close thereto. C. E. D.

(For high speed work some makers also allow the inlet valve to remain open from 5 to 7 degrees of crank shaft rotation after the crank end dead point has been reached.—Ed.)

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DISCUSSION OF MATERIALS, STEEL AND ALUMINUM PISTONS.

Chicago, Ill.

Cast iron seems to be the accepted material for cylinders and pistons. It is cheap and wears well. Its strength, however, is low in proportion to its weight and it is rather unreliable unless large sections are used. Its use, therefore, becomes questionable when light weight is sought. Steel cylinders were used on the C. G. V. car for a short time, but were soon replaced with cast iron. The Thor motorcycle engines had steel cylinders in 1906, but since then cast iron has been used. Steel cylinders continue to be used on racing machines. The Panhard racers had them this year as did Christie in his Grand Prix racer. Christie used steel pistons also. Each of them had two rings of phosphor bronze cast on to form the bearing surface. Prest steel pistons have been used on the De Dion engines for some time and were used on several of the French racers last year. None of the latter, I believe, had both cylinders and pistons of steel. Steel on steel is a bad combination unless hardened. Only one engine in which both cylinder and piston were of steel ever came under the writer's notice and it had both cylinder and piston badly scored. The use of steel cylinders seems now to be confined to racers where copious lubrication is always had. The use of steel pistons in cast iron cylinders seems to be growing abroad.

It would be interesting to know how the bronze bearing rings on the pistons of Christie's racer worked. I understand that alloys containing copper have been found unsuitable for packing the piston rods of large double-acting gas engines, as such alloys were attacked by carbonic acid. White metal would not stand the heat.

The Tony Huber-Peugeot motor which won the French two-cycle motor trials was fitted with an aluminum piston. This use of aluminum while novel seems to offer some advantages, especially for two-cycle and air-cooled engines. The heat conductivity of aluminum is 665 (silver 1000), while that of cast iron is 35℃. Thus the temperature of the piston head would be lower and better equalized when aluminum was used than with cast iron. Since aluminum melts at about 1160 degrees F. and loses strength long before this point is reached it is doubtful if very much weight could be saved. Aluminum has a high coefficient of friction (hence its use in friction drives), but this should be of little moment where the surface is lubricated. Since the expansion of aluminum is .00001234 inches per degree F. as compared with .00000556 inches for cast iron a large allowance for difference in expansion would be necessary. As the compressive strength of aluminum is very low, much below its tensile strength, the allowable pressure per square inch of bearing surface would have to be low; which it usually is in pistons as the speed is high. The writer never saw aluminum for a bearing but once and then the pressure was sufficient to enlarge the bearing and soon caused the aluminum to abrade.

Aluminum is used for the cylinder heads (water-cooled) of the Antoinette aeronautical motors in France with good results. Aluminum pistons in steel cylinders would seem to have good features for some conditions. Manganese bronze would seem even better if not attacked by carbonic acid. A thoro discussion of the use of various materials would be beneficial, I believe. W. L. BROCK.

We are glad to get your most interesting letter. If our readers will freely use this department it will be all the more interesting to all and help much toward the perfecting and introduction of this valuable means of transportation, the automobile. Cast iron has several features which commend it for hot work. If you will wipe your fingers across a piece of cast iron that is being machined you will get them dirty. Other metals will not show this effect, so it becomes plain that the iron is different in one peculiar manner at least. This blackening is due to the presence of graphite and it is this which protects the iron from wear and perhaps also from heat. It does not warp out of shape so easily as some other metals and this is of value where durability is to be considered. In engine work, except in special cases, it is strong enuf to stand the service if it is thick enuf to machine easily and truly. On account of this fact nothing is gained by substituting steel or bronze. If the cost of working is not to be considered, then the walls may be made still thinner and the strength of the material and its ability to resist damage from accidental blows become of importance. My own experience with thin steel walls says this was due to the expansion under the sudden application of the intense heat of the explosion with consequent leakage. A mass of metal, however, cannot be changed in temperature so suddenly. I attributed it to intense heating of the walls in spots with consequent burning of the oil and added friction because of this destruction of the oil film.

With a steel piston the case is different. The rings take most of the friction and the piston has simply to hold the rings in place. The piston is subjected to severe mechanical shocks and these are destructive to cast iron, so that metal is not so advantageous in a piston as in a cylinder. I am sure designers could save weight in reciprocating parts by different design. The prest steel pistons are leading in the right direction for they require that the piston pin bearings be attacht instead of cast in place. If the piston is made plain inside so it can be machined, it can be made quite light and the pin bearing can be riveted or bolted in place.

I experimented with aluminum considerably in the early days, having used it for engine heads, water-cooled, and for pistons both of motorcycle engines and for large engines in 1897. I found it often porous so that the pressure forced the gas thru it altho it lookt sound. Further it grew weak under so little heat that I was afraid it would fail if a man forgot his water supply and on such accounts I ceased to use it.

For bearings, aluminum is not good unless the weight is negligible. I understand that in such places as clock frames it wears better than brass. It is my belief that we do not need more expensive materials that we may gain a little power or save a little weight; but that we need simpler devices. Simplification will both save manufacturing cost and maintenance expenses. Simplification will reduce weight and add efficiency faster than anything else. C. E. D.

SPRING PISTON.

PHILA., PA.

I will thank you for your opinion as to what would happen in the make up of the following engine, cylinder as per sketch. Also what kind of card it would be apt to make.

The spring piston will be moved toward the head end and springs comprest at instant of explosion, as the regular piston moves away from its center the spring piston will follow up and keep up the pressure some so as to use it at the point of most leverage, when reached by the crank. In other words I would say that the spring piston would cause the high peak on an indicator diagram, to lower, and to draw it out more, for instance like a late cut off in a steam diagram. SYD VERTS.

Your spring piston idea has been shown by another man in these columns. His letter appeared page 132c, March issue. There is nothing new in it and it is not worth patenting. It will do the work as you describe but the spr ng would be short lived or else very heavy. Why not use gases for a spring? They are frictionless and give back all the power put into them if their heat is not allowed to escape A low compression does just what you are trying to do so far as the card is concerned but it does not scavenge as your device would do Scavenging can be secured by opening an air port at the end of the exhaust stroke and leaving it and the exhaust port both open for an instant. Fresh air will follow the exhaust and wash out the cy inder ready for a new charge which can be a little richer and thus give good power with low compression. I have advocated low pressures for auto work for years and I am pleased to see the idea gaining ground.—C. E. D.

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TROUBLE IN STARTING.

Springton, Pa.

I have a 1907 runabout. Got it in September, new, and have trouble in starting. The compression is alright and battery does not seem weak. I went to Easton to see the endurance run and had her standing about two hours and then could hardly get her started, but after she started ran her about 17 miles, did not miss an explosion and worked fine. Can you give me a cause for the trouble in starting? What anti-freezing mixture do you recommend that is not injurious to car and gives complete satisfaction? DAVID H. CRESSMAN.

Starting trouble is usually due to improper mixture. If you get a mixture into an engine that has just been runing well, you can feel pretty sure that it will fire and run again. A strong spark is needed more with a cold engine than with a hot one. Try wetting a kerchief with gasolene and placing it on the air inlet. This will cause the air drawn thru the kerchief to become saturated with vapor of gasolene and so fire easily when it gets to the spark points. With make and break spark it sometimes happens that the break is slow and so makes a weak spark, but this cannot be the case with a vibrator coil. Denatured alcohol and water, half and half, is a good anti-freeze compound C. E. D.

ENGINE WILL NOT SPEED UP.

Columbus, Ohio.

I have a single cylinder 4-cycle engine in my runabout. It does not develop the power that it ought. I am under the impression that the fly-wheel is too large. The cylinder is 6x6 ins., and the fly-wheel is 24 ins. in diameter. Has a four-inch face by two-inch in depth. The compression is good. The spark is strong and the carburetor adjustment O. K. The best that this engine can do is about 320 revolutions per minute. I am under the impression that the engine should do much better. I would be pleased to have your opinion on the matter, and any information would be greatly appreciated. I will be pleased to receive your answer in your most interesting journal of which I am a reader. C. E. HERMAN.

The size of the fly-wheel has nothing to do with your trouble. Evidently the valve timing is wrong or the valves do not lift properly. Or maybe the muffler is clogged so that the gas does not get away at the faster speeds. Take off the muffler and try the engine. Find out when the valves open and how much. Also be sure that the spark is timed right. Such an engine should be able to run up to or above 1000 r. p. m. When you find the trouble write and tell us for the benefit of the next man.

FOUR-CYLINDER OPPOSED MOTOR.

Lindsay, Canada.

We have been working on a two-cylinder, four-cycle opposed engine; 7¼ inch bore, 6¾ inch stroke, running at 650 revolutions per minute, but have difficulty in keeping the connecting rods from getting hot and we cannot get sufficient power out of the engine. We want 28 H. P. continuous work. We govern with throttle on air intake and we are not satisfied with the outfit in any shape. What we are now thinking of building is a four-cylinder opposed, 7¼ inch bore, 8 inch stroke to run at a speed of 450 revolutions per minute, the crankshaft to be made with bearings 7½ inches long on cranks which are opposed; the connecting rods on each opposed engine to work side by side on crank; the cylinders would offset 1½ each; the balance of offset would be made on connecting rods; there would be centre bearing for crank shaft; the cylinders would stand on an angle about 1-6th. Our idea for this is to get the oil more easily to crankshaft bearings. We were also thinking of using a governor on gasoline supply instead of air intake. We would like to have your idea about the opposed cylinder engine working on the angle and also as to best style of governor. We are wanting this engine for combined traction and power and to be as light as possible, say about 1800 pounds weight, to develop 35 to 40 H. P. Any information you can give will be thankfully received.

SYLVESTER MFG. CO., Ltd.

Your present engine looks to be well designed. I would hunt first for trouble in the making up. If you have undue friction anywhere it will cut out the power and so prove to be the cause of your trouble. Examine the pistons carefully to see that they are not rubbing hard somewhere. If they are too tight they not only destroy power, but throw more strain on the connecting rods and perhaps spring them. An offset rod must be stiffer than one not offset. If these are not of the stiffest steel and if they show any signs of uneven pressure, I would either get a new pattern stiffer sidewise or get steel castings from some good steel foundry. Be sure there is ample relief for the head of the piston. A flat head can only expand diametrically and must be one to two-thousandths less per inch of diameter to make up for the difference of temperature in the head and in the water-cooled cylinder walls. Also be sure that the crankshaft is true. If the pins are not parallel to the shaft, the bearings will heat and pound in spite of all you can do. A locomotive building friend told me they always had trouble with crank pin bearings when they bored the pin hole from one side and the axle hole from the other, but since boring both from the same side and with the same setting so as to absolutely insure parallelism their crank troubles ceased. A governor should work on the mixture. It is not easy to get good results even in a slow speed engine by throttling one element of the mixture for this constantly varies the quality.

You ought to be able to oil the crank pin bearing by a sight feed drip oiler on top of the case with a wiper on the connecting rod end. This will take off the oil each turn and be sure to get it where wanted. A little graphite helps smooth up a rough bearing and keeps things cool. If you wish to incline the cylinders, I see no objection to doing so except the explosions will not quite balance. The second will follow the first closer than the third will follow the second. This is of little moment in an engine as heavy as you propose. If you want it as light as possible, it need not be over two-thirds as heavy as you propose and still be ample in every part. If you put two connecting rods on the same pin, put a single bushing under them. This distributes the work over more surface than if you let each work on one-half the space. It will let you make the pin but slightly longer than if for one rod if you choose to make it so short.

For stationary work the pendulum governor is the simplest, but for traction work you must have a ball or centrifugal governor. You will get greater economy from a hit or miss device, but for steady running use throttle governing and put on plenty of large flywheel. C. E. D.

SAFE PISTON SPEED.

Halsey, Pa.

Being a subscriber to the Trade Journal I would like the following questions answered: (1) What is considered a safe piston speed in feet per minute for gas or steam engines? (2) What is meant by a strangle valve? I think it is some form of automatic inlet for gasoline engines. (3) What kind of steel is the best for permanent magnets in a magneto?

J. H. DEVLIN.

Six hundred to 900 feet is considered a safe practical piston speed for a well-built engine getting good care. An auto engine is specially lubricated and is designed to run at its top speed when occasion requires, so there has of late years grown up the practice of rating them at 1000 feet per minute piston speed. I consider this a speed that requires great care if it is to be maintained. A strangle valve would mean a throttle valve or any device where the ingoing air or mixture was strangled or throttled. I would take the meaning from the surrounding text or description. Tungsten steel is said to be best for permanent magnets. Much depends on the temper and the use or abuse of the magnet after put into service.

C. E. D.

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BLAMING IT ON THE ENGINE.

BRIDGEPORT, CONN.

I thank you very much for your letter in regard to the gearing of my car. Since writing you have found that the car undoubtedly had some trouble beyond the gearing. The car is geared 4 to 1, 4 cylinders, 3½ in. bore, 4 in. stroke, and I put on a new set of cylinders, 4 in. bore same stroke and geared the car 3 to 1, but it did not seem to take it.

I found that the front wheels wh ch had been repaired at a garage, were left in bad shape, so that the housings had cut through nearly ⅞ of the steering knuckles, both top and bottom. Then after taking the wheels off and sending them to the factory, I disconnected the high speed clutch and tried turning the rear wheels by hand, myself on one side and a friend on the other, it was all we could do to turn the wheels. Then after disconnecting the universal joint back of the change speed gear box, I found they would turn perfectly easy, so took the gears directly out of the car and shipped them also to the factory.

Of course I dislike very much to have a new set of gears made, as I have 3 to 1, but if not too much trouble would like to ask you what really is the difference in ratio of bore between a 4 to 1 gear and a 3 to 1 gear. Perhaps, after all, the engine would handle the car with the 3 to 1, with these other things made right.

As I understand, in your judgment a 4-cylinder 4 x 4 ought to be enough to handle a car weighing 2,100 lbs. with a 3 to 1 gear.

I would also like to ask one more question. If the full elliptic springs are put on the rear, would torsion rods running from the rear axle one on each side to the frame be sufficient with the springs pivoted at the top The car now has platform springs, but does not seem to ride easy on the rough roads that I want to go on.

In testing the cylinders, as per your advice, would a testing gage with a set pointer be all right, turning the cold engine over by hand. I really think that there must also be a leak somewhere in the engine, and would like to try it out and see what the compression is. C. H. SHANNON.

Your letter is a particularly valuable one because it shows how prone people are to blame the motor when the car does not go to suit them, whether they know the condition of the rest of the car or not. I hear it on every side. Constantly motors are blamed for overheating when they are doing much more work than they ought to do or than they were ever designed to do. The maker puts in the size and design of motor that in his judgement is ample to make the car do the work reasonably to be expected of it. If the user by over loading as is often done by adding seats, or by neglect of bearings or similar parts increases the oad very materially and is obliged to work the motor unreasonably hard, the maker should not be blamed. Some folks think a motor should work to its limit with out damage but if they will try to do this with their own muscles they will be sore and unfit the next day. Pushing a motor to its limit calls for more lubricating oil with rapid sooting of the walls. It takes more fuel with a low record in this respect. It calls for more cooling capacity and if badly carbonized the normal cooling arrangement may fail and the car or the maker get the blame, never the brilliant genius who presides over the affair and is responsible directly or indirectly for its condition and use or abuse. Every part of the rig should be as free as good bearings and good oil can make it. Then the motor can handle it easily and sweetly. Every few days you should push the vehicle by hand and see if it is running easily. Starting the motor when hot should tell you whether it is as free as at some other time. Also keep track of the compression. Get accustomed to a good compression and try to remember how much effort it takes and if it gets harder or easier look for trouble. Harder may mean a tight bearing or a piston needing oil, while easier may mean that there is a leak. Watch the brake bands. In nearly every car they drag some. Even a little drag cuts down the efficiency a great deal. Be sure every part is as it was designed to be before beginning to change. Consult the makers as to any proposed change. They w ll usually willingly aid you and if they have tried your plan they can tell you why it is wrong and save you money.

An ordinary steam gage is all right for testing compression. Better have the engine hot for several reasons. It has to work hot and you wish to know its condition when it is working. If it is warpt out of shape it will show most when hot. If it leaks so fast that the oil will not stop it when hot, the cold oil being thicker and stiffer, might stop it and you get a false impression. Finally, compressing a charge makes heat. If this goes into cold walls it does not let the gage show the true pressure. The gage hand should fall s owly if the compression is good. If you can not get it up till it is down again, then you have a bad leak.

I do not understand what you mean by "ratio of bore" in reference to gear reductions. Before changing springs, oil up the leaves of the present ones. See that all the bolts in the eyes are free. Test how far they move in actual service. Maybe they are simply too stiff. Take out one of the short leaves. Better submit your new spring arrangement to the makers.—C. E. D.

FRONT WHEEL DRIVING AND REAR WHEEL STEERING.

WORCESTER, MASS.

I am a constant reader of the "Cycle and Automobile Trade Journal" and would like to have you answer, in the columns of that magazine, a few questions.

While I am not a motorist I am very much interested in anything pertaining to motoring. In reading the numerous descriptions of cars written for the Trade Journal by Mr. Hugh Dolnar I have noticed that he quite frequently speaks of cars, in which he has ridden, having the rear wheels try to pass the front wheels. What I would like to know is this. Would'nt this trouble cease if the cars were propelled by the front wheels instead of the rear wheels? It seems to me that this would be a partial if not complete cure for that trouble. I notice that practically all other forms of vehicles are drawn and not pushed and consequently have none of that trouble. If the front drive was used, would it not be all right to steer with the rear wheels? I ask this second question because it seems to me to be a better solution of the steering problem than the use of universal joints, or some combination of gears, to drive the front wheels if they likewise do the steering. I should like to hear from you and also from others connected with the building of cars. I have noticed that there are two or three new motor trucks coming on to the market in which front drive is employed, and this made me think that what was good for a truck was good for a pleasure vehicle, especially in the line of drive location.

Any information which you can give me on the subject will be much appreciated. FRED B. FAY.

It is a poor dog that has no good points. Front drive has some advantages, but most designers believe it has more disadvantages. We have not yet found a simple way to do it without interfering with the front steering; and rear steering is bad. Try leading a bicycle backward if you wish to actually find out how bad. The rear steering wheels must turn into a curb in order to get the car away from it.

They must cross the car tracks to the wrong side to get the front wheels out on the right side and then cross back. This is more distance and more track trouble. Rubber tires do not leave a wet car rail easily so it is often very difficult to get away from a car track without reversing and converting the thing into a front steerer temporarily. Trucks are large high priced rigs and often have to get into close quarters. They do not move rapidly and their wheels have wide tires. They therefore are less affected by tracks than the smaller faster rigs.

There is an easier solution for the skidding problem. It is simple too. Simply put the weight where it belongs, on the drivers, and you can forget skidding. Try it yourself. Carry all you can on your shoulders and you walk without slipping. Try to push or drag all you can and the footing must be of the best or your feet will slip. When the weight is on the front, it is no wonder the rears slip. For ten years I have been driving autos winter and summer almost daily and have never owned a pair of tire chains or other non-slipping device. I have also driven many rigs that lost their heads on every bit of wet asphalt and consider that such a construction not only tends to discourage buyers and users, but is under certain conditions dangerous.—C. E. D.

SELDEN PATENT DATE.

LIMA, N. Y.

Kindly advise me through your Journal the date of issue of the Selden patent and oblige. F. M. BAILEY.

The Selden patent bears date of Nov. 5th 1895. Its filing date was May 8th 1879. It was therefore kept alive in the Patent Office nearly seventeen years or a period nearly equal to the full term for which patents are granted. During this period the modern auto was perfected far enuf to hold successful contests on both sides of the water and so obtained no aid from this patent.—C. E. D.

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BLUEING BRASS AND MAKING FIRE EXTINGUISHER.

PINE PLAINS, N. Y.

Will you please answer these questions through your Mechanical and Technical Department?

1. Can you tell me of a preparation for coating metal, to give it the appearance of gun metal?
2. How is fire extinguisher made. H. JACKSON.

WORCESTER, N. Y.

Will you please tell me, in the next edition, the best formula for changing brass, by acids, to a blue or a gun metal finish, and advise me as to whether it will stay so for a long time and work. B. W. HOWE.

If I wanted to coat some metal, I would go to the nearest chandelier works and ask for a sufficient quantity of lacquer. Drug and paint stores may be able to supply it. These lacquers are made in any color and so skilfully colored that it is not easy to see at a glance whether a cheap hatchet is actually blued steel or lacquered cast iron. A handy and fairly serviceable substitute can be easily made by dissolving shellar in alcohol and coloring to suit. A solution of sulphide of potassium will color brass. Have the metal polished before beginning, if a smooth and even job is desired. Wiping it with olive oil and exposure to the weather will also serve, if not in a hurry.

The bottom idea in fire extinguishers is to provide something that when heated gives off a gas that will not support flame and by thus keeping the air away from the flame prevent it from burning.

A solution of sulphate of ammonium and bicarbonate of soda is said to serve well, and if bottled separately will keep indefinitely. Dry bicarbonate of soda (baking soda) and sal ammoniac are generally mixed with fine earth to keep them from becoming lumpy and then kept in a paper or tin cartridge. Almost every formula is different.

Fire losses are mostly preventable and the yearly loss is an enormous drain on the country. Every family should occasionally discuss what to do in case of fire and thus be ready to act if required to do so. The value of a fire pail is increased many times if a dipper accompanies it, for with the dipper the water can be thrown just where wanted. Shut off the drafts if you wish to stop the fire. Fabrics exposed to fire can be made fireproof by wetting with a 10% solution of sulphate or phosphate of ammonia. The effect is permanent until washed out.—C. E. D.

(Another method of blueing brass is the following: Warm the clean unlacquered brass and immerse it in a solution of 1 oz. Antimony Chloride, 3 oz. of pure Hydrochloric Acid and 20 oz. of water. Rinse in clean water and dry in saw dust.—Ed.)

AIR COOLED CARS FOR HOT COUNTRIES.

IMPERIAL, CAL.

I want to take up an agency for a car that will be suitable for the desert. It is very warm here in the Imperial Valley in the summer time, reg. 120 to 125° and the water-cooled cars boil their water very quickly. There are a number of water-cooled cars in the valley but no air-cooled.

I have no trouble with motorcycles over heating, would I with an auto?

Also may I ask, is there a 2-cycle air-cooled auto motor on the market, and if so, is it a success? ELMER E. PECK.

The best way to find out whether you can use air-coolers in your temperature is to try. I believe it can be done. Further I believe the air-cooler will be less trouble there, where water is scarce, than a water-cooled. I would give preference to a light car with a large motor and particularly to a car that had gone thru some of the hard and hot endurance runs successfully as well as given good service in the hands of its users. Get in touch with the makers and see what they have to say. Give preference to a cylinder that is machined all over like many of the motorcycles are, for it is likely that under the increast heat such a cylinder will expand evenly and remain true. 95 degrees is not excessive in this part of the world and you have but thirty more. A slightly less compression and a slightly higher fire test oil will make most any a r-cooler meet your needs in my opinion. If you have any trouble to get a suitable oil perhaps I can help you. I have for years used high test oils.

An increase in temperature of 30 degrees in a water cooled motor is likely to carry it beyond the capacity of its radiator and if its jacket gets full of steam it is no longer evenly cooled and is more likely to warp out of shape. Makers of water-cooled motors do not have to be so careful to get proper iron and proper cylinder design as do the makers of air-cooled engines.

I have been watching the Speedwell air-cooled 2-cycle for over a year and it seems to be doing all right. Made by A. H. Yocum Co., Reading, Pa.—C. E. D.

ANSWER TO CHAS. R. HALL.

GERMANTOWN, PHILA., PA.

Your question in the February Auto. Trade Journal has interested me, as I have successfully used a similar runabout for 5 years.

Have kept it up in good condition and am still getting good results, but know it is underpowered.

I would not advise cutting the cylinder, as the proper position for ports in the bottom, is at a point which would tend to weaken it, and I also believe they would be of very little benefit.

If you are willing to go to some expense, I would suggest replacing the present cylinder head with another one, of such shape as to reduce space and increase compression, containing valves, larger, say 2 in. in diameter, and connect a good carburetor of larger size. You will find you can almost double the power of the engine.

I trust the above may be of some benefit.—G. E. F.

I thank you for your reply to Mr. Hall's query. We desire to make these columns as valuable to our readers as possible and can only do this by using the best information possible. Many heads are better than one and actual experiences with any given machine beat whole pages of theory or even experiences with some different vehicle. I think the suggestion to use larger valves and a larger carburetor is good but I do not believe in the higher compression suggestion. High compression means higher economy but it does not make the engine pull so well nor run so steadily at slow speeds and these features are of more value in an auto engine than economy and high speed. A writer has recently shown by indicator cards that the torque per turn falls off much faster in a high compression engine than it does in a low one and you must admit that this is not what is wanted.—C. E. D.

ADVANTAGES OF OFF-SET CYLINDERS.

AUBURN, IND.

Kindly advise as to the merits of the "Off-set Cylinder" as applied to four and six cylinder vertical motors. In your opinion will it be liable to general adoption? Do you advocate it? And is it American or Foreign practice. Please advise as to best practical publication up-to-date "Automobile Motor" building and designing. HENRY N. MOORE.

If an engine does not reverse, it should be "Off-set." This permits more direct thrust and slightly lengthens the working stroke. The great saving is in lessened friction against one side of the cylinder wal . It is funny how some designers will not consider a horizontal engine because "the weight of the piston wears the cylinder out of round" and yet will continue to use an engine that is not off-set, when the wear from needless side thrust is many times that from the weight of the piston of a horizontal motor. With the off-set shaft the connecting rod angles are slight on the working stroke and great on the idle return stroke. It will in all probability be generally adopted except on reversing engines. So far as I know it was first used on Duryea engines, having been a feature there for ten years.

"Gas Engine Design" by Prof. Chas. E. Luche and 'The Gas Engine" by Hutton are two good books on the subject.—C. E. D.

FRICTION DRIVE INFORMATION.

Toledo, Ohio.

Regarding Mr. A. M. Castle's query in the Mechanical and Technical Department of the "Cycle and Auto Trade Journal," February number, I can supply him some information that may help him out. If he will get the February, 1908 number of the "Machinery," Engineering Edition on page 353, he will find a copy of a paper read before the Society of Mechanical Engineers in December, 1907, that pretty thoroughly covers the ground. The paper was read by Mr. W. F. M. Goss and is entitled "Power Transmission by Friction Drive." Also a chart for determining the horsepower transmitted by the following combinations of materials with the coefficients of friction as deduced from a lengthly series of experiments. I trust this may be of some service.

ARTHUR DUGREY.

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BALANCING A SINGLE CYLINDER MOTOR.

Lethbridge, Alberta.

May I ask a portion of your time and space in the Journal for a reply to the following queries: (1) What size and weight of fly-wheel is required for a single cylinder, vertical, 4-cycle motor, mec. operated valves, cylinder bore 4¾x5-inch stroke? (2) What is best practice, to counter balance the crank, piston and connecting rod by counter weights on fly-wheel, or by same attached to crank arms? Please describe best method to obtain a reasonable running balance. (3) What should be the horse-power at say 750 to 1000 revolutions. Thanking you in advance, I beg to sign myself,

STUDENT.

The size and weight of fly-wheel is a matter that may be varied considerably so that it is impossible to say that any particular size is needed for any given engine. If the engine is to run slowly part of the time, the wheel must be large and heavy. If it is not desired to run slowly at any time the wheel may be very light. Make the size as large as convenient and reduce the weight accordingly if for auto work. If for sationary work it may be well made heavy, for weight is of little matter and a heavy and large wheel runs more steadily than a small light one; 20 inches diameter by 150 lbs. weight is about as small and light as I think will meet your needs. Weights on the crank arms are better than on the fly-wheel, but must be heavier for they are closer to the center. You can save a little weight by putting them on the fly-wheel, but being a little to one side they do not truly balance and so the vibration is worse. You cannot fully balance a single cylinder job with such weights however. If the weights balance the piston and rod they are too heavy and are out of balance the other way, i. e., crosswise the engine. If the weights only balance the crank and end of the connecting rod and thus avoid being out of balance crosswise, they do not balance the piston. The common practice is to make them too heavy to balance the crank and rod end, but not heavy enuf to balance the piston also and thus split the difference.

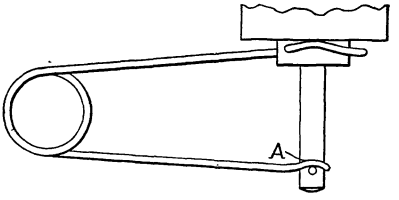
What to do in any particular case depends on the circumstances. If the foundation is solid so the engine cannot jump up and down, it is best to slightly more than balance the crank and rod end for then you will have no cross strains and the foundation will hold it the other way. This also applies if it is a vehicle engine with cylinder lengthwise the body of the car. Consider the conditions and act to fit the case best. The power is estimated by squaring the bore and dividing by 3. This is for 750 ft. piston speed per minute or 900 r. p. m. of your engine and is 7½ H. P. C. E. D.

SHEAR SPRINGS ON AIR-COOLED ENGINES

Bridgeport, Conn.

Writer notes on page 93 in January number "Cycle and Automobile Trade Journal," in reply by you to F. W. regarding air-cooled motors that you state there need be no valve spring trouble, that if the spiral spring softens at its ends, use a shear spring; and that you have used a shear spring in place of Helical with very satisfactory results. I am now using Helical springs and have a good deal of trouble. Would be glad to use the shear spring, but seem to be unable to find out what such a spring is. If not too much trouble, will you kindly give me a drawing? Thanking you in advance, I remain, T. FISH.

The shear spring takes its name from the device used to shear sheep. A similar shear is now sold for trimming the edges of lawns. This form of spring depends for its elasticity on the bend at the bottom of the U and if it has much service to perform or is desired to be of long life it has one or more coils at this point. In some cases its ends are simply turned outward and dropt into shallow holes so the pressure is applied by the extreme point of the wire. This forms a rocking joint free from friction. This form of spring is often used in clippers or in ordinary scissors where a spring is desired to open the blades. For use on an exhaust valve it should have eyes, nearly closed, at each end. The open eye permits getting it around the valve stem without removing the valve or its pin or nut. If the eye is to push against a pin it should be deprest a little so as to take a central position free from friction, as shown in the sketch at A. If it is to bear



on a flat the bend or depression should be in the opposite direction so as to give a rocking bearing as at the upper end. You will plainly see that the elastic portion is far away from the hot stem and that the leverage tending to bend the wire is less as the distance from the bottom of the U is greater. If the wire is stiff enuf to do the work it will not bend at the valve stem till it is very hot. Further, such a spring is much lighter than the usual kind. I have often wondered that designers have not used it to save weight, noise and valve injury. Its easy removal also makes it very desirable. I have used it for 10 years and often seen stems red hot without damage to the spring. C. E. D.

DO THE PUBLIC WANT SAFETY STARTING DEVICES?

Philadelphia, Pa.

I have in mind two schemes to prevent back kicking of starting cranks on gasoline engines, and if either or both are installed on crank it is impossible for the crank to kick back, preventing the operator from getting a broken arm.

Will you kindly inform me if such a thing is of any use to the automobile trade and to what extent. WM. G. KEUCH.

There are many improvements that look like good things which the public do not seem to care for. Later they may get their minds off of other matters and take up these very same things with avidity. The anti-kick starting crank is a thing that costs but little to make and I have for years past supplied a few of them on vehicles turned out by me but there seemed to be no willingness on the part of the public to pay anything for such a safety device so I never even applied for patent. Others have taken out patents and some pretty strong claims exist on devices of this kind. Before spending much money in development I would advise that you get acquainted with these patents thru some patent Attorney and see if you can get a patent to protect your invention. If you have a new device and are willing to spend some money advertising and creating a demand, you may be able to work the public around to a point of view where they may demand anti-kick cranks. They are like sheep in that they follow a leader blindly, if you can get them started. I do not think it can be done and would not advise spending any money on it. Nobody gets excited over a broken arm or a case of tuberculosis; it takes cholera or some uncommon but less important trouble to wake them up. The usual anti-kick arrangement uses a second pawl on the crank to lift out the main pawl if it moves backward. It does the work perfectly.—C. E. D.

FIBRE VS. LEATHER FACING.

Lowell, Mass.

I have a 1905 runabout and have a lot of trouble with the transmission slipping. The expanding shoes are faced with leather. Would it be advisable to face them with fibre. I get this idea from the bands on the transmission of the Oldsmobile runabout, which are faced with fibre and grip to beat the band. Kindly let me hear from you at once.

HENRY L. COTE.

Your clutch shoes need adjusting. Usually the leather facing will hold better than fibre. Leather, however, soaks oil and then may slip. If you will work it full of common chalk you will find that it holds well. Fibre is used for bearings and is very slippery when oily, but it is so hard that it does not soak oil and so does not continue to slip as greasy leather may. It usually takes more effort to set up a fibre clutch than a leather faced one. C. E. D.

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WHY GASOLINE TANKS ARE AT THE REAR

Providence, R. I.

Kindly inform me thru the columns of your Journal why the custom seems to be growing among some of our leading makers of placing the gasolene tank under the rear end of the car? The front seat would seem to me a much better location, eliminating to a great extent the chances of breakage, of force feed and a lot of extra piping. C. P. S.

In the big races abroad and on tours, much gasolene is used and under a small seat there is not room for so large a tank. This sent it to the rear. It will stay there till users get tired of the nuisance and extra piping and then it will be moved to a more rational location. At the rear it raises dust and is more exposed to damage than if in the body somewhere. It is easier to fill there, but also easier to tamper with. C. E. D.

(For long distance touring, 20 to 30-gallon tanks are supplied by some makers. These if placed under the front seat are very often so low that when nearly empty and the car on a grade pressure feed is necessary, so these large tanks are usually placed at the rear as they must have pressure feed anyway and there is plenty of room. In this position tanks are not only accessible, but leave free valuable carrying space in the body for touring and also do not necessitate the removal of passengers and cushions when tanks are being filled.—Ed.)

WANTS COMMERCIAL ELECTRIC WIRING DIAGRAMS.

Indianapolis, Ind.

Have been studing all articles on motor cars and motor car parts in your splendid Journal, and would be pleased if you could answer in your columns as to where I might secure diagram of wiring for prevailing electric commercial cars, as I am interested in electric cars and appliances. If you feel as you could, would be thankful if you could give sketch of the above in the next issue of your journal.

JOHN LANE.

You can generally get wiring diagrams from the makers of the car. We do not know to which cars you refer and cannot spare space to give a number of unnecessary diagrams.

C. E. D.

2-Cycle Engines

HUGH DOLNAR

INQUIRY.

C. P. Malcolm.

I have been greatly interested in your articles on the 2-cycle engine, published in the Journal. Kindly give me address of best work on 2-cycle, embodying your ideas. Do you know any firm selling patterns or castings built on lines you advocate?—J. B. GLASGOW.

Mr. Malcolm is no longer living. No such book was ever printed, and no one, so far as known, can supply parts of Mr. Malcolm's motors.—H. D.

WANTS NAMES OF 2-CYCLE ENGINE MAKERS.

Will you kindly give me the names of the makers of 2-cycle gasoline automobile engines, and greatly oblige.—

GEO. W. KEELER.
Care of O. B. North & Co.,
New Haven, Conn.

Will makers of 2-cycle motors please correspond with Mr. Keeler, as above?—H. D.

CAUSE OF 4-CYCLING OF A 2-CYCLE MOTOR.

Cleveland, Ohio.

Why does a 2-cycle motor miss alternate explosions when running light and throttled close? All 2-cycle engines I ever saw do this. Can you tell why?—SHERBONDY.

A throttled charge results in low compression, as the cylinder is not filled to its normal capacity when the exhaust closes, and the low compression causes failure of ignition.* The fly wheel carries the piston down and the partial charge expands but does not exhaust as the pressure in the cylinder is below atmosphere; when the intake port opens a second volume of charge is admitted, thus giving double the charge volume which the cylinder had on the previous compression stroke, thus making compression enough when the up-stroke ends to permit the spark to light the charge and enable the piston to make a working stroke. Then the exhaust occurs and the same performance is repeated, making the motor run 4-cycle until the throttle is given more opening. If the engine has work to do it will run at the same speed without "4-cycling" because the throttle is opened more and the greater charge volume gives greater compression and permits ignition. A variable compression chamber cubic content would avoid "4-cycling," and a pure air charge, never throttled, power of motor varied by a variable quantity of fuel injected at the intake in the pure air charge entering the cylinder, would give constant compression and would avoid "4-cycling" so long as the charge was rich enough to burn. But if the fuel were to be throttled too low with constant compression, and the fuel were injected in such a way that the second fuel charge could enter the intake port though no air was drawn into the cylinder, then the constant compression motor would "4-cycle," same as the throttled motor does when running light on a throttled charge.

This brings in the stratified charge. Manifestly, if the fuel were injected into a compressed pure air charge at a point close to the spark plug there might be a volume of mixture rich enough in fuel lying close about the spark plug points to fire a much smaller quantity of fuel than can be burned when this small quantity of fuel is equally diffused through the entire compression space.

The "4-cycling" of a 2-cycle motor does not waste fuel nor cause muffled explosions except in case of charge expansion by heat from cylinder walls enough to cause part of the charge to enter the muffler. A 2-cycle motor throttled closely and running light may sometimes run 4-cycle with a light muffled explosion between the working stroke explosions, caused in the manner specified by the exhausting of part of a charge too lean to be fired when compressed, as the second charge would yet be increased in richness.

Since 4-cycling does not occur when the motor is working under a load it is not of much importance, but of course the 2-cycle builder wants his motors to work 2-cycle, not 4-cycle.

The pure air charge with fuel injected at the intake port will increase motor flexibility over that of the motor which sucks a carburized charge into the crank box, and the greatest possible 2-cycle motor flexibility would result from a pure air charge and consequent maximum compression, in combination with a mixture compression force pump which would deposit a very little mixture in the compressed charge close around the spark points.

But none of these speculations seem to be

*This statement conflicts with the fact that a charge is more easily ignited when only moderately compressed, than when highly compressed and failure to ignite, causing 4-cycling, is usually explained, as follows: When closely throttled less fresh charge is allowed to enter and more of the burned gas remains. If throttled sufficiently the proportion of fresh charge is so small that the large amount of burned gas dilutes it so that the mixture is too weak to be ignited. Exhaust occurs, some of this mixture goes out and another throttled charge enters. As there is no more burned gas added (due to the failure to explode) this additional charge supplies sufficient fuel to make the mixture ignitable and a working stroke occurs. The cycle is then repeated.—ED.

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of much practical value, as the 2-cycle motor, pure air charge with fuel admitted to the charge as it enters the intake port, will give constant compression and wide range of power without 4-cycling, and this pure air charge with fuel admitted at the intake seems likely to be much used. No fuel pumps are needed, it is enough to permit liquid fuel to enter the pure air charge as it rushes into the intake port, and the gasoline or kerosene fuel can probably be successfully supplied thru variable needle valves to a multiple cylinder motor, though the writer has never seen this tried. The Secor motor does this successfully with a single cylinder motor, not with a constant compression, however, as the Secor motor throttles the air and the liquid fuel charge both together.—H. D.

CRANK AND PISTON PIN OILING IN 2-CYCLE MOTOR.

BROWNSVILLE, PA.

I would like to have you describe in the Cycle and Automobile Trade Journal, some successful way of lubricating the pitman bearings in the piston and crankshaft wrists, on a 3-cylinder, 2-cycle, 3-port, vertical engine. The splash system now used causes too much oil to reach the cylinders, and I experience too much trouble from carbon in the cylinders. JAS. R. HERBERTSON.

I believe the cheapest and surest way to oil a 2-cycle crank-box pressure motor, is Perry Okey's method of first nearly filling the gasoline tank and then pouring 1-20 or 1-24 gallon of lubricating oil into the gasoline tank for every gallon of gasoline contained in the tank. See Story of Okey Runabout. —H. D.

Opinions and Suggestions

Under the above heading we will be pleased to publish letters from our readers, expressing opinions, stating how they have overcome difficulties, or making useful suggestions. In this department will also be published longer communications or articles, of either a general or technical nature. This department succeeds the "Difficulties Overcome By Users" department, owing to its growth and the varied nature of the matter received.

EXPERIENCES WITH A KEROSENE BURNER.

H. W. HARMON,

Effingham, N. H.

The January number of your journal, contained a little article of mine on the use of kerosene as an automobile fuel. If it demonstrated nothing else, it was certainly conclusive as to the extent of your circulation; for I have been deluged with letters from every part of the country asking for further information, and urging me to write more fully on the subject. Am surprised at the great interest the users of steam cars manifest in the kerosene burner. Now I am not a chemist, and my scientific knowledge of the subject is far from overpowering, yet as I have managed to stay with kerosene burners and obtained very satisfactory results for three seasons, it may be that my experience may have in it something that may prove helpful to the beginner:

The reader may assume that I had long and careful instruction, that I had given the subject deep thought and careful investigation. Unfortunately, this happy condition was not mine. I knew as little of a kerosene burner as an Apache Indian of an airship. There were only two things in my favor, a good car—Stanley—a good burner—National. I give the names not only because it is their due, but for the reason that it answers a multitude of questions from your subscribers, which otherwise I shall have to answer. My faith in kero-burners was from the recommendations of those who had tried them out, and were using them with good results. I was told, however, "You will have trouble for the first two weeks," which proved absolutely true—it was entirely due to myself. I noticed the successful users were men of mechanical turn of mind and reasoned that I could not do as well until I found that it is not skill, but knowledge required for this work, and that the instructions of the makers were really worthy of some attention. The burner was installed in a hurry, and fully exemplified the truth of the old proverb, "The more haste, the less speed," for the maker in a trial spin of a few rods failed to discover that the gauge on the main line was registering falsely, and thereby the fuel line was not getting the required pressure, by 30 pounds. Added to this great handicap, my alcohol lighter by some mischance had been injured beyond use. I had a small gasoline torch, but a weak affair, barely equal to vaporizing gasoline, so my only way to fire up was to use an asbestos wick soaked in kerosene and inserted under the pilot vaporizer. The oil I had was dirty and unfortunately I did not filter it. The wire gauze in the main line had inadvertently been left out, and the one in the fire-tip I did not roll or clean properly. The burner was of the old single part type, no longer made. As if my cup of sorrow was not full to overflowing, these first two weeks, I bought a gold brick in the shape of a large and powerful gasoline torch that was to end all my firing troubles, "It didn't," but it did produce some of the most startling and weird effects. It produced a large flame, but thro the centre of it would be projected a small stream of raw gasoline that made a reservoir of the burner till heated enough to vaporize, and would then start a conflagration that would heat everything in the vicinity, except the vaporizers. My pitying angel finally came in the shape of a professor of chemistry, who was a past master of torches, and we so patched up this one as to be able to fire-up slowly. I now began to look over the instructions of the makers with more care and interest. I strained the oil, filled the pilot-tank two-third full instead of overflowing, put wire gauze in the main line and also learned that it should be cleaned once in a while, and if very bad oil is used twice; kept the gauze in fire-up clean and properly rolled, and made the discovery that the aperture the makers used in the pilot was a trifle better suited for the work than one worked out with a pegging awl. A new torch, an increase of air pressure and I became so convinced that I could now use kerosene successfully that I had the burner changed to one with a double compartment. I also discovered and rectified the false reading of my pressure gauge. My attention at about this time was called to the fact that the makers said, "Clean the pilot with alcohol or gasoline," and I had been using kerosene. This was the finishing touch and I have since had no cause for criticism or complaint. I do not say perfection has been reached, for that is not of this earth, but burners have been made that with intelligent use and ordinary care will successfully burn kerosene for auto fuel.

There are a multitude of little things to which I would like to call the attention of the novice, but the maker's instructions would probably be more intelligible, and perhaps in a way might be said to cover the same ground. In conclusion will say to the beginner, don't change the construction of anything connected with a kerosene burner, no matter whose make, till you have fully considered it, and have good reason to believe the change will be an improvement. Remember the makers have probably gone over the same ground. See that pipe lines are perfectly tight and that the required presssure is constantly maintained. Do not hurry firing. Study it and learn to treat your burner in the way it gives best results on your car. Do not ignore trifles at first, for as in art, they are the sum of perfection. You will find chance to manifest your individuality in your use and care of the burner after you are familiar with it. A man who is as well skilled in this line as perhaps any in the country uses his burner in an entirely different way from mine, yet we are both mighty satisfied with the results obtained, as I trust you will be if you do your part as the maker intended.

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ECONOMY AS AN ADVANTAGE OF STEAM CARS.

4 Wells St., Plattsburg, N. Y.

To the arguments in favor of steam given on page 61 of the February number, I would like to add one word. There are many men who do not feel that their income is sufficient to warrant their buying and maintaining a gasolene car, but who could afford to own a steam car, if they would buy judiciously. Last season I ran a small steamer, apparently of the same make as the one referred to in the February letter. I bought it second-hand for a trifle, and after overcoming my first difficulties, inevitable in the case of one who had no experience with machinery, I ran the car during the summer without serious mishap of any kind. The greatest expense was for tires. For other repairs my outlay for the last four months of the season did not amount to $1, all told. The little car, though designed for two people, will accommodate four very comfortably, and has power enough to carry four over ordinary roads faster than I want to ride. At any reasonable speed, it runs as smoothly as one could desire, and it can be controlled perfectly even in the midst of a street crowded with vehicles. To sum up, I would say that for the amount I was willing to spend, I could have found no gasolene car that would do the work required.

CHARLES NORTON.

(We would like the address of the "Strong Steam Advocate" of page 61 of the February number, as he neglected to include same in his letter to the Editor and we have mail for him. —Ed.)

EXPERIENCE WITH FRICTION TRANSMISSION.

Then the next question is to get your power to the hind wheels. The prospects are that the friction transmission will soon be the accepted type, and the writer has always insisted on a double drive, one to each hind wheel. This method is correct design, in that it always gives a balanced pressure on both sides of the disks at all times. The writer tried this design a year ago and also the single traversing wheel. I found that while the single wheel is simpler so far as speeds and reverse are concerned, it necessitates a compensating gear, a long shaft between bearings, which will spring the shaft and gives only half the holding power at any time.

On the double drive I found it hard to support the centre bearings of the friction wheel shafts, but these shafts are short, and if the bearings can be held rigidly the shafts will not spring. I first tried driving the disc shaft by some sort of a jaw clutch from the flywheel shaft, but found that if there was any lost motion, the discs being large, the inertia of the two moving bodies, one driven and the other driving, would shake loose the discs on the shaft. I then took the flywheel off and put in its place an arm equal in length to the diameter of the flywheel, with a ball at each end, and a similar arm on the disc shaft. These were connected by ball-box pitmans about six or seven inches long, which would allow considerable fore and aft motion of the disc shaft and still have no lost motion, and the power was applied far out from the shaft.

This arrangement gave no trouble by jarring loose. but the question of maintaining a given amount of clearance between the discs and paper wheels required solving. I tried a side lever for opposite directions, and on this lever had a pedal with a knee-joint to the forward motion, so I could break contact at any time; shift my speed and lock the joint back to exactly the same position as before. This seemed to work pretty well, but I had no provision for taking up wear of the friction rims and I had to keep moving my lever farther all the time until a limit was reached.

At any rate, this plan removed the flywheel and I can never agree with a maker who puts in a 16-inch flywheeel and then follows it up with a couple of discs 20 to 24 inches diameter, and I fear those that are so constructed will have trouble with the joints between the flywheel and the discs. The removing of the flywheel and making the discs act as such, places the weight farther back, and also saves some weight, which is of great advantage in a light, practical machine, and the reversing disc can be made much smaller and lighter than the forward one.

Another feature that the writer likes about this system of driving, is that practically the whole machine is carried on springs, leaving the axles light and naked. I cannot conceive why some designers will load a hind axle with a lot of casings and compensating gears, and sometimes change gears, weighing as high as 400 or 500 pounds, and yet over every stone that the wheel strikes, on inequally of the ground this mass of iron and wood must be lifted instantly, thus pounding the life out of the tires, when the axle could just as well be made light so it could pump up easily and quickly, letting the springs absorb the shocks. In this case I would also recommend the rotating of the hind axle instead of wheels on spindles, as there is then no wear on spindle and the wheels never get wabbly.

I would like to see more discussion in the Journal as to the relative merits of different constructions and devices, and the reasons for the opinions and hope the publication of this will bring out some new ideas that are not prejudiced by a desire to sell rather than to spread useful information and to perfect the modern means of locomotion.

GRAPHITE FOR AUTO LUBRICATION.

There are many places on an automobile, according to Joseph Dixon Crucible Co., where graphite can be advantageously used.

In discussing the lubrication question of the cars in the New York-Paris race, it was suggested to use graphite owing to its non freezing qualities. It increases cylinder lubrication to mix about a teaspoonful of it to each quart of crank case oil, or a little of the graphited oil may be squirted directly into the cylinder.

For side chains, graphite may be applied dry or mixed with gasoline and oil or with oil alone. If the chains are treated with a mixture of gasoline and graphite mixed to a thick paste and rubbed in well, the chains will run dry, but smoothly and quietly, and dust and dirt will not adhere. Treatment in this manner should be given for every 250 miles, according to conditions of road.

For the leaves of springs, nothing is better than an occasional treatment of a thick paste made of graphite and oil and when introduced under the leaves, it prevents the squeak so commonly heard and so annoying. Where the leaves are tight, then the graphite is often better introduced by means of kerosene, being mixed with kerosene so as to form a thin mixture.

Graphite rubbed on the rims of the wheels will prevent the tire shoes from becoming rusted to the rim.

FOUR WHEEL AND FRICTION DRIVING.

Hagerstown, Md.

The writer has followed the development of the self-driven vehicle ever since your journal was started and has come to some conclusions of his own that will sometimes agree with your editors and sometimes not.

While the auto cannot exactly be compared with the standard traction engine of the day. my experience with both vehicles has been that neither can be a successful self-moving machine until all four wheels are driven.

The necessity for extra loading on the hind axle on the accepted drive is just what buries it in the ground when it fails to keep moving. Equal loads on each axle would obviate this and give the additional pulling power of the front wheels. If we are to drive with one pair of wheels, we would get better results by driving with the front wheels and make them higher instead of lower than the hind wheels. Any engineer knows that you can pull a small wheel over an obstruction easier than push it over; but the writer appreciates the fact that we have a knotty problem on our hands when we undertake to drive and steer at the same time.

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CAUSE OF UNEQUAL PERMANENT SET OF FRONT SPRINGS.

That one of the front springs of a car is under greater oad than the other is unquestionably true, as shown by the fact that one spring takes a greater permanent set than the other and this takes place much quicker in one than the other. With motors which are cranked right handed, the right front spring is most affected and with engines cranked in a left handed direction the left front spring is the sufferer.

The cause is not obscure and is due to the reaction on the engine of its own torque. As every action has an equal and opposite reaction there is a strong tendency for the engine case to rotate in an opposite direction from that of the engine shaft. This reaction is of course communicated to the frame and springs with the result above mentioned and is not due to gyroscopic action of the fly-wheel as sometimes suggested except perhaps a slight action in the case of a fly-wheel the axis of which is transversely located and even then the slight gyroscopic action affects either front spring according to the way the car body is tipped.

FINISHING ENGINE BORES WITHOUT GRINDING.

Philadelphia, Pa.

Occasionally it is necessary for lack of tools or one desires to finish a cylinder and piston without grinding. This can be done and a very satisfactory surface obtained, if properly done. Many use fine emery and oil, say 90 or 120 emery, but this is not advisable as particles of the emery are sure to imbed themselves in the metal and cannot be displaced by cleansing with gasoline.

A longer but better method is to use wood ash and plenty of oil, running the engine by belt from a live shaft. Plenty of oil should be used and the process continued for at least 12 hours, and twice this time will be beneficial rather than otherwise. Some makers have such an abhorrence of emery that they will not even use it in the wheel form. However, finishing by grinding is now accepted as standard practice, but it is safe to say that the less loose emery used on the bore the better.

The writer would like to hear thru the Journal the opinion of others on this subject.—S. D. F.

ANSWER TO GALEN HALL.

Portland, Me.

In reply to article in January Trade Journal, under "Difficulties Successfully Overcome by Users," from the Galen Hall Co., Atlantic City, N. J., would say my change speed lever would prevent contacts burning or getting into reverse position accidentally, as its operation is absolutely positive, the position of stops or notches could be easily arranged to correspond to their contact points. I have a full sized working model that was exhibited at the Automobile shows and was subjected to all kinds of abuse, but never failed to operate. I have also equipped cars in Portland, Me., with these levers, that have been in use nine months. Would be pleased to send them model and testimonials.—CHAS. W. BERRY.

HEAT HARDENED CEMENTS TO STOP CRACKS.

ATTLEBORO, MASS.

Would you kindly answer through the Automobile Trade Journal a practical method by which I can stop up a crack in an aluminum crank case?

Crack is a small one and does no harm only when engine is timeing, and then the compression forces the oil out of the crank case. Thanking you in advance for the information, I remain J. C. DANIELS.

(In our February issue 1908, page 62 under the heading "To Repair Cracked Cylinders," a method of filling cracks in cylinder jackets is outlined. Cracks in the crank case can also be treated in a similar manner, with prepared cements which can be obtained from the Smooth-On Mfg. Co., Jersey City, N. J. and Johns-Manville Co., Wil iams St., New York. The methods vary slightly according to the cement used. The cement makers will gladly advise you in any syecial case.—Ed.)

"Very few motorists know that there is a safe way to select automobile cylinder oils other than the slow expensive process of elimination by trial of the various makes, says T. E. Tomlinson, of the Havoline Oil Co., of New York, maker of Havoline Automobile Oils.

"The quickest way to determine the quality of an oil for automobile cylinder use is by the color test. The technical jargon of viscosity, fire test, specific gravity, etc., is unintelligible to most automobilists who know only that what they want is oil as free from impurities as possible, as it is a well known fact that the hot gases in the cylinders burn up the oil, which then deposits a residue of carbon. This carbon deposit is responsible for an endless variety of engine trouble. It is only by a process of filtering that mineral oils can be freed to any extent from the impurities natural to them. The more the oil is filtered the less impurities it contains and consequently the less carbon it will deposit—and the lighter and clearer in color it becomes."

The careful driver knows the sound of his engine and instantly notes any unusual or peculiar noise and investigates. Such care not only means long life to the mechanism, but in some cases has a direct bearing on the length of life of the operator.

It is a common belief that calcium chloride has a very detrimental effect upon galvanized iron pipes and tank, in connection with the circulating system. This is really a fallacy as the action is so very slight if the alkali is pure or reasonably so, that it is really negligable. In several instances tests showed only a slight brightening of the wetted surface as compared to that exposed to the air.

The A. A. A. is calling for a boycott of New Jersey owing to its foolish restrictive measure against automobilists and is calling upon users of motor cars to avoid the State of New Jersey.

The injurious effect of the use of motors on the price of horses has not proved to be what many farmers expected. The average prices of horses in Chicago in 1907, as compared with 1902, shows an increased value, as follows: Draft horse, $28; carriage pairs, $32; driver, $20; general use, each, $20.

The Agricultural Department statistics show an increase in 1907 over 1906 of 297,725 horses and mules in the United States. There are 8,237,449 more harness-using animals in the country now than there were eight years ago.

Mr. J. S. Draper, for three years sales manager of the Wayne Automobile Co., Detroit, has taken up his work as sales manager for the Mora Motor Car Co., Newark, New York.

We are advised by H. H. Franklin Mfg. Co., of Syracuse, N. Y., that in the recent 96-hour non-stop run of a Franklin 28 H. P. runabout at Washington, D. C., the average gasoline consumption was but one gallon for every 24½ miles traveled, and one quart of cylinder oil for every seventy-two miles. On this run, which included 500 miles of road running, it is estimated that the machine would have traveled 2,450 miles at thirty miles an hour.

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n business in 1906 in a small but very
plete factory of its own, with William E.
bondy as Factory Superintendent and
H. Sherbondy as draftsman and designer.
hese two brothers, William E. is a ma-
st of some 15 years experience, 12 years
ly connected with the gas engine, while

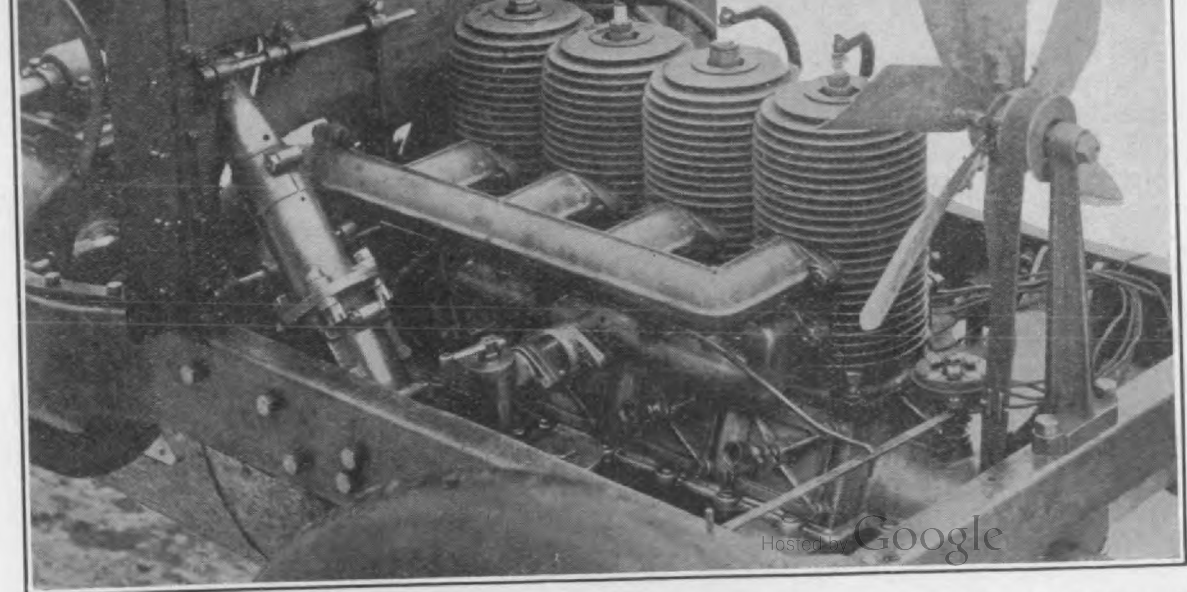
1905, cylinders 4 x 4 ins.

This was a strong, flexible motor and th
cooling was wholly satisfactory. The desig
for the car and motor here illustrated an
described was begun in 1906, Earl H. bein
the designer and draftsman and William H

Fig. 1. Deraine 2-cycle air-cooled motor touring car chassis, right side elevation. Wheel base 112 ins., gauge 56 i
all 34 x 4 ins. Motor four vertical cylinders, 2-cycle, air-cooled, 4 7-16 x 4 ins., 38½ B. H. P. at 1600 R. P. M. The spe
ge is gears always engaged with solid jaw clutches, 3 forward speeds and a reverse with bevel gear to full floating r
. Weight of chassis only, about 1,700 lbs.

l H. had a special technical training at
e University School of Cleveland, is a
dent of the gas engine and has strong pre-
ences for the 2-stroke cycle and air-cooling.

Sherbondy the constructor. The two broth
carried on a small business as general m
chinists and built the car as they had tim
placing it on the road in August, 1907, w



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inders set very closely together, $5\frac{1}{2}$ ins. only from center to center, $4\frac{7}{16}$ ins. bore, and a single fan in front with no hood whatever. The outside diameter of the cooling-rib circle is $6\frac{1}{8}$ ins., making it needful to slab off the cooling ribs to place the cylinders on the base, so that the fan has very small effect on the second and third cylinders. The first cylinder is coolest, next comes the fourth, then the second, with the third cylinder hotest, all as would be expected with this construc-

which are only $\frac{3}{4}$ thick and the cran are only $3\frac{5}{8}$ long, the sides being close t crank-arms and the bottom member o crank-box, which is split in the plane c crankshaft axis, giving the rod-ends $\frac{1}{8}$ clea only.

The crankshaft wrists and journals ar $1\frac{3}{8}$ diameter and the crank-boxes are bal poured directly into seats cast in the base lower crank-case member. An indicator of the crank-box pressure shows 5 lbs.

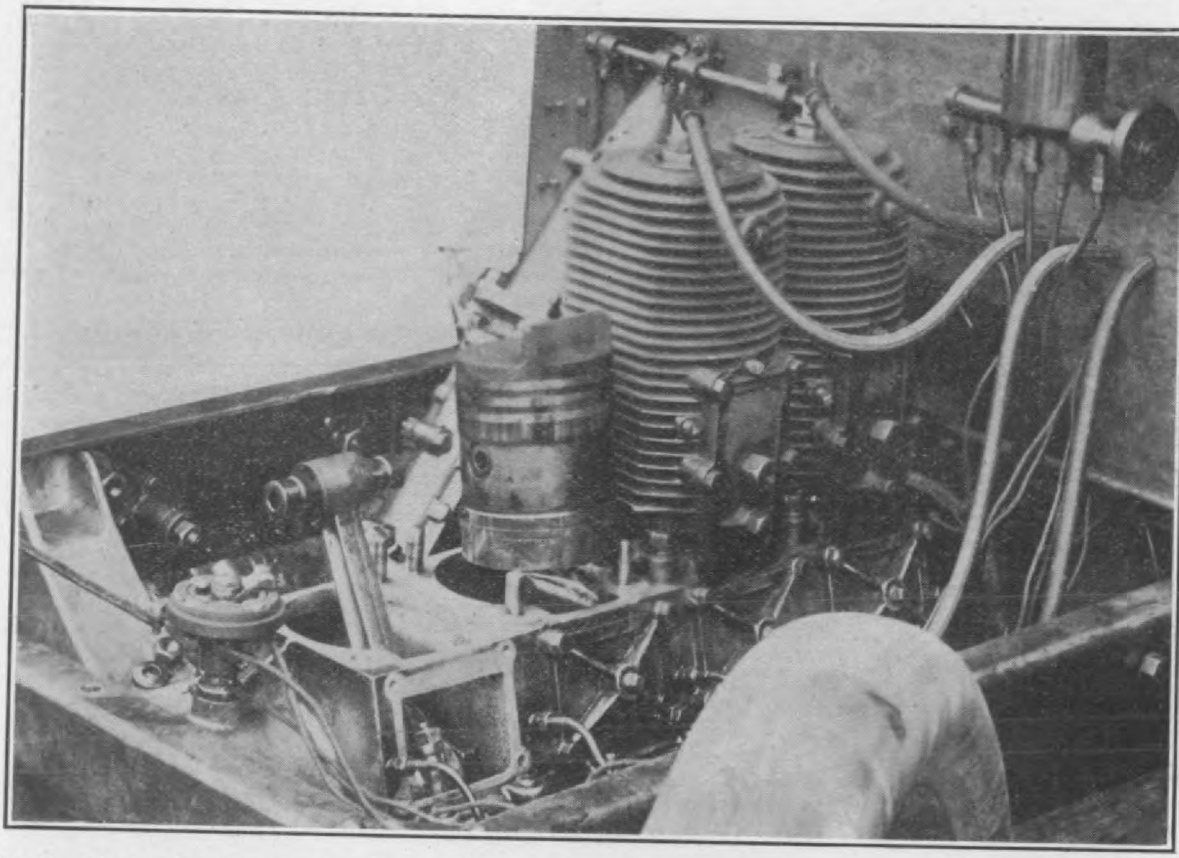

Fig. 2. Right Side of Deraine 2-cycle, air-cooled motor in position, showing the exhaust pipe and the carburetor t supply pipe. The fan is six blades, 17 ins. diameter, belt driven from the crankshaft, $2\frac{1}{2}$ to 1 ratio. The ign tem is a storage battery, a four-coil box and jump spark plugs in the tops of cylinders. The cooling ribs are 21-32 c hed 7-16 C. to C., and cover the cylinder length as nearly as bolts permit. Side-pipe throttling was tried and disca favor of carburetor throttling. The compression space is intended to give 85 lbs. with cold air. The action of the ront is supplemented by the suction of a fan-arm fly-wheel in the rear.

n and arrangement. But even the hot rd cylinder has never shown any sign of er-heating either in the way of weak pres-e or sticking of the piston from deficient rication.

Besides this good air-cooling with seem-ly inadequate agents, this Deraine car is able for a new form of clutch, the engag-member being an integral, toggle-expanded nze ring, cut in one place only, for novel-in the crank-box form and for an original ed change gear design, gears always in sh.

No device of any kind is fitted to pack shaft between the crank-pits. The mo shows maximum power at 1600 R. P. which is the highest speed yet attempted the testing stand.

The bevel gear ratio is 3 to 1, with 34 i wheels, 1623 crankshaft turns to the m

The car has made 45 miles an hour, wh would give the motor 1217 R. P. M., mo working strongly of course.

The Deraine fan-fly-wheel is 20 ins. d meter, 4 ins. face, with 6 fan arms, weig of wheel 76 lbs. The total weight of mo

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ese are of conventional design, and are of sufficient interest to demand detail iption at this time, as it is not the present

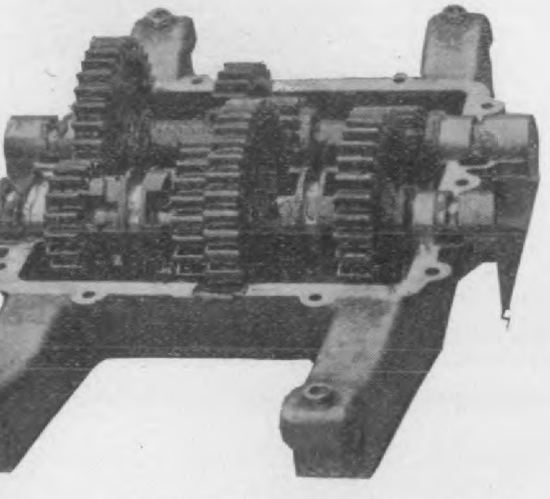
4. Two views of the Deraine 2-cycle air-cooled r, finished showing construction. The upright cylinder, hand of illustration, shows the exhaust port above ank box intake port, piped to the carburetor.

ose of the Sherbondy's to market the ne immediately. As shown by the rations, the Deraine car is well propor- d and well designed throughout.

DERAINE SPRINGS.

ese are half-elliptics in front and full ics in the rear, all $1\frac{3}{4}$ wide, tongued and ed.

e front springs are 36 ins. long, 5-leaves, ed in the middle, jointed in front and l in the rear to the chassis frame.



. Deraine change gear. The gears are all soft nickel- d. p., always all engaged, speed changes obtained by w sliding clutches, all soft. Both the line-shaft and aft are in plain phosphor bronze bearings.

rear full elliptics are 36 ins. long, 5

is sure to free itself when disengaged an drives perfectly in all degrees of slippin engagement. It is proposed to offer thi clutch for sale to the trade.

The clutch expanding member assembl is shown in Fig. 6. A toggle linkage is place between the free ends of this clutch expand ing member and the middle joint of thi toggle linkage is supplied with an incline

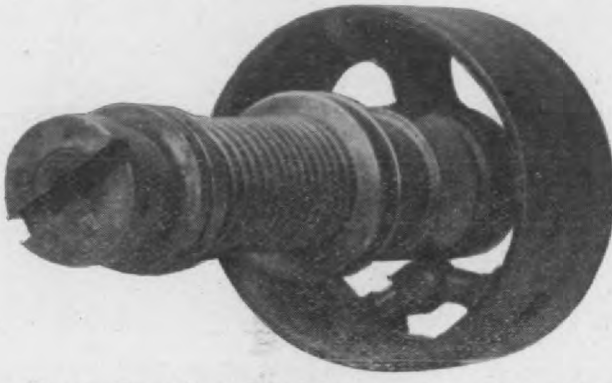


Fig. 6. Deraine expanding clutch member, intermediat shaft and coiled spring, assembly placed between the moto fly-wheel and the gear-box line shaft.

face to co-act with a 45 degree cone pushe forward by the 368 lbs. thrust of a coile spring, and so expand the bronze clutc member. The drum, integral with the fly- wheel, is $6\frac{1}{2}$ ins. diameter x $3\frac{7}{8}$ face, covere by an oil-tight cap.

The clutch expanding member is 6.485 ins diam. turned to a true circle 15-1000ths small

The cylindrical rim is connected to the hub by one arm only, is finished by turning in the lathe and is then completed by one saw-

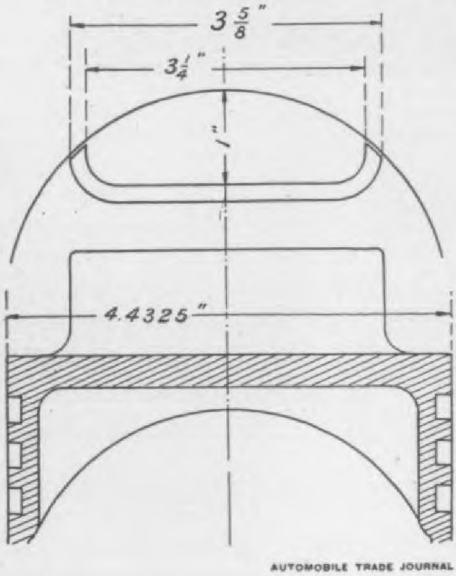


Fig. 7. Deraine piston, top end, and deflector. The cylinder bore is 4 7-16 in. The total length of the piston is 5 ins. The piston form is a straight taper 3-1000ths small at the bottom and 5-1000ths small at the top. The deflector

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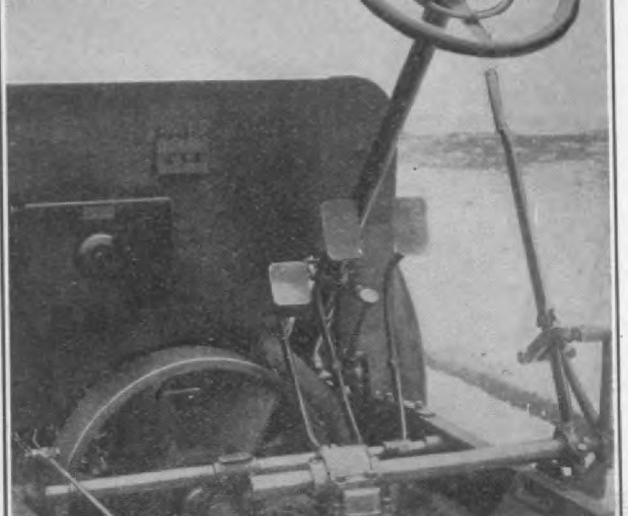


Fig. 8. Deraine control. The spark lever is ratchet retained on top of the hand wheel. The steering action is right and left screw threads and nuts.
The outside hand lever, not yet placed will work the external brake band. The hand lever shown is in two slots, the whole rock-shaft and lever moving together sidewise to effect the selective gear clutch operation.
There are 3 large pedals and one small throttle pedal. The left pedal works the clutch, normally spring engaged. The middle and right pedals are twins, moving together to first disengage the clutch and then apply the cam-rocker expanded rear hub drum brake shoes. The small pedal between works the throttle.

with extreme disfavor, although liking the toothed gear speed change, and this led him

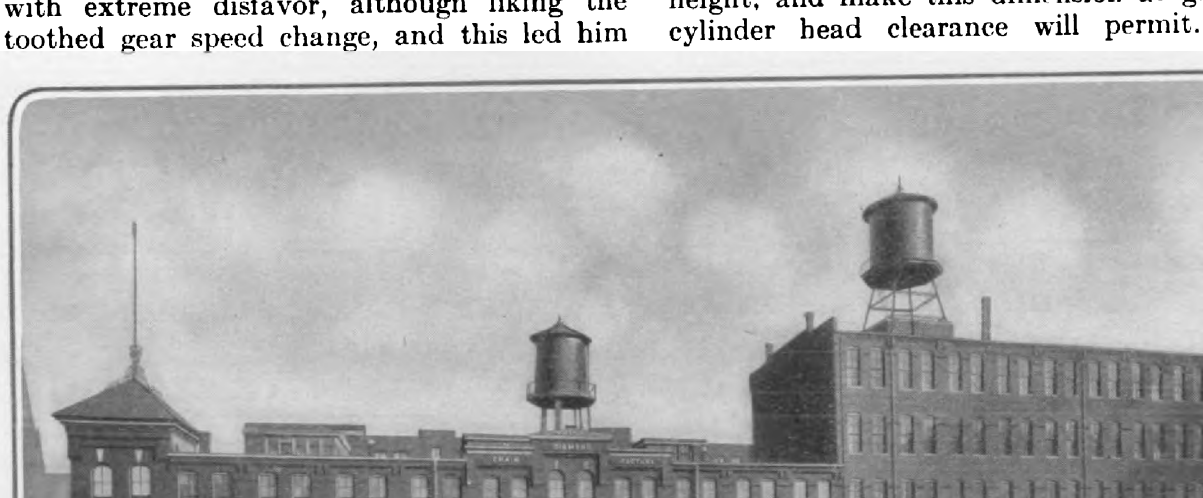
The clutch jaws were first fitted w
lost motion and the change selection
not be handled at all on the road. The
jaws now have considerable sidewise clea
and the clutch handles well and the c
gear is silent.

THE SHERBONDY DEFLECTOR.

The Sherbondy Brothers tried more
one form of deflector in this motor, and
experiments with a visible charge
pressure, so that the actual course
incoming charge could be observed.

However, no visible charge entranc
give entirely correct information if th
inder is open, because of the lack of
vacuum which follows the opening
exhaust port in the 2-cycle motor,
when working must considerably affe
movement of the entering charge.

The form of deflector adopted fo
motor is shown in Fig. 7, and thoug
the result of many trials and long con
experiments it does not differ mat
from many previous examples in the
of other 2-cycle motor designers. The
bondy's are convinced of the value of de
height, and make this dimension as gr
cylinder head clearance will permit.



The above reproduction shows the enlarged plant of the Diamond Chain & Mfg. Co. at Indianapoli
The four story addition now completed, makes the entire plant one of the most modern in construction, an
the increased facilities, the capacity of output is more than doubled. Diamond Chains are made in 138
and for almost every purpose. The Diamond Company is now making a full line of sprockets and is also p
to manufacture automobile and machinery parts on contract, and build automatic machinery for specia
poses.

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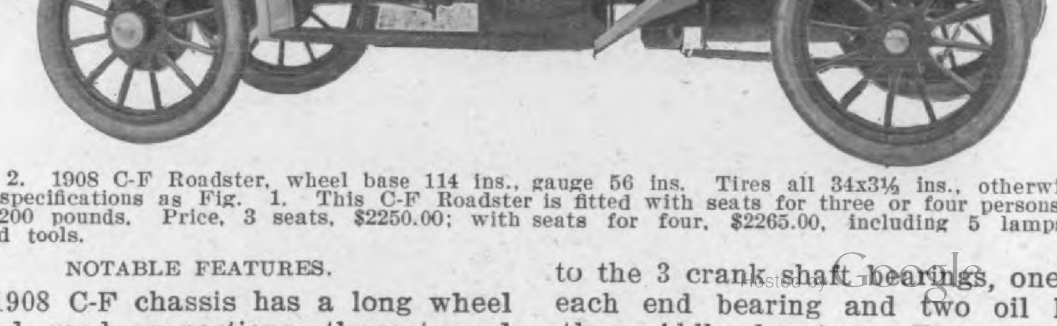
1233 Michigan Ave., Chicago, Ill., U. A., offers two models, a 5 passenger ring car and a 3 or 4 seat roadster, e chassis for either body model, en- ly new chassis design, price for the 5 senger touring car or the three seat lster, $2250.00, and for the 4 seat lster $2265.00. The 1908 C-F motor is 4 nders, 4 cycle, water-cooled, 4½ x 5¼, 3. H. P. at 1000 R. P. M.

springs are half elliptics front and rea with a special, short top-leaf arrangeme to check bouncing, an original C-F featu said to wholly prevent tossing on roug roads. The chassis frame, prest steel, ins. greatest depth, is by A. O. Smith. Th motor and gear-box are carried on a su frame, with Blood Bros. universal joint from the line shaft to the bevel pinio shaft.

Fig. 1. 1908 C-F 5-passenger touring car, wheel base 114 ins., gauge 56 ins. Tires all 32x4 ins. or four cylinders, vertical, 4-cycle, water-cooled, 4½x5¼, 35 B. H. P. at 1000 R. P. M. Multiple disk ch, 5 disks, two bronze with cork inserts, sliding gear, three speeds forward and a reverse with bevel to full-floating rear axles, all on ball bearings, line and side shafts on Hess-Bright ball bearings, l balance gear. Weight 2400 lbs. Price $2250.00, including 5 lamps, mats, horn and tools, all ready the road. Cape top, unlined, $100 extra. Cape top, lined, $125 extra.

ese C-F 1908 models are very moder- priced, well built, and present a fine arance, both the touring and roadster es showing straight line effects, while roadster front board is deeply cowled, permanent side enclosures of the foot d. The standard C-F colors are a red sis with maroon touring body and a roadster body.

The motor is by the Milwaukee Moto Company, which has established an exce lent reputation and is supplying a thorol reliable line of 4 cycle water-cooled en gines. The water circulation is by a tw pinion pump. The lubrication is by plunger pump in an oil well, pump ec centric driven from the cam shaft, with oil leads, unobstructed, from the oil pum



ig. 2. 1908 C-F Roadster, wheel base 114 ins., gauge 56 ins. Tires all 34x3½ ins., otherwise same sis specifications as Fig. 1. This C-F Roadster is fitted with seats for three or four persons, weight t 2200 pounds. Price, 3 seats, $2250.00; with seats for four, $2265.00, including 5 lamps, mats, and tools.

NOTABLE FEATURES.

e 1908 C-F chassis has a long wheel

to the 3 crank shaft bearings, one lead to each end bearing and two oil leads to

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cal. The oil well has a low bevel settling basin with a drain cock which permits heavy dirt to be removed from the oil. The

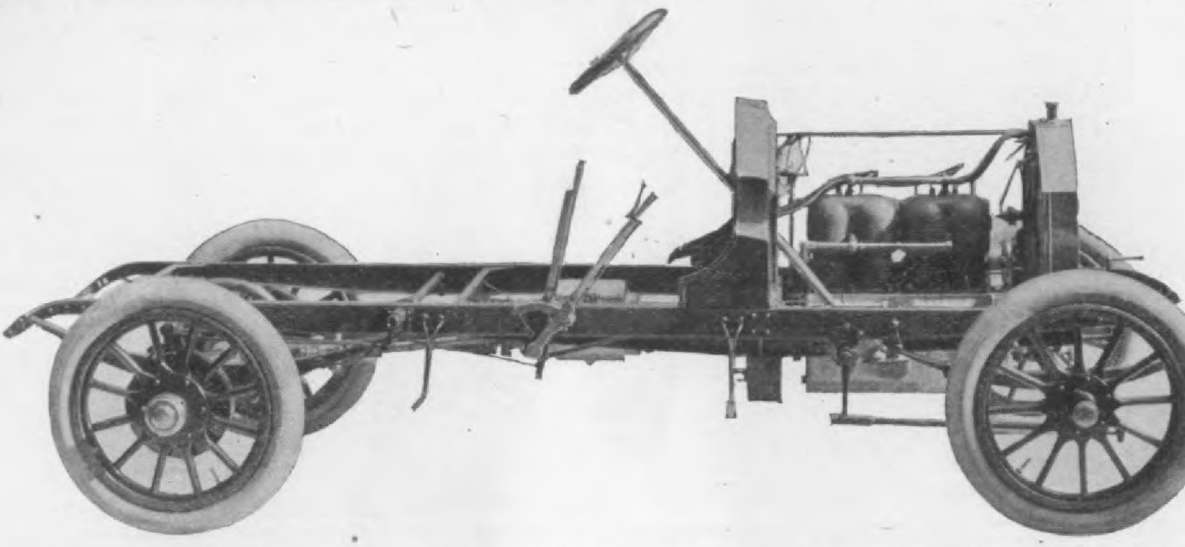
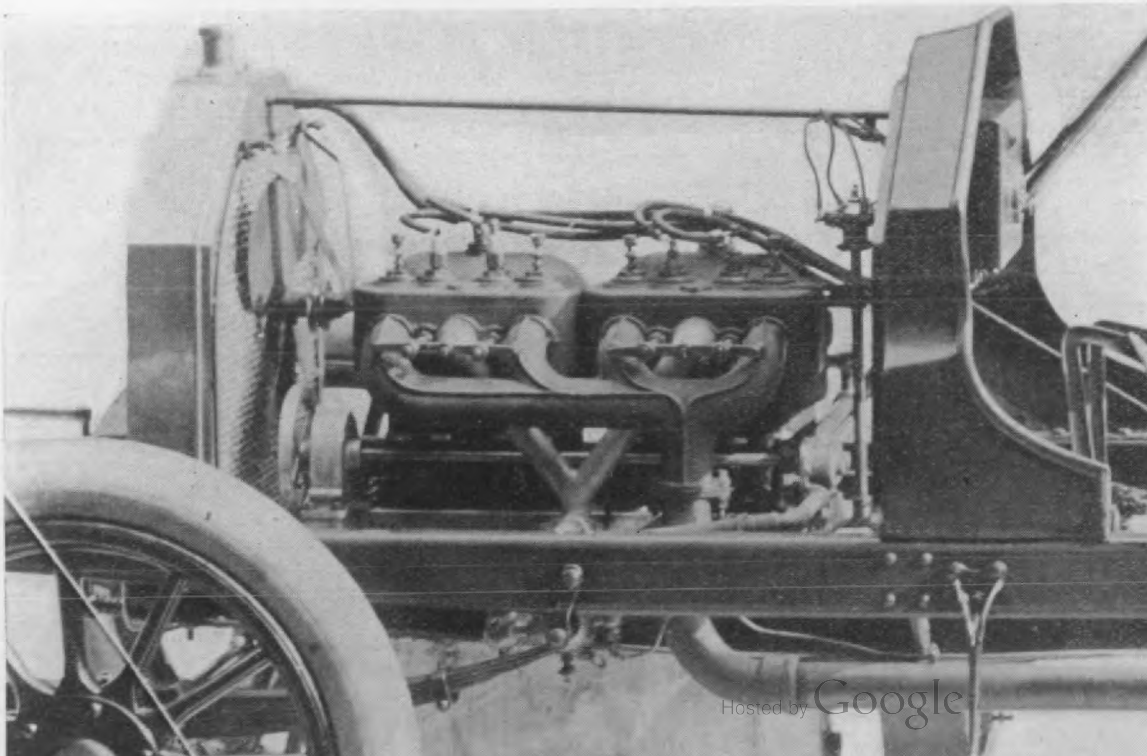


Fig. 3. 1908 C-F chassis, right side elevation. The deeply hooded front board is an aluminum ing. The construction of this front board is well shown in Figs. 5 and 6.

construction of the motor is too well known to need detailed description here. The motors have proved themselves to be durable, powerful for their weight and strong on throttled charges.

The ignition is jump spark plugs, a commutator with a wire brush for leaning the contacts in front of the roller which distributes the current, four coils in a box on

bronze with cork inserts, fixed to with the fly wheel. These 5 disks pinched together by a sliding collar four bell-cranks linkage, temper-s with check nuts in the bell-crank free enabling the clutch to be adjusted. bushed clutch hub to form the forwar crank shaft rear end enters the b shaft steadiment. The sliding gear, tive, is by Warner, and has both th and side shafts on Hess-Bright ball ings. The propeller shaft has Blood universal joints at each end.



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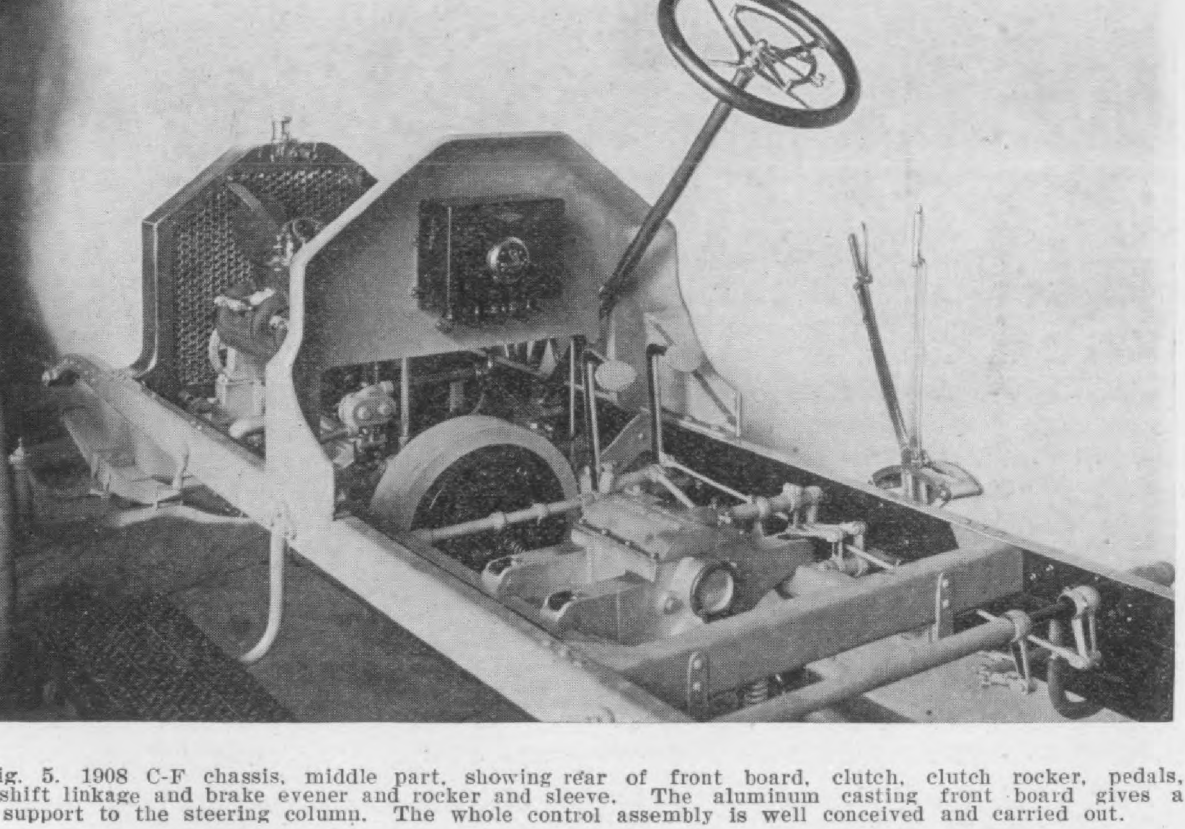
n shaft is on ball bearings. The rear construction is Garford's and is well n. The balance gear is beveled and xles are full-floating.

BRAKES.

e rear hub brake drums are 14 ins. eter, and have external bands, lined camel's hair, 3 hole lever applied, and nal steel-casting shoes with replace- bronze faces, metal to metal contact, rocker applied. The brakes are ap- through an evener, a rocker and a e-bushed rocker sleeve. No line shaft e is fitted.

gin to rise the resistance of the super imposed check-leaf increases rapidly be cause of the spring-forms and so prevents body tossing. Any improvement in springs is noteworthy, as the springs are the des pair of motor designers.

The rear springs are linked to the rear chassis frame spring eyes by an integral steel casting, the two side members being united by a bridge close above the top of the spring end, which serves as a check to prevent this rear spring link from turning half way round in case of a violent move ment, as has been known to occur with two



ig. 5. 1908 C-F chassis, middle part, showing rear of front board, clutch, clutch rocker, pedals, shift linkage and brake evener and rocker and sleeve. The aluminum casting front board gives a support to the steering column. The whole control assembly is well conceived and carried out.

THE 1908 C-F SPRINGS.

ese are all half-elliptics, 40 ins. long ns. wide in front and 50 ins. long x 2 vide in the rear. All the springs are d to the chassis frame in front and l in the rear. The springs have 7 s in front and 10 leaves in the rear, a short "check-leaf" on top of each g. The spring leaves assemblage is regular curve, but is made high in middle, over the spring perch. The spring "check-leaf," ends curved ward when free, is screwed down on top of this peculiarly curved, main g-leaf-assembly. This arrangement

plain links, not bridged over the spring end, making it needful to stop the car, jack up the axle and replace the spring and links in proper position.

THE C-F CAR BODIES.

These are all made of sheet steel. The touring bodies are what is known as "straight line" in general effect, and have doors swinging to the rear.

The roadster bodies have deeply cowled front boards, the steel cowl ends being extended to the rear to enclose the forward foot space with sides 8½ ins. high, improving the appearance and retaining small articles which may be carried on the foot

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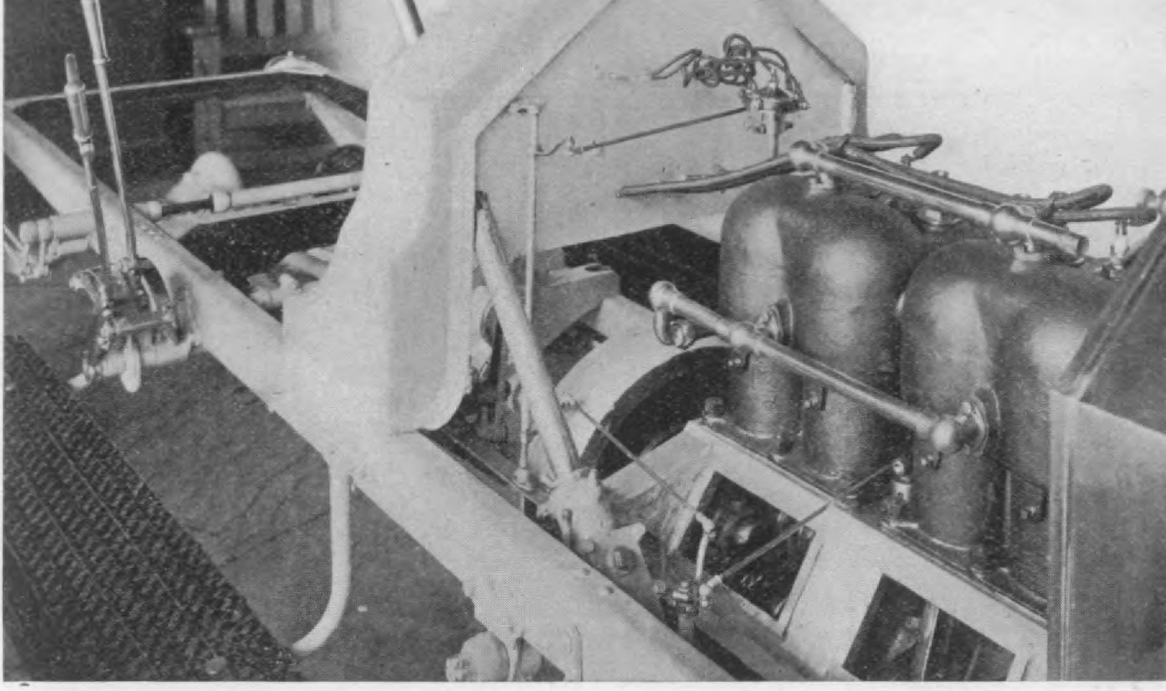

Fig. 6. 1908 C-F chassis, right side of motor, oblique, looking to the rear, showing steering post, of front board, spark and throttle control linkages, commutator, water connections and the motor opened to give access to the crankshaft. The C-F spark control linkage has been carefully worke and is clearly shown in this picture. A vertical rock shaft is placed in ball-bearings fixt to the front so as to transfer motion to the commutator thru straight globe end connections and a globe end l passed across the motor base to the carburetor. These linkages are in good mechanical form and the bearings obviates hand oiling and make the spark con-trol action smooth and durable. It is the working out of connection details that makes a car convenient and satisfactory to the driver on the

throttle levers are ratchet retained on top of the hand wheel. The carefully designed spark and throttle linkages have previously been noted at some length.

There are two outside levers, the outer one, latched, when pulled backward first disengages the clutch and then applies the internal, emergency, rear hub brake shoes.

The inside lever is in a wide slot and is pulled inward or pushed outward moving fore and aft to effect the se gear shaft.

There are two pedals on the foot The left pedal disengages the clutch right pedal applies the ordinary ex brake bands to the rear hub drums single rock shaft. The internal shoes are applied through an evener

Palmer & Singer Bring Out New Car

The Palmer & Singer Co., of New York City, are now placing on the market a complete line of high-powered cars, known as the Palmer and Singer, or P. & S. cars. In addition, the Simplex car, formerly marketed by Smith & Mabley Mfg. Co., will also be marketed from the new Palmer & Singer Building, 1620 Broadway, N. Y. The 4-cylinder, 40 H. P. P. & S., known as Model 4-40, will sell for $4000 to $5000, according to bodies, and will seat 7 passengers. The other model will be a superbly finished town car at a comparatively moderate price.

The American Automobile Association proposes to promote Gymkhanna sports, brake tests, dust trials and events of like

The Daimer Motor Co., Ltd., manuf of the English-Daimler has instituted a of engineering scholarships for young m 18 years of age. The candidate must examination in mathematics, mechani physical sciences. The successful can are given two years' training in the sho at the same time have a course of mapped out for them by a compet structor.

According to reliable sources of in tion the entrance to the Long Motor Parkway will be off the Jeric and one mile below the famous Corners, where the headquarters officials of the Motor Parkway will cated. The plans have been ma the building of a $20,000 home for

nerly of Columbus, now located at Spring-, Ohio, are offering for 1908 a line of mercial as well as pleasure cars. The pany states it was necessary to take up w location, in order to increase its output, neet the growing demands, both in com-cial and pleasure cars and that it is now pared to build cars to meet every require-t, having some of the best facilities in country.

everal new models have been added to line for 1908 in addition to the Model B ssenger, 24 H. P. Touring Car, $2,750.00, 24 H. P. Landaulet or Town Car $3500.00, Limousine, $3,300.00, the Model C, 7-enger 50 H. P. Touring Car, $3,500.00 and 50 H. P. Model C Runabout, $3,500.00. new cars are the Philadelphia runabout a combination touring car.

The air cooling methods are continued fro year to year practically without chang The cylinders are cast separately with integr cooling pins, and ribs, on the upper part f assisting convection. The main air condu from a blower in front leads up over the to of the cylinders, and is made of aluminu with individual air jackets for each cylinde The centrifugal blower is geared to the cra shaft at a ratio of 4 to 1. The starting cra goes on the blower shaft, and thus engi cranking is made very easy. The cooling proportional to the heating whether the c is moving or standing still.

The crank shaft consists of five long bearing of Parson's White Brass. The Atwater-Ke System, of ignition is used on the Philadelph runabout, and is most simple and economic For the lubrication the McCord Precision oil

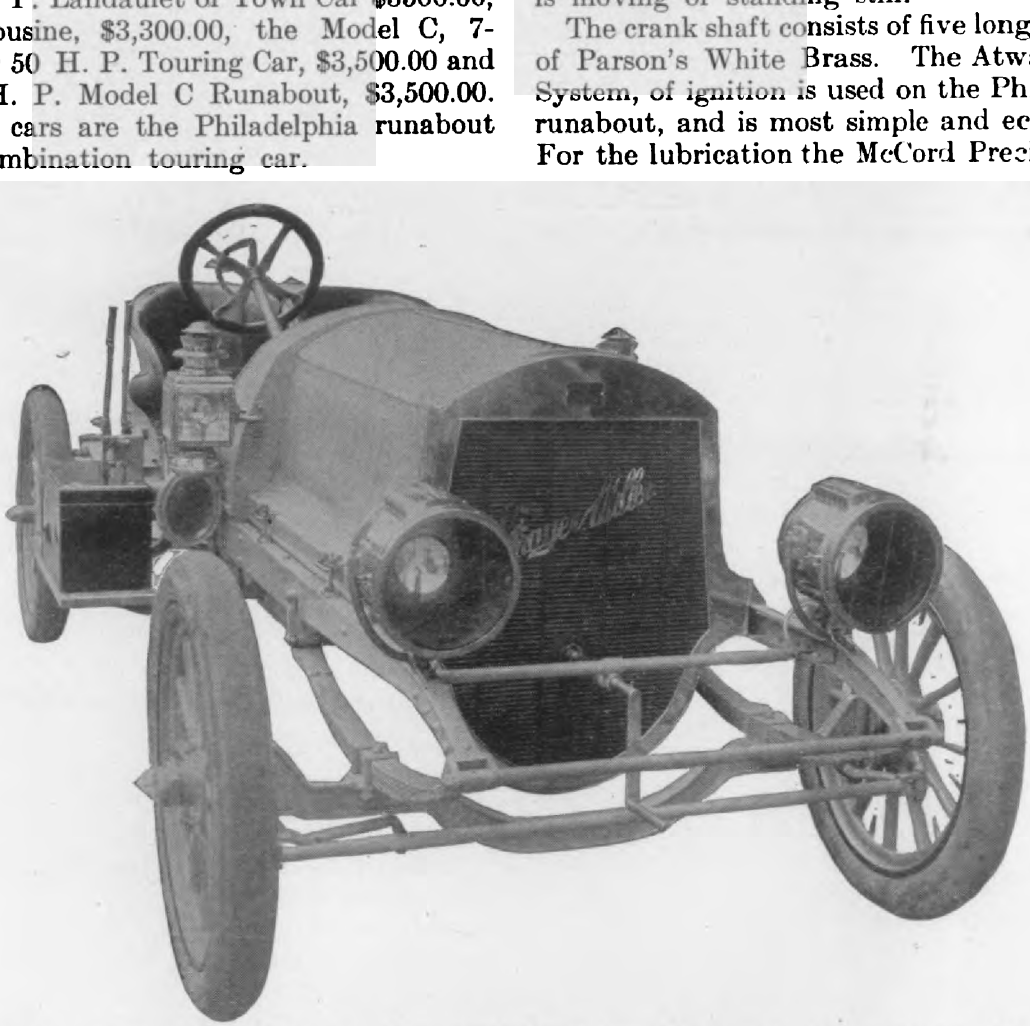

Fig. 1. Frayer-Miller Philadelphia Runabout. Motor 4-cylinder, 24 H. P., "Frayer-Miller Air Cooled." -16x5½ inches. Atwater-Kent ignition from dry cells. Positive oiling by McCord oiler, sliding change speed ng three forward speeds and a reverse, shaft drive and floating rear axle. Wheel base 100; tires 32x4. The wer is geared about 4 to 1 and the starting crank is on its shaft, thus reducing to a minimum the effort essary to crank the motor. Weight 1,850. Equipment: 2 gas lamps, 2 side lamps, tail light, tire holder and l kit. Price $2,250.00

THE PHILADELPHIA RUNABOUT.

he Philadelphia Runabout, is an ideal two enger car, for both business as well as sure, it is very snappy at all times owing ts light weight and high power. It has ery racy appearance, and all the qualities

is used, which is mechanically driven, insuri prompt lubrication at the proper places, copper tubes leading from the oiler. A co clutch is used and operated by a pedal whi insures a very easy and gradual starting the car. The frame is cold prest steel, 4

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ront I-section. The tires used are 32 by 4, and he light weight and the large wheels used on this model, add greatly to the life of the ires. The equipment consists of two gas and wo side lamps, including tail light, and complete equipment of tools.

Layton Aves., Milwaukee, Wis., manufac an extensive line of cold-drawn seamless specialties such as acetylene tanks, ga tanks, compressed air tanks, and num other articles of similar nature for the mobile trade. These tanks will stand a

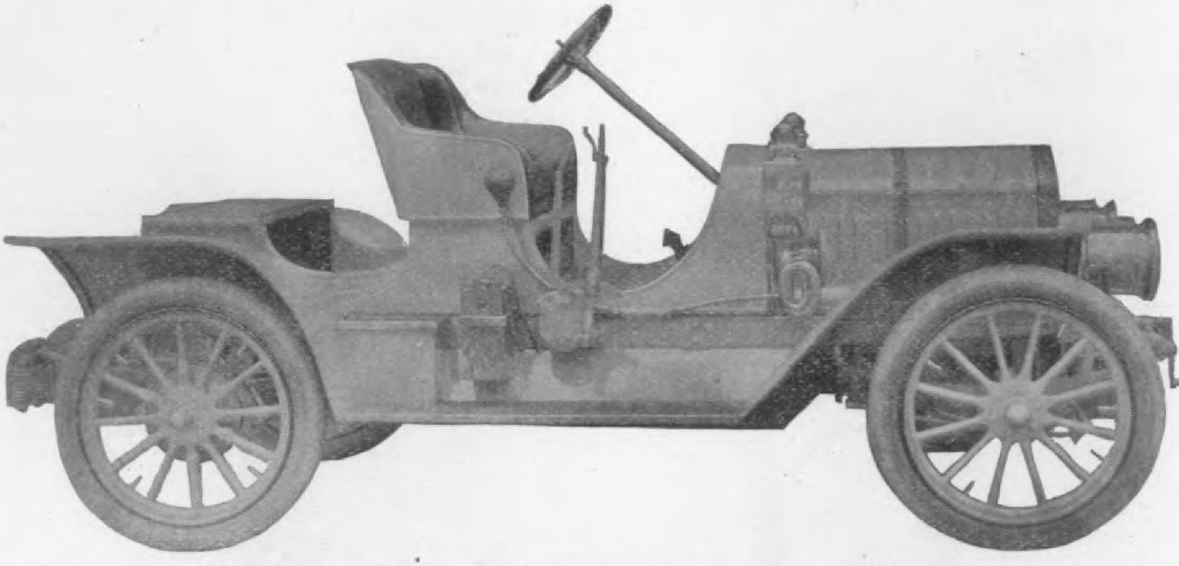

Fig. 2. 1908 Frayer-Miller Combination Runabout. This car is fitted with a 4-cylinder air cooled m similar to the Runabout but is arranged to take a large tool box, single rumble seat or a surrey seat to ac modate two, thus making it either a two or three passenger runabout or a five passenger car, the general s fications are as in the other model. Weight complete 2,250 lbs. Price fully equipt and including all co nations $2,500.00.

THE COMBINATION RUNABOUT.

The Combination Runabout is a new car hat is so arranged that its seating capacity an be varied to suit almost all conditions nd will doubtless therefore, be a very popular ar with 1908 purchasers, It will accomodate ither two or three passengers as a runabout nd five as a touring car. It is said the demand or this kind of car has been steadily increasing. t is equipped with a 4-cylinder, 24 H. P. rayer-Miller air-cooled motor. The lubriation as well as the ignition system, are the ame as on the Philadelphia, runabout the heel base is 100 inches with a tread of 56, a frame of prest steel four by one eighth nches. The transmission is of the sliding ear type, giving four speeds ahead and one everse and equipped throughout with Hessright bearings. The hardened gears, one nch face, are made of special carbon steel, and pitch, all are operated with one lever, by special gear shifting, arrangement which akes the shifting, very simple with all speeds. he quadrant is of the modified H slot type, hich governs the gear shift-lever, without ooking on the part of the driver, and the hifting of the gears are made silently on all peeds. The car is shaft driven. As so many

draulic pressure test of 150 to 1200 po per square inch, the thickness of the ma in the complete article being in accord with the test resistance desired. All pro are thoroly coated (tinned or galvan inside and out. Besides drawn steel this concern also makes pressed, deep sta and drawn steel, brass, or copper specia steel and gray iron castings, and does ele plating of all kinds.

Denatured Alcohol for Non-Freez Solutions

U. S. Industrial Alcohol Co., 100 Wi street, New York City, are manufact of denatured alcohol, and are selling product to the automobile trade for freezing solutions for the circulatory tems of gasoline motors. Before re mending denatured alcohol for this pur a great deal of experimentive work was by their mechanical department unde direction of Irwin Buck, M. E.

This company calls attention to the that denatured alcohol has no corrosiv tion on any of the metals with whi comes in contact and its ability to withs

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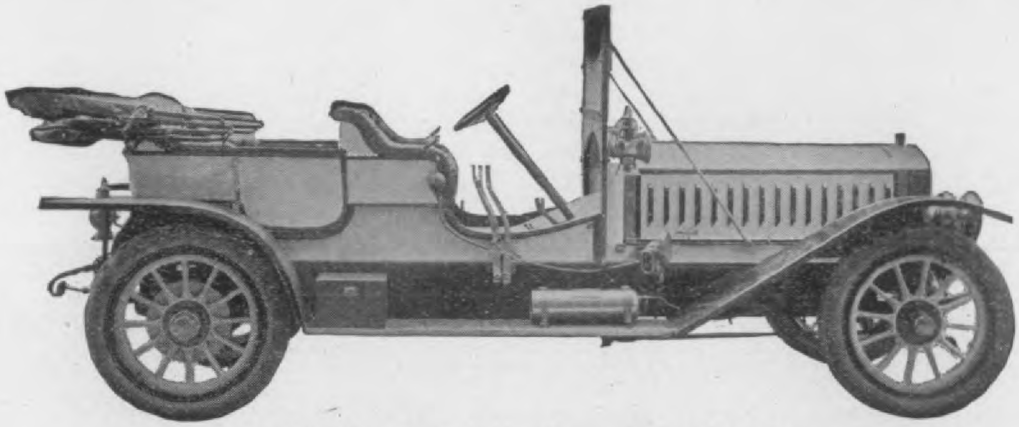
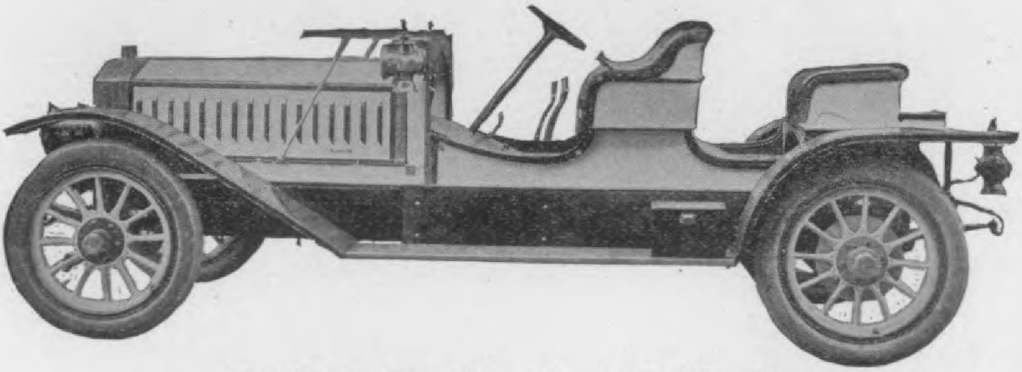
1908 Austin Models



6 Cylinder Austin, 90 H. P.



6 Cylinder Austin, 90 H. P.

The 1908 Austin Models are designed to exactly meet my own personal require-ents after 6 years of building high grade cars, and to fulfill the ideas of that class of wners who want the "sportiest" kind of a car it is possible to get with *all* the power d speed they can possibly use—a car that is either a touring car or a runabout capa-e of making a 1000 mile trip any time, and will beat anything on the road.

Our 6 cylinder 90 h. p. model is my idea of such a car—and I believe it stands day without an equal in the Automobile world at any price.

Our new combination body as a touring car has an extra folding footboard hauffeur's seat. The tonneau seat can be replaced in 3 minutes by a rumble seat, us converting the car into a runabout of the very latest design.

The equipment is complete in every respect, and includes both seats, and extension rrey top for the touring car, and single top for the runabout. We also furnish this ew combination body on our regular 60 h. p. model in place of 7 passenger touring ody. This regular standard body, either with or without detachable limousine top, ill be furnished on both 60 and 90 h. p. models.

All Austin cars have the celebrated Austin Motor and are built in our own shops der my personal supervision.

Send for Catalogue and detailed information about our new models.

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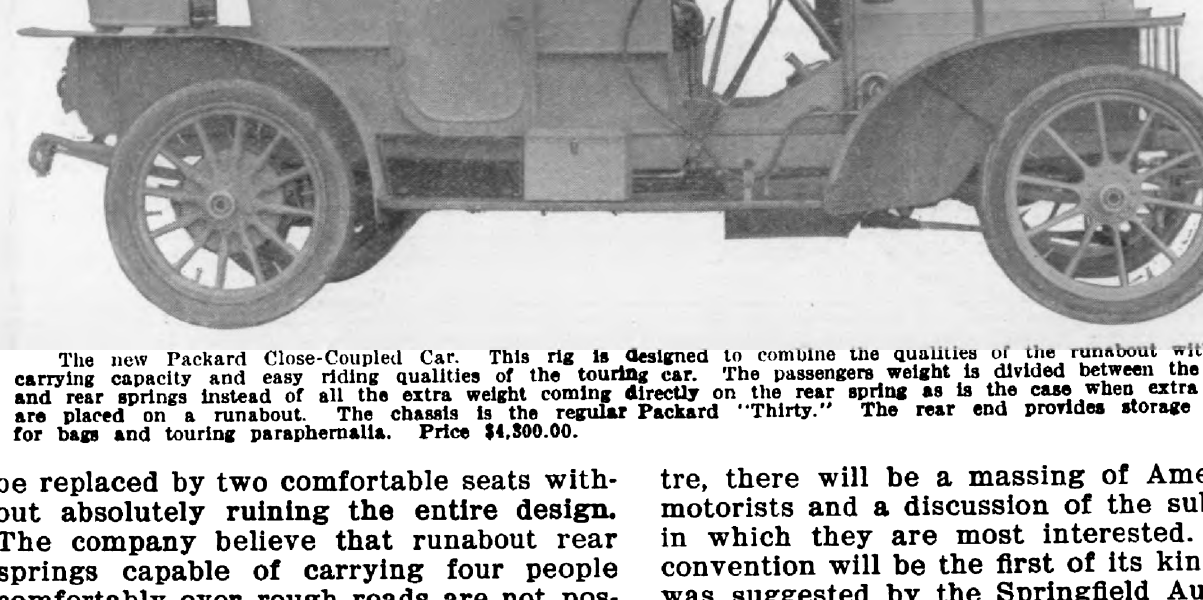
enger car, the owner of which may wish o drive it himself, with his friends close o him, while the chauffeur, if he be in at-endance, is carried in the rear, the Pack-rd Motor Car Company, of Detroit, Mich., as brought out a special close-coupled ody. This body, attached to the well-nown Packard "Thirty" chassis, is shown n the accompanying illustration.

The Packard "Thirty" runabout is de-igned as a two-passenger car with a rum-le seat for the chauffeur. Every detail f its construction is directly intended to provide comfort for the two people in the egular seats. A runabout chassis is not lesigned for two extra passengers, and lso, two small hard rumble seats cannot

A. A. A. Convention for Buffa

At a meeting of the directors of American Automobile Association, hel the Association's headquarters, No. Fifth Avenue, New York City, Tues March 3rd, the Board resolved to hol open convention of the American mobile Association devoted chiefly to cussion of good roads, legislation and ing at Buffalo on July 6th and 7th, to which city all of the clubs of the ciation will be asked to conduct club t At this convention the good roads ex of the United States, as well as moto interested in legislation, will be invit be present. The Glidden tour will from Buffalo on July 8th. Thus the



The new Packard Close-Coupled Car. This rig is designed to combine the qualities of the runabout wit carrying capacity and easy riding qualities of the touring car. The passengers weight is divided between the and rear springs instead of all the extra weight coming directly on the rear spring as is the case when extra are placed on a runabout. The chassis is the regular Packard "Thirty." The rear end provides storage for bags and touring paraphernalia. Price $4,300.00.

be replaced by two comfortable seats without absolutely ruining the entire design. The company believe that runabout rear springs capable of carrying four people comfortably over rough roads are not possible for a car primarily designed for two people, because the variable load is all on the one set of rear springs and not distributed between the front and rear springs, as in the case of the touring car.

A logical solution of these design problems is the Packard Company's new close-coupled car. In this new design the passengers are midway between the front and rear axles, so their weight is distributed between the front and rear springs. Consequently, a variation of one or two passengers in the load is not immediately felt, and the car can be used with half or full load, with practically equal comfort. It is a peculiarly safe and capable car for fast, hard driving over rough roads, owing to

tre, there will be a massing of Ame motorists and a discussion of the sul in which they are most interested. convention will be the first of its kin was suggested by the Springfield Au bile Club of Springfield, Mass.

It might not do to say that a comp satisfactory substitute for the pneu tire will never be found; but the fa mains that after some twenty years pneumatic tire still holds its place, no standing the millions in cash and e that have been expended to supplant do away with its chief shortcoming—t evitable puncture.

It wasn't so very long ago that an mobile laid up at the road-side for repai a usual thing, and the papers joked about the difficulties of motoring. Cart

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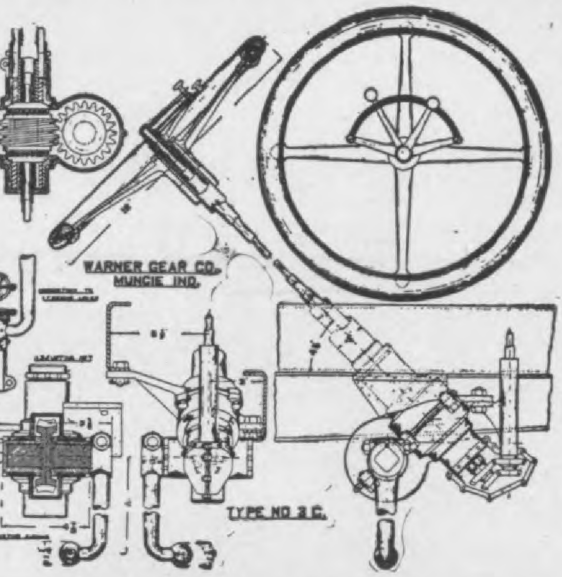
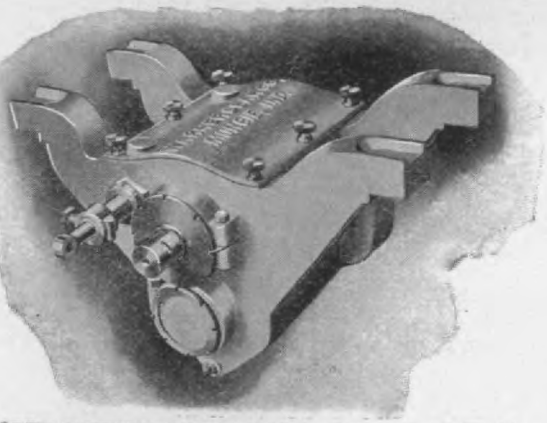
1908 GEARS



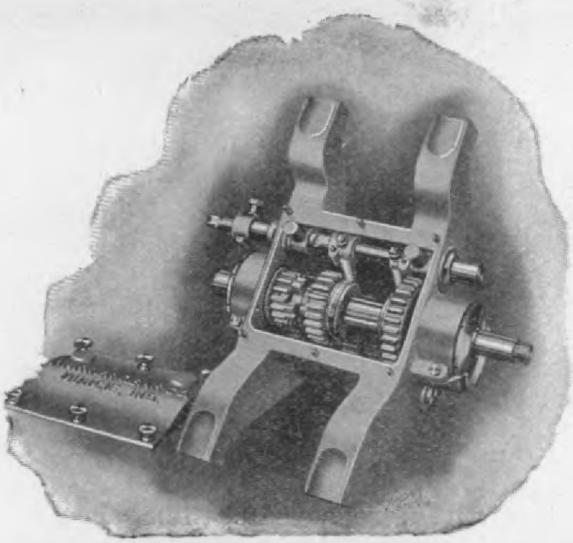
STEERING GEARS

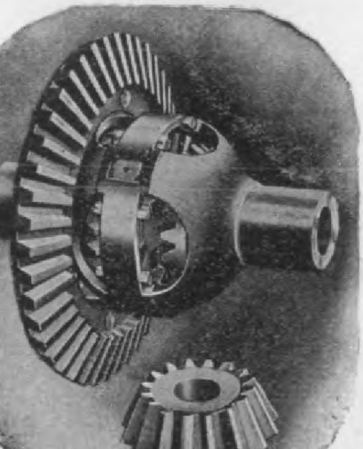
that are built to **"Stand Up."** Worm and sector adjustable, hardened and ground to size. Control levers mounted on top of 16 inch wheel, ribbed aluminum spider. Ball Bearings.

TRANSMISSIONS



"SELECTIVE" SLIDING—35 and 50 H. P.





For Timken Roller Bearings and Annular Ball Bearings.

GEARS are made from **SPECIAL GEAR** forgings, hardened, ground and "treated." We also furnish **"SELECTIVE"** control levers. We build both

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placed on the market a new line of 4-cycle gasoline motors for automobile and marine use. These new motors are made in two, four and six-cylinder sizes, cylinder sizes ranging from 4 x 4½ in. to 6 x 6 in., but the four-cylinder size only is here shown, tho the descriptive matter is, of course, equally applicable in all essentials

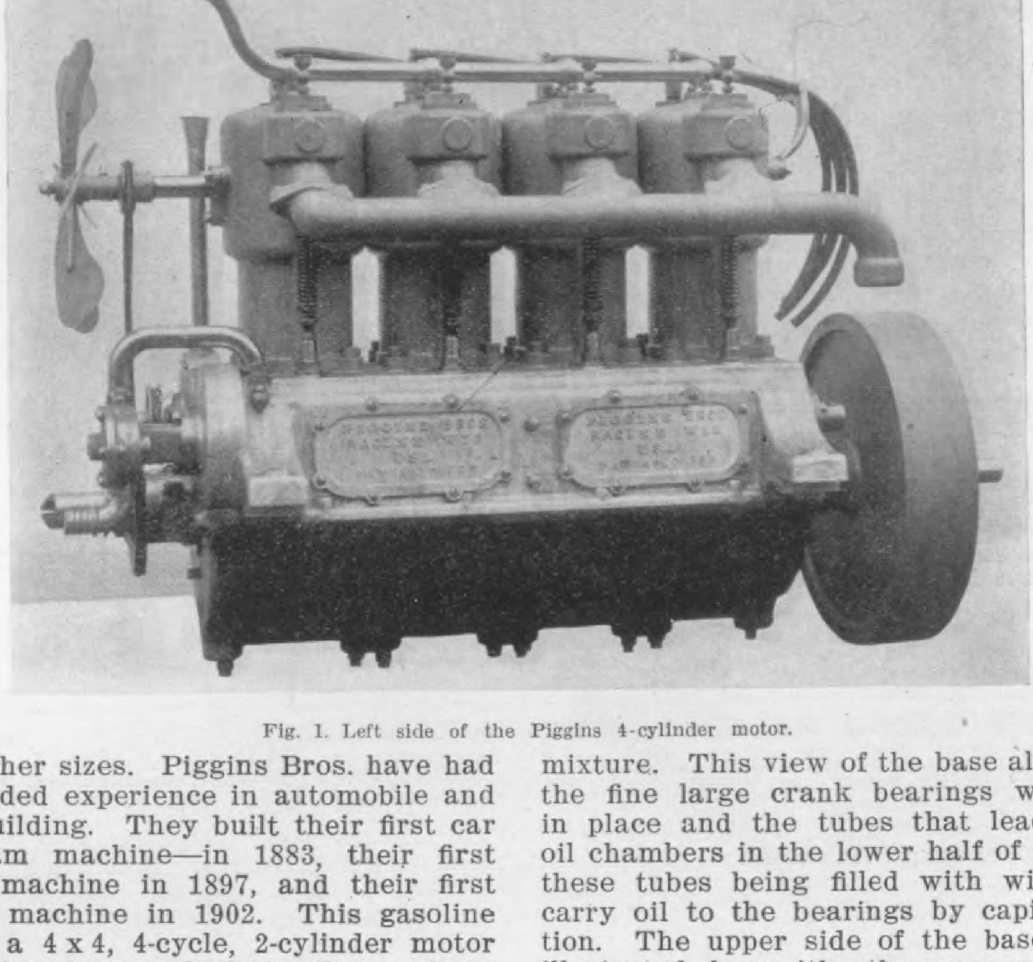

Fig. 1. Left side of the Piggins 4-cylinder motor.

to the other sizes. Piggins Bros. have had an extended experience in automobile and motor building. They built their first car —a steam machine—in 1883, their first electric machine in 1897, and their first gasoline machine in 1902. This gasoline car had a 4 x 4, 4-cycle, 2-cylinder motor and developed a speed of 18 miles per hour carrying four persons. They have been manufacturing gasoline motors for some years and this latest design, here described and illustrated, represents their accumulated experience. It has been their endeavor to turn out a first-class motor both in material and workmanship, which is, besides, neat, compact and accessible. They claim that by putting a little gasoline in the pet-cocks over each cylinder and giving the crank a couple of turns, the engine may then be started on the spark.

A left side view of the 4-cylinder Piggins motor is here shown, this view displaying the valve springs, the valve adjustments, the exhaust manifold and the circulation pump. Vertical and base-end detail views

of the cylinder.

The gas manifold and water pipe cast on the inside of the base, as ca seen by reference to the illustratio inside of the top half of the base. construction adds to the strength o base, and insures thoro vaporization

mixture. This view of the base also the fine large crank bearings with in place and the tubes that lead t oil chambers in the lower half of the these tubes being filled with wicks carry oil to the bearings by capilla tion. The upper side of the base i illustrated herewith, the gas and

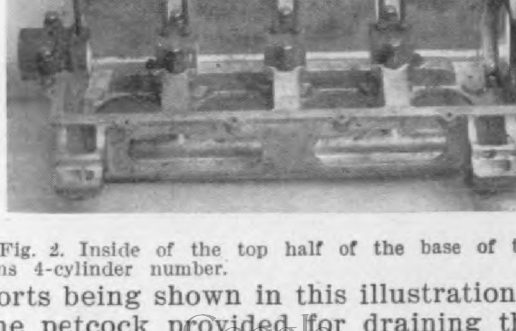

Fig. 2. Inside of the top half of the base of t gins 4-cylinder number.

ports being shown in this illustration the petcock provided for draining t tire water system. Two large hand are provided in the end of the base

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The Future
OF THE AUTOMOBILE
DEMANDS

1st. That skidding be eliminated.
2nd. That the machine be efficient in bad weather.
3rd. That wear on Tires be reduced to a minimum.
4th. That the maximum power generated be used in propulsion.

Hedgeland
EQUALIZER

Fills all these wants. Is interchangeable with the differential in 22 makes of cars. Manufacturers, Garages, Owners, write for catalogue and prices.

Hedgeland
Manufacturing Company
Canton, Ohio

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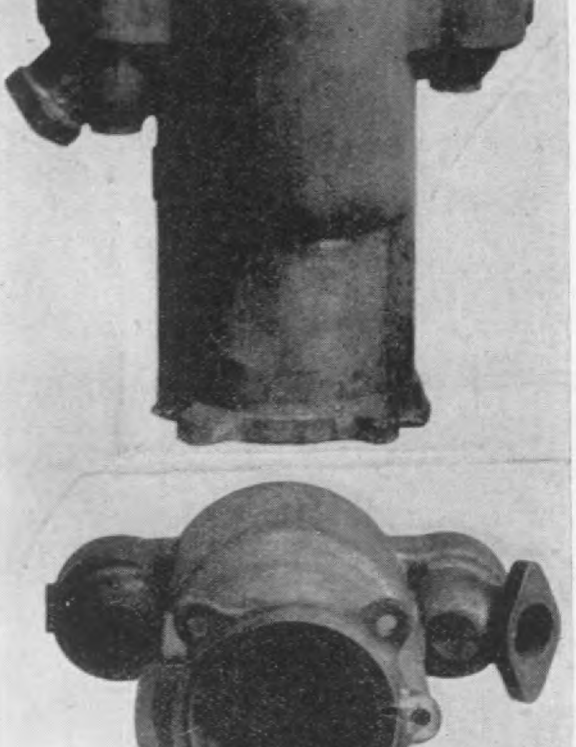


Fig. 3. Vertical and base-end views of a cylinder of the ggins Motor.

nd a pet-cock is provided at the end of ne base for ascertaining the height of ne oil level. Plugs are provided in the ottom for drawing off the oil from any ne pocket if desired.

The piston is fitted with three rings on ne upper end and two oil grooves, also a ing at the lower end and three oil grooves.

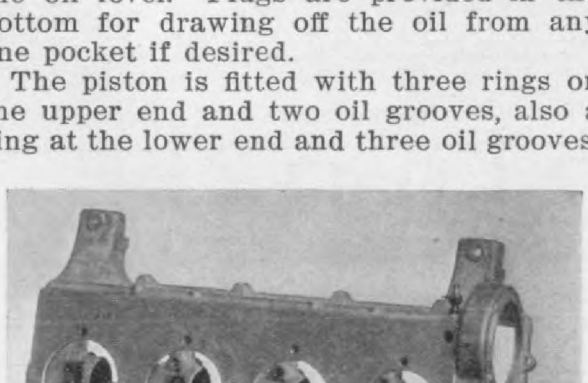


Fig. 4. Upper side of the base of the Piggins 4-cylinder.

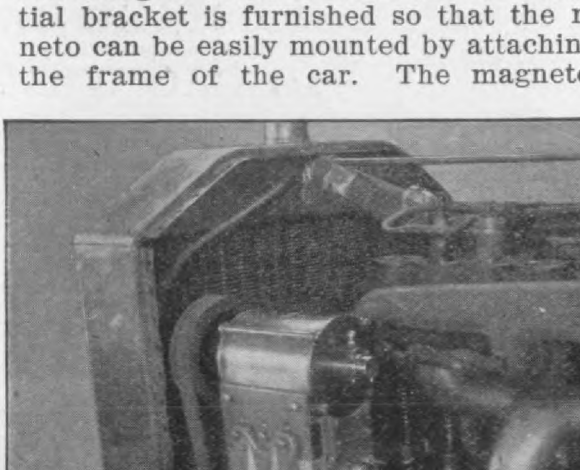
he grooves above the lower ring receive il from the inside of the piston thru oles drilled into the piston at intervals

piston pin in place.

The connecting rod is a steel drop f ing having a large bearing surface at upper end bushed with bronze. The lo end is babbitted. The two screws that l the cap on the lower end are of la diameter and have five threads. I washers and split keys are used to see them in their proper place.

K-W Model F Magneto

The K-W Ignition Co., Whitney Bl Cleveland, Ohio, has recently brought its model F magneto, which is intended marily for use on Ford runabouts, bu also applicable to other makes of cars. illustration herewith shows the magn on a Ford car, illustrating the metho mounting it on this machine. A subs tial bracket is furnished so that the m neto can be easily mounted by attachin the frame of the car. The magneto



K-W Model F Magneto as applied to the Ford Run

equipt with a pulley for one-inch belt driving from the fly-wheel. The manu turers claim that if a non-stretch water-proof belt is used, no belt tro will be experienced, and they are prep to furnish a suitable belt for $1. The m neto sells for $35. This model F mag is not materially different from the m A, which has already been described, b runs in an inverted position.

Jos. H. Whiteford & Co., 21-25 N Jefferson street, Chicago, Ill., make b signs for use on demonstrating automob monograms, script nameplates, nickel pl letters for use on motor boats, license figures, and all kinds of metal signs, n

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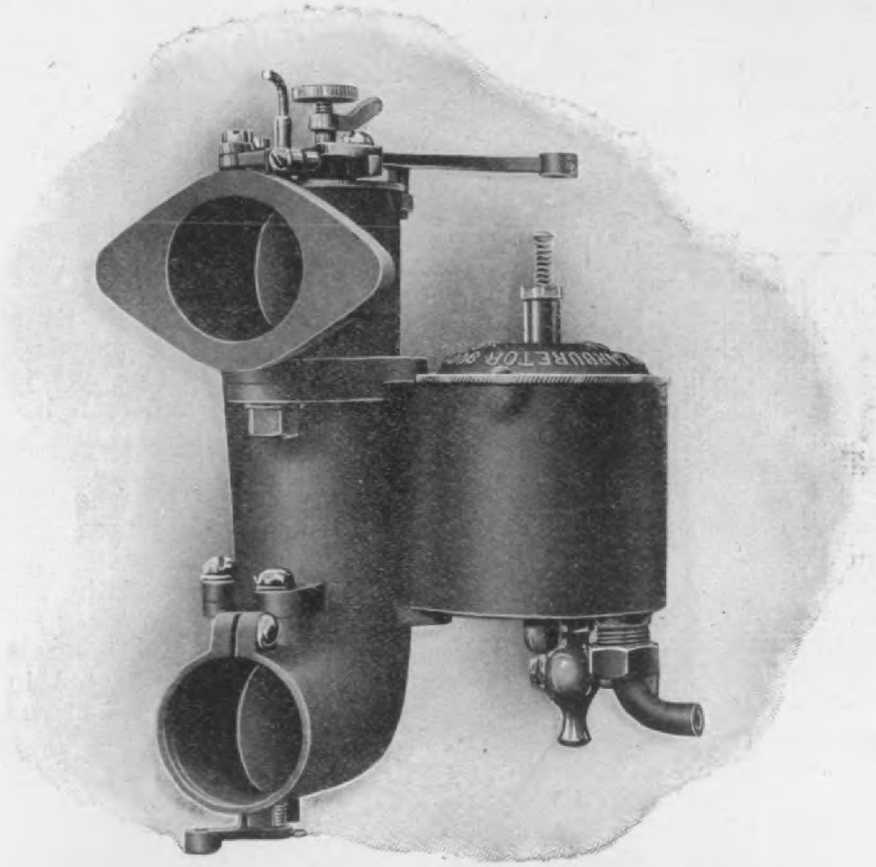
IT DOES NOT TAKE TEN YEARS

o build a mechanically correct carburetor. We proved that o thousands who have been seeking relief from poorly con-tructed Carburetors.



The BUFFALO CARBURETOR

s as nearly perfect as modern mechanical skill can make it. It s used by the manufacturers of Autos WHO KNOW as regular quipment.

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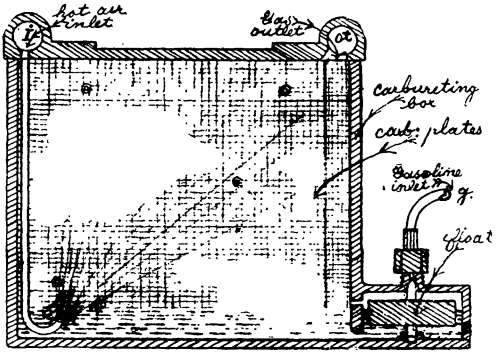
BUFFALO CARBURETOR CO.

The Weiwoda Triple-Action Carburetor

The Weiwoda triple-action carburetor is the product of Mathias Weiwoda & Co., 1660-1668 Bushwick Ave., Brooklyn, N. Y., and employs the principle of the old style wick type carburetor. Among the advantages claimed for this carburetor is the fact that it is impossible for it to get out of order, as no valves or spraying devices are used in its construction; also that it will work on a lower grade of gasoline than is now possible. It is also claimed to be economical of fuel.

In this device gas is formed by the passing of hot air thru a series of plates covered with a capillary acting fabric saturated with gasoline. The plates are enclosed in a rectangular metallic box, which is fitted with two openings, one for admitting hot air from a hot air jacket around the exhaust pipe, and the other for discharging the gas to the engine.



Sectional view of the Weiwoda Triple Action Carburetor.

The hot air enters the carburetor at (i), takes its way thru the spray tubes and, on leaving the same, it is carburated by passing upward thru the layer of fuel and also thru the spray of gasoline which it takes up by the velocity given it by the suction stroke of the engine piston.

The gasoline spray is thrown all over the fabric walls so that they are saturated to their utmost capacity when the air is passing between them.

A constant level of gasoline is kept in the tank by means of a small float. The manufacturers state that this carburetor consumes half a pint of gasoline per horsepower per hour. The throttle valve was especially designed for use on this carburetor and is similar to a three-way cock, one opening of which has a check valve for the carburetor, one connects to the intake pipe of the engine, while the third is regulated by an air slide valve. An automatic auxiliary air valve is contained in the throttle valve itself.

The carburetor is made in three sizes, as follows: No. 3, for 3-5 H. P. single cylinder or 8 H. P. multiple cylinder engines, $15.00; No. 5, 6-10 H. P. single cylinder or 15 H. P. multiple cylinder engines, $20.00, and No. 7, 12-20 H. P. single cylinder, or 30 H. P. multiple cylinder engines, $30.00. No. 3 is 11 in. long, 6 in. wide and 7¼ in. high; No. 5, 12 in. x 6 in. x 8¼ in., and No. 7, 15 in. x 6 in. x 8¼ in.

Stark's "Alumaloyd Sheets

The Stark Alumaloyd Rolling Mill Co., Canton, Ohio, is furnishing to the automobile trade "Alumaloyd" sheets designed especially for bodies, dashes, guards, bonnets, battery boxes, drip pans, mufflers, etc., and recommended for their durability and their non-rusting quality. These sheets are made from a metal of special composition coated with an aluminum alloyed metal by a method said to result in the absorption of the aluminum alloy, not a surface coating.

These "Alumaloyd" sheets can be stampt, drawn, prest, double seamed or soldered, and one of the chief claims of superiority made by the manufacturer is that as they will not rust, the matter of finishing a body or other part made from them is not only greatly simplified but is a much cheaper process than is usual. The maker of these sheets claims that an "Alumaloyd" body can be finished by the application of a primer, one color-coat, a rubbing and a finishing varnish, the original surface of the sheets being equal to a pumice-stoned surface, so that the sandpapering, rough stuff filling, putty-filling, pumice stoning and the application of several color and rub coats are all eliminated.

For guards and bonnets the saving is similar to that effected in bodies, on account of the absence of rust around rivets, stays and stiffeners.

These sheets are packed in cases of 175 lbs. each and can be furnished in all standard sizes and gages.

Charles F. Sweet, of Hartford, Conn., manufactures a complete line of automobile lubricants, soap, metal, polish, etc., all of which are distributed by Empire Distributing Co., 200-204 West 71st street, New York City, to whom all inquiries should be addrest. The "Sweet" line includes the "Mercedes" automobile oils, light, medium, heavy and special, for all cars, put up in 1, 5 and 10-gallon cans, barrels and half barrels; Non-Fluid greases for transmission lubrication, etc., in four consistencies, supplied in 2, 5 and 10-pound pails; Climax cup grease, for lubrication of bearings, gears, etc., in four consistencies, in 2, 5 and 10-pound pails; oil soap, guaranteed free from alkali or any ingredient that would injure the surface of automobiles, in 5, 25 and 50-pound pails, barrels and half barrels; Magic metal polish, put up in pints, quarts and gallons, with white, black and red polishing powders.

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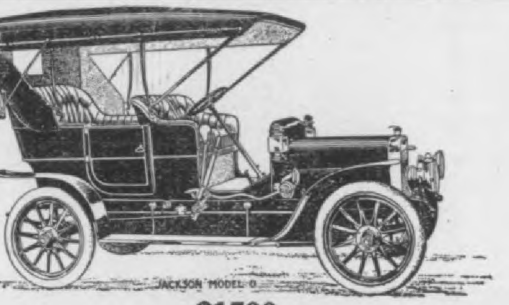
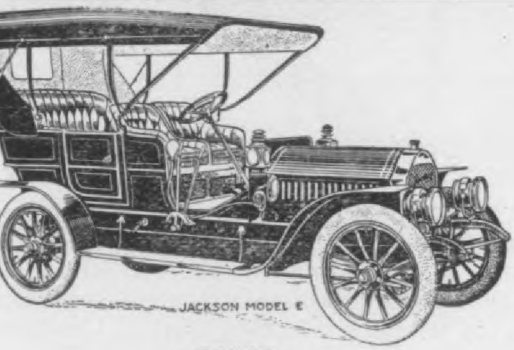
Jackson

"No Sand Too Deep—
No Hill Too Steep."

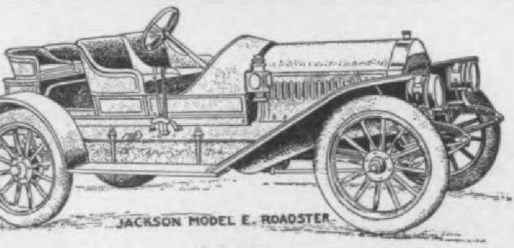
$1250



$1500



$2000



$2000

Amidst all the pomp, glitter and circumstance of the many Automobile Shows of 1907-08, surrounded by and compared with competing cars of various prices and degrees of excellence, this superb line of Jackson cars has compelled the attention of all. They are the Anti-Hard Times Cars. They are made right and sold right. They are winners.

Send for Catalogue

Jackson Automobile Co.

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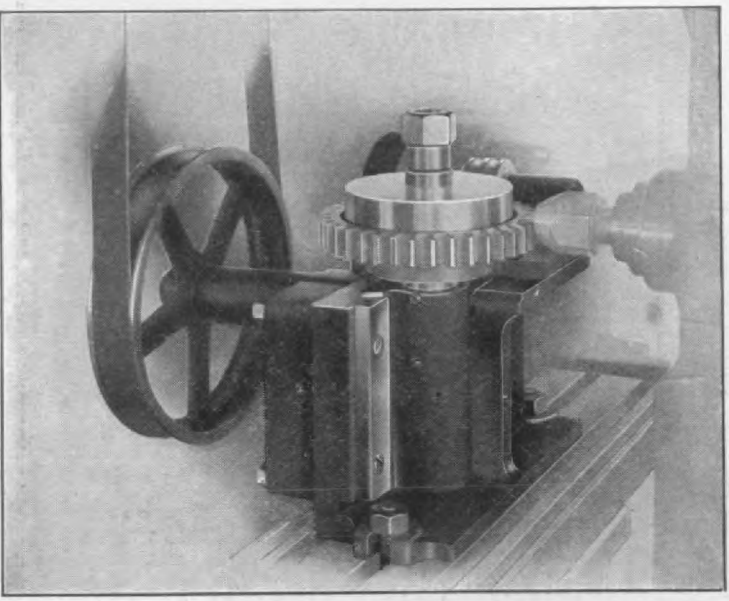
The purpose of this attachment is to provide quick and easy means for automatically chamfering or rounding the teeth of sliding gears for automobile change speed gears and for similar purposes in connection with machine tools, etc. The device is manufactured by the Long Arm System Co., of Cleveland, Ohio.

The attachment may be secured to the table of a small milling machine, and when once set up with the initial adjustments of the cutter and work made, it is not necessary to stop the machine or do any other work than to take off and put on duplicate gears. It will chamfer gears of from 2-inch to 9½-inch pitch diameter and of 4 to 10 diametral pitch. When run at the proper speeds, about 12 teeth per minute may be chamfered or rounded. The contour of the chamfering may be changed by using special cams, or special cutters, or both. The frame is of cast iron, of strong cross section, and to it all the details of the complete attachment are secured. Two slots are provided for the bolts clamping the attachment to the milling machine table. The bracket is securely fastened to the side of the frame and the principal driving mechanism is held in it. This consists of the main driving shaft, with pulley and pinion attached; the cam spindle, with cam and cam gear attached, and engaging with the driving pinion; and the rocker arm carrying the intermediate gear connecting the cam gear with the worm driving gear. The cutter usually furnished with the attachment are double end cutters, the body of the cutter



The "Long-Arm" Automatic Tooth Chamfering attachment.

plete with counter shaft, clamping one worm, one cam, two double end cu and bushings for locating and holding size gear.

The Herz Tandem Pump

To meet the requirements of those desire a power operated tire pump permanently attached to the motor, & Co., 203 Lafayette St., New York have lately placed on the market a type of power operated pump, which call the "Tandem." This is a very s device, takes up little room, and seem meet the requirements of the case ex As will be seen from the illustration with, it consists of a small pump w very simple operating mechanism, co ing of three discs arranged in tanden of which is to be held against the fly- of the motor by the user. The han detachable, as shown in the illustrati that the pump can be stowed away in small space when not in use. The is of cast aluminum with bearings of phor bronze, and the friction wheel of aluminum covered with pure gum. connecting rod is of bronze and the h is of enameled wood. The total l with the handle is 24 inches and the width is 5 inches. The price is $20 extra heavy rubber hose is furnished at 35 cents per foot, and a mano is attached at an extra cost of $3.50. also furnish an air-tight pump conn at 45 cents extra.

The Herz Tandem Pump.

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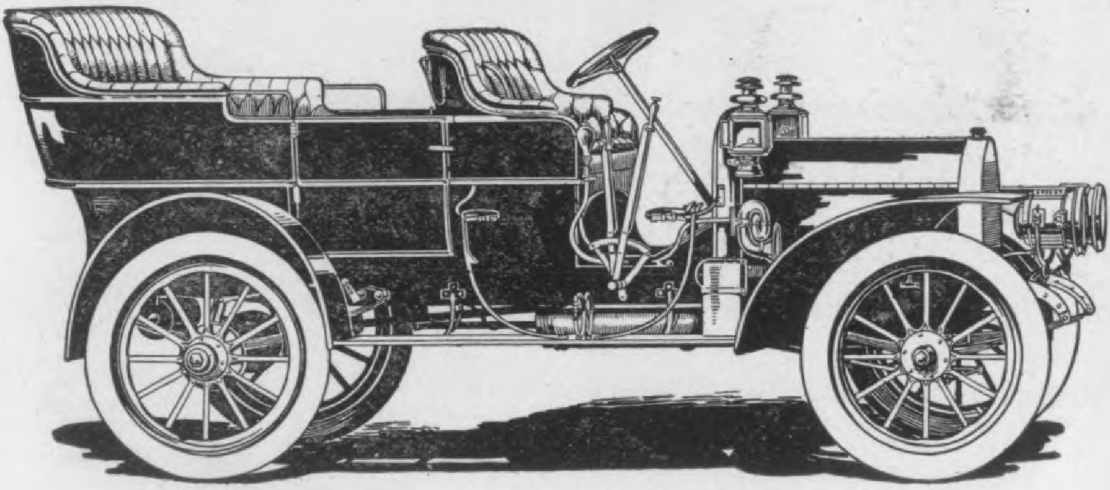
A dependable car
A responsible maker

Over half a century's reputation for honorable and orthodox business methods should appeal to every prospective purchaser of a car, and to every live dealer with an eye to the future. *The STUDEBAKER* policy may be summarized in four words

"Good, or Made Good"

It's worth much to know that the firm that makes your car is *both able and willing* to give you a square deal.



Studebaker

Automobile Co.

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makers of the well-known Smith speed indicators, clocks and compasses, have just brought out a taximeter for automobile use. We are informed that this taximeter has been thoroly tested, officially, in England.

The Smith Taximeter is 8 inches high, 7 inches wide and 5 inches deep, and is fitted with a dial which shows the fares as regulated by the attachment on the wheel and any extras which may be added during the trip. The Taximeter is worked

The "Smith" Taximeter.

on the well-known Horo-metric system, i. e., actuated by the time or distance according to the speed at which the vehicle is travelling. The instrument is of remarkably simple construction. Although constructed most substantially thruout, the Taximeter, which has a strong aluminum case, painted to suit the color of the vehicle, weighs only about 15 lbs. The clock used in this instrument is of S. Smith & Son's own manufacture, with two-day movement.

When the Taximeter is for hire a flag shows at the top of same, designating that

Furthermore, there is a round dis a set knob for use of the driver, wh set by him to the amount of extras c able to the passenger. There is counter, for the use of the prop which automatically records the a actually received for extras by the Another counter is used also for th prietor, which automatically record exact amount the driver has receiv fares on the Horo-kilometric register

The attachment for the wheel is simple, the pullying system being ployed, an arm being actuated on every turn of the wheel. This pul wire inside of a flexible shaft, which the driving wheel of the Taximete tooth. Thus the motion of the instr is slow and consequently there is cally no wear on the working parts.

The "Mascot" Auto Clock

One of the latest dash clocks offer trade is the "Mascot" auto clock, factured by the Angier Company, Boylston St., Boston, Mass., and wh shown herewith.

The "Mascot" Auto Clock and Mounting

The outfit consists of an Ingers hour stem wind and stem set wat closed in a heavy, polished brass ing. The clock and mounting pres very neat appearance. List price is

R. H. Willits Auto Accessory Mf Alexis, Illinois, are putting out a prep called "Car-Bo-Nit," said to remove deposits from gasoline motor cylinders. tablespoonfuls of "Car-Bo-Nit" are thru the spark plug opening into a and left in it over night to disolve th

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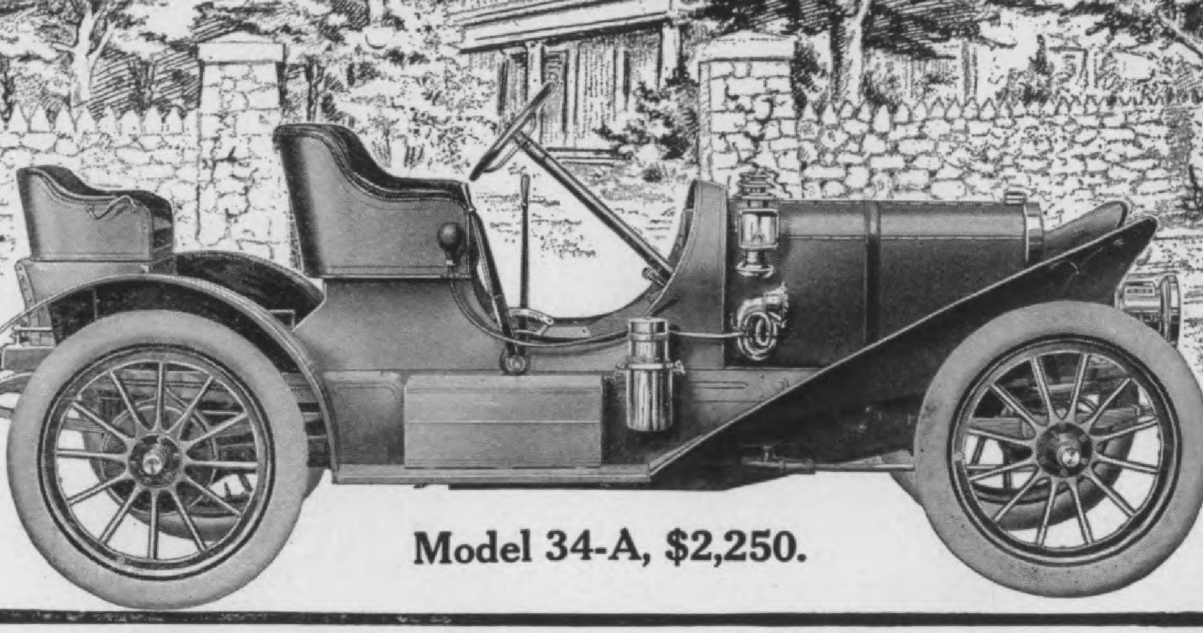


Model 34-A, $2,250.

The Ideal Transportation

The gentleman's roadster is the ideal connection between the suburban home and city office. It changes the hot, dusty journey on a crowded "local" to a pleasant ride in the clear, fresh air that fits you for the business of the day.

Rambler

The Rambler roadster, Model 34-A., is a speedy, classy car with the power and endurance of a touring car and the convenience of a runabout.

Mechancially it possesses every valuable feature found in any car at any price, such as offset crank shaft, straight line drive, large wheels, etc., and in appearance has a distinctive character of its own that marks it a thoroughbred.

An examination will convince that

It is the Right Car at the Right Price

Two other models, touring cars at $1,400 and $2,250.
Our catalog gives full details, write for it today.

Thomas B. Jeffery & Company

Digitized by Google

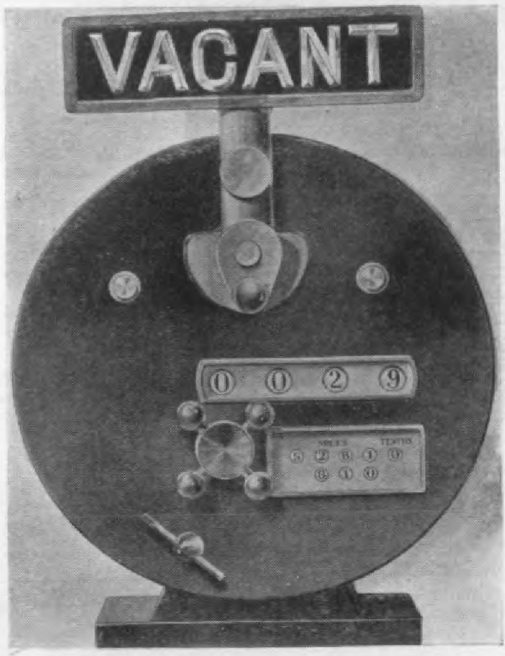
ity, manufacturer and inventor of the ones Speedometer, has recently brought ut a Taximeter, which is mechanically mple and shows a high quality of workanship, general appearance and finish.

The instrument is about 7 in. in diameter y 4 in. in thickness. It has a silver dial ce in front with figures indicating the te or tariff, the total fare to be paid by e passenger, and a separate indication r the extras. The reverse side of the inrument has a dial giving a total of all oneys received by the driver, the total ileage made by the cab and the trip milege, which can be reset by the driver if desired. Also a separate count of the umber of trips with single and with doule tariff. A vacant sign is also displayed n the reverse side of the instrument hich, when a passenger enters the vehile, is thrown to the right by the driver

The Jones Taximeter, front view.

ntil it assumes a horizontal position, inicating on the dial tariff (1) and at the ame time ringing up an initial charge of 0 cents for the first half mile. After the irst half mile has been traversed an addiional charge of 10 cents for each quarter nile is added to the total. In the event of here being a trunk or other baggage for which there is an extra charge, the driver urns a knob on the reverse side of the nstrument which causes the extra charge o be indicated under the heading "Extras" on the dial, and also adds the amount of he extra charge under the head "Total

position when the same initial charg made, which after a third of a mile been traversed an additional charge o cents for each one-sixth of a mile. Taximeter, in addition to containing counting mechanism actuated by the n age, also contains a clock mechan which, when the "Vacant" sign is down the vehicle is standing, causes a charg 10 cents to be registerd for each six n utes of waiting, and a like amount is ad to the total. This, of course, is all ranged automatically so that the dr has no control over the instrument ex to start it and stop it.



Back view of the Jones Taximeter.

One of the most important improvem is the "Totalizing" feature, which gives entire amount due from the passenge a single total without the necessit adding the tariffs and the extras. **the entire amount of money due the company, such as initial charges, tional charges and extras, are given** single total. The Taximeters are now ing manufactured, and will be lease operators of motor taxicabs, horse etc., and the Jones Company attaches pairs, maintains and guarantees the struments. The company believes that is the only satisfactory method on w to operate the instruments.

Kraeuter & Co., 577-579 Eighteenth av Newark, N. J., makers of pliers, bearing

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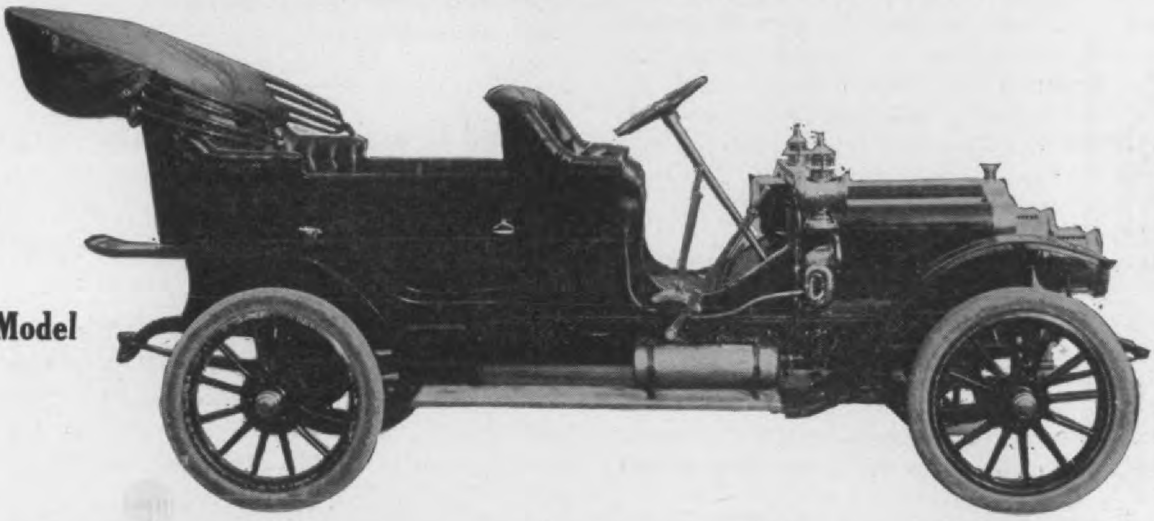
THE SELDEN CAR



Model

Five Passenger Touring Car, $2000
Three Passenger Runabout, $2000

AN ATTRACTIVE CAR
AT AN ATTRACTIVE PRICE

SPECIFICATIONS

ngine—4 cylinders $4\frac{1}{4} \times 4\frac{1}{2}$, 28-30 brake horse-power.

ransmission—3 speeds forward and reverse, selective, Timken bearings.

heel base—109 inches; tread, standard; clutch, cone leather.

ody—sheet metal, straight line type, roomy and comfortable.

Tires—$32 \times 3\frac{1}{2}$, quick detachable; make optional.

Frame—pressed steel, $4\frac{3}{4}$ inches deep.

Front axle—single I-beam drop forging, ball bearings.

Rear axle—Bevel gear drive, enclosed type, roller bearings.

Ignition—synchronized jump spark.

Weight—empty, 2,200 lbs. (actual, not catalog.)

REPRESENTED IN GREATER NEW YORK BY
The Palmer & Singer Manufacturing Company, 1620 Broadway

SELDEN MOTOR VEHICLE CO.

ROCHESTER, N. Y.

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The gun is the product of the Garage Equipment Co., Milwaukee, Wis., and can be used for either oil or grease. It is made of 3-inch seamless steel tubing, 9 inches long, with malleable iron top and bottom.

The "Perfect" Combination Oil and Grease Gun.

When used for heavy grease the gear is in mesh with the teeth on the plunger and by turning the crank, very high pressure is obtained, driving the grease thru the nozzle and into the bearing. When used for oil, the gear is slid out of mesh with the plunger and by taking hold of the handle at the top of the plunger, it can be pulled upward or shoved downward with ease, thus sucking in a quart of oil and delivering it to the oiler or the part desired.

The gun holds two pounds of grease and can be filled by screwing off the bottom cap. It is made of steel and iron. The nozzle opening at the bottom is threaded for one quarter inch standard pipe, and nozzle No. 1 and No. 2 is furnished with each gun.

List price in Japaned finish, with one nozzle $3.75; nickle plated finish, with one nozzle, $4.50; extra nozzle, 20 cents.

The Lockwood Primer

The Lockwood Brothers Co., 101-107 W. Pearl street, Jackson, Mich., who operate a garage, some time ago devised for customers a primer for gasoline engines so that a car motor could be started on the first turn of the crank. This primer met with such favor locally that the makers have commenced to manufacture it for the trade generally and are listing it at $5, each primer being sent with a guarantee of efficiency or money refunded.

The Lockwood Primer is arranged for attachment to the dash, and consists of a receptacle for hold-

All pipings, unions, wood screws, e are furnished with the primer. The w of installing it can be done in thirty n utes, as one hole drilled and tapped intake-pipe and one hole drilled thru dash are sufficient.

"Red Cross" Lubricants and Soap

Auto Oil Co., Jackson, Mich., makes a of oils and greases especially adapted to au mobile use and marketed under the br "Red Cross." Its chief product is the Cross No. 100 non-carbonizing oil which as name suggests will not carbonize, accord to the claims of the maker. No. 100 i light body oil of pale color and is rec mended for both air- and water-cooled in all seasons. In first using this oil i advised that, after a few days use a tea ful of wood alcohol be put in each cylin while hot and allowed to stay there over n after which the engine should be started the exhaust opened after 10 minutes run to allow the carbon deposits to escape. oil is put up in gallon, 5 gallon, 10 gal ½ barrels and barrels, prices ranging from to 40 cents per gallon, according to quan purchased.

This line also includes light, medium heavy oils for gasoline motors, oil for st motors, a multiple disk clutch oil and a tr mission oil, also a graphite lubricant. company also makes a pure linseed oil for cleaning bodies, leather, plush or ra upholstery, etc. This soap has the sistency of heavy vaseline and is of a amber color. Price is 6 cents per poun barrel lots up to 12 cents per pound in pails.

John A, Thompson & Co., having h quarters at 204–208 Jefferson Avenue, Det Mich., act as factory representatives for sev makers of automobile accessories and four travelling men. They solicit car m facturers only and work on a commis basis. They have met with gratifying su during the past year and are taking on sev new lines for the coming season. They handle Atwood lamps, Shain ignition app tus, Ball carbureter, Gustave Cornelis Co's brass and copper tubing, Contin

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Famous Frictio

FLYER

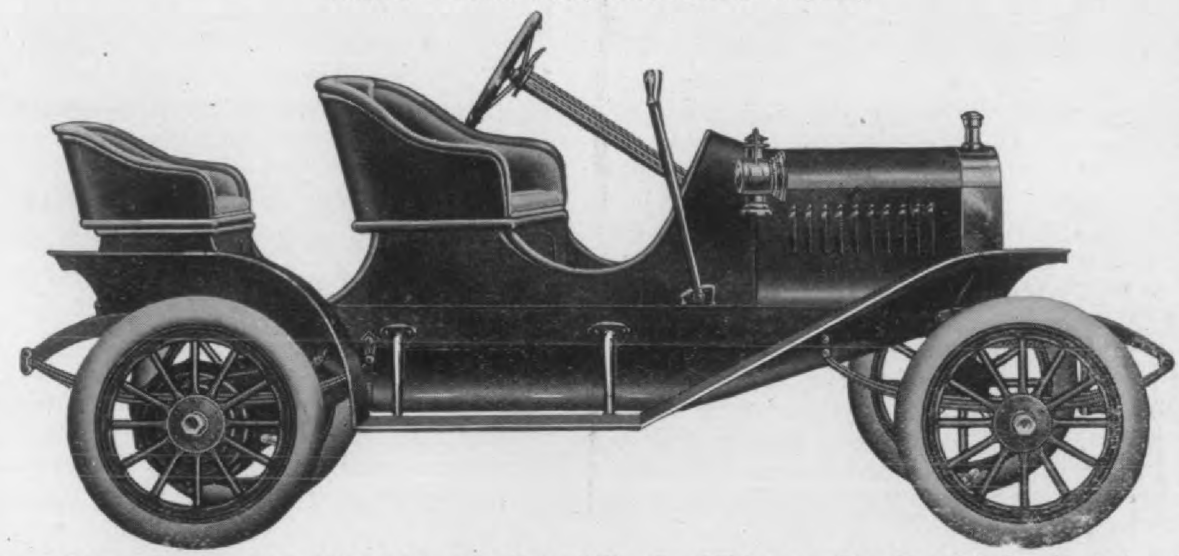
LAMBERT, "MODEL M."

This five-passenger, side-entrance car, with a detachable tonneau, is especially built to supply the increasing demand for this, the most perfect, practical and popular car.

SPECIFICATIONS, MODEL M

Wheel Base—105 inches.
Tread—56 inches.
Frame—1½ x 3 x ¼-inch angle steel.
Wheels—32-inch wood artillery.
Tires—32 x 3½-inch pneumatic.
Motor—Rutenber 4-cylinder, 35-40 H. P.
Speed—1 to 50 miles per hour.
Carbureter—Float feed.
Ignition—Jump spark.
Radiator—Honeycomb type, with fan.
Drive—Shaft and bevel to rear axle.
Brake—Internal expansion in each rear hub.
Bearings—Timken Roller Bearings on front wheels.
Clearance—11 inches.
Gasoline Capacity—20 gallons.
Weight—1900 pounds.
Equipment—Cape extension top, two arge gas lamps with generator, two oil lamps, tail lamp, horn, tool boxes on running board, full tool equipment.

PRICE—$2,000, Complete, F. O. B. Factory



LAMBERT, "MODEL 18."

or "The Car Without a Gear Box," is the simplest, nobbiest and best car on the market for the money.

SPECIFICATIONS, THE LAMBERT 18

Wheel Base—95 inches
Tread—56 inches
Frame—Pressed steel.
Wheels—30-inch wood artillery.
Tires—30 x 3-inch Clincher
Bearings—Hyatt roller and standard ball.
Clearance—12 inches.
Gasoline Capacity—10 gallons.
Painting—Deep red.
Upholstering—Fine quality of leather.

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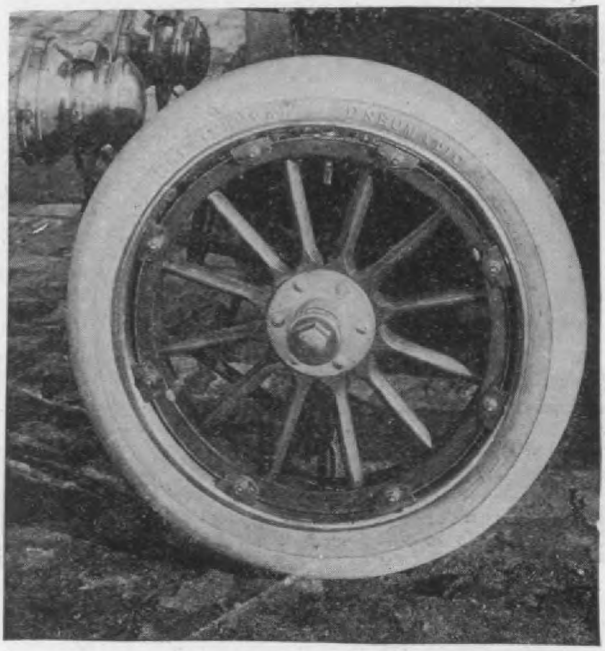
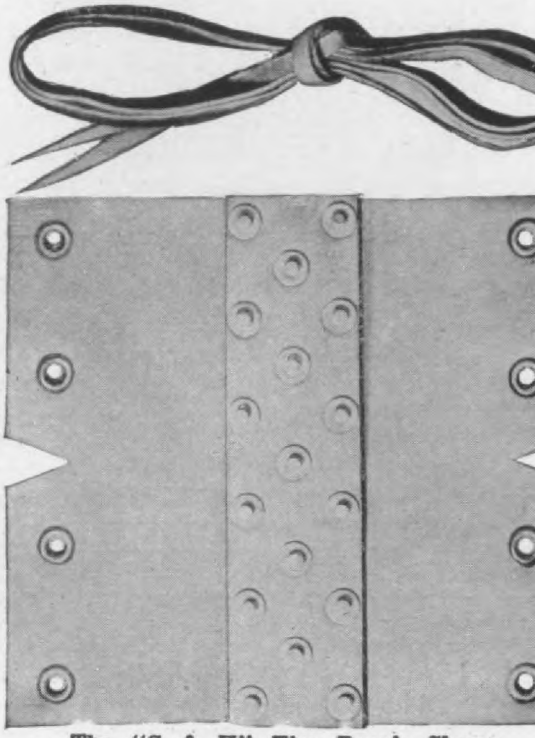
ering the American trade the "Continen-
tal" demountable rim for carrying and us-
ng "Ready-Flated" tires, as the company
alls them. The convenience and advantages
of carrying inflated tires on rims ready
for instant replacement of a punctured tire
are well known and this "Continental"
demountable rim was placed on the mar-
ket to meet this well-defined and very ap-
parent need. It has been on the European
market for over two years.



Continental "Ready-Flated" Tire on the wheels.

The rim is a plain clincher rim and the
ire can be inflated at home and carried on
he car ready for use when needed. The
im is held to the wheel by means of 8
mall wedges, each having a flange ex-
ending at a right angle and therefore ly-
ng flat against the felloe. Each flange has
round hole which registers with a bolt
xtending thru the felloe, screw and on the
uter side. The idea is, of course, to use
hese demountable rims on all four wheels
nd when a replacement is necessary the
nuts are removed from the 8 bolts and
he wedges thus released allowing the de-
nountable rim, which is of slightly larger
iameter than the wheel proper, to be
eadily removed and the extra one with
"ready-flated" tire to be instantly put on.
The wedges are then put in place again
nd the nuts put on the bolt ends. As the
uts are screwed home the wedges are
orced between the wheel and the demount-
ble rim holding the latter firmly in posi-
ion. A brace and socket are furnished
or easy manipulation of the nuts, but any

market a new tire sleeve, the chief
ture of which is the kind of leather
in its construction. This leather is ta
by a special process which is said to
it exceptional wearing qualities, and i
ished with a material that will not i
the tire.



The "G & K" Tire Repair Sleeve.

The tread portion of this sleeve is
ded with rivets to give additional pr
tion to the tire and add to the dural
of the sleeve. The sleeve is 8 inches
and is furnished in three lengths,
8½ and 10½ inches. Five feet of
best rawhide lacing is furnished with
sleeve.

"Bull Dog" Steel Wire Belts

New York Wire & Spring Co., 71–75
Avenue, Hoboken, N. J. are now manufa
ing steel wire belts for driving pumps,
etc. These belts, called the "Bull D
are made of the best grade piano wire
have a one piece screw connection fittin
threads on the inner circumference.
belts are easily adjusted by simply cu
off the excess length and backing up th
a few turns, the spring of the belt al
keeping the coupling in place.

McCord & Co., Old Colony Building,
cago, Ill., well-known as makers of Mc
Oilers, are now making flexible, coiled
belting for oilers, fans, etc. A flexible, n
less joint is used to connect the two en

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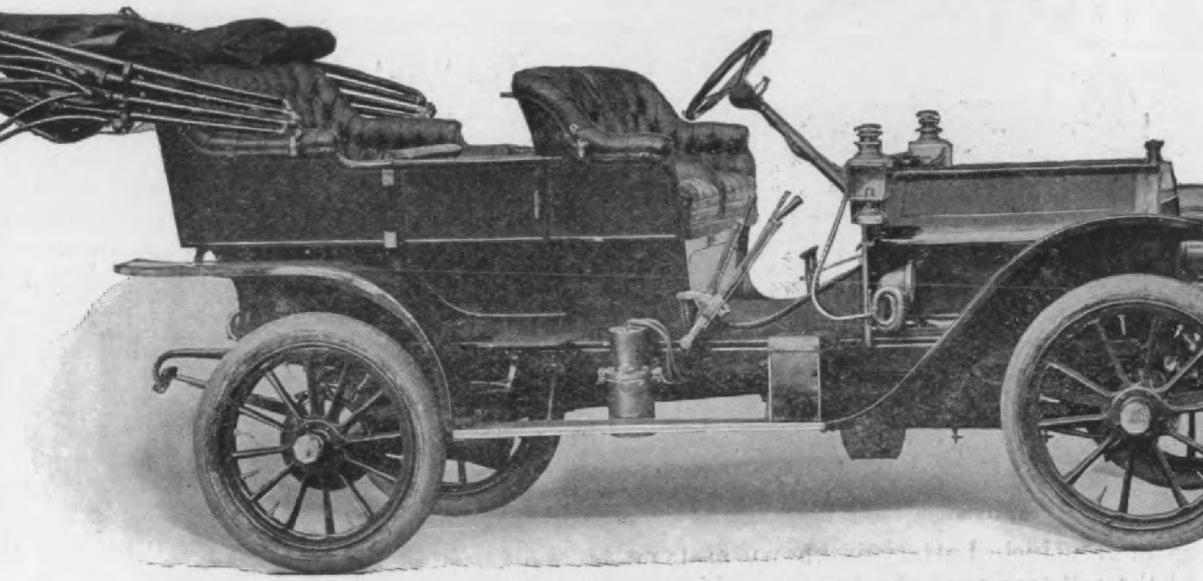
The Wayne at $2500 Ushers in a New Era of Value-Giving in Automobile Manufacture



Wayne

THIRTY

¶ To know how much value you are getting in the Wayne at $2500 you must turn to the cars of higher price.

¶ You must ride in the Wayne—and ride in the cars of higher price.

¶ You must operate the Wayne—and operate the cars of higher price.

¶ You must experience the extraordinary efficiency of the Wayne engine; you must put it through a drastic course of tests under any and all conditions.

¶ You must enjoy the immensely smooth, silent riding qualities of the car till the conviction is fixed upon you that you have never ridden in any car at any time that pleased you more thoroughly.

¶ Then, and not till then, will you realize what superb value you get in the Wayne at $2500, with "nothing to buy but the license."

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THE WAYNE AUTOMOBILE COMPANY

nmunistic village, settled by mechanics entists and artisans who endeavored to oduce the best, and since the dissolution of community in 1898 the Zoar storage bat-ies have been in process of evolution by mer members of the Zoar society and ex-t electricians associated with them. The im is made that the plates absolutely re-n the active material thus conducing to rability and long life.

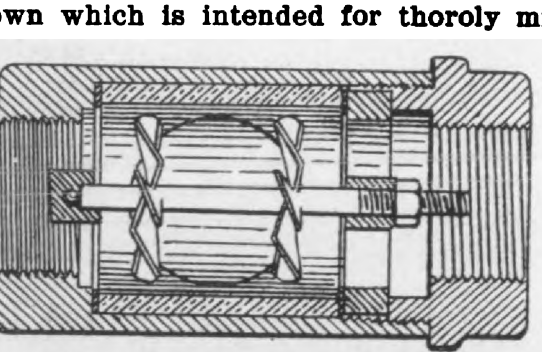
Zoar Ignition Battery

The Zoar vehicle battery is known as type nd the cells are made in ten sizes ranging m 5 to 23 plates each and having discharge acities of from 16 to 88 ampere hours. plates are 5¾ ins. wide by 8⅜ ins. high. ces range from $7.25 to $31.35 per cell. counts are given the trade.

oar ignition batteries are made in three es of 34, 51 and 68 ampere hours' capacity pectively. Each type is made up of one, , three or four cells and weights range n 8½ to 61 lbs., prices from $7.75 to 440.

The Morgan Auxiliary Gas Mixer

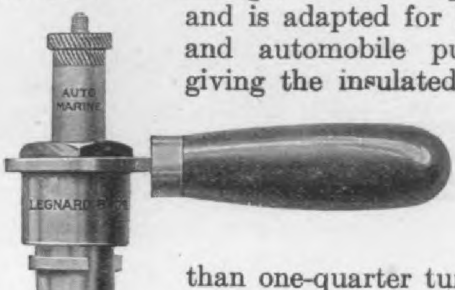
Pioneer Iron Works, Antigo, Wis., has t placed on the market the device here own which is intended for thoroly mix-



easily attached and that could be used w any carburetor on the market withe change. The object is to break up the p ticles of gasoline as finely as possible a to mix them thoroly with the air. The vice consists of a cylindrical passage w practically a section of pipe, in which pair of fans are caused to rotate by t suction of the engine cylinder. It is ve simply constructed and there is practica no wear on its moving parts. The sh carrying the fans runs on ball bearings

The "Auto-Marine" Spark Plug

The "Auto-Marine" spark plug, mar factured by Legnard Bros. Waukegan, I made its first appearance in public at t National Boat and Engine Show, held at t Coliseum in Chicago. It is a separable pl and is adapted for both mar and automobile purposes. giving the insulated handle l



The "Auto-Marine Separable Spark Plug.

than one-quarter turn, it is p sible to remove both points fr the cylinder of the engine, cle or adjust, without danger of sho and without the use of tools. multi-cylinder motors this can done without shutting down t motor.

The locking device is a dural ground taper cone fitting, secu ly locked by taper cam shoulde The taper fit makes it absolut gas tight.

Nothing but the best procelains are us and the electrode is a special non-corrosi wire which will stand a very high temperatu without disintegrating.

The plug has been tested for over a ye on both air and water cooled engines and said to give satisfactory results. List pr is $1.50.

The Banker Brothers Co., Pittsburg, P manufacturer of the Banker wind shie now has the necessary measurements file for fitting its shield to the followi cars: Autocar, Buick, Columbia, Corb

GOODRICH TIRES

will carry more cars in 1908 than they did in 1907—possibly more cars than any other make of tires in America. The fact is of no interest to the individual motorist except as an indication of the experience of a very large number of other motorists. No one sticks to a certain make of tire through sentiment;—no product receives such cold-blooded testing as the automobile tire. Hence, the fact that Goodrich Tires are being chosen by the majority simply means that their merit has been *proved* by experience.

The outcome of almost every important road test for 1907 is an invitation to specify Goodrich Tires.

THE B. F. GOODRICH COMPANY : AKRON, OHIO

BRANCHES IN THE PRINCIPAL CITIES

Hosted by Google

years' study and investigation of the prob-
lem and much experimenting and testing.
In the "Healy" removable rim and tire
standard parts are used thruout—stand-

Fig. 1.—Wheel altered to receive a "Healy" Rapid
emovable Rim and Tire. The clamps on the ends
the spokes are clearly shown.

rd clincher rim that takes any clincher
ire, long stem valves and long lugs. The
im is held in place on the wheel by a
eries of metal clamps which are attached
rmly to the ends of the spokes. No
elloe is used. These clamps powerfully

Fig. 2.—Placing "Healy" Rapid Removable Rim and Tire
wheel. The socket wrench is used to tighten up the nuts
ich draw up the clamps on the spoke ends, these clamps
nly gripping the rim so that it cannot slip or creep.

ip the rim, holding it so strongly that
creeping is possible. In case of a punc-
re or injury to a tire, it is only neces-
ry to loosen (not remove) eight nuts,

clamps to the ends of the spokes.
operation is very inexpensive and
Healy Company claims that the co
Healy rims for all four wheels, incl
spare rim, wrench, and equipping, is
than the cost of one new tire. It is
said that this construction is stro
than the ordinary felloe and plain r

An important feature of this rim i
fact that a tire can be changed wi
removing the rim if desired. Henc
no spare inflated tire is at hand, a
which might arise by an unfortu
series of punctures, a new tire can b
on in the usual manner without rem
the rim.

The Healy Company guarantees
rim and agrees to change back a c
mer's wheels to their original type
out charge if the new device is no
every way satisfactory.

"Fawcus" Metal and Rawhide Ge

Fawcus Gear Co., 2826-2830 Smal
street, Pittsburg, makes a specialty o
manufacture of gears, both metal and
hide. A booklet issued by this compar
lustrating a few types of gears, and sug
ing various uses of the same, is indicati
the progressive methods employed and
thoroness of the effort put into the m
facture of Fawcus gears. The illustra
include those of the smallest pinion up t
18 ft. diameter gear, which the com
has produced. This company caters e
cially to the motor trade, and, besides
ing individual gears to specifications, is
pared to design complete transmission

Fawcus spur metal gear teeth are
the bevel gear teeth planed and the wo
hobbed. The rawhide gears are made
with flanges of bronze riveted to the
hide with Swedish iron counter-sunk ri
The rawhide used is thoroly seasoned
comprest. Teeth can be cut to any stan
involute pitch, and bores and keyways n
to fit any standard shaft. The rawhide g
are furnished in both spur and bevel ty
New rawhide rims can be fitted at any
at a minimum cost.

"American" Name Plates, Etc.

The American Name Plate & Mfg. Co.,
230 Kinzie St., Chicago, Ill., are manuf
urers of etched name plates and claim for t
product the features of beauty and deep e
ing. The sketching is all done by hand
first class artists and photography is not

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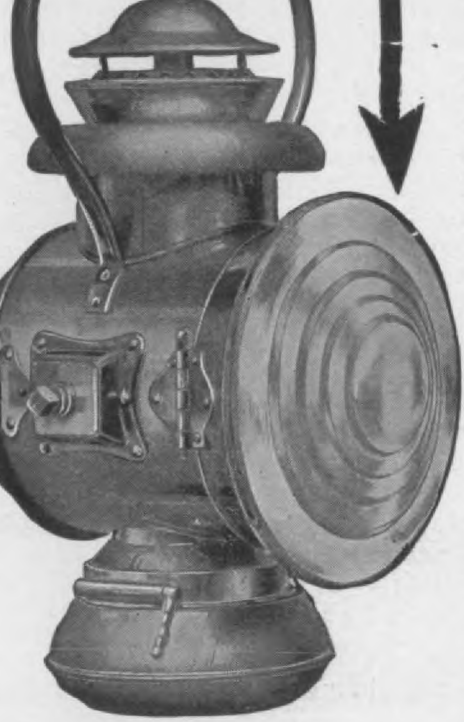


HAM'S TOURIST

It is very powerful, but if you place a candle behind it the results would be very unsatisfactory, therefore the most perfect principle of reflection and projection is useless with a poor light, but the more intense the light the greater the results. This is where our "Cold Blast" principle comes in. It produces a brilliant and intense white flame, which combined with the perfect reflection of our lamps and this powerful lens, throws an immense, strong, penetrating light that you can always depend on.

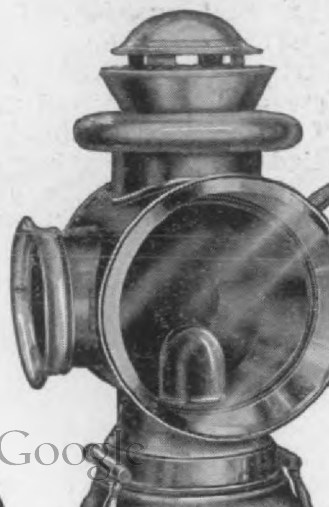
If you equip your car with a pair of Ham's Tourist Lamps, you'll find that it will not be necessary to use your acetylene lamps very often. They are preferable to acetylene lamps for city driving, as they do not give that blinding, glaring light which is so objectionable and still the light produced is strong enough to serve you with entire satisfaction at any tine, regardless of the condition of weather or roads.

HAM'S "COLD BLAST" Automobile Lamps Are Built for Service

How About Your Tail Lamp?

No doubt you have experienced the trouble usually connected with unreliable tail lamps. If so you will appreciate the good features of a Ham Tail Lamp more than ever. When you have a Tail Lamp on your car that you know is going to stay lit when you light it, you experience a lot of satisfaction, I'll tell you, and you'll find that pleasure will be all yours if you equip your car with HAM'S LAMPS.

Specify and insist on getting HAM'S LAMPS. You'll not regret it as they are guaranteed to give satisfaction. Also send for one of our New Catalogues. Address Dept. D.



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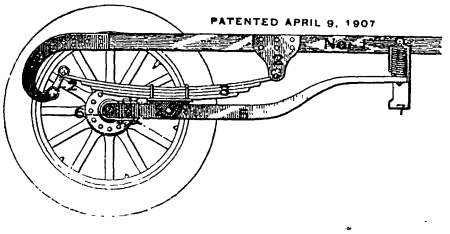
C. T. Ham Mfg. Co.

The "Stolp" Shock Eliminator

Oscar Stolp, of Sheppard & Stolp, wire goods makers, 18-20 Fletcher street, New York City, has invented and placed on the market a new type of shock eliminator for automobiles. This device is here illustrated, and the cut shows it to be designed on entirely novel lines, usual practice not having been considered in the designing of this device, which is wholly original and has been planned to meet certain definite requirements as perceived by the inventor.

It will be seen that the regular body spring is pivoted to a bar (5), which is a part of the shock eliminating device. When the car wheels pass over an inequality in the road surface the axle is forced up and the springs (3) are comprest slightly as they strike, and at the same time the forward end of the lever (5) is thrown downward by turning on the pivot in bracket (4), the lever then



Rear end of a car fitted with a "Stolp" Shock Eliminator: 1. Side frame of the vehicle, the rear extremity of which curves downwardly as is the usual case; 2. Hanger and link which connect the opposite end of the spring 3, with the side frame; 3. Bottom half of an elliptical spring which is placed under each side frame; 4. Bracket rigidly clampt at the center of the spring 3, and pivotly attached to the lever 5, near its rear end; 5. A lever the most essential element of the apparatus and having its forward end off-set to carry it nearer to the frame; 6. Rear axle tree carrying the rear wheels and having a pivot or journal connection with the rear of the lever 5; 7. Casing suspended from the frame and receiving the forward end of the lever 5, which is governed by a light coil spring connected at the top of the casing to the top of the lever.

oscillating slightly until it again assumes a normal position. It thus appears that the force of the wheels and connecting parts moving either to or from the vehicle frame is transmitted thereto in the shape of two opposing forces, respectively applied thru the spring (3) and the spring in the casing (7), and since these forces are opposed to each other their combined effect on the bed or body of the vehicle neutralize each other, and no shock follows.

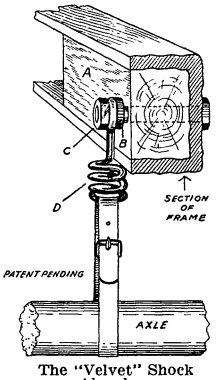
In the same manner the front wheels carried on the front axletree may be mounted and the eliminating action made perfect. The front axletree should be attached to the levers at the rear end of the latter's pivotal connection.

The coil spring (7) is attached to the car body short of the center, as shown in the cut. In action when a depression or elevation is met with in a roadbed, the axle of the car is forced up, but the body of the car is restrained from rising by the coil spring and the lever (5) on which it rests. The aim is to keep the car at a normal position at all times by offsetting the oscillation following contact with a rough road by the resistance of the coil spring and the equalizing qualities of the lever.

One of the most interesting claims made for this device is that it saves a very large percentage of tire expense and permits the use of solid tires without lessening the comfort of the passenger or increasing the wear on the machinery.

The "Velvet" Shock Absorber

A very simple type of shock absorber was recently brought out by B. C. Mears & Co., 1300-1304 E. Lexington street, Baltimore, Md., its simplicity being apparent at a glance, as will be seen by reference to the accompanying drawing. It consists essentially of a strap or band looped around the car axle, an oil tempered spring (D) and a bolt to connect the spring with the car frame.



The "Velvet" Shock Absorber.

To attach the device to a car, a block of wood (A) is first placed in the channel of the frame and the steel bolt (C) is past thru an eye formed at the upper end of the spring, thru the wood block (A) and the frame. A washer (B) is provided to prevent the spring from wearing the block (A). The strap is made either of water proof leather belting and fitted with steel buckle as shown, or of rubber-coated, non-stretching canvas belting and fitted with a special clamp.

It will readily be seen that as the car springs are deprest by a jolt no resistance is offered by this shock absorber, as the strap simply drops as the frame falls toward the axle. On the rebound, however, the spring (D) resists the upward motion of the vehicle springs sufficiently to absorb all unusual violence of the same. For adjustment it is only necessary to load the car and tighten the strap. A set of four of these absorbers lists at $12.

The Bausch & Lomb Optical Co., the Bausch-Lomb-Saegmuller Co., of Rochester, N. Y., and the Carl Zeiss Optical Works, of Jena, Ger. have joined interests with the intention ultimately to manufacture in the U. S. and its possessions, the products of the Carl Zeiss Works of Jena.

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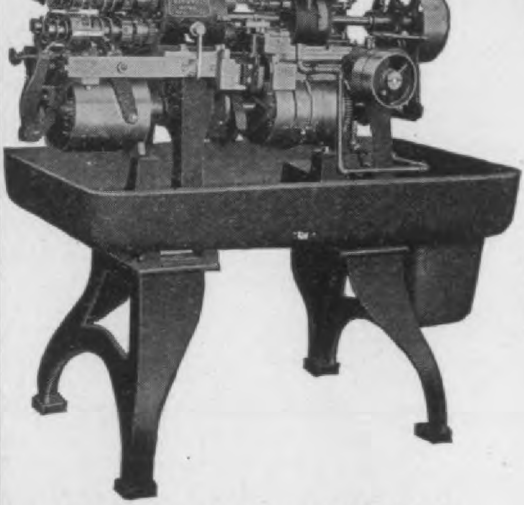

The Acme Automatic Multiple Spindle Screw Machine

REDUCED COST

—AND—

Increased Output

are indicative of

THE

ACME WAY

in Screw Making and the manufacture of duplicate parts from the bar. It's contagious—Try it.

NAMCO

CAP and SET SCREWS

"V" & "U. S." Standard Threads supplied from stock at our Warehouses

Special Milled Product

to your specifications

They're all made in the Acme Way and they're right

The National-Acme Manufacturing Co.

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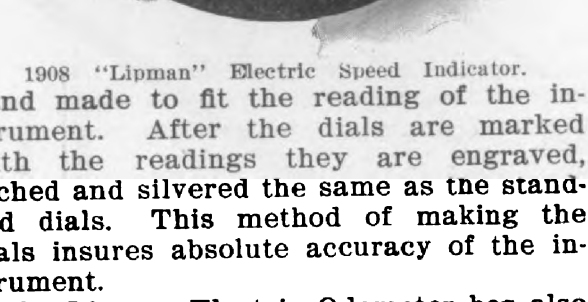
cator was briefly mentioned in our February number, but no illustration of the new dial was shown. The cut herewith illustrates the exterior of the 1908 instrument and the interior mechanism has not been materially changed. Each dial is

1908 "Lipman" Electric Speed Indicator.

hand made to fit the reading of the instrument. After the dials are marked with the readings they are engraved, etched and silvered the same as the standard dials. This method of making the dials insures absolute accuracy of the instrument.

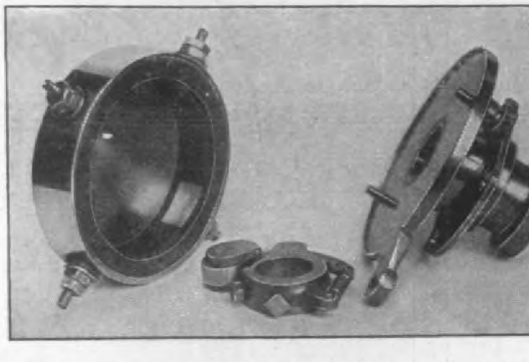
The Lipman Electric Odometer has also been improved in exterior appearance, the 1908 instrument being here shown. One



"Lipman" Electric, Dashboard Odometer.

of the main features of this device is the fact that no flexible shaft is required as the instrument is electrically operated. Attached to one of the front steering knuckles is a device which makes electrical contact with the batteries every 100th of a mile. Every time this electrical

It is so arranged that the fiber ring w holds the contacts may be conveni removed for cleaning without distur the timing or lever connections. In o to give the best results a timer sh be thoroughly cleaned and oiled regul hence the Lipman timer is designed convenient placing so that the user have no reason for neglecting it.



"Lipman" Special Timer for Ford Runabou

This Timer does not ride on the s the case shifts on the outside of the tionary main cam shaft bearing. does away with all wobbling and in accurate and uniform timing. The ers furnish the Timer complete wit lever connections and wire so tha machine work whatever is required special front bearing for the cam is furnished with the Timer. Price plete with all necessary parts is $

These instruments are the produ The Lipman Mfg. Co., Beloit, Wis.

"Folsom" Hoods, Fenders and Ta

C. R. Folsom Mfg. Co., South Bend, well-known as makers of various metal articles, has lately entered the mobile field with a line of hoods, mud pans and fenders. Its machinery ment for this class of work is most con and one of the features of the auton fenders is the placing of the mud rim mud aprons on the top surface witho use of rivets. This is accomplished by ing the same in with a wire which ma very rigid and durable construction. can be done with any style of fender leaves an off-set on the top of the fe which makes a very neat finish. Abo different styles of fenders are offer this firm.

One of the main efforts of this com designers is to produce fenders of a as well as mechanical merit, and the

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ONE DOLLAR DOES THE TRICK

STRAIGHTLINE GASOLENE GAUGE

(Patents Pending)

¶ The Pictures tell the story. Simply pass the Gauge through the filling hole until it strikes the bottom of tank. The metal Float remains level with top of gasolene, and a downward pressure of the thumb locks it, showing you the depth of gasolene in inches. It will gauge the depth of gasolene in any shape tank up to 18 inches in depth. ¶ It is made entirely of Brass, and enclosed in a *Dust-Proof* Fibre Case strong enough to stand

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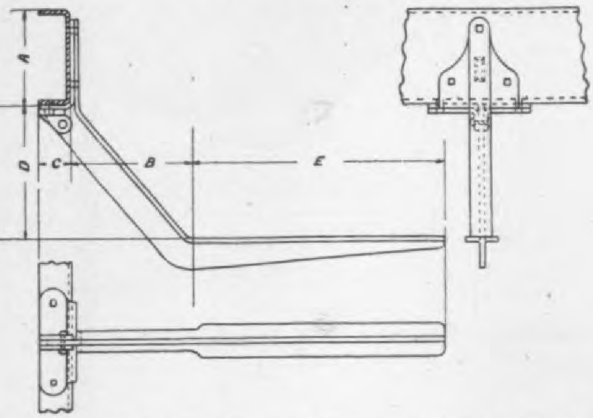
tep bracket recently brought out by The arish & Bingham Co., the well-known xperts in prest steel and stampt metal ork. This bracket is made of a combination of commercial T iron and prest teel pieces. The illustration shows a tep riveted to a section of the side rail n such a manner that the T iron, prest



he New "P & B" T-iron and prest steel Step Bracket

teel pieces and side rail become a composite whole when the job is finished. The dimensions B, C, D and E can be aried to suit the requirements of any ndividual manufacturer. The particular dvantage claimed for this step hanger ver a drop forged hanger of the same tyle is its economy of manufacture. The dvantage over prest steel hangers is he rigidity and strength at vital points. Particular attention is called to the prest teel pieces on both sides of the hanger nder the side rail, which act as a brace o prevent any side motion.

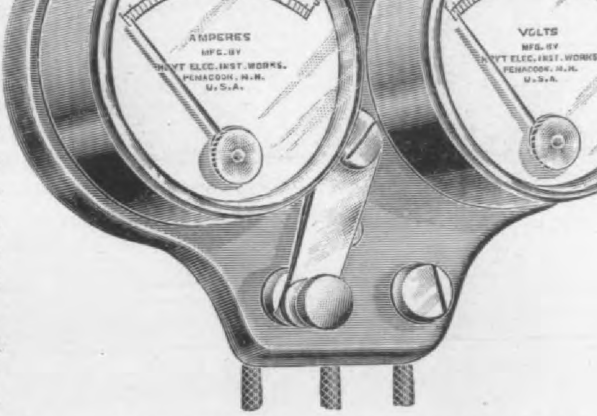
Thc "Acme" Universal Joint

Acme Universal Joint Co., Kalamazoo, Mich., manufactures a universal joint for utomobile driving shafts, etc., which is

this construction reducing friction minimum and causing the bearing to w evenly. The bushings are ground and ished.

"Hoyt" Battery Testing Instrumen

Hoyt Electrical Instrument Mfg. Penacook, N. H., has on the market ignition battery testing outfit prising a voltmeter and an amm mounted on a common base or bracke conjunction with a three-way lever sw the outfit being designed for attachn to the dash where it will be readily cessible to the car driver, who can test his batteries at any time while car is in motion. The voltmeter and meter are permanently wired in con



"Hoyt" Ignition Battery Testing Outfit.

tion with the battery and coil, and to the batteries it is only necessary to t the lever switch shown below the in ments. When the switch lever is pl in the middle position the ammeter is in circuit; when at the extreme both voltmeter and ammeter are in cuit and when at the extreme left instruments are cut out. This outfit at $8 and is suitable for use with dr storage batteries.

Fluff-Foe

Fluff-foe is the product of John C. Cal & Co., 1119 Chamber of Commerce Chicago, Ill., and is said to prevent scali rust formations in the radiator and jacket, of an internal combustion motor. manufacturers state that there are no del ous ingredients in this product, and it will

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TIRE BARGAINS

We have just closed a large contract with one of the largest and best known Automobile Tire Manufacturers in the world. We made a very large purchase in order to get the lowest price, enabling us to sell accordingly.

Owing to the very low price we are selling these goods for, we are compelled to withhold the producer's name. However they are all new, clean 1908 product, every tire and tube bearing the manufacturer's name and backed by their season's guarantee.

The terms of this sale are absolutely cash with order. At the very low price we are offering these goods, we cannot afford to sell them otherwise than for cash.

Remember, Every Tire Backed by Manufacturer's Guarantee. Do Not Delay But Send in Your Order To-Day

We agree with every purchaser of one of these tires that if upon examination he is not satisfied with his bargain the same is to be returned to us and his money refunded.

Again we repeat, that the first quality tires quoted on this sheet are absolutely 1908 product and every one bears manufacturer's name and is fully warranted for the current year.

Table of Sizes and Prices of 1908 First Quality Tires, Tubes and Casings

Size.	Complete.	Case.	Tube.	Size.	Complete.	Case.	Tube.
28 x 2½	$16.00	$12.75	$3.15	28 x 3½	$27.90	$22.60	$5.30
30 x 2½	17.00	13.75	3.35	30 x 3½	29.65	24.00	5.65
28 x 3	21.00	17.25	3.85	32 x 3½	31.55	25.60	6.00
30 x 3	22.65	18.55	4.10	34 x 3½	33.70	27.35	6.35
28 x 3½	23.45	18.85	4.65	36 x 3½	35.80	29.05	6.75
28 x 4	34.70	28.35	6.35	28 x 4½	43.70	35.80	7.90
30 x 4	37.10	30.30	6.85	30 x 4½	46.85	38.35	8.50
32 x 4	39.75	32.50	7.25	32 x 4½	50.00	40.95	9.10
34 x 4	42.10	34.40	7.75	34 x 4½	53.15	43.55	9.60
36 x 4	44.75	36.55	8.25	36 x 4½	56.30	46.15	10.15
34 x 5	64.95	53.55	11.45	38 x 5	72.40	59.60	12.80
36 x 5	68.70	56.55	12.10	40 x 5	76.30	62.85	13.50

The Following Are High Grade Factory Seconds Clincher Tires, CasingsAnd Tubes Guaranteed Mechanically Perfect.

Size.	Complete.	Case.	Tube.	Size.	Complete.	Case.	Tube
28 x 2½	$10.00	$8.00	$2.00	30 x 2½	$11.25	$9.00	$2.25
28 x 3	12.50	10.00	2.50	28 x 3½	17.15	14.50	3.65
30 x 3	14.00	11.00	3.00	30 x 3½	19.35	15.50	3.85
32 x 3	15.20	12.00	3.20	32 x 3½	21.50	17.50	4.00
30 x 4	24.00	19.50	4.50	32 x 4½	30.75	25.00	5.75
32 x 4	25.65	21.00	4.65	34 x 4½	33.00	27.00	6.00
34 x 4	27.50	22.50	5.00	36 x 4½	35.25	29.00	6.25

Firsts Single Tube Automobile Tires

Size.	Price.	Size.	Price.	Size.	Price.	Size.	Price.
26 x 2½	$9.00	30 x 2½	$11.00	28 x 3	$12.00	32 x 3	$15.00
28 x 2½	10.00	32 x 2½	12.00	30 x 3	13.25	32 x 3½	17.50

Good Seconds Single Tube Tires @ $2.00 per Tire lower than Firsts.

THE GUARANTEE TIRE & BICYCLE CO., 208-210 S. Illinois St. INDIANAPOLIS, IND.

LONG DISTANCE PHONES: Independent, 2200; Bell, Main 1398

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but it is now made by N. B. Petry, 418-424 Commerce street, Philadelphia, having formerly been made by another concern, but recently improved by the present manufacturer both in usefulness and appearance: the prongs or hooks have been lengthened, which makes it much easier to operate on the large size tire casings, and the bright parts have an anti-rust finish, preserving the tools in

The 1908 "Pilliner" Tire Tool.

stock and in use. The rubber handle also has been made heavier, making it easier on the hand of the user. The "Pilliner" tool is designed to obviate injury to the casing.

What will appeal to the automobilist and to the dealer, however, is the fact that the price has been reduced from $2.50 each to the reasonable price of $1.50 each, which will greatly increase its sale. The lower price will no doubt appeal to the user, and the increased quantity sold will make it more attractive to the dealers.

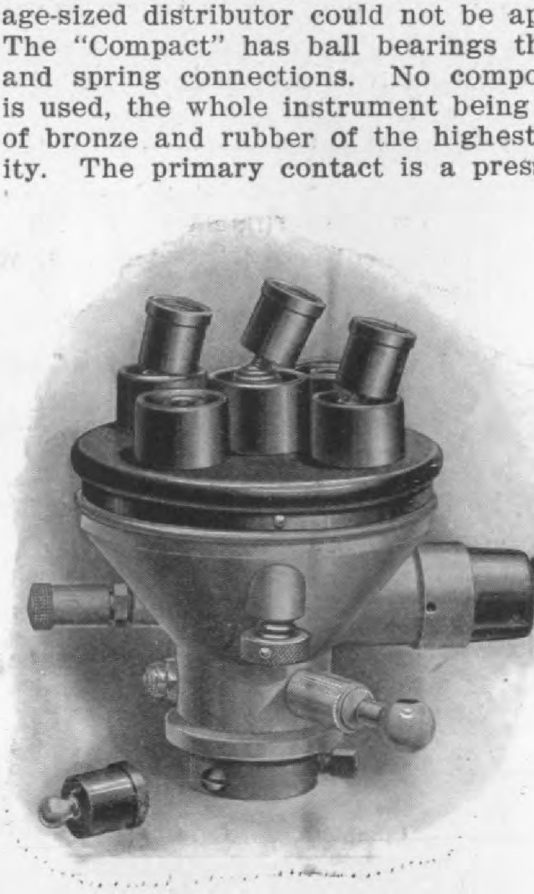
"M. & B." Oils, Soap, Etc.

McLean-Brandon Oil & Paint Co., 63-67 Long Wharf, Boston, Mass., manufacture a line of high grade cylinder and engine oils, belting, packing, automobile body soap, etc., and are American agents for "Velure" a paint for automobiles, boats, etc.

Their line of lubricants includes the "M. & B." combination cylinder and bearing oil for gasoline engines and the "Swastika cylinder oil both of which stand a high fire test and are especially adapted

New York City, are calling especial
tion at this time.

This model was first exhibited a
Paris Salon in 1907 and is remarkab
its small size, which allows this i
ment to be put in places where the
age-sized distributor could not be ap
The "Compact" has ball bearings th
and spring connections. No compo
is used, the whole instrument being
of bronze and rubber of the highest
ity. The primary contact is a pres



The Herz "Compact" Distributor.

tact made between two hardened too
studs prest against each other, an
cover is secured to the body by me
spring nuts which are self-lockin
not removable from the body at all.
is no loose piece on the whole
ment, no nut or pin or screw that
fall out during vibrations.

The cables are screwed into ball-s
terminals, which again end in small
balls which are prest into spring
ers, which hold them in place but
the cable to remove and revolve a
The whole instrument may be dis
bled in the component parts in a fe
onds and assembled again in a very
time.

Robertson & Co., 324 W. Madiso
Chicago, Ill., manufacture the "Red

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Who Dares

How very few manufacturers stand ready to back the article they make "WITH A LONG TERM GUARANTEE"—that the article will prove to be all that they claim in their advertisements.

WE DO

We guarantee our Speedometers for five long years, against everything but misuse. This guarantee is absolute and unqualified. It has no strings to it—no holdbacks, no reservations of any kind. It don't cover some one part only, but applies to the entire instrument

Absolutely for Five Years

Our guarantee also covers the famous Stewart Flexible Shaft, Swivel Joint and all connections. We are the only Speedometer manufacturers guaranteeing the instrument and equipment complete. We know that our Speedometers and their equipment are really superior to all others, regardless of price, and back our claims with the most liberal Speedometer guarantee ever issued

Pin your faith to

STEWART SPEEDOMETERS

THEY MAKE GOOD ALWAYS

SEND FOR CATALOG

STEWART & CLARK MFG. CO.

Price List

No. 4. Stewart Combination Speedometer-Odometer, full size dial (4-in.), 60-mile $40

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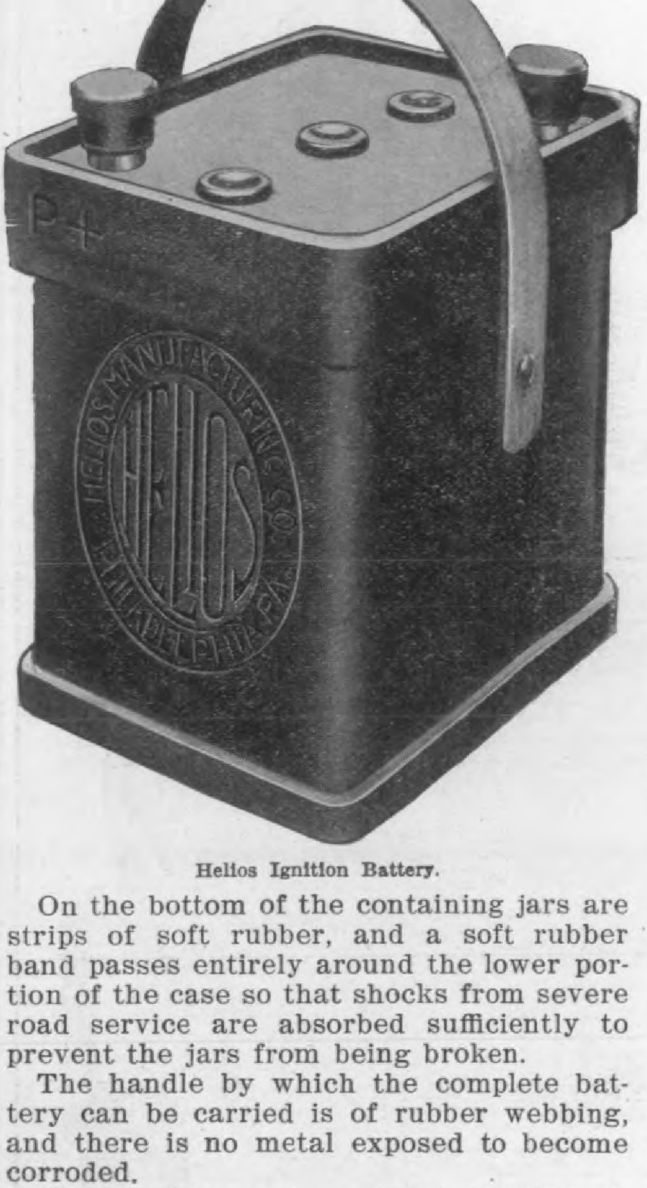
tion battery, the containing case of which is made of very heavy hard rubber divided by hard rubber partitions into two or three compartments so as to contain either two or three separate elements. The compartments are each provided with a cover which is sealed into place, and over these individual covers is placed a heavy hard rubber master cover, which effectually conceals all of the live parts, and entirely prevents slopping of the acid.



Helios Ignition Battery.

On the bottom of the containing jars are strips of soft rubber, and a soft rubber band passes entirely around the lower portion of the case so that shocks from severe road service are absorbed sufficiently to prevent the jars from being broken.

The handle by which the complete battery can be carried is of rubber webbing, and there is no metal exposed to become corroded.

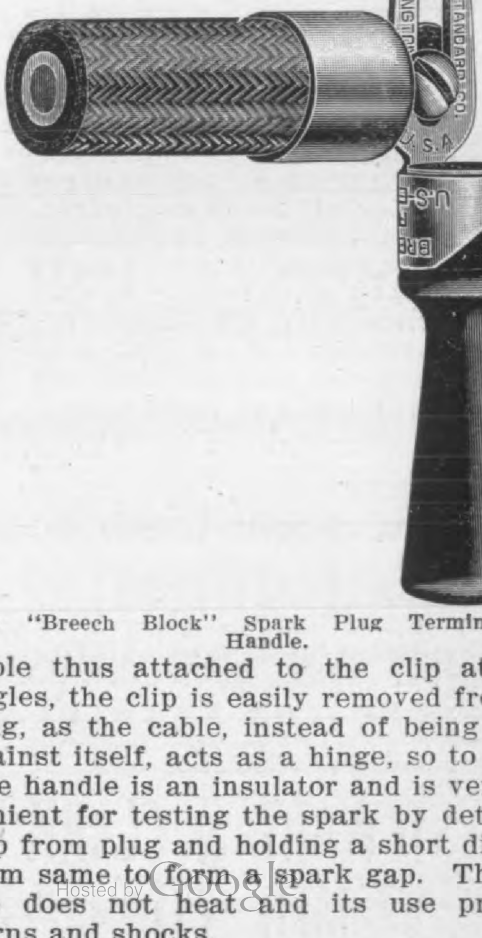
The binding posts consist of ⅝-inch round antimonious lead posts threaded at the top, thru the side of which at the bottom of the thread is drilled a hole to receive the conducting wire. The post is also drilled from the top vertically, the ver-

used at any point in this battery, n material which can be affected by a fumes. The elements are of the st Helios type, which have been fav known for many years.

The construction of this battery simple that in case of damage to t ments, they can be replaced by a and all the parts are interchangea that repairs can be furnished at an if needed.

The 1908 "Breech Block" Pl

The new feature of the Breech spark plug is a handle which is bei nished with the popular Breech Bloc manufactured by the Standard Co Torrington, Connecticut, U. S. A. Th dle is of enameled wood and inser the clip in place of cable. The regu ble clip is attached to the Breech clip with a small brass screw and nut are furnished with each plug. Wi



The "Breech Block" Spark Plug Termin Handle.

cable thus attached to the clip at angles, the clip is easily removed fr plug, as the cable, instead of being against itself, acts as a hinge, so to The handle is an insulator and is ve venient for testing the spark by det clip from plug and holding a short d from same to form a spark gap. Th dle does not heat and its use p burns and shocks.

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Everything for Automobile DEALERS AND OWNERS

We are Manufacturers' Agents and Distributors, Manufacturers, Importers, Jobbers and Wholesalers of

Automobile Supplies, Materials Accessories, and Tools

Western Distributors of **CONTINENTAL TIRES** Best by Every Test

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Careful and Accurate Shipment
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Prompt and Courteous Attention

Excelsior Supply Co.

Send for Catalogue "AA"

Established 1876 **CHICAGO, ILL.**

233-235-237 RANDOLPH ST.

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electrical measuring instruments two new volt and ammeters known as types D and E.

The "Robert" Type E Switchboard Meter.

Type E is especially designed for use in automobile and electric launch lighting, storage battery charging, small lighting plants, etc. This instrument is of the electro-magnetic type, and may be used on either direct or alternating current. It is accurately calibrated, and has a distinctly drawn scale. The base is 3¾ inches in diameter. The base is a casting and the shell is of brushed brass with beveled

The "Robert" Type D Switchboard Meter.

0-3 amperes to 0-30 amperes, and the meters in three sizes, 0-6, 0-12 and volts. Price is $6 for any size. The ampere size is particularly adapted to as a spark coil indicator. The mate and finish are similar to those of Typ The binding posts are arranged for e front or back connection. The oper principle is similar to the Robert po instruments, being of the permanent net type.

New NoXal Products

The NoXal Polish Mfg. Co., 12 42 Belmont Ave., Phila., has rec placed on the market two new prod one of which is called the NoXal poli powder, and seems to fill a real nee view of the fact that rigid laws and i ance restrictions operate somewhat ag the use of liquid metal polishes. NoXal polishing powder is a metal p sold in powder form to be mixed gasoline when used. The character of polish makes it possible for a garage prietor to carry any amount of it on without any danger of fire or explosio it is only necessary to mix a small tity of the powder with the gasoline a one time.

The other new NoXal product is a body polish for automobiles similar t NoXal furniture cream, which has bee the market for some time. This body ish is put up especially for the autom trade, and it is claimed for it that it remove scratches, stains, grease and spots as well as producing a high on enameled or varnished surfaces. not intended as a varnish, but a which renovates and gives new life t varnish. Samples may be had of new products by writing the manufa ers.

Macbeth Lens Mirror

Macbeth-Evans Glass Co., Pittsburg the well-known lamp chimney maker is t a prominent position in the automobile as a manufacture of lens mirrors for mobile lamps. Macbeth lens mirrors are with a greater radius of curvature of the than of the front, which of course, mak lens thinner in the middle than on the These lenses are polished correctly an curately to these two radii. This con uses colorless glass free from defects and carefully silvering the back of the lens

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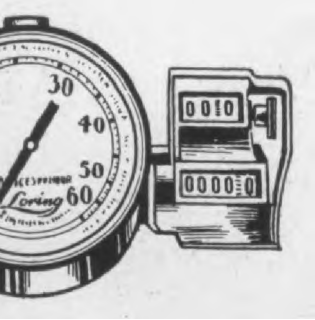

THE ORIGINAL *Loring* SPEED GAUGE

y are all copying **Loring Speed Gauge** truction, because the severest tests have ed that it is an instrument always *accur- reliable, steady,* and withal compact, since the smallest speed indicator made.

Loring Speed Gauge is sold on its its, and may be returned after 30 days' , if not *entirely satisfactory*. The best cator sold at a fair price.

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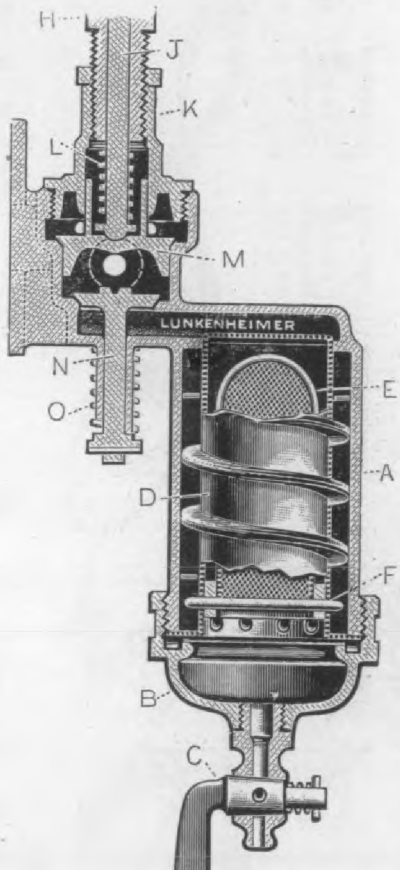
Several new devices are included in the 1908 line of The Lunkenheimer Co., of Cincinnati, Ohio, including a line of multiple feed, mechanical lubricators, to be illustrated in a future number.

The Lunkenheimer exhaust pressure regulator is designed to automatically control the pressure of the exhaust, for forcing fuel from the main to an auxiliary tank or direct to the carburetor, or for operating a pressure lubricator. It is to be mounted in a convenient and accessible position and connected with the exhaust pipe by means of a ⅜-inch (outside diam-



Sectional view "Lunkenheimer" exhaust pressure regulator.

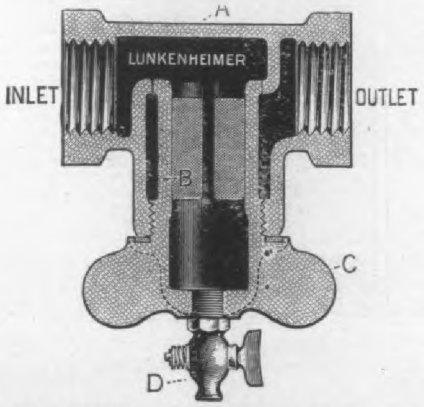
eter) tube. Referring to the lettered cut herewith, the pressure enters at S, passes around tube D thru the spiral passage, then thru holes at bottom of tube D into the strainer chamber, thru the fine gauze strainer E past the check valve N. From here the pressure is led thru quarter-inch (O. D.) tubing to the gasoline tank or exhaust pressure lubricator, as the case may be, and also thru a separate connection to pressure gage, which is mounted on the dash, and which shows amount of pressure carried in the system.

M is a spring relief valve which may be

of water (which would otherwise b ried into the gasoline tank) is collec the cap after a day's run. The fine strainer is provided to screen th and remove the remaining particl carbon. The spiral tube and the str are easily removed for cleansing, b screwing the knurled cap B.

The check and relief valve disc made of hard bronze and are very fully and thoroly ground in. The valve construction is such that it c get out of order, the adjustment tremely simple, and it is very easi sembled.

To fill all probable requirements types of the Lunkenheimer pressur ulator are made. Price is $9.



Lunkenheimer Gasoline strainer, sectional view.

The gasoline strainer is for use generator valves and is made with horizontal and vertical outlets, a sec view of the horizontal type being herewith. This strainer is attached pipe connecting the fuel tank and th erator valve and is easily remove cleaning. It will be observed that th (C) has quite a large pocket in th tom for the reception of any wate may be in the fuel, and a spring-key (D) is provided to drain off the accu tion from time to time. Prices range 90 cents to $1.55 without cock, and $1.45 to $2.10 with cock. The str are furnished without drain cock otherwise ordered.

The Anti-Selenite Co., 2230 Olive S Louis, Mo., manufactures a compou removing carbon from cylinders of line motors. This compound is c to be of a purely vegetable compo that will not harm the metal or any

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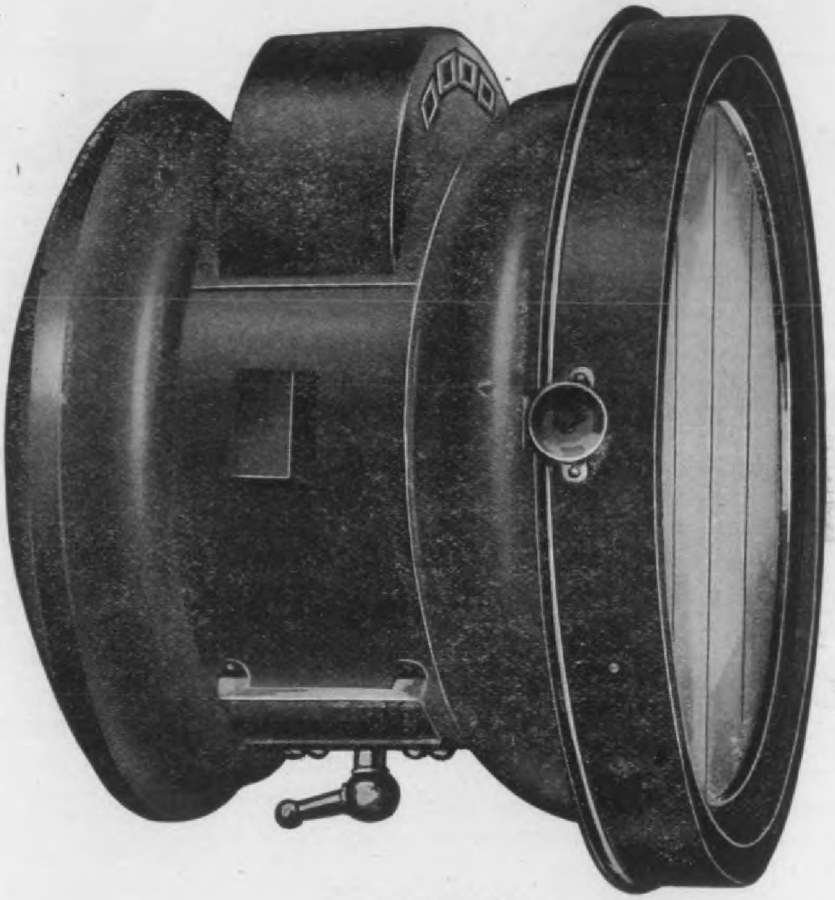
GRAY & DAVIS

High Grade Black Finish



NO. 96-97-98

We can furnish any of our lamps to order in our High Grade Black Finish. Not an enamel or Japan, but an electro plate. Will not chip or rust. A damp sponge and chamois occasionally used keeps it clean and bright. Beautiful and rich in appearance, durable and serviceable.

On account of labor necessary to produce this finish we are obliged to charge 15% advance over regular price.

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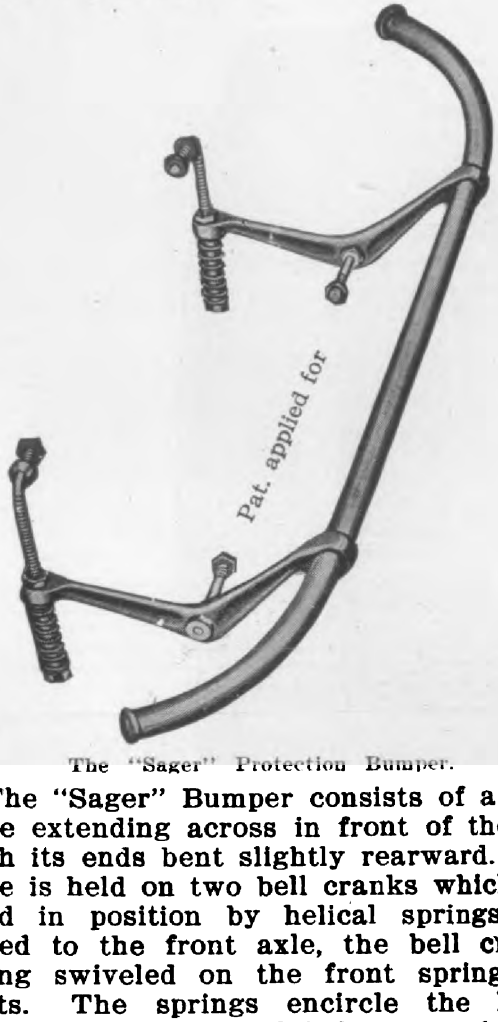
GRAY & DAVIS

or motor cars, to protect the lamps, radiator, etc., from damage from collisions caused by horse vehicles and other motor cars backing into a car. In shifting cars in the garage danger of collision is also imminent and a protection of this sort may often be the cause of saving a great deal of money and annoyance. The bumper is also useful in head on collisions of any kind and in case a pedestrian is struck by a car.



The "Sager" Protection Bumper.

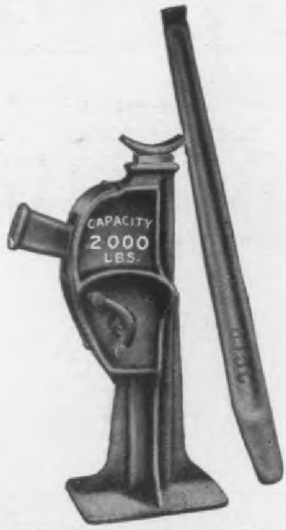
The "Sager" Bumper consists of a neat tube extending across in front of the car with its ends bent slightly rearward. This tube is held on two bell cranks which are held in position by helical springs fastened to the front axle, the bell cranks being swiveled on the front spring eye bolts. The springs encircle the lower ends of L-shaped stud bolts securely fastened to the frame.

Two styles of this bumper are made, one finished in black and the other in brass. The plain finish style can be painted to match the finish of the car. This style lists at $18. The other style is made of steel lined brass tubing, the outer brass tubing making a very durable and handsome finish. Price is $25.

XX Century Automobile Jack

This jack is the product of the Joyce & Cridland Jack Co., of Dayton, Ohio, who

ened.



The XX Century Automobile Jack.

A reversing lever is provided w changes the jack from raising to lowe adjustment. This reversing lever lock either position by a positive bolt, w obviates all danger of shifting this leve the bolt cannot be moved except by i tion. The operating lever is made sir to an I beam in cross section, which g the greatest strength with the least we and its outer end may be used as a tool.

"Atlas" Finished Crank Shafts, Pist Piston Rings, Etc.

The Atlas Mfg. Co. of Fostoria, Ohio, n a specialty of finishing crank shafts, an cylindrical parts by the grinding me This concern finishes the shafts com ready to assemble, and also finishes p and piston rings. By making a special this work, this company holds that it produce a much better article than otherwise be obtained and at a price appeals to the customer.

Clum & Atkinson, of Rochester, N well-known founders of aluminum, and bronze castings, are now makin aluminum solder for soldering br aluminum crank and gear cases, f cracks in manifolds, soldering br moulding or broken clutches, buildin spots or defective castings, filling up re-counterboring a hole that has counterbored too deeply, restoring b that may be removed by mistake making up aluminum patterns and other uses in automobile work. Rec

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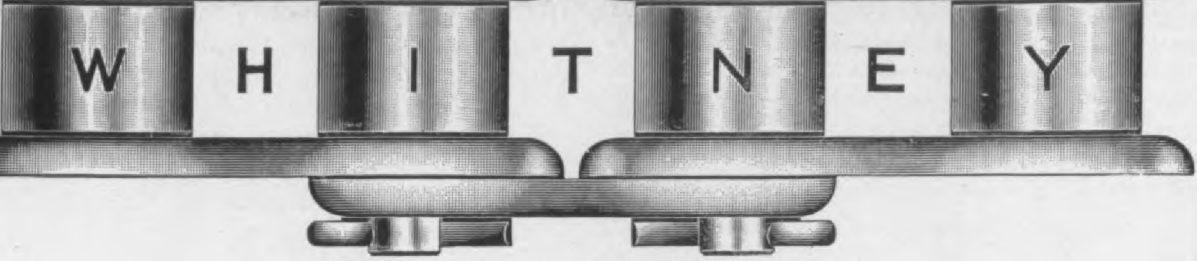
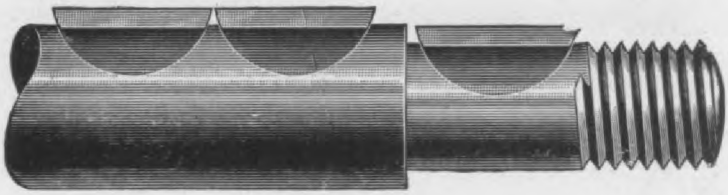


We are now well settled in our new factory and READY TO SHOW RESULTS.

Prompt delivery and constant improvement in quality.

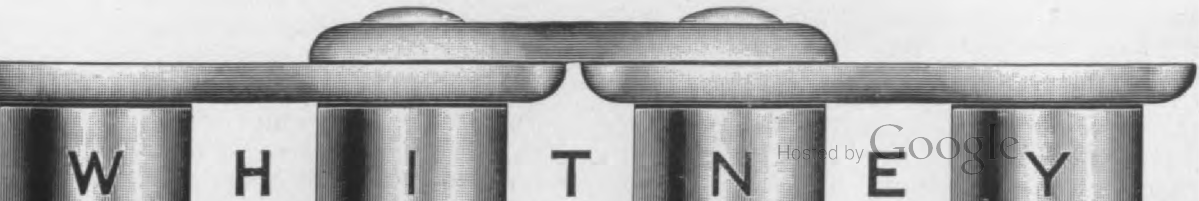
In our effort to possess the finest chain plant in existence and to maintain the highest degree of Accuracy, Efficiency and Finish, we are going to the very limit.

We will now make all sizes of Roller and Bushing Chains for which there is a reasonable demand.



If you are not taking advantage of The Woodruff Patent System of Keying, it is high time to investigate same. It has been adopted by most of the leading automobile manufacturers, who report better results and a great saving in cost.

THE WHITNEY MFG. CO., Hartford, Conn.



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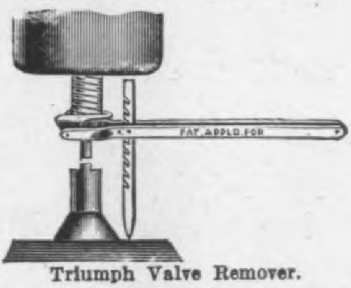
aced on the market the Triumph Valve emover, herewith illustrated. This is a ery compact simple device and weighs nly 6½ oz. It is capable, however, of ompressing extremely heavy valve prings, and the advantages claimed for it re, that by its use perfect equalization is

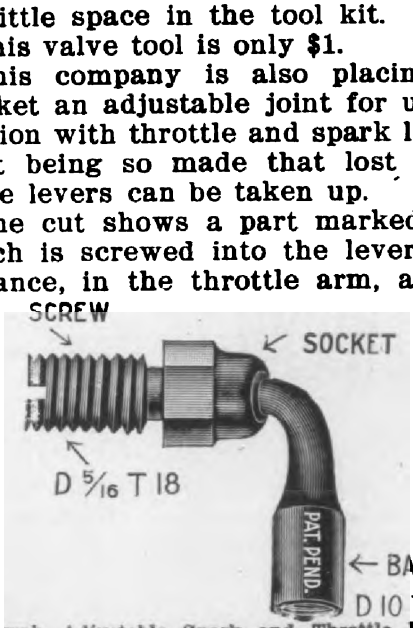


Triumph Valve Remover.

btained in the compression of the springs nd that it is exceptionally convenient to se, as it can be placed in a very small lace, which is of advantage, not only in se, but in view of the fact that it takes p little space in the tool kit. The price f this valve tool is only $1.

This company is also placing on the narket an adjustable joint for use in connection with throttle and spark levers, this oint being so made that lost motion of hese levers can be taken up.

The cut shows a part marked "screw," which is screwed into the lever arm; for nstance, in the throttle arm, and having



Triumph Adjustable Spark and Throttle Lever Joints.

smaller diameter thread part on it which crews into the part marked "socket." This not only adjusts the tightness of the all, but also forms a lock nut in connection with the part marked "screw." The part marked "ball" has the ball at one end, nd a hole at the other, which connects up with the lever rods. This joint is neat and s made so that perfect alignment of the evers is not necessary. It is also inexpensive and is made in various sizes with he part marked "ball" at any desired ngle.

The Ford Tire Repair Link

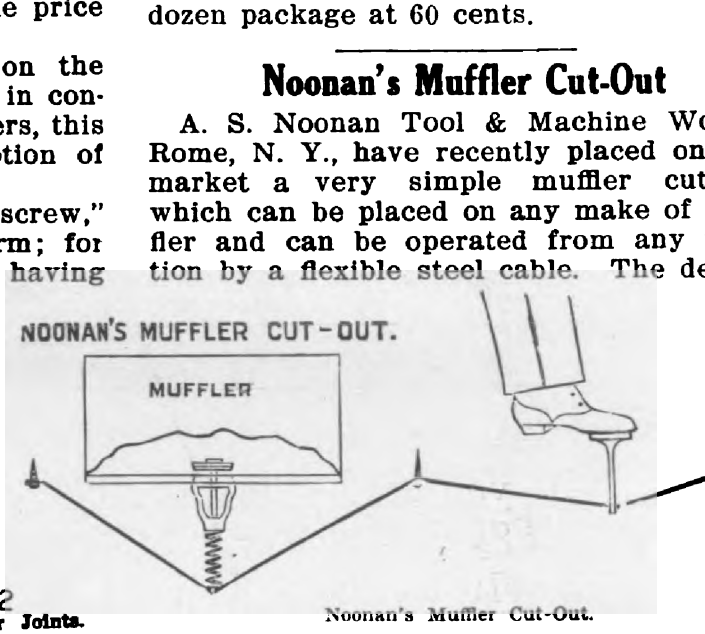
To provide economical and quick means links, which are made of special steel copper finished, and packed in a steel that can be readily carried in the tool These links are arranged with the ends of the wire slightly separated so

The Ford Tire Chain Repair Link.

they can be inserted in the chain and two ends are easily brought together. it has been heretofore necessary to vide an entirely new cross chain, t links will result in a great saving, as link will save the whole chain. The of the repair links is very low, a pacl of one dozen listing at 35 cents, and a dozen package at 60 cents.

Noonan's Muffler Cut-Out

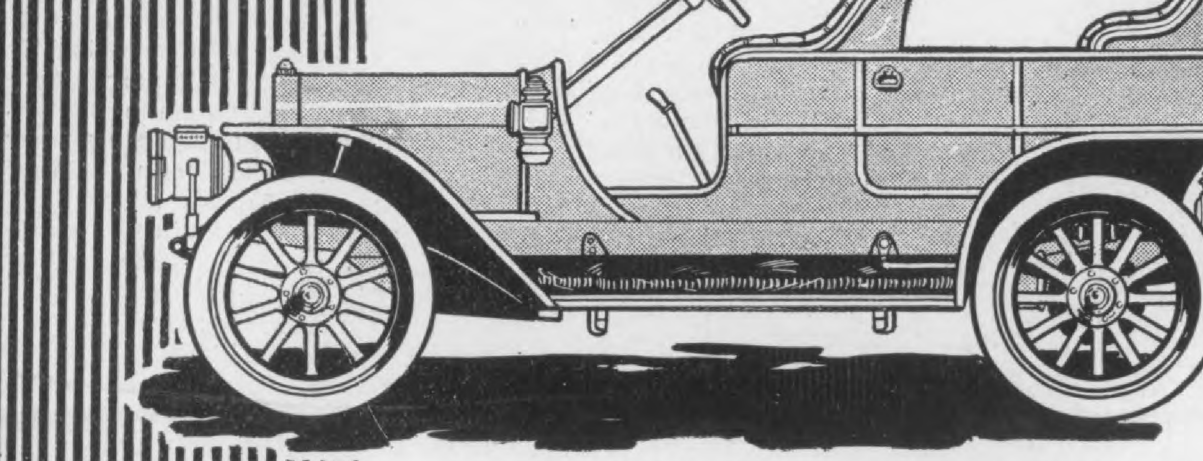
A. S. Noonan Tool & Machine Wo Rome, N. Y., have recently placed on market a very simple muffler cut which can be placed on any make of fler and can be operated from any tion by a flexible steel cable. The de



Noonan's Muffler Cut-Out.

is operated by a small foot pedal whic furnished with the outfit. The list of the device complete is $3.50. It sists of a disk valve, normally held t seat by a helical spring and raised o seat by depressing a push button w tightens the steel cable as shown.

Utica Drop Forge & Tool Co., Utic Y., recently opened a new plant with elaborate ceremony in which hundre Uticans joined in celebration of the e The new plant, in which the manufa of drop forgings, pliers and nippers be continued, is an irregular shaped b ing of 275 feet average length, while



Model B Touring Car, Seating Five, 20 H. P.,
Weight, 1600 lbs.; Price, $1,400

Oakland

The automobile manufacturer of today is down to "brass tacks"—he's up against real competition.

Hitherto he has been very much in the position of the man who served ice cream at a Sunday school picnic—the demand exceeded the supply.

The result was that the cost of manufacture didn't worry him very much. It was a case of get the cars out, no matter what they cost.

But this year the wise manufacturer is choosing his market. The field for the light runabout and the heavy, high-powered luxurious touring car is already in the hands of three or four manufacturers.

But how about the field for the the medium-priced car—a sensible, serviceable every day automobile—one that doesn't cost a small fortune to buy or an average income to maintain?

The manufacturers of the Oakland have seen this opportunity, and the result is the Oakland car—in two models—roadster and touring car, light in weight, ample in power, and stylish and handsome in appearance.

The power equipment of the Oakland is our two-cylinder vertical motor, here for the first time successfully worked out, and brought to full efficiency, without vibration. The number of adjustments throughout the Oakland are less than half those in other cars of its class, thus insuring simplicity and economy.

We shall be pleased to correspond with those who are in the market for this type of car, or with agents who realize with us the wide possibilities of a car properly built on these lines.

Oakland Motor Car Co., Pontiac, Mich.

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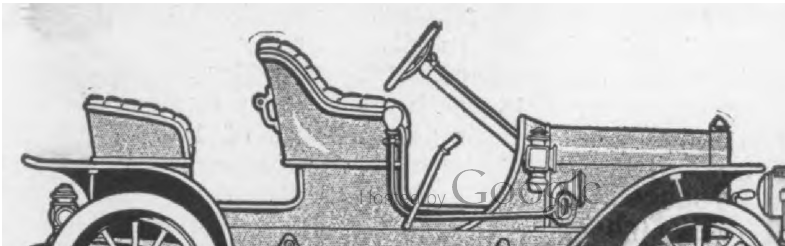

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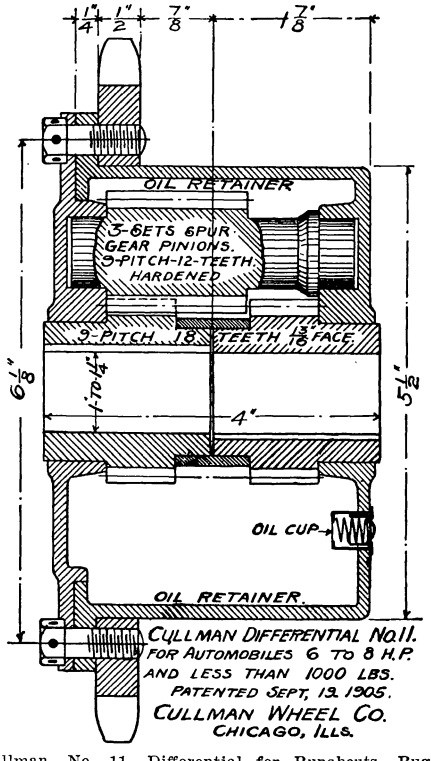
New "Cullman" Differentials, Sprockets and Brake Drums

The 1908 catalog of the Cullman Wheel Co. of 1220 Greenwood Terrace, Chicago, Ill., shows several important additions to the line of differentials, etc. made by this widely known, long established concern. It is quite indicative of the trend of the times that this concern is making some

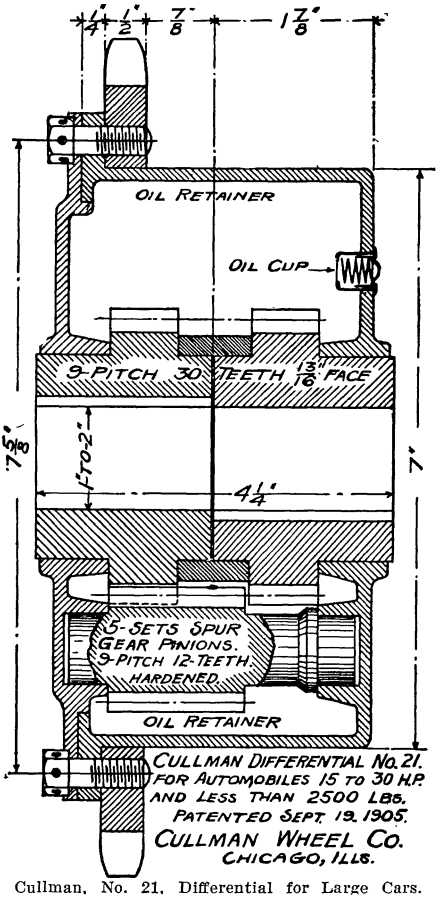


Cullman, No. 11, Differential for Runabouts, Buggy Type Cars and other light Vehicles of 15 H. P. or under.

special designs of sprockets and brake drums, differentials, etc., for buggy type automobiles. The Cullman No. 11 differential, one of the new 1908 designs, is especially suitable for use on the counter shafts of this type of car, light touring cars and runabouts of 15 H. P. or less, and for rear axle mounting on very light runabouts of 8 H. P. or less of a weight not exceeding 800 pounds. The brake drum is 5½ inches in diameter by 2⅝ inches braking surface. The two large spur gears have 18 teeth of 9 pitch and 13-16-inch face engaging three sets of 12-tooth pinions. The hubs of the large gears are 2 inches long and bored for axles from ¾ to 1¼-inches in diameter. The weight, not including driving members, is 15 lbs. All gears are case hardened. Price of the differential only, less driving member, is $17; with sprocket, $20; with bevel gear drive, $38 or $36 according to type selected. No. 12 gear is of similar construction but heavier and prices range from $25 to $46.

No. 21 Gear is for the rear axle of runabouts and touring cars up to 30 H. P., and for the counter-shaft of 40 to 50 H. P. touring cars. The brake drum is 7 inches in diameter and 2⅝ inches across the face. The two driving gears have 30 teeth, 9 pitch, 1 3-16-inch face engaging 5 sets of pinions with 12 teeth each. The large gear hubs are 2⅛ inches long and bored for axles from 1 to 2 inches in diameter. This gear weighs 28 pounds and prices range from $28 to $44.

The new Cullman rear wheel sprocket and brake drum combination is designed for direct attachment to the rear wheel with clips. The sprocket is fastened to the brake drum with cap screws locked by means of a patented spring wire lock to prevent the sprocket becoming loose.



Cullman, No. 21, Differential for Large Cars.

This sprocket and brake drum combination is made in three sizes. No. 1 is for light, high wheel, buggy type cars and will take sprockets of 1-inch pitch with 36 teeth, or larger, with 8½-inch hole; brake drum bored 8 inches. Price complete is $3.50 plus the price of the sprocket which of course is dependent upon the size. No.

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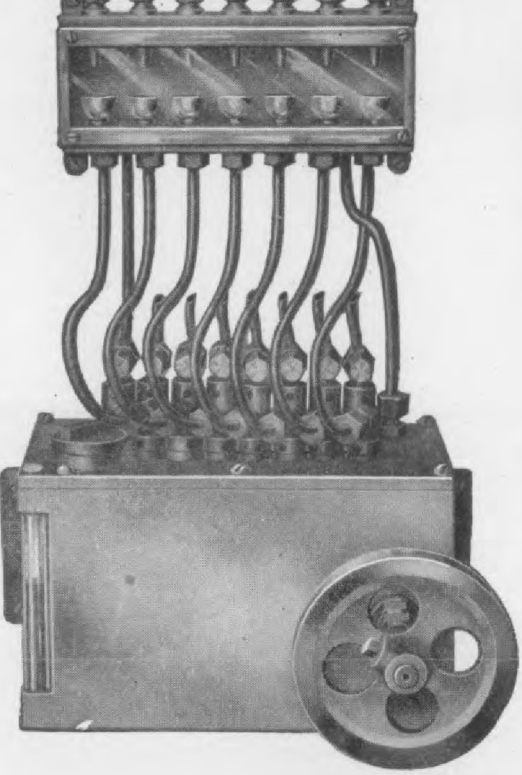


THE SHERWOOD MECHANICAL FORCE SIGHT FEED MULTIPLE OILER

The Simplest—Most Reliable and in all respects the most satisfactory and best oil pump

Set of Sight Feeds and Pump Reservoir separated so that each can be located at most convenient point, or furnished with sight feeds on reservoir so that entire device can be located at one place.

Does not depend on gravity for feed of oil from sight feeds to cylinders but gives a positive mechanical feed of oil to the sight feeds and from the sight feeds to the parts to be lubricated.

MANUFACTURED BY

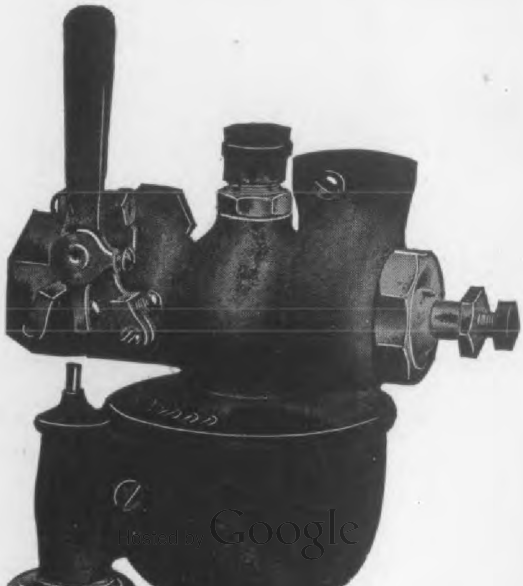
The "Sherwood" Manufacturing Co.

BUFFALO, NEW YORK

CATALOGS AND PRICES FURNISHED ON APPLICATION

THE "SHERWOOD" FLOAT FEED CARBURETOR

Simple Construction
Reliable Feed.
Perfect Mixture
Positive Shut Off
Easy to Operate
Wide Working Range
Starts Quickly and Easily
Perfect Control of Engine



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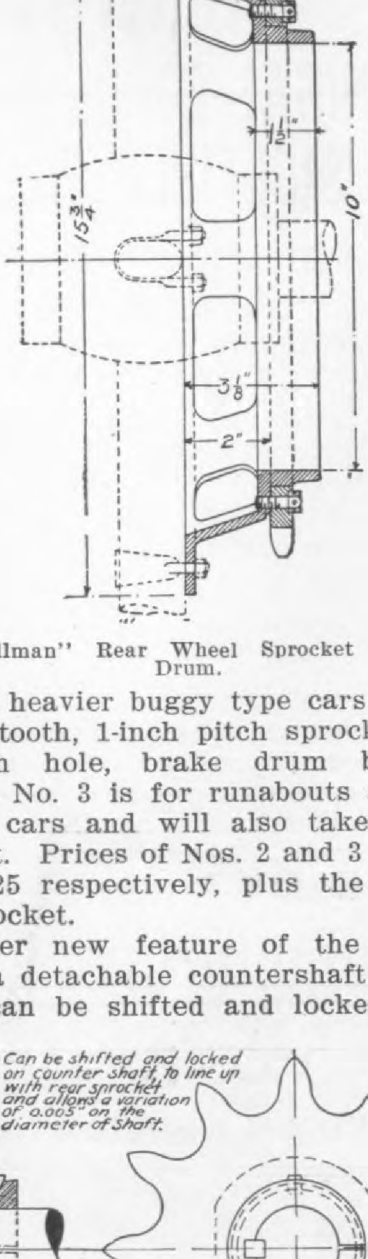
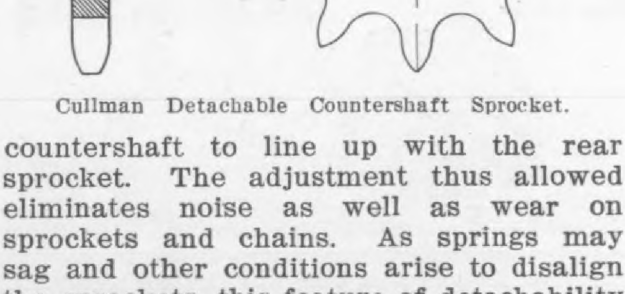


New "Cullman" Rear Wheel Sprocket and Brake Drum.

2 is for heavier buggy type cars and will take 42-tooth, 1-inch pitch sprockets with 10½-inch hole, brake drum bored 10 inches. No. 3 is for runabouts and light touring cars and will also take 42-tooth sprocket. Prices of Nos. 2 and 3 are $4.00 and $4.25 respectively, plus the price of the sprocket.

Another new feature of the Cullman line is a detachable countershaft sprocket which can be shifted and locked on the



Cullman Detachable Countershaft Sprocket.

countershaft to line up with the rear sprocket. The adjustment thus allowed eliminates noise as well as wear on sprockets and chains. As springs may sag and other conditions arise to disalign the sprockets, this feature of detachability is valuable and it is also a great advantage in that it allows easy change of sprockets to suit different local conditions. Adjustment is made by loosening and

The Universal Tire Sleeve has bee signed with a definite purpose in view designer's aim being to produce a sl that would be universally applicabl any wheel and tire, that would a thoro protection to the weak spot on tire and that could be applied insta The sleeve itself is made of specially pared chrome leather and is fitted on tread with links to take the wear. draft hooks and side plates assure conformity to the shape of the tire.

The Universal Tire Sleeve.

The most novel feature of this pr ing sleeve, however, is the device by it is attached or anchored to the Because of the varying sizes of thicknesses and shapes of felloes, et lowance must be made for these tions in producing a "universal" s and provision has been made in this for these conditions. An "anchor" i

Anchoring Device of the Universal Tire Sl

vided, consisting of two hexagon steel bolts in a steel box with a d able cover, each bolt having a r wheel and pawl, both actuated by a mon torsion spring. The bolts h square shaft portion to which small are stapled, the outer ends of these carrying flat hooks which engage wit tangular eyes on the sleeve sides. of these anchors are used on each s and are placed on the inner side felloe, the four small straps stra the felloe with the hooks engagin eyes on the lower edges of the s To tighten up the sleeve the hexagon bolts are alternately turned by mea a plain wrench, the ratchet wheel pawls holding each slight adjus To remove the sleeve the wrench

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THE "OLDSMOBILE"

'IG CARS
SINES
SOUTS

THE CAR THAT DOES THINGS

1926 EUCLID AVE.

BELI
NOR'

CLEVELAND, O. Jan. 16, '08.

O. C: Foster, Esq.,
Mgr. Cleveland Branch,
Warner Instrument Co.,

Dear Sir:-- Last year you furnished me with an instrument which I used on the "Mudlark" in my tour from New York to Florida, and it gave us such good satisfaction that I would like to have one of your clock and light instruments for a model "M" Olds in which I will make a similar run this coming week from New York to New Orleans by way of Syracuse, Buffalo, Cleveland, Louisville and Birmingham.

Trusting that you will give this order your personal attention, and that I may receive the instrument in time, as other speed indicator companies have offered to furnish me free of charge an instrument for this occasion. However, I would rather buy a Warner than accept their offers as the Auto-Meter has always given me complete satisfaction.

I remain, yours very truly

R. R. Owen.
Oldsmobile Co

November 21, 1907.

THE AUTOMOBILE.

BUNK

¶ Webster says "Bunkum" means speechmaking for mere show—mere talk. It aptly illustrates the advertising methods of some Speedometer manufacturers. There's a lot of "bunkum" about wonderful tests in tours and races. In most of these events the Speedometers used are not selected and paid for by the car owners, but are installed by some Speedometer manufacturer, free of charge, for advertising purposes.

"Bunkum" concerni-

Our Competitor's Advertisement

Warner Instrument Co.

140 Wheeler Ave Beloit, Wis.

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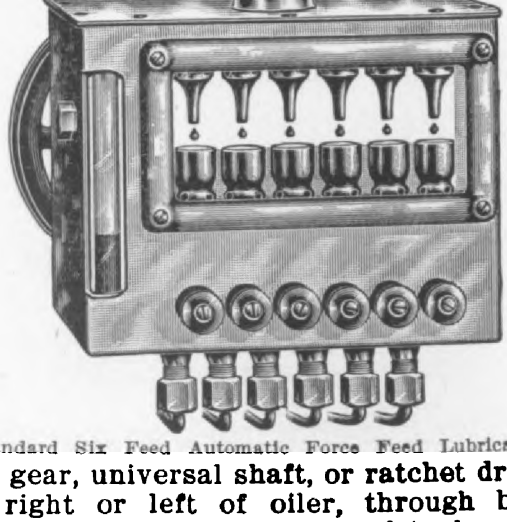
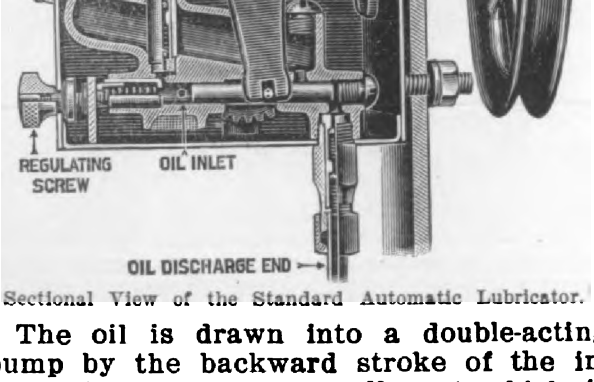
ıcture a very extensive line of mechan-
ıl oilers for automobiles and power boats.
hey are made in six sizes, with reser-
oirs of from 2 to 12 pints capacity, and
ith from one to eighteen feeds, with pul-



Standard Six Feed Automatic Force Feed Lubricator.

ey, gear, universal shaft, or ratchet drives,
n right or left of oiler, through back,
ther end, bottom or front of tank. This
ype oiler can be placed either on the dash
r under the hood.

The reservoir is made of highly polished
heet brass with reinforced joints, and a
pring snap filling plug on the cover,
hained to the oil strainer, which elimi-
ates the cross threading of the screw
hread type. The sight feeds and feed
djustment are arranged on the front wall
f the reservoir, thus permitting the re-
hoval of the cover without disturbing any
f the pumping mechanism.



Sectional View of the Standard Automatic Lubricator.

The oil is drawn into a double-acting
ump by the backward stroke of the in-
ake plunger thru a small port which is
ncased by a strainer preventing any for-

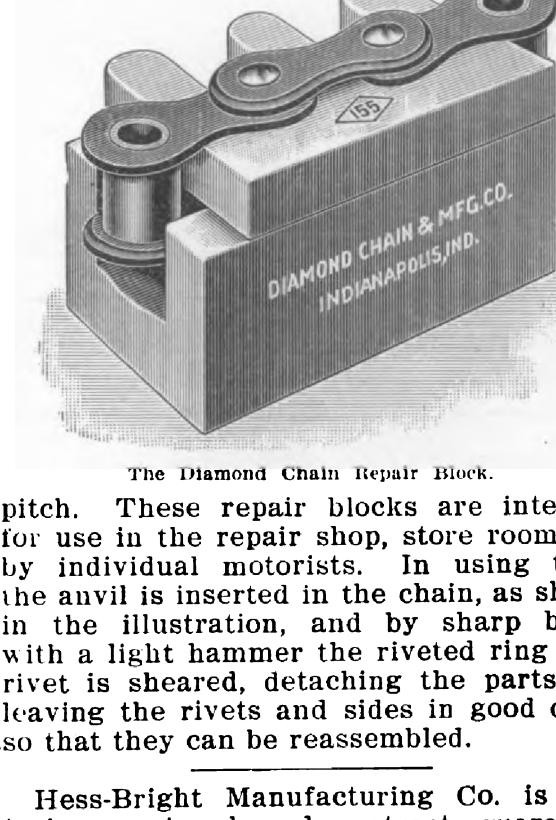
pump where it is discharged thru
checks on to the part to be lubricated

The discharge pump has a greater
pacity than the intake pump, which
vents the drip cup from overflowin
set at full stroke. Each feed can be r
lated independently by the adjusting sc
on the front wall of the reservoir,
locked by a lock screw in same.

The rocker arm which engages
plungers is operated by an eccentric
worm shaft drive or by a reciproca
ratchet movement.

The Diamond Chain Repair Block

The Diamond Chain & Mfg. Co., of
dianapolis, Ind., are manufacturing a c
repair block for detaching the links
rivets of riveted roller chains, this b
rendering the removal of links or rive
quicker operation than with detach
chains. The anvil is made from alloy
and is very handsomely finished. Diffe
sizes are furnished for chains of diffe



The Diamond Chain Repair Block.

pitch. These repair blocks are inte
for use in the repair shop, store room
by individual motorists. In using
the anvil is inserted in the chain, as sl
in the illustration, and by sharp b
with a light hammer the riveted ring
rivet is sheared, detaching the parts
leaving the rivets and sides in good c
so that they can be reassembled.

Hess-Bright Manufacturing Co. is
isuing an iron-bound contract, guara
ing all H-B ball-bearings for a perio
three years. This contract is issued t
individual car owner thru autho
agents and dealers.

The Boston Gear Works, Norfolk D
Mass., inform us that the new additi
their factory gives them about 50 per

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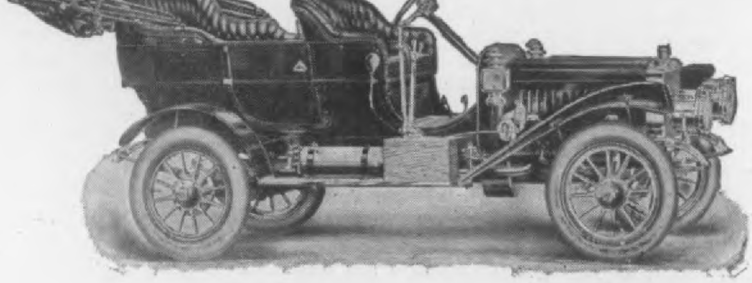

THE $2000

THE STANDARD OF AMERICAN AUTOMOBILE VALUE

Mitchell

Perhaps you've noticed that most cars cost more than the Mitchell. Did you ever notice that they were any better in finish or in material—or any better in **performance**—on the road?

Ride in a $2000 Mitchell and **see.**

Have any Mitchell agent "show you" a Mitchell.

Look it over—go out into the country and test it on the toughest hill you know of—through some particularly bad stretch of sandy or muddy road. Notice your power—notice speed—notice the sweet running motor—the tranquil action of all moving parts—ease of control—notice general efficiency, Mr. Prospective Owner.

Then if you can see how you'll get two or three thousand dollars more automobile value out of any other car—**buy** the other car, we won't say a word.

But you won't **find** more value in any other car.

Present day automobile value is **standardized in** the **Mitchell** at **$2000.**

A demonstration will prove this to **you.**

You are under no **obligation** to buy when you ask for a demonstration.

If you are considering the purchase of a car we want you to **know** the Mitchell, and we want **to show** you what you get in a Mitchell at $2000 and that you can't get any **more** in **any other** car, **regardless** of the price.

Call up the Mitchell agent.

The Right Price for the Right Car

$2000

WRITE US FOR CATALOGUE No. 18

MITCHELL MOTOR CAR CO.

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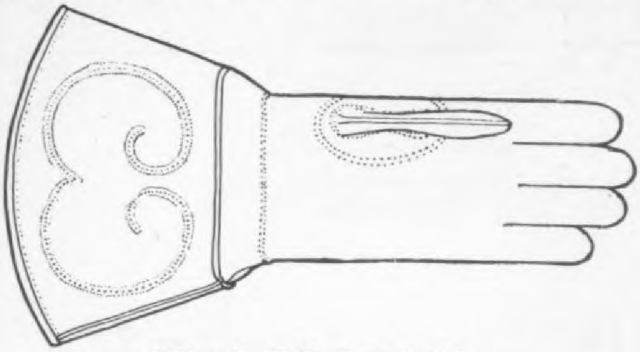
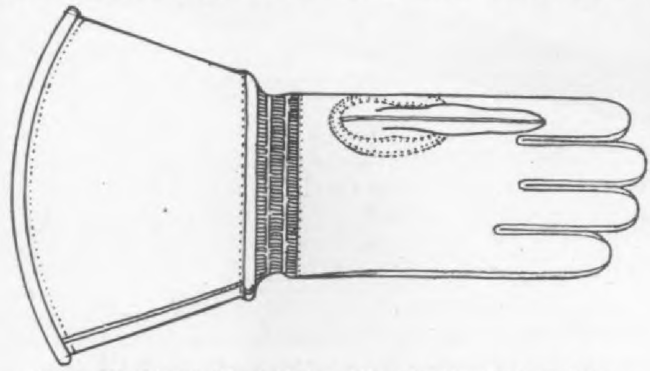
are offered, one of which is lined with



"Ripon" Unlined Gauntlet.

either knit wool or lamb skin fur. The other is unlined. Both styles are table cut, made from selected colt skin and furnished in gray, brown or black. They are



"Ripon" Lined Gauntlet with elastic web wrist.

warm, soft and pliable, specially suited to the chauffeur's requirements.

The unlined glove has an elastic web wrist.

"Wallace" Automobile Robes and Overcoats

The Hugh Wallace Co., of Detroit, Mich., makes a complete line of overcoats and robes for both men and women's wear. For the atutomobile trade this concern makes a specialty of the "Wallace Montana," imitation Buffalo robe. This is curly wool faced, interlined with rubber, and has an Astrakhan cloth back. Practically all "Wallace" robes are reversible and made either with rubber on one side or with a rubber inter-lining. "Wallace" robes are 54x72 inches.

This concern's overcoats are made in all styles and of all kinds of fabrics and furs. They are usually made in 52 inch lengths.

The "Wallace" line also includes automobile gloves and mittens in Buffalo Fur Cloth, Astrakhan Cloth, Black Manchurian Lamb, Black Jap Martin, Yellow Dog, Black Galloway, Raccoon and Muskrat.

tained in the simplest manner imagi
and the robes are sold at a very reaso
price, hence it is not surprising tha
makers have found this robe a big s

The cut herewith shows clearly
glance the design and simplicity o
robe, the main feature of which i
foot compartments. The robe is ma
Kersey and one style is furnished
rubber facing. The foot forms are

The "Sho-Fur" Auto Robe with boot-shap
compartments.

with leather strongly riveted. An
web fastener over the foot form allo
adjustment to any size foot. The s
the foot form is above the lower e
the robe so that there is no space b
to allow the entrance of cold air.

It will be noted that the "Sho-Fur
is practically the same as a plain r
which all car users are accustome
that its great advantages are not ob
at any sacrifice of simplicity, comf
usefulness. Besides the user has
freedom in using the pedals and c
sert or remove his feet from the foot
instantly.

The plain Kersey robe sells at $
the rubber-faced style at $6. Both
are furnished in green or black, sol
ors.

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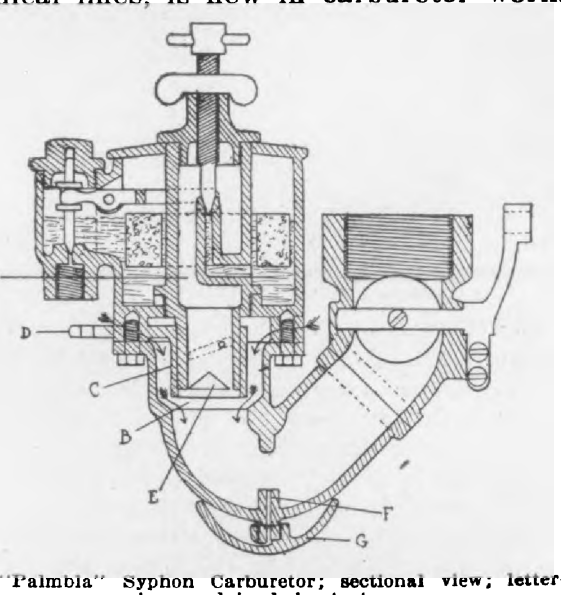
The Cyclone carburetor, formerly

es some of the principles of their 1907 el, but is entirely new in its style and hod of operation. The new method l, the syphon, while old in other me- nical lines, is new in carburetor work.

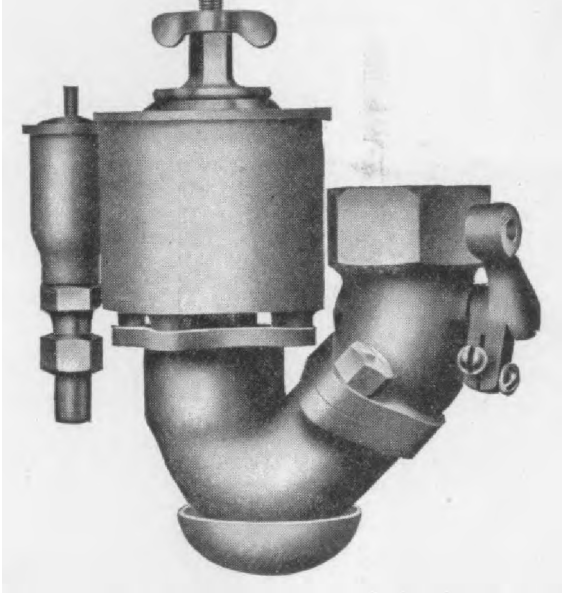


"Palmbla" Syphon Carburetor; sectional view; lettering explained in text.

his carburetor has but one air intake as it has no auxiliary air valve, it dis- ses entirely with any moving parts or ves. It has only one adjustment (gaso-), and is said to give a uniform mix- e at speeds ranging from 300 to 2500 P. M. The carburetor works on the e principle as the well-known steam hon water ejector or lifter. Referring the sectional view, A indicates an air- t tube in the centre of the float cham- with a gasoline feed nozzle in the cen- of same. E is a cone concentric with fastened to lower end of tube A. C loose sleeve fitted on the outside of er end of tube A and is moved up or n by handle D. This varies the air ning at B to suit different size motors. a fixed opening and is normally set at lowest point. F is a little round base the bottom of the curved mixing tube. mall hole is drilled through to connect the priming cup G. Arrows show the intake openings. The float chamber the throttle are ordinary construction. 45-degree flange connection at H per- s of side or top outlet.

o operate the carburetor the needle ve at the top of carburetor is given one- a turn, and the carburetor primed a primer (not shown) until the gaso- shows in the priming cup at the bot- . The motor can then be easily started the air passing thru at B comes in con- with the fuel coming from the air A, as well as to pick up more fuel

sure in tube A and but a small quantity gasoline flows. As the speed of the mot is increased, greater friction of the a takes place at B, and a consequent mo power of the pressure in the air tube and a greater flow of fuel. Experimen have shown that the flow of fuel is in e act proportion to the air passing throug at B with a fixed opening at feed nozzl If the air opening at B is increased a opening in gasoline feed nozzle is i creased by the opening of the needle val proportionately, the same mixture can had at all speeds of the motor with t exception that the motor cannot be thro tled to as slow a speed as before. F spreading on the road with a light loa the handle D is moved, which increas opening at B. This has the same effe as an auxiliary air opening to intake pi as used on some of the cars for speedi purposes. When the motor stops, the su



The "Palmbla" Syphon Carburetor.

plus gasoline feeding down the walls the tube A collects at the base of curv mixing tube and gives a starting char without priming.

This carburetor is made in ½, ¾, 1, 1 and 1½ in. sizes, and lists at $8, $10, $ $16 and $18.

The Witherbee Igniter Co. has moved factory and main offices from 541 West 4 St., New York City, to the third floor the Motor Mart Bldg., 1876 Broadway. T new quarters contain over 8000 feet floor space.

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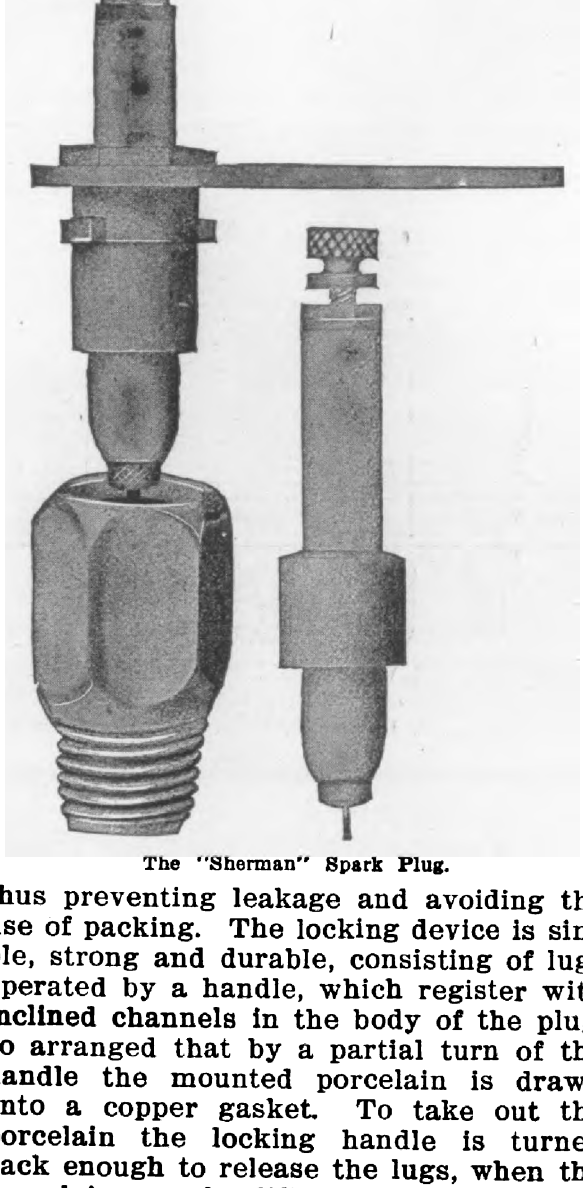
H. W. Doherty, formerly of the Corb

apart, making it easy to keep clean and allowing it to be used as a priming cup to prime the engine in cold weather. The plug is the product of G. H. Sherman and Son, 419 St. Aubin Ave., Detroit, Mich.

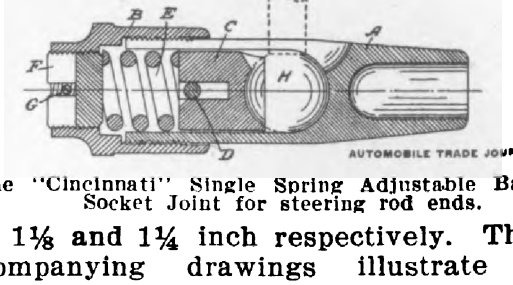
An improved method of packing the porcelain is used, which consists of packing the porcelain into a metal shell with a special copper gasket, and utilizing the explosions of the engine to hold the porcelain against the packing. The firing pin or central electrode is made in one piece, the head of which is ground onto the end of the porcelain, making a mechanical fit,



The "Sherman" Spark Plug.

thus preventing leakage and avoiding the use of packing. The locking device is simple, strong and durable, consisting of lugs operated by a handle, which register with inclined channels in the body of the plug, so arranged that by a partial turn of the handle the mounted porcelain is drawn onto a copper gasket. To take out the porcelain the locking handle is turned back enough to release the lugs, when the porcelain can be lifted out. To prevent fouling as much as possible the plug is bored out in such a manner that the porcelain is protected, and the spark ...

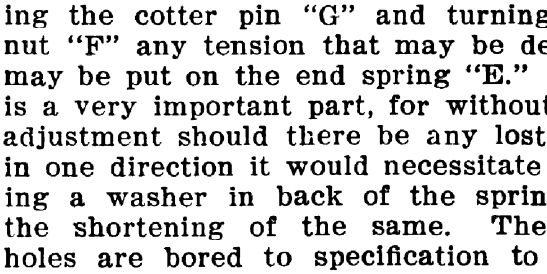
placed on the market a new type of ing rod joint which is of the ball socket type and is adjustable for wea Two styles are offered, one a d spring joint and the other a single s joint, three sizes of each style being reversed.



The "Cincinnati" Single Spring Adjustable B Socket Joint for steering rod ends.

1, 1⅛ and 1¼ inch respectively. Th companying drawings illustrate styles, the single spring joint drawin ing suitably lettered with referenc the description which follows.

No part of this connection is forge all parts are made from solid bar The cones coming in contact with th are case hardened, the springs oil pered, the whole forming a socket will take up sudden jars with safety. maker has given particular attenti the latter and, as will be noted, it i possible for the ball to come out o socket, inasmuch as the same is slipt the milled slot "C" and held in pla cap "B" secured with a taper pin Another advantage of these sockets is they are readily adjustable, for by re



The "Cincinnati" Double Spring Adjustable B Socket Joint for steering rod ends.

ing the cotter pin "G" and turning nut "F" any tension that may be de may be put on the end spring "E." is a very important part, for without adjustment should there be any lost in one direction it would necessitate ing a washer in back of the sprin the shortening of the same. The holes are bored to specification to different sized connecting rods.

The Witherbee Igniter Co., manufa ers of Witherbee batteries and Wico cialties, have just established a br office at 720 Main St., Buffalo, N. Y der the management of Mr. James ley.

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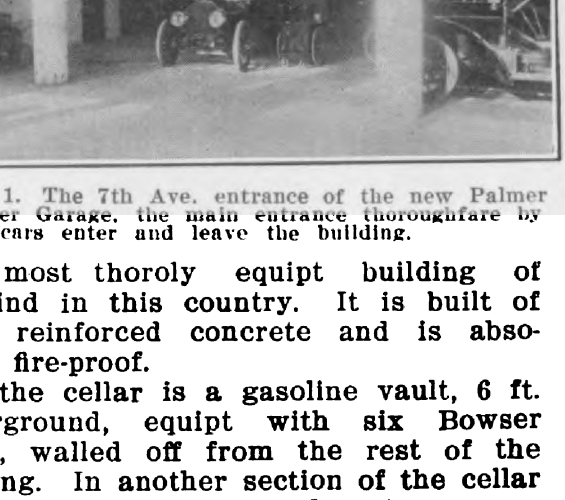
The New Palmer & Singer Building

e Palmer & Singer Building at 1620, d 24 Broadway, N. Y., is the latest nce of the belief among men of af- that the automobile industry is as its infancy and that its most profit- lays are yet to come.

s building compares favorably in size inish with any of the giant office ngs in New York City, running as es from Broadway thru to Seventh e and occupying a frontage on both s which surpasses most of the large ngs on upper Broadway. It cost a ne to build and another fortune to for the purpose of handling motor n modern fashion and is said to be



1. The 7th Ave. entrance of the new Palmer er Garage, the main entrance thoroughfare by cars enter and leave the building.

most thoroly equipt building of ind in this country. It is built of reinforced concrete and is abso- fire-proof.

the cellar is a gasoline vault, 6 ft. rground, equipt with six Bowser , walled off from the rest of the ng. In another section of the cellar he boiler rooms and motor rooms, valled off, the latter furnishing power he elevators, etc. Another feature series of oil tanks with overhead s to facilitate handling barrels of oils ferent grades. A large water pump in er section of the room is for the pur- of furnishing water to the tank on

being sent up to the machine shop above. A turntable and wash stand for cars, complete the equipment of this room to which access is had by means of the two large elevators which run to the top floor of the building and which have a carrying capacity of six tons each.

THE GROUND FLOOR.

Large doors, leading from Broadway, give access direct into the salesroom, one of the most attractive in Manhattan. The permanent display of cars on this floor will comprise 50 H. P. Simplex cars, the three cars of the Palmer & Singer line, the Four-Forty touring car, the Six-Sixty 6-cylinder runabout, the Palmer & Singer

Fig. 2. Executive offices on the second floor, Palmer & Singer Mfg. Co.'s garage building.

town car and the light Selden touring car.

The desks of the members of the sales force are conveniently situated at the back of the room. To the right is the gentlemen's washroom and to the left a ladies' retiring room, beautifully furnished in white enamel and equipt with every toilet accessory.

Behind the salesroom, joining by three large doors, is the ground floor garage, an enormous room for cars that are running in and out all the time. It has a very wide entrance on Seventh avenue and will be the thorofare by which cars enter and leave the building.

On this floor are gasoline vaults con

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urther add to its conveniences.

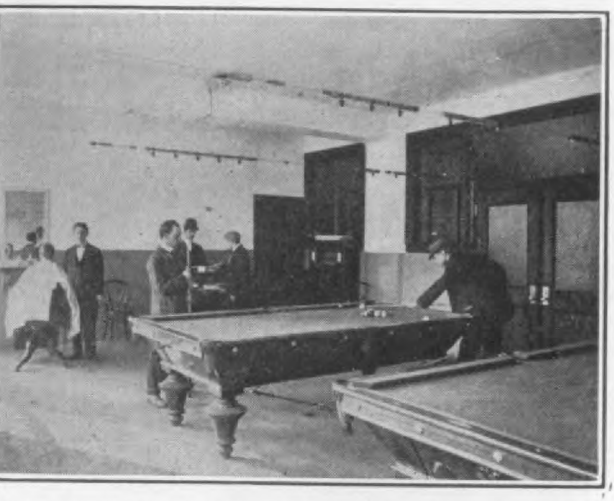
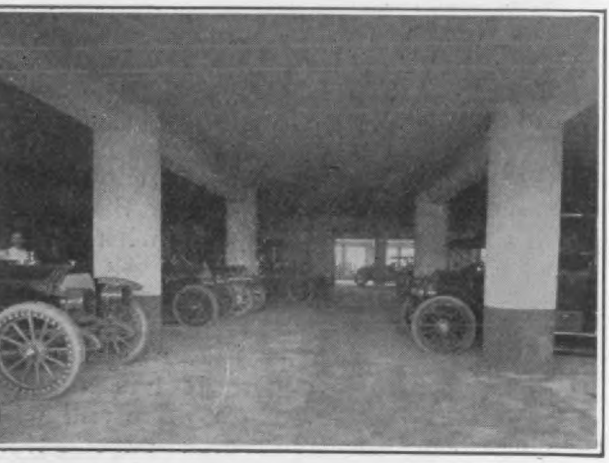


Fig. 3. Recreation room Palmer & Singer Building. barber shop and bar for soft drinks is also main-ined.

MEZZANINE FLOOR.

Returning to the salesroom from the arage one may ascend winding stairs, n either side, to the Mezzanine floor here the switchboard, telephone operator, ook-keeper, cashier and auditor have heir respective offices, together with sev-ral stenographers and detail men.

Behind this floor is a large fire-proof ault containing files, books, safe, station-ry, office accessories, etc. A door from he mezzanine floor gives access into the arage behind the salesroom, opening on he gallery, which runs the whole length f the block, on both sides, from Broad-ay to Seventh avenue and across one nd. On this gallery are over 150 lockers or chauffeurs and customers who have ars stored in the garage. These lockers ontain coats, robes, tires, lamps, etc., and



ig. 4. Palmer & Singer Building, third floor; gar-e for active storage and washing.

are constantly at his disposal.

SECOND FLOOR.

Going upstairs from the garage from the salesroom end, one comes to private office extending clear across entire front of the building on the Br way side. This office may be used show room, also, as it has room for cars. Here the officers of the comp and their secretaries have their des

CHAUFFEUR'S ROOM.

Behind the salesroom is another ga floor, easily accessible by elevators. the Seventh avenue end of this floo the chauffeurs' club room, a most at tive lounging place, equipt with a ber shop, two pool tables, shower ba music room containing a piano, and a room amply supplied with tables. T is also a bar where soft drinks are ser

THIRD FLOOR.

The third floor is devoted entirel storage, with a capacity of over 60 This room, like all the others, is supp

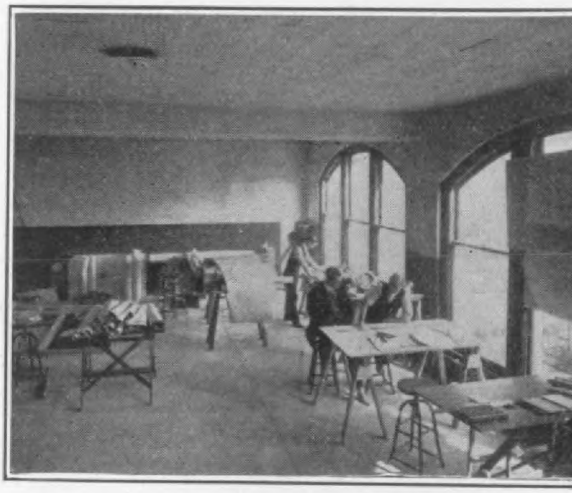


Fig. 5. A corner of the drafting room on the floor where plans for experimental work wil made.

with turntables and wash-stands for cars, but most of the washing will be d on this floor so that the other gar floors can be kept absolutely dry.

The fourth floor has an enormous ca ity, covering as it does the whole gro site of the building between Broadway Seventh avenue. This will be devoted tirely to the storage of cars and is eq with all the conveniences of the ot garage floors.

Prominent among the features of fifth floor is a drafting room wh draughtsmen will be constantly at work all sorts of experimental features wh the Palmer & Singer Co. will try out.

On this floor also is the stockroom

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capacity is such that 20 cars may be undergoing repairs at the same time. It is intended to make it the best equipt shop of its kind in the country. It has a full assortment of lathes, speed drills, drill presses, milling machines, planers, grinders, buffers, a forge, a portable crane with which to take out motors, transmissions, etc., and four pits. These pits are each about four feet wide, four feet deep and 10 feet long. The shop is as light as all outdoors as it has twelve skylights, filling almost the entire roof, as well as large windows on all four sides. It has tremendous work benches and room for many scores of workmen.

Retail Notes

Algonquin Motor Co., The, Boston, agent for the Oldsmobile, has finished the alterations and improvements to its salesrooms. Arthur E. Adams is manager.

Borderwisch Automobile Co., of Dayton, Ohio, will be reorganized for the purpose of continuing the business on the plans determined upon by its late head, Mr. Borderwisch, previous to his death.

Bradford, T. C. Co., of Wilmington, Del., has leased the Tanguy Bldg., at Delaware ave. and Tatnall st., and will remodel it and convert it into a garage.

Burkleo & Stephen, Oak Park, Minn., have opened up an automobile repair shop on 2d st.

Buick Motor Co. has opened a branch at 415 Massachusetts ave., Indianapolis, Ind., to be conducted under the style Buick-Losey Co., R. H. Losey being in direct charge of the business.

Derry Auto Co., Derry, N. H., has sold garage and machine shop to J. O. Thomas and B. R. Melcher, who will conduct the business under the same style. The new proprietors are open for the agency of any good-selling article pertaining to the automobile trade.

Dingley, Bert., Modesto, Cal., opened his new garage, at 719-721 10th st., on New Year's day.

Dunning, D. R., Portland, Oregon, has completed a new 35x100-foot brick garage on E. Oak st., near E. 3d, which cost $3000.

Ellenbeck & Muller, of Brooklyn, N. Y., recently opened a garage and repair shop at 912 Bedford ave.

Franklin, H. H. Mfg. Co., Syracuse, N. Y., has appointed H. G. Kilbourne, a well-known mechanical engineer, as its Boston manager.

Fiat Automobile Co., The, has opened a repair department on the third floor of its building, at Broadway and 57th st., New York City, under the management of Emanuel Cedrino.

Fix Automobile Co., The, C. E., Zanesville, Ohio, will build a new two-story garage, this spring, at the corner of 9th and Main sts., and its old building on 9th st. will be retained for storage purposes and connected with the new building, which will be of concrete blocks.

G. & J. Tire Co., The, has discontinued its Boston branch, at 204 Columbus ave., and the Enterprise Rubber Co. has been appointed New England representative.

Haynes, Robert J., severed his connection with the Autocar Co., of Ardmore, and joined the forces of the General Motor Car Co., 249 N. Broad st., Philadelphia, Pa.

Hartford Rubber Works Company has discontinued its New York branch, at 88 Chambers st., and will concentrate the business in its uptown branch, 57th and Broadway. The downtown agency will be kept up by Charles E. Miller, at 97 Reade st. The Hartford company has also removed its Boston branch to larger quarters, from Atlantic ave. to the Heard Bldg., 817 Boylston st.

Hibbard, W. L., of the Hibbard Automobile Co., Milwaukee, Wis., has retired from the firm.

Johnson, H. Howard, opened a garage at 645 Washington st., Brookline, Mass.

Keystone Motor Car Co., of Philadelphia, Pa., agent for the Packard line, recently opened its new building, which has been in course of construction for some time.

Klockau, Wm., Rock Island, Ill., wagon repairer, is building a two-story garage adjoining his present establishment; to measure, 37x40 feet, and to cost $5000. Besides engaging in repair work he will sell the Ford car.

Knoff, Wm., of Coshocton, Ohio, is making plans for enlarging his garage and bicycle repair shop in Main street.

Kuelme Bros., Second and Mullberry sts., Mankato, Minn., carriage builders, have added a garage to their establishment.

Lea, Henry C., Philadelphia, Pa., will erect a three-story garage at 229 to 243 N. Broad st., with a frontage of 122 feet on Broad st. and a depth of 120 feet 5½ inches on Watts st. The cost will be about $150,000.

Lovejoy Novelty Works, Laramie, Wyoming, are now in their new 48x80 brick garage, which has a plate glass front and both front and rear entrance. A well equipt machine shop is maintained.

Luttrell Company, The, of Washington, D. C., will now handle the Locomobile line, which was formerly handled by the Pope Automobile Co., in that city.

Maxwell-Briscoe Motor Company recently established a new sales agency at 84 Mechanic st., Worcester, Mass.

Mason, J. W., Newark, N. J., will soon occupy a new two-story garage, at 350-352 Halsey st.

Michigan Auto Supply Co., Menominee, Mich., opened a garage and repair shop at 323 Grand ave. Firm consists of John Fish, Sr., and F. J. Stukel.

Miller Motor Co., Racine, Wis., which has conducted a garage and salesroom at 7th and Wisconsin sts. for two years, has opened an auxiliary salesroom at 310 6th st. It will build a new one-story, 44x120-foot garage as soon as plans can be completed.

Mitchell Automobile Co., of Newark, N. J., will shortly open an agency in the new DeCamp Bldg., in Halsey st.

Mora Motor Car Company has recently appointed W. W. Burke, manager of their New York branch, which will shortly be opened at the southeast corner of Broadway and 52d st.

Morehouse, F. A., will open a public garage at 412 Garfield ave., Atlantic Highlands, N. J., about May 1.

Oklahoma Motor Car Co., Oklahoma, Okla., is erecting a one-story brick garage, 50x140 feet, on Second st., at a cost of $5000.

Paul, E. H., Newhall st., Lynn, Mass., recently opened an automobile repair shop at the above address.

Paulman, Henry & Co., Chicago distributers of the Pierce Great Arrow cars, have completed a deal with the manufacturers by which their territory is extended to include the Dakotas, Minnesota, Northern Wisconsin and Montana. A branch house has been opened by Paulman & Co., at 113 6th st., Minneapolis, Minn., in charge of R. J. Randolph.

Prospect Park South Garage, Brooklyn, N. Y., will put up a two-story addition, to be used as a machine shop.

Roberts, O. G., Columbus, Ohio, recently opened his new garage, at 921-933 E. Gay st., the main building of which is 102x150 feet, built of concrete blocks and fireproof construction thruout.

Roman Automobile Co., of 1740-42 Market st., Philadelphia, Pa., has opened a branch at Broad and Wood sts.

Sears-Nottinger Automobile Co., Des Moines, Iowa, will shortly be housed in a new garage being erected by the Ewing estate. The building will be one story high and have no basement; dimensions, 66x132 feet.

Shaw, Walden W. Co., of Chicago, agents for the Berliet, Premier, Reo and Columbus electric cars, recently moved into its new building, at Michigan ave. and 21st st.

Solliday Motor Company, 8th st., near Grand ave., Milwaukee, Wis., is building a two-story brick garage, which is expected to be ready for occupancy about April 1.

Standard Auto Garage Co., Youngstown, O., will erect a large brick garage at 128 W. Rayen ave., to cost $5000.

Studebaker Automobile Company opened a branch salesroom in Cleveland, for the sale of their electrics, on Euclid ave., near 20th st., with Alvin H. Smith as manager.

Studebaker Automobile Company, South Bend, Ind., recently opened its Philadelphia branch, at 328-330 N. Broad st., with a formal reception. The branch is in charge of Messrs. A. J. King and Frank Yerger. The Studebaker Company has also opened a branch at Seattle, Wash., in charge of C. J. Zintheo, in connection with the Studebaker Brothers Company's northwest vehicle sales department, at 308 First ave., South.

Testard, H. A., Masonic Temple, ground floor, corner Perdido and St. Charles sts., New Orleans, La., has recently taken in the store adjoining his, doubling his facilities for repairing bicycles and automobiles.

Thomas-Detroit, E. R. Co., are now represented in Chicago by George W. Hipple, formerly with the National Cash Register Company. The Thomas-Detroit branch is at 1424 Michigan ave. Mr. Hipple's force of assistants includes four salesmen, two demonstrators and two mechanics from the factory.

Vosburgh, J. R., of Johnstown, N. Y., opened a Southern branch, at 618 Main st., Jacksonville, Fla.

West-Stillman Motor Car Co., Philadelphia, Pa., are agents for the Pennsylvania, Mercedes and Pope-Waverly cars. Frederick K. Mears has been appointed president and general manager, H. E. Stillman will continue as sales manager and E. P. West will be secretary and treasurer.

Whitten-Gilmore Co., of Boston, Mass., recently opened its new salesrooms, at 907 Boyleston st., where it will handle the Thomas line.

Winton Co., The, recently opened its San Francisco (Cal.) branch, at Van Ness and Grove aves.

Young Bros., Modesto, Cal., are erecting a new 75x140-foot garage on 9th st., between I and J sts. The building will be of brick, with a white prest brick front.

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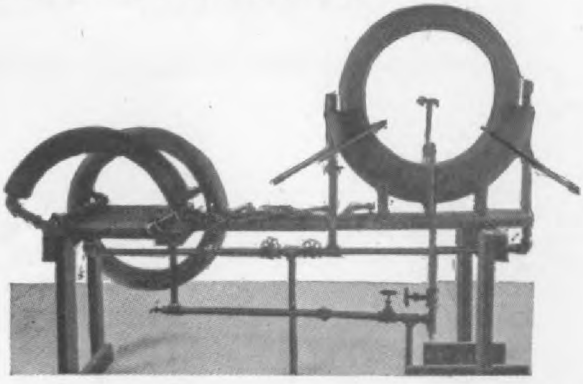
clincher tire vulcanizing outfit, which it is claimed will entirely prevent burning of the clinchers, as it cures only the new gum without heating any other part of the tire, thus avoiding disintegration of the tire from over-vulcanization.



The "Ogden" Clincher Tire Vulcanizing Outfit.

This apparatus will repair blow-outs, retread and re-cover outer casings. It is especially designed for repair shop use, and is furnished with all bench tools, tube vulcanizer, and moulds for 3, 3½, 4 and 4½-inch tires for $200. Steam boiler, pipe and connections are not included. Separate parts can be furnished if desired. Tire moulds, 3 and 3½-inch complete, list at $55.00; 4 and 4½-inch complete, $65.00.

"Avery" Illuminated Demonstrator Signs

Avery Portable Lighting Co., 18-22 Martin St., Milwaukee, Wis., is now producing for dealers illuminated signs for day and night use on demonstrating cars. These signs can be attached to the back of the car or to the radiator and when used on the rear of the car take the place of a tail lamp. These signs are intended to be used in conjunction with the "Autogas" acetylene tanks made by the same company. The pipe line from the gas tank to the headlights is tapped and an additional connection made for the sign which is illuminated by two small jets consuming very little gas.

The front of the sign is made of stained glass, the letters being white and the background red. The letters are about 2 inches high. Price of the sign is $4.00 list with a discount to dealers. License numbers can also be furnished in this style.

New Agents

The Glide will be handled during 1908 by the Du-

man at Minneapolis under charge of M. J. I and Teddy Dey.

The Thayer Automobile Company, Marinette are now representing the Buick and Pope cars.

The Ideal Plating Co., Boston, Mass., m Ideal handle bars, inform us that it is now sented on the Pacific Coast by M. A. Bryte, S ket St., San Francisco, and in the Middle W Hastings & Anderson, 116 Lake St., Chicag have a full line of samples and will take up ies formerly referred to the factory.

The York Motor Car Company, of York, Pa., an the following as new agents for the York Pullman Randall Company, Boston, Mass.; Grant Gasoline C pany, Providence, R. I.; J. P. Sullivan Compan London, Conn.; Star Motor Car Company, Newark N. A. Barnett & Co., Cranford, N. J.; E. Gibson Co Indianapolis, Ind.; Thomas & Tolman Auto Compa kane, Wash.; Hernandez Automobile Company, Cuba; Automobile & Machine Motor Company, Ch N. C.

The Logan Construction Company has placed its ship for Cuyhoga County with the Southern Moto Company of Cleveland with offices at 805 Citizen and garage at 6410 to 6414 Detroit Ave.

George A. Haws has placed the agency for Panha mobile cylinder oils and lubricating compounds with L. H. & B. I. Bill, 132 Valencia St., San Francisco, will represent them on the Pacific coast, including Ca Oregon, and Washington Territory. Also with Leon & Co., 226 Columbus Ave., Boston, Mass., and Nock Co., 126 No. 4th St., Phila., Pa.

The following agencies for the sale of Jewel Cars h recently established by the Forrest City Motor F. A. Faller, Wilmerding, Pa.; Broad St. Garage Co. hem, Pa.; Brodess & Co., Decatur, Ill.; C. E. Arkon, Ohio; D. W. Goble, Monon, Ind.; Ray Co., Ft. Worth, Texas.

The Cleveland branch of Morgan & Wright h discontinued as arrangements have been mad the Ohio Rubber Co., 2048 E. Ninth St., for clusive sale of its automobile, vehicle and bicy in Cleveland and vincinity.

Stearns agencies have been given to Alle Company, of Brooklyn, 1287–1291 Bedford Av Morgan B. Kent of Boston, the latter being ap the State of Massachusetts.

Messrs. Cimiotti Bros., 1843 Broadway, Ne City, have taken up the sale of the York automobiles for territory of Greater New Yor Island and Westchester county.

J. P. Beck, of Saginaw, Mich., a wel carriage dealer, has secured the agency in th tory for the Welch, Stoddard Dayton, Maxw Reo.

Harry S. Haupt, 139-41 South Broad street delphia, has been succeeded by Joe Keir as ap the Thomas cars.

Messrs. Moreland and Duholm, Austin, Min taken the agency for the Ford.

E. L. Leinbach Automobile Co., 2312 avenue, Baltimore, Md., will handle the Dayton line.

A. O. Hunter has recently been app manager of the Chicago branch of the lin Automobile Company.

Charles S. Henshaw of Boston, wh handled the Haynes and Thomas prod retail for several years, has disposed interest in his Boston store and signe the Haynes factory to look after its exclusively, appointing agencies. Bost be Mr. Henshaw's headquarters coverin England especially.

The E. R. Thomas Motor Co., of B N. Y., advises its dealers that it h cided to furnish as part of the

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YBERG AUTOMOBILE WORKS
437-39 Michigan Ave., CHICAGO, Ill.

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Motorcycles Prominent at Sportsman's Show

Contrary to the practice of former years, he motorcycle was this year given more ttention and better space allotments at he various shows, a fact particularly noiceable at the recent Sportsman's Show eld February 20th to March 7th at the Iadison Square Garden, New York.

The motorcycles represented were as ollows: The F. N., marketed by the Ovington Motor Co.; the Indian motorycle, manufactured by the Hendee Mfg. Co., and exhibited by the New York agents, . A. Baker & Co.; the N. S. U., built by he N. S. U. Cycle & Motor Co., which has n American branch at 206 W. 76th St., New York City; the Thor, exhibited by the R. E. Sporting Goods Co., and make by Aurora Automatic Machinery Co., of Auora, Ill., and the Minerva, a foreign mahine, marketed by Geo. V. Lyons Mor Co.

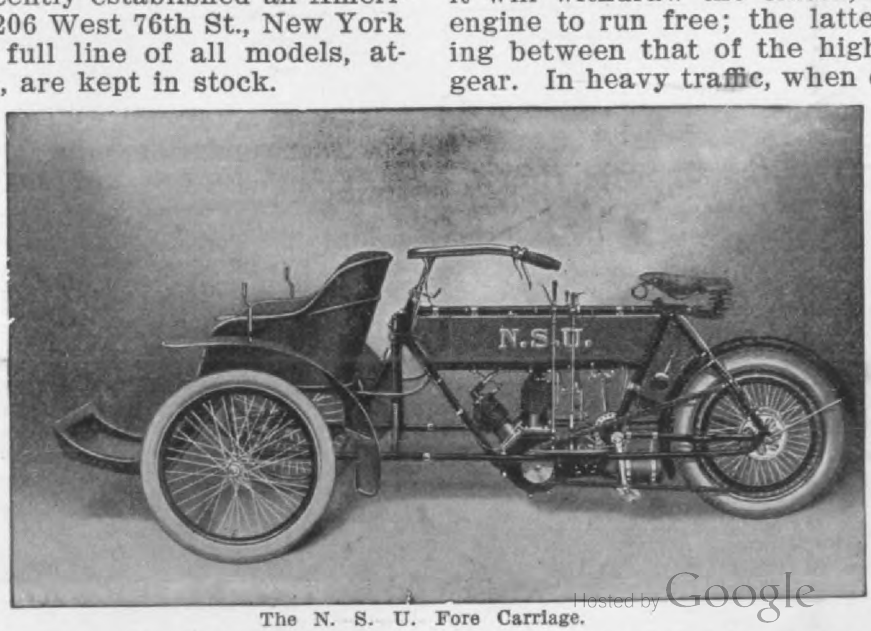
Features of the N. S. U. Motorcycles

Herewith are illustrated a fore carriage n an N. S. U. motorcycle, made by the N. S. U. Cycle and Motor Co., London, Eng., which recently established an Ameriian branch at 206 West 76th St., New York City, where a full line of all models, atachments, etc., are kept in stock.

brackets, clips, bolts and nuts for at ing. The N. S. U. side car is simila the fore carriage with the exception o method of mounting.

The concern also makes a two-s gear which is of the sun and planet in which several small spur wheels they slide into slots in a band that is between and in mesh with a large i nally-toothed ring and a small extern toothed wheel, so that the holding o leasing of the centre wheel, the intern toothed ring or the ring holding the i mediate wheels alternately gives the n sary changes in gear. The low gea obtained by holding the central wheel and driving the internally-toothed first to the motor axle, thus driving th termediate wheels, fixed to the belt ley, round the central wheel at a spee per cent. less than the speed of the m

The change of speed is effected by m of a rod with a handle which is clam to the top tube of the motorcycle. handle when turned to the left bring high or normal gear into action an lows a direct drive after the maner o ordinary pulley. When turned from high-gear position to the extreme right low gear is obtained. If the hand turned midway between the two posi it will withdraw the clutch, and allow engine to run free; the latter positio ing between that of the high and the gear. In heavy traffic, when driving o



The N. S. U. Fore Carriage.

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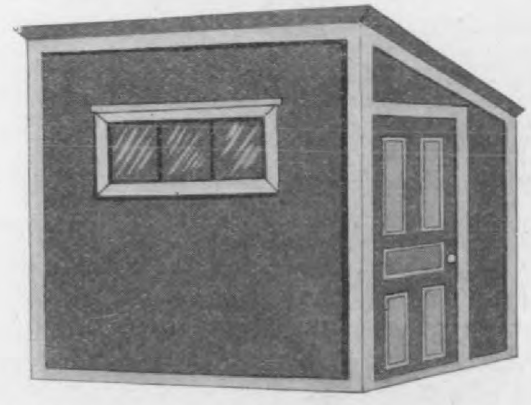
the magneto, but is very strongly made. is capable of a speed of 30 miles per ır. A Simms Bosch high-tension mag- o is used for furnishing the ignition rent. The cylinder bore is 62 mm. and stroke 70 mm. A round belt transmits power to the rear wheel.

e N. S. U. 1¼ H. P. Single Cylinder Motor Cycle.

The frame is 23 in. high, the wheels are in. in diameter and are shod with 1¾- h Peter Union or Continental tires. sides the coaster brake on the rear eel a hand-operated band brade is also s. It is suitable to hold a single-piece ed. Wide mudguards are used. The oline capacity is 1 gallon. The equip- nt includes a metal tool case and set of ls.

he "Chicago" Portable Motorcycle House

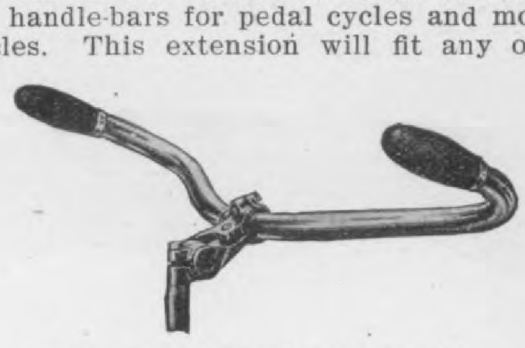
The Chicago Portable House Co., 4724- 4 Shields Ave., Chicago, Ill., builders portable garages and cottages, realizing demand for a portable motorcycle ıse, have designed the building illus- ted herewith.



vided on one side. A regular panel do with rim lock is fitted. The building primed with one coat of light paint the outside.

The "Echo" Extension Handle-Bar

Echo Co., Young Street, Tonawanda, Y., are on the market with an extensi for handle-bars for pedal cycles and mo cycles. This extension will fit any or



The "Echo" Extension Handle-Bar.

nary standard handle-bar and, when us allows any position of the bar from iow drop to a high upright position. is claimed to be strong, neat, simple a convenient. The list price is $1.30; or may be had with bar complete for $2. Discounts are given the trade.

"Persons" Motorcycle Tool Kit an V-Belt Fastener

The Persons Manufacturing Co., Worc ter, Mass., manufacturer of the well-kno Persons motor saddle, has recently add two new products to its line, namely, motorcycle tool kit and a V-belt fasten both of which are here illustrated.

"Persons" Motorcycle Tool Kit.

The tool kit is made of full-weight c sole leather, the front, bottom, back, and flap all being one piece. The ends double hand stitched in with waxed fl

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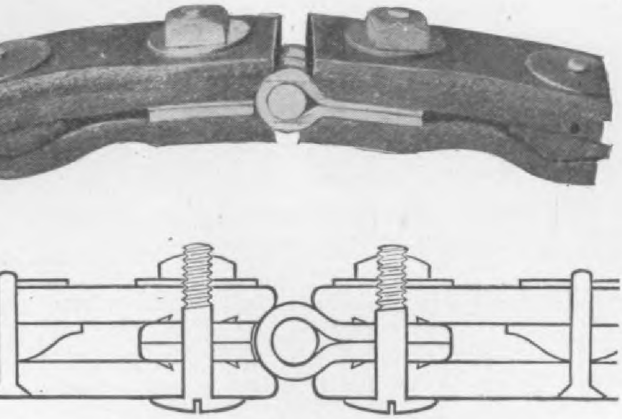
ose, and the kit to slip from its place.

A special feature of the kit is that it will o on the top tube of any motorcycle in hich the tank is carried below the top ube, without its being necessary to en- rely remove the tank in order to get the ollars attached.

The retail price is $2.25, but for thirty ays the Persons Manufacturing Co. will end one of the kits by express prepaid to ny user upon receipt of money order for 2.00.



"Persons" Fastener for V-Belts.

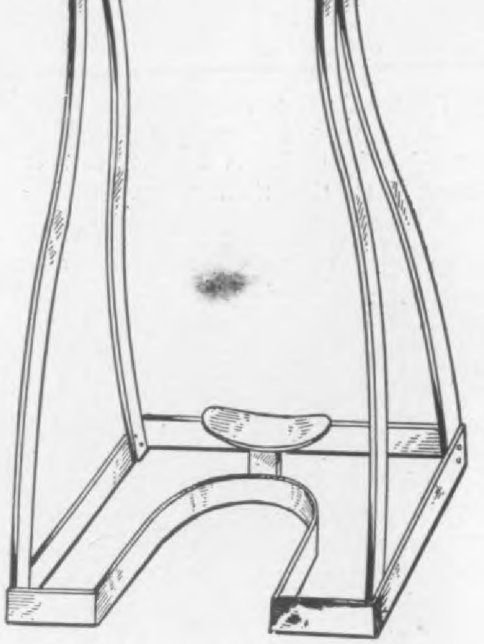
The Persons belt fastener is designed articularly for V-shaped belts of two or ore ply. It is constructed so that the nd of the belts can be brought up snug gainst the axis of the hinge, keeping the ontact surface of the belt to the highest ossible degree of efficiency. The pin or xle of the hinge is not a straight rod as ight be imagined, but has an increased iameter in the middle, thus evenly dis- ributing the wear of the butte and at the ame time without riveting the ends. The olts are machined from a special bar steel ⅛-inch in diameter.

The fasteners are provided with large, eavily copper plated steel washers to bring e full surface of the belt in contact with e pointed offsets on the faces of the inges, thus evenly distributing the strain n the leather. A sample fastener will be ailed to any rider for 22 cents, while a iscount is given the trade.

"Capitol" Motorcycle Specialties

Several attractive sundries are offered e cycle trade by Capitol Specialty Co., 65-469 Madison Ave., Albany, N. Y., in- luding a combination stand and luggage arrier, a tool box, a chain idler, a spoke nd tire protector and a reserve pedal.

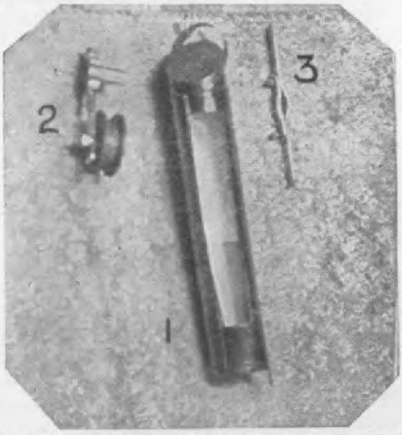
The stand is made of flat metal strips



The "Capitol" Motorcycle Stand.

the Indian. Of course, the device is nished for all makes of motorcycle pedal cycles. It is held up in running tion by a thumb nut and bolt, and it very simple matter to swing it under machine when needed as a stand. I is $5.

The "Capitol" tool box is of tubular f made of tin, and clamps on the top of frame tube that runs from the hea the crank hanger. It consists of two m bers, one telescoping within the other a half turn of the outer member open closes it. It has a fair capacity, its di sions being 16 in. long and 2½ in. in d eter. Price is $2.50.



(1) "Capitol" Tool Box for Motorcycles; (2) Chain I (3) Spoke Protector.

Their chain idlers are furnished t all makes of chain-driven machines, lists at $2.25, nickeled. The spoke and protector is for the purpose of preve the chain from cutting spokes. It con of two flat rods arranged to clamp on

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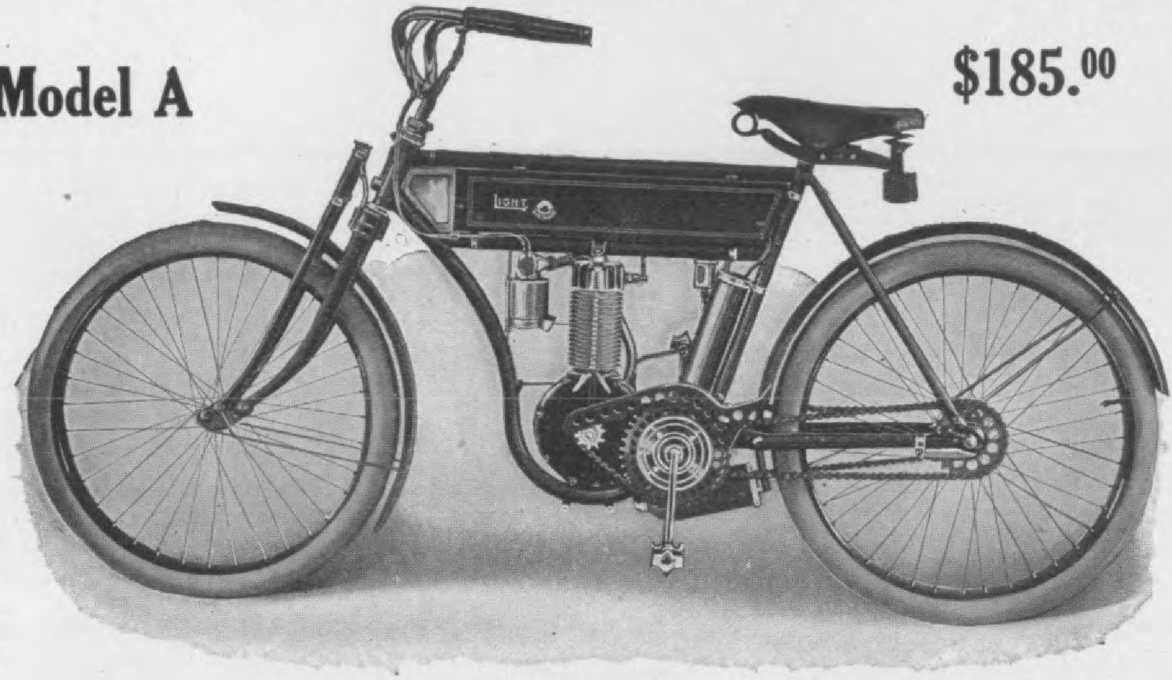
"LIGHT"

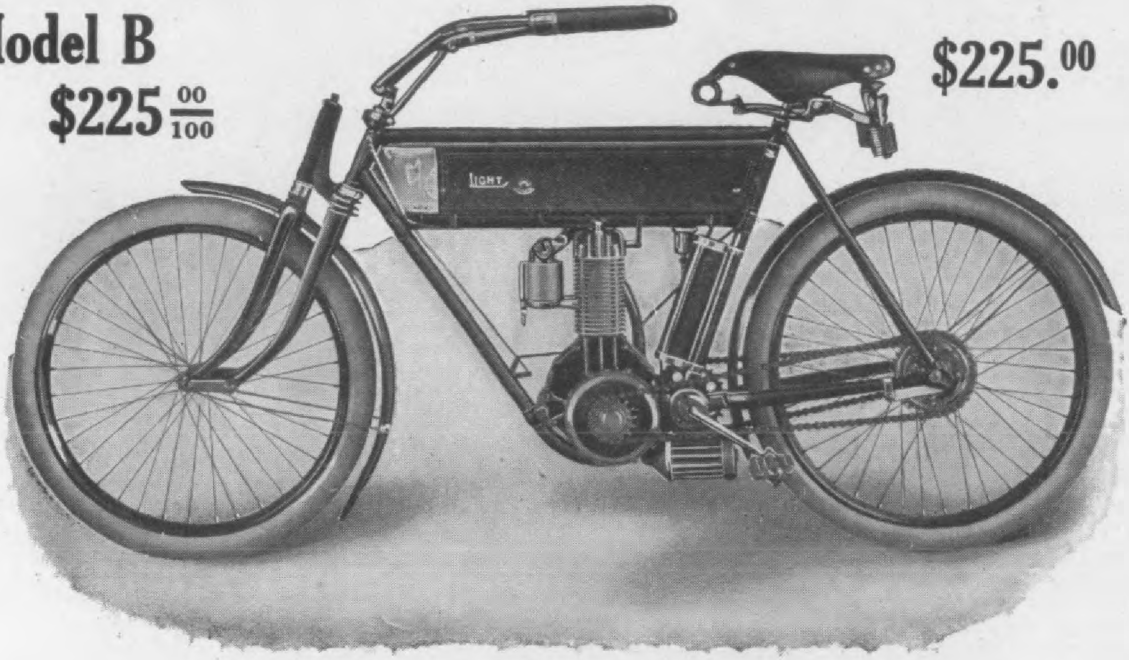
That Cannot be Hidden Under a Bushel

Model A **$185.00**



Model B **$225.00**

$225 $\frac{00}{100}$



THE

LIGHT MFG. & FOUNDRY CO.

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Answers to Motor Cycle Questions

BY CHAS. H. METZ

HOW TO INSTALL SEPARATE IGNITION SYSTEM.

DEPOT COMMISSARY, MANILA, P. I

As an interested reader and subscriber to your valued Journal in these Islands, I would like to get straightened out on the following:

How can two systems of ignition be accomplished on a "Brown" (English) twin cylinder motorcycle? It has mechanically operated inlet and exhaust valves and magneto gear driven. A contact breaker is necessary for batteries and the gears driving magneto are on that side. Another plug may be screwed in cylinder over exhaust valve. I desire magneto and battery ignition, as in case of a breakdownof either system, the other may be used.

A brief description of what is necessary in attaching a contact breaker complete and also have the gears for driving magneto, will be appreciated.

Mechanically operated inlet valves certainly do surpass automatic ones on motorcycles, both for high and low speeds, the latter especially. Some of the American makers should take it up. It adds no complication.

Trusting to hear from you through your valued Journal, and thanking you in advance, I am. JNO. F. DORNEY, JR.

We are pleased to hear from a brother Motorcyclist from away off in our Pacific Island possessions. We would appreciate indeed a letter from him telling us more about Motorcycling in the Phillippines, the road conditions, kind of machines used, etc. Our American manufacturers, I am sure, would be interested to know what conditions are to be met to secure the trade in the motor line, which now is open to them.

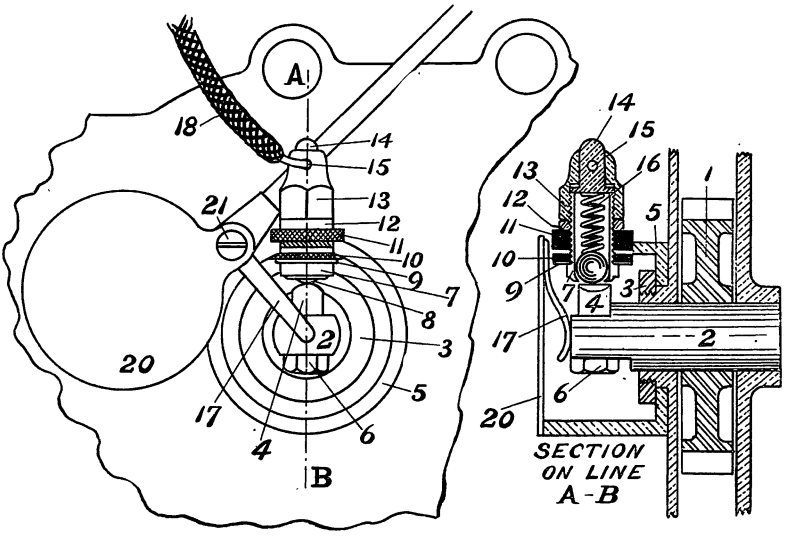
We have heard it argued that the Islands were going to be a source of trouble to us, but did not expect it to strike so near home. The Brown being an English make we have not the detailed imformation at hand to advise you definitely how to install a separate ignition system in conjunction with the magneto. However, we take it that the timing gear arrangement on the twin is similar to the single cylinder so we will illustrate a device which may answer your purpose.

The gear which drives the motor shaft undoubtedly revolves at one-half crank shaft speed so you could use a continuation of this shaft for operating the spark timer, but it would be better to use the intermediate gear, as it would allow the removal of magneto in case of repair. This gear, of course, would need to be of the same size as the half time gear and should be extended through the cover in the manner shown. The ball contact device which we have illustrated has proven itself very reliable We might suggest, if you expect to use a dry cell battery, that you arrange for four cells, using two in circuit with a switch to alternate with the other two. In this manner you will get fully double the mileage with a very little sacrifice in speed.

The accompanying drawing represents a side view and section of motor and case in part. The spark timer case is shown with cover open for inspection. The shaft 2 is flattened and drilled near its end to permit a contact bolt 4 to be clamped in place. The shaft 2 is revolved by half time gear 1, causing the hardened bolt 4 to come in contact with hard steel ball 8 at each revolution of the shaft.

The contact with ball 8 completes the electrical circuit through spring 16 and plunger 14 by being connected with interruptor terminal 18 of the induction coil, and a spark is produced when the bolt 4 leaves contact with the ball 8.

The spark timer is made up of three principal parts: The shaft 2 has a bolt 4 clamped in place by nut 6, and is rotated by gear 1 keyed to shaft. The case 5 is held against the gear cover by nut 3 rotating on a projection of the gear cover. The case has a cover 20 held in place by screw 21. The ball contact is composed of a socket 7 into which a ball 8 is held by a spring 16 and plunger 14, these are also held in place by the cap nut 13. The ball contact is clamped to the case by means of a shoulder on socket 7 and nut 12 having insulated washers 10 and 11 to prevent electric current from short circuit except through wire 18. 17 is a contact spring pressing against end of shaft to insue a good ground connection of shaft 2



REVERSING MOTOR BY SPARK TIMING.

ST. LOUIS, MO.

Would you please tell me if a gear drive Indian Motorcycle can be reversed for a chain drive just by different timing. I have heard a new crank case is necessary on account of the different position of the cogs on the spark and exhaust cams. I am a subscriber. Hoping to see an answer in the next number. I am, Respectfully yours, T. J. MOSS.

The motor may be reversed by timing. Note the position when exhaust valve closes, also when spark takes place. Set the gears so that these operations will take place relatively in connection with the piston movement, when fly wheels are revolved in opposite direction.

Sometimes the exhaust valve cam is formed to cause a quick action in opening, and a slower one in closing. This may effect the running somewhat when motor is reversed, but usually the cam is made so it can be reversed. The same is also true in regard to the ignition cam.—C. H. M.

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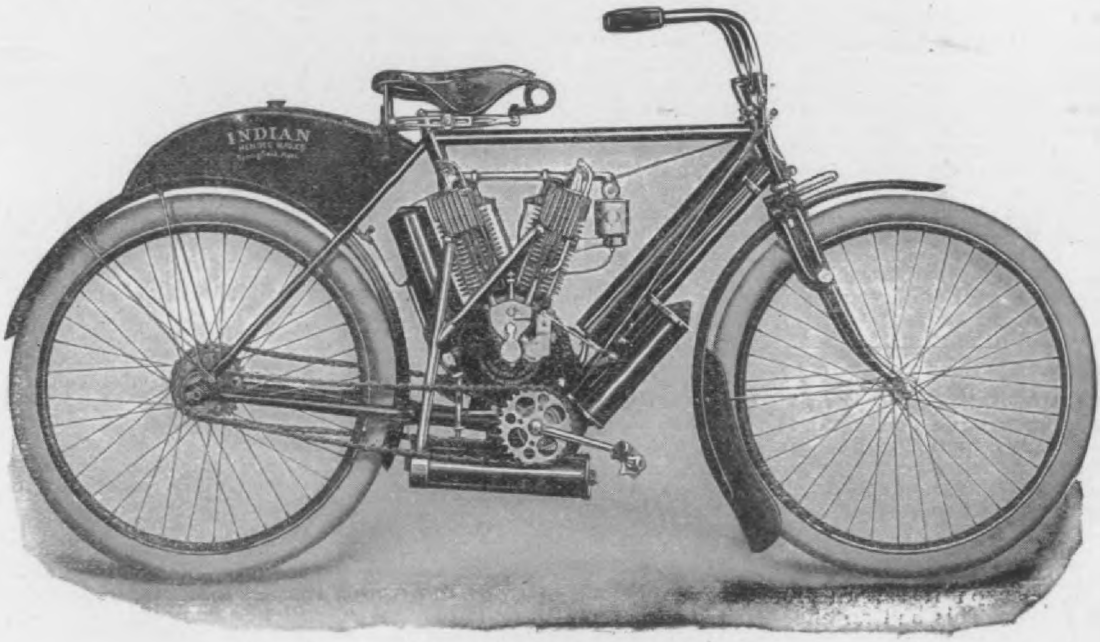
STILL WINNING
Records and Friends

The Indian

At Los Angeles, Feb. 22, the Twin Indian Broke World's Records Three Times

5 Miles in 5 Minutes, $5\frac{1}{5}$ Seconds.
5 Miles in 4 Minutes, $58\frac{1}{5}$ Seconds.
10 Miles in 10 Minutes, 2 Seconds.

ALL WORLD'S RECORDS, MADE ON A FLAT DIRT TRACK!!!



TWIN CYLINDER INDIAN

Another Winning:

On the Pasadena-Altadena Hill Climbing Course The TWIN CYLINDER INDIAN BEAT THE RECORD in 1 Minute, 17 Seconds. Over 60 miles an hour!

Best automobile time in this event was 1.35 for a 75 h. p. special machine.

A SECOND INDIAN TWIN EQUALLED this time in spite of delay from collision.

All Indians are Good Machines for both Dealer and Rider

WRITE AT ONCE FOR PARTICULARS

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WHERE IS THE TROUBLE?

PATERSON, N J.

Having read at different times the valuable information you give in your answers to motorcycle queries, I take the liberty of telling you my motorcycle troubles.

I have lately purchased a second-hand motorcycle of French construction called the "Diamant," which I thought could be put in good running order, but for some reason, not known to me, it will not work as it should.

It is a 2 H. P. machine with mechanically operated valves.

The intake valve is $1\frac{1}{16}$ in. in diameter at largest point, the exhaust $1\frac{1}{4}$ in., the bore $2\frac{3}{4}$ in., and the stroke is 3 inches.

The compression is good, also the spark. I at first thought the trouble was in the carburetor, so I put in a new Curtiss carburetor but obtained no better results. I can get things adjusted so it runs well in the stand at all different speeds but when taken on the road, it does not develop power enough to carry me up a slight grade, and sometimes when running at high speed in the stand it stops short without any apparent reason.

The feed pipe from the carburetor has a $\frac{5}{8}$in. hole and is 12 in. long.

Do you think it probable that it is not large enough to feed cylinder with enough mixture?—PETER THOMPSON.

Your trouble would not seem to be in the intake pipe although this could be $\frac{1}{8}$ larger to give best results. The intake and exhaust valves are in correct proportion, and if these lift, say $\frac{7}{32}$ for the exhaust and $\frac{1}{8}$ for the intake the trouble is not likely to be there. It is important that the valves seat themselves properly. They should have about $\frac{1}{32}$ in. clearance between stem and plunger when at lowest position. Have known of motors working in the manner you describe on account of valves not seating, there being only a very slight clearance between stem and plunger when the engine was cold. The expansion when heated up caused the plunger and stem to lengthen sufficiently to prevent the valve from seating. The trouble might also be in a choked muffler.

There are so many causes for loss of power that it is impossible to locate it definitely from the description given, so the best way is to first be certain what the proper working conditions of such a motor are, as given by the makers, then trace out each thoroughly and you are pretty sure to locate the difficulty. We shall be glad to h ar from you if you locate the trouble. —C. H. M.

EXPERIENCES WITH PICRIC ACID.

OAKLAND, CAL.

Would like to give your readers the benefit of my experience with picric acid as used to increase the power of gasoline motors.

The druggist of whom I procured it said it was very dangerous, being explosive by concussion or heat.

I first put a piece the size of a grain of wheat on an iron block and dropped, by means of a string, a $2\frac{1}{4}$ lb hammer on it several times, standing some distance away. This had no effect so took the hammer and struck it violently, with no effect, so concluded it was not so dangerous after all. I next put about $\frac{1}{4}$ teaspoonful in about 2 oz. gasoline and let it stand 15 or 20 minutes stirring frequently and found it only slightly soluble. On igniting this it burned, so far as I could see, just as if it were gasoline alone. Upon examination I found the acid crystals had been entirely consumed leaving no residue. I then concluded it was safe to try it on my motorcycle so I put one tablespoonful into 3 quarts of gasoline and let it stand about one week shaking occasionally. Not more than one-half of the acid dissolved giving the gasoline a yellow color and forming a yellow precipitate. Upon trial I found the engine which is 4-cycle 2 x $2\frac{1}{2}$, gave noticeably more power probably about 10 or 15%. Wherever a drop of gasoline was spilled a yellow deposit (the acid crystals) was left.

I made inquiry of one of the professors in chemistry at the University of California, as to the nature of Picric Acid and he said that, "lyddite" used by the British in the Boer War was nothing more or less than Picric Acid and we all know how treacherous it proved.

He said, it was only slightly soluble in gasoline, kerosene or alcohol but readily soluble in water. When dissolved in the above fuels it is probaoly less explosive than in crystals, but the danger lies in evaporation of the solution leaving the dry crystals which might be easily exploded and if this happened near the opening of the gasoline tank disaster could readily follow. It is like nitro-glycerine and some other explosives. Slight concussion may set it off under some conditions and under others it might take considerable.

So I feel thankful I did not get my head blown off in my experiments. E. R. NASH.

PROPORTIONS FOR RACER.

PHILA. PA.

I intend building a speedy and powerful motorcycle engine and come to you for help. Engine is to be $3\frac{1}{4}$ in. bore $3\frac{3}{4}$ in. stroke, which I think will give me 4 horse power. What size valves should I use and what compression space should there be? Will 10 in. fly-wheels be large enough? What can I gear this machine up to. PAUL JONES.

Make exhaust valve $1\frac{1}{2}$ in. diameter with $\frac{1}{4}$ in. lift. Inlet valve $1\frac{3}{8}$ in. with $\frac{5}{32}$ in. lift. Compression space 30% of piston displacement. This would be rather high compression for ordinary use, but for power and speed high compression is required. 10 in. fly-wheels with 1 in. face will be ample. Machine if light will stand 3 to 1 gear for racing. C. H M.

INTERNAL VS. SPUR GEAR PLANETARIES

SAN FRANCISCO, CAL.

Will you kindly answer the following questions in the mechanical and technical department of your valuable journal?

1. Why have manufacturers discarded the internally cut gear in favor of the spur gear in planetary gear-sets, notwithstanding the greater simplicity of the former?
2. Which do you think most suitable to use in a motorcycle two speed gear?
3. What is a good book of formulæ for gas-engine construction and where can same be obtained?—D. T. RYAN.

Internal gears are considered more costly than the smaller spurs and this is one reason for their abandonment. I think there are some patents that interfere with the use of the internal in certain arrangements and this may have had something to do with the use of the other devices. Again some makers have taken up some other means of changing speeds and so have abandoned the form they used without in any way condemning it or giving preference to any other form of planetary.

I have always preferred the internal gear because I got a device that was narrower and yet had large pinions and great strength and these are all valuable features in a motor cycle.

H. H. Thorpe & Co., 1256 Michigan Avenue, Chicago, Illinois, will hereafter market the entire output of Armac motorcycles.

I. Whipple, of Chicago, Ill., has been chosen to act as Western distributor by the Harburg Tire Co., for the Harburg motorcycle tire made in Germany.

The Hendee Mfg. Co., manufacturer of the Indian motorcycle, has established a branch depot at 1251 Michigan Ave., Chicago. The building is a two-story structure, 35 x 125 ft., and is located directly opposite the new Southern Hotel and in the heart of the automobile district.

The Royal Motor Works, Worcester, Mass., announce that they have secured Eveleth V. Hill, formerly with the Worcester Pressed Steel Co., to act in the capacity of sales manager of their product.

As a result of strong and convincing testimonials received by the Kansas City, (Mo.), Police Commissioners from the Chiefs of Police in St. Louis and New York, regarding the advantage of using motorcycles in the police department, the Kansas City commissioners have decided to buy three machines.

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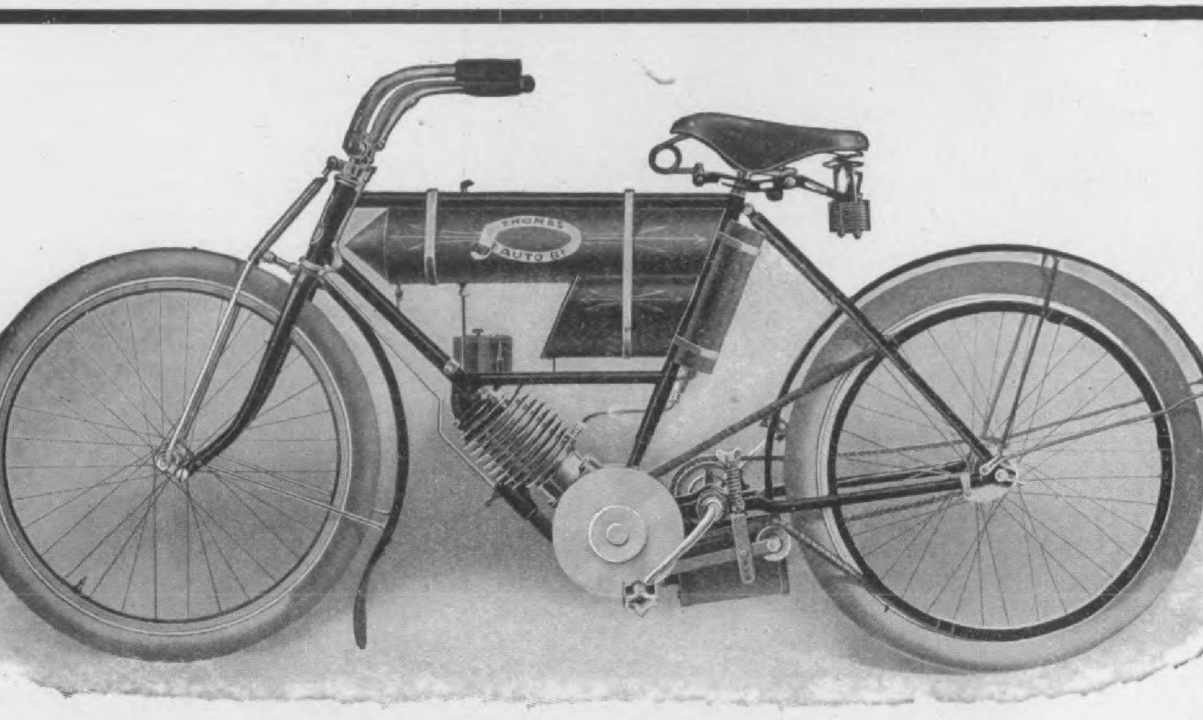
THE AUTO-BI



A Successful Motor Cycle

Should have plenty of power to climb hills easily.

Should have a practical (tried and tested by the public) method of transmitting pow n engine to rear wheel.

Should have a grip control which will not tire the wrists by hanging on to a loose gri yet be under the instant control of the rider.

Should be equipped with an auxiliary exhaust port to keep motor cool, and add ver and speed, by getting rid of exhaust gases quickly.

Should have motor hung as near the center of machine as possible and very low to ma chine steer easily and so the rider does not have to *straddle a hot motor*. Motor should ced as near horizontal as possible so that explosive force and vibration is exerted on a li h momentum of machine and rider, thus doing away with vibration.

Motor should have solid forged crank shaft *hardened and ground* to *size* (all automobil one piece shafts ; why ?) inside of motor should be easily accessible without removi tor from frame. Cases split horizontally, as in the Auto-Bi, allow this.

Truss spring cushion forks are indispensable for safety and comfort.

It should be equipped with flusher valve for easy starting at all times.

It should have ample tank capacity for touring purposes.

It should present a graceful pleasing appearance with each part in harmony and bu the particular purpose to which it is put.

A SUCCESSFUL AGENT

Will insist on securing a motorcycle which includes each of the above features. Tl l assure him of a machine which will be easily sold, and will stay sold, and a motorcyc ch he can recommend and build up a business with.

A SATISFIED CUSTOMER

The buyer of the 1908 Auto-Bi will get a machine that is guaranteed for the year. It e, comfortable, powerful, speedy, can be easily controlled by the novice, and is a strict

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It's the Machine

which gives such unqualified satisfaction to its owners by reason of the fact that it "never fails" at the severest test or on the tour.

We will send you full particulars with pleasure.

N. S. U. Motor Co.
206 W. 76th st., New York.

It's the Machine—

the excellent qualities of which enable its riders to secure success in open competitions all over the world.

Mr. J. D. Hamilton, the well-known motor cyclist, who successfully competed in the British A.C.C. Trials with an N. S. U., writes:

"In the last competition I found it (the two speed gear) invaluable, and it was only by letting in the second speed that I managed to negotiate the horses and dogs at the foot of Birdlip, and get to the top without dismounting. The machine and two-speed gear I used are the same as I took over the Juras and Alps into Italy and this, coupled with the fact that I did not lose a single mark for reliability in the last severe trials, is sufficient indication of their excellence.'

N. S. U.

The "Rough Rider" Grip

Hartford Rubber Wks. Co., Hartford, onn., are furnishing the motorcycle trade new motorcycle handle-bar grip called e "Rough Rider." It is made on the same ies as the old bicycle handle-bar grip, t is elongated so that it extends a conderable distance beyond the handle

The "Rough Rider" Motorcycle Grip.

pair. It is said to have met with the arty approval of motorcycle riders thrut the country and is already widely used. oper, thus relieving the rider's wrists considerable of the jar and jolt of the dinary short handle. It is made of a e quality of rubber and retails for $2.00

The "Peerless—V" Belt

Gibs Belt Company, 1459-63 Michigan enue, Chicago, Ill., has placed on the arket a new type of belt for motor cycles. means of a bolt that passes thru th A combination of the advantages of b chain and belt drives is claimed for t construction for the chain prevents stre ing while at the same time not detr ing from the flexibility of the drive. T belt is run slack and will run on v short centers.

In Riverside, California, an ordinance been put in effect forbidding the use of cut-out, under penalty of a fine not exceed $200. The same law also set a speed o miles an hour in the business district of city, 10 miles in the residential section, 15 miles elsewhere.

$40 MOTOR CYCLE

We have the largest line of N and Used Motor Cycles, P

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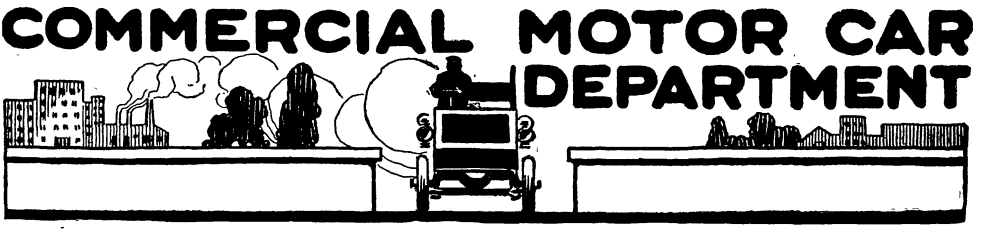

Experience of Commercial Motor Car Users

Gas Company Uses Both Motor Cars and Horse Wagons

Springfield Gas Light Co., Springfield, Mass., use four motor cars, all gasoline machines, in addition to a number of horse drawn vehicles including dump carts, drays and business wagons. This company considers it advantageous to employ both classes of vehicles in their business and finds comparison of the two methods of transportation difficult in view of the fact that each method seems to have its own peculiar advantages in its line of business. Generally speaking, it uses the horse drawn vehicles for nearby hauls and the motor cars for long distance work. Two Knox machines are used, one a single cylinder car with a carrying capacity of about 1,800 pounds, and the other a 2-cylinder car of 2,500 pounds capacity. These two cars are used in general jobbing work around town. An Atlas 3-ton truck is used for hauling pipe, coke and heavy material used in this company's business and a Cadillac single cylinder runabout is used generally. The company is unable to state how many horses have been displaced by the motor cars as it has added to both horse and car equipments.

The ignition system seems to have been the chief source of trouble in this concern's experience and it suggests as the most needed improvement better batteries and battery connections and spark plugs that will not soot.

Good wages are paid by this company and only good men hired; hence no trouble has been experienced on this score. The machines have been stored in a public garage but the company contemplates the erection of a garage of its own and feels that this arrangement will be advantageous.

Detroit's Municipal Automobiles

Motor cars are used in several municipal departments of the city of Detroit, Mich., and a recent report of the finance committee relative to the expense of maintaining these cars is of interest. This report covers the six months from July 1, 1907, to January 1, 1908, and the figures for three departments having two cars each is as follows:

	Public works	School board	Parks boul.
Chauffeurs	$366.00	$399.00	$360.00
Gasoline	76.88	84.02	132.44
Lubricants, etc.	39.01	22.60	14.04
Repairs, renewals	281.26	172.20	619.53
Storage and care	132.00	165.80	.....
Insurance	.....	62.19	.....
Totals	$895.15	$905.81	$1,117.01

Altho charges of extravagance have been made against the school board in reference to the expense of maintaining its cars the report shows that the school board's machines are operated more cheaply than those of the department of public works, if the item of insurance is omitted, and that they cost much less than those of the parks and boulevards department, even though the latter do not run up bills for storage and insurance.

The fire department has three machines which it operates for $1,060.61. The fire department, however, pays nothing for storage, thus saving about $200, nor is the item of insurance included in the total. The school board automobiles thus show up well in comparison with those of the fire department.

The board of health and the water commission each has one machine, costing respectively $395.30 and $464 for the half year. In neither case does this include the service of a chauffeur, nor, in the case of the water commission, does it include storage or insurance.

The Colville & Metaline Transportation Company of Colville, Washington, has recently started an automobile passenger and freight stage line between Metaline and Colville, using two 40 H. P. cars, each carrying twelve passengers, and a four-ton freight truck. Every two days a round trip will be made, thus giving daily service in both directions and connections will be made at Colville with the Spokane Falls and Northern Railroad to Spokane, eighty-seven miles. This arrangement will cut the time of the trip from thirty hours to seven and a half hours and make a route 147 miles shorter than formerly. The present route from Metaline to Colville by boat and rail is 187 miles, while by the automobile stage line it is 40 miles.

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The Gifford-Pettit Manufacturing Company, 17 Devon Avenue, Chicago, Ill., U. S. A., as organized in May, 1907, to exploit com-ercial cars designed by Mr. A. F. Feldt, who s been between eight and nine years with otor cars in responsible positions and had eviously designed some passenger vehicles.

The first Gifford-Pettit truck, 3-tons paying-ad, was completed in August, 1907, has been oroughly tried out on the road, and a truck ut little changed from the first model, was own at Tattersall's, Chicago, December, 1907 hibition, as the Gifford-Pettit 1908 offering.

NOTABLE FEATURES.

The Gifford-Pettit truck is carefully de-gned by an experienced constructor, and is ell built from well selected materials. The rength is everywhere ample and the four-linder motor, 35 H. P., gives abundant ower. The sliding gear is of the simplest pe, progressive gear-shift, three forward crank and then rely upon the jump-spark start. The hardened steel change gears 5, d. p., $1\frac{5}{8}$ ins.face. The bevel gear coun shaft drive is also of hardened steel, and is 4, d. p. The line and side shafts of the cha gear are in plain phosphor bronze bearing The water-circulation is by a two-pinion pu No fan is used, as the water jackets are large and the water circulation is rapid, abundant radiator surface.

A special feature of the ignition is Feldt hammer-spark action the novelt which lies in the time regulation, w differs generically from anything previo noted by the writer. The hammer-sparl attracting much attention from Amer car-motor designers at the present time, bec it is believed that the large spark-vol produced by the conductor-break fa rapidity of combustion and considerably creases the power of a motor over that ob

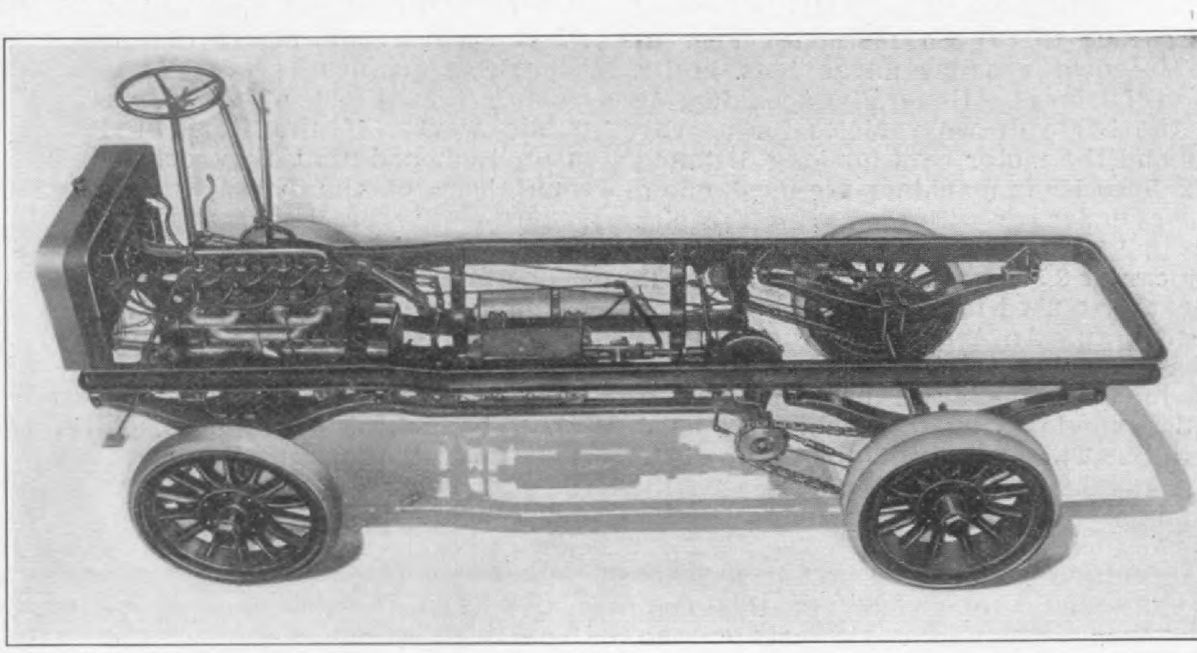

Fig. 1. Gifford-Pettit 3-tons paying-load truck. On fair roads can carry 5-ton loads. Wheel-base, 120 ins. Gau s. front, 62 ins. rear, double face solid tires, 36x5 ins. Rear, 36x$3\frac{1}{2}$ ins. "dual", two faces, 8 ins. over all. Moto linders, $4\frac{3}{4}$x6 ins., 35 H. P., 4-cycle, water-cooled, double ignition, jump spark plugs and storage battery for self-startin ms-Bosch low-tension magneto and hammer spark for ordinary service. Progressive sliding gear, three forward spee reverse with bevel gear and 8-pinion spur balance gear to divided counter-shaft, with side chains to rear wheels. Ex d internal rear hub drum brakes and a brake-drum on the counter-shaft. Weight about 5000 lbs. Price, regular 500.00, including 3 lamps, horn and tools.

peeds and a reverse, direct on high-speed ith no change gears engaged. The motive ssembly is on a deeply-dropped sub-frame, ne universal slip-joint is placed in the line haft between the clutch and gear-box, and nother between the gear-box and the counter-haft. The addition of the storage batteries, our-coil box and jump-spark plugs to the able with the jump-spark, other condi the same.

Feldt adds four hammer-spark cams t intake cam-shaft, making a total of 8 on the intake side. The four intake- cams are of usual form and construction. four hammer-spark cams are circular. spark-action lifters are directly over

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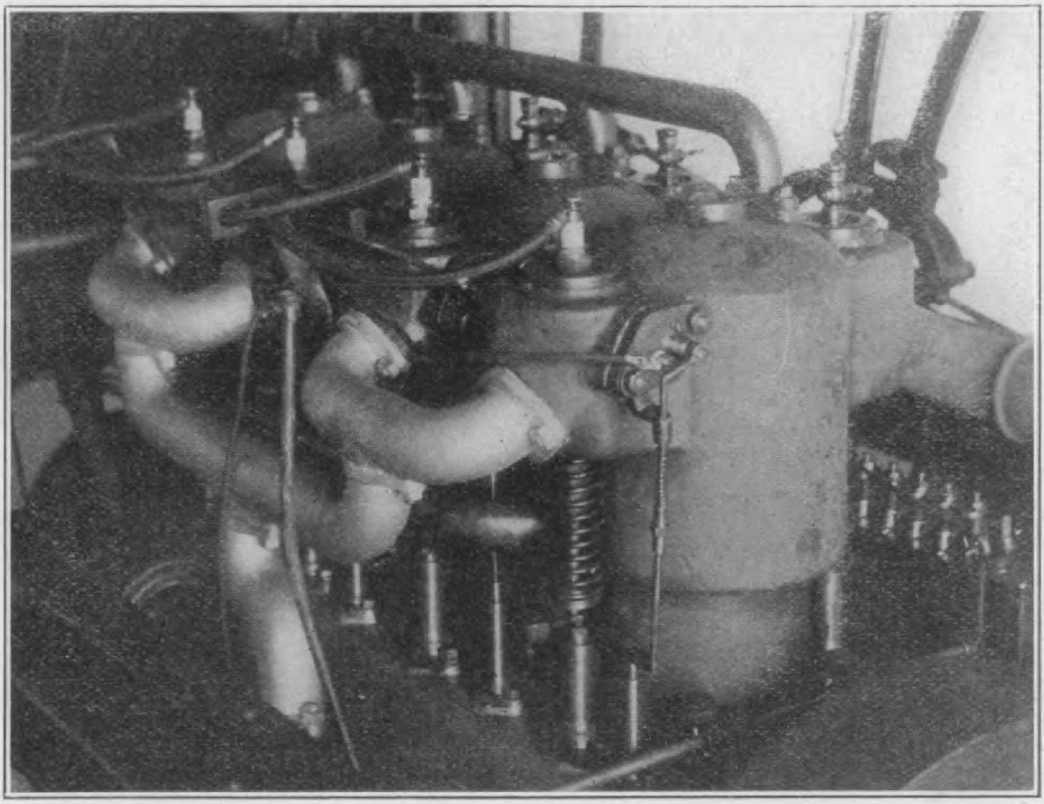
of crank-shaft angular advance, the cir-
ferential extent of the lune-shaped de-
sions in the perimeter of the otherwise
ular spark-cams requiring only one half
many degrees of circumferential extent,
ause the crank-shaft makes two turns to
cam-shaft turn.

Vith this construction it is easy to link
spark-rocker to the timer-rocker and
nake the one spark-r gulating lever contro
n the jump-spa k and hammer-spark timing.

of the front springs. The struts are $1\frac{7}{8}$ c
with hexagon turn-buckles, check-nut retain
near the front eye. The countershaft positi
is fixed and the rear axle is moved in t
spring-clips for chain adjustment, which
seldom required after the first assembling.

THE CHASSIS FRAME.

The frame is of channel steel, $5x1\frac{7}{8}$ in
6 lbs. to the foot, placed with the chann
outside, leaving the inside smooth for t
sub-frame and cross-girt placing. The chass



. 2. Left side of Gifford-Pettit Motor; cylinders cast separately, valves on opposite sides, valves are steel forgings w
s and stems integral. Cylinders are finished by reaming. The peculiar igniter mechanism described in the text is sho
e rear cylinder.

THE AXLES AND SPRINGS.

he front axle is an I-section steel drop-
ing, $4\frac{1}{2}x2\frac{1}{2}$ ins.; the web is $\frac{1}{2}$ in. thick and
ribs are $\frac{5}{8}$. The front axle with the steering
s weighs 148 lbs. All wheels are on Timken
ers. The yoke-opening is 7 ins. The stub-
pins are $1\frac{1}{4}$ ins. dia., hardened and ground,
in hardened and ground bushes and the
is carried on ball thrust-bearings. The
ring is by a hardened worm and sector,
adjustment, with three turns of the hand-
el for the full sweep of the front wheels.
rear axle is a solid steel forging, $2\frac{1}{2}$ ins.
are. The spring-perches are steel castings,
nped on the rear-axle body.

he front springs are 48x3 ins., 14 leaves,

frame is 192 ins. long, front spring-eye to t
rear end, and is 36 ins. wide in front for 60 i
and 40 ins. wide the rest of the way.

The sub-frame is channel steel $3x1\frac{3}{4}$ in
dropt $13\frac{1}{2}$ ins. and 12 ins. below the top of t
frame rides. The sub-frame is 25 ins. wi
by 108 ins long. The motor base is dro
12 ins. below the frame top and the gear b
and counter shaft are dropt $13\frac{1}{2}$ ins. T
counter-shaft is $1\frac{1}{2}$ ins. dia., in plain bron
bushes, with ball-thrust bearings each side
the balance gear. The chain is $1\frac{1}{2}$ ins. pitc
$\frac{3}{4}$ wide, $\frac{7}{8}$ rollers, 20 teeth and 42 teeth in t
sprockets. The rear-hub sprockets and bra
drums are integral steel castings.

THE BRAKE..

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ade with a view to high speed and efficiency. he valves are all alike, steel forgings, heads nd stems integral, valve-heads $2\frac{1}{4}$ ins. dia· 5 deg., angles, 2 ins. port diameter, with $\frac{3}{8}$ ntake lift and $\frac{1}{2}$ in. exhaust lift.

The cylinders are cast in single units, symetcal, valves on both sides and are reamed, nly. The pistons are finished by roughing in ne lathe, then heating so they can be seen in ne dark and packing in sand to cool. Then ney are turned to size and finished by grinding thousandths under size, whole length, cylinrical. There are 3 eccentric rings above the istons, $\frac{3}{8}$ flat-lap. The pistons are relieved t the pin and again below the pin.

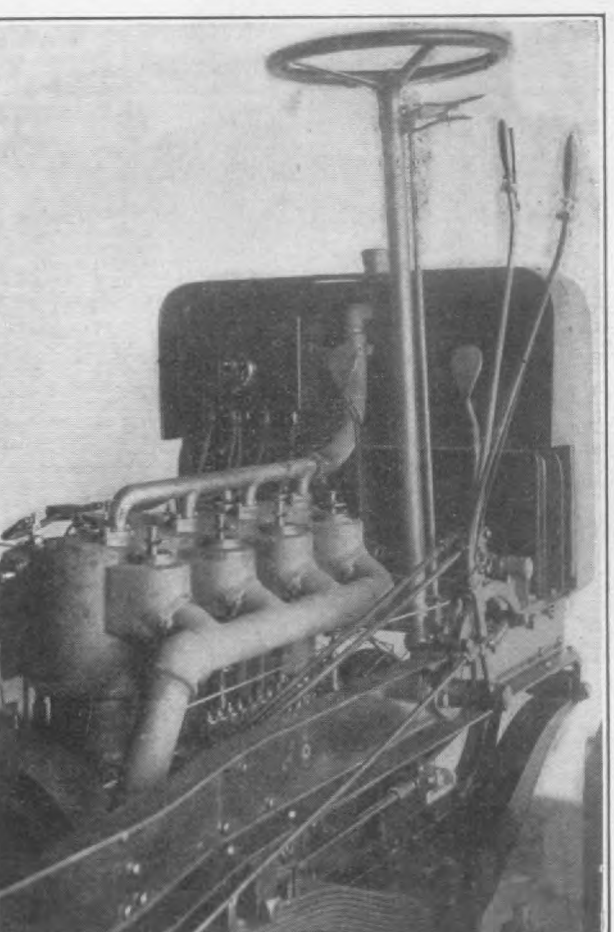

Fig. 3. Right side of the forward end of Gifford-Pettit hassis, showing the exhaust side of the motor, the rear of e dash which is formed by the back of the radiator, and the ontrol levers on the column are also shown. The spark lever dvances the spark time of both ignition systems. The gear ifts and brakes are operated in the usual manner.

The pistons pin are soft tool-steel, 1 in. dia., ith $\frac{1}{2}$ in. holes to within $\frac{7}{8}$ of the locking end, hole through this $\frac{7}{8}$ pin-length. The piston-in retention is by a cross-wise spring bolt

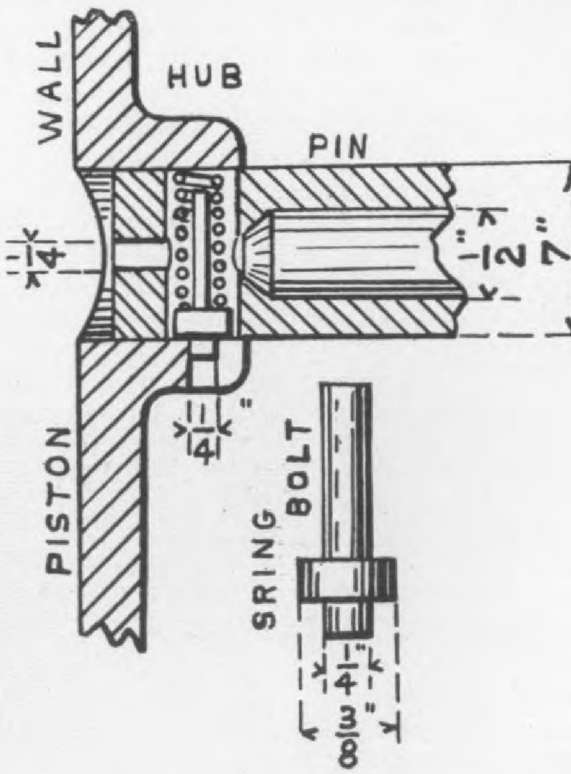

Fig. 4. Gifford-Pettit piston pin retention. A great different forms of retainers are now used to hold pistor in trunk-pistons, some of which are costly and unsatisfa The spring-bolt retention here shown is an adaptat French practice. It is new to the writer, and it is efficient and readily assembled and disassembled. The coiled spring pushes the end of the shouldered sprin into the $\frac{1}{4}$ hole in the piston hub. To remove the pin th is pushed inward. The bolt is also pushed inward in a bling. The $\frac{3}{8}$ dia. cross hole in the pin is not drilled through; this leaves a spring retaining ledge at the top the pin cross-hole which takes the bolt and spring.

sandths thick respectively, giving by binations, 5, 10, 11, 14, 16, 19, 22, 25, 28, 30 thousandths liner thickness without rer ing metal. The top ends of the rods bronze bushes forced into them.

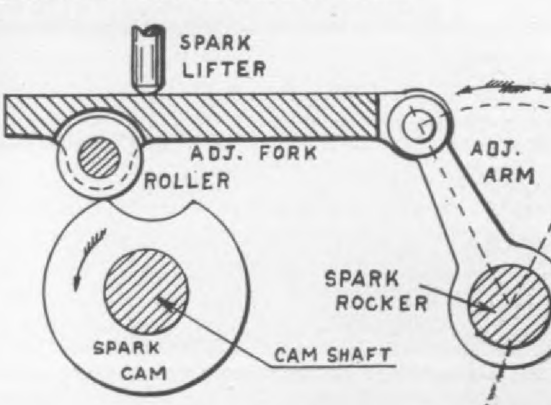

Fig. 5. Diagram of Gifford-Pettit hammer-spark regulation. Four spark cams are fixed to the cam-sh suitable locations, and are ridden by rollers in forks j to four spark adjusting arms fixed to the spark rock as shown in the sketch, the spark-rocker being move

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to the change-gear box. The crank-box oil-basin a e aluminum alloy. The three k-shaft bearings are in bronze boxes split. oil-po l depth is governed by open stand .

by a concentric rock shaft and rocking sleev at the right of the steering column, with hori zontal levers, rachet retained. The one leve regulates both the jump spark and the hamme spark time, as described.

1908 Homer Auto Truck

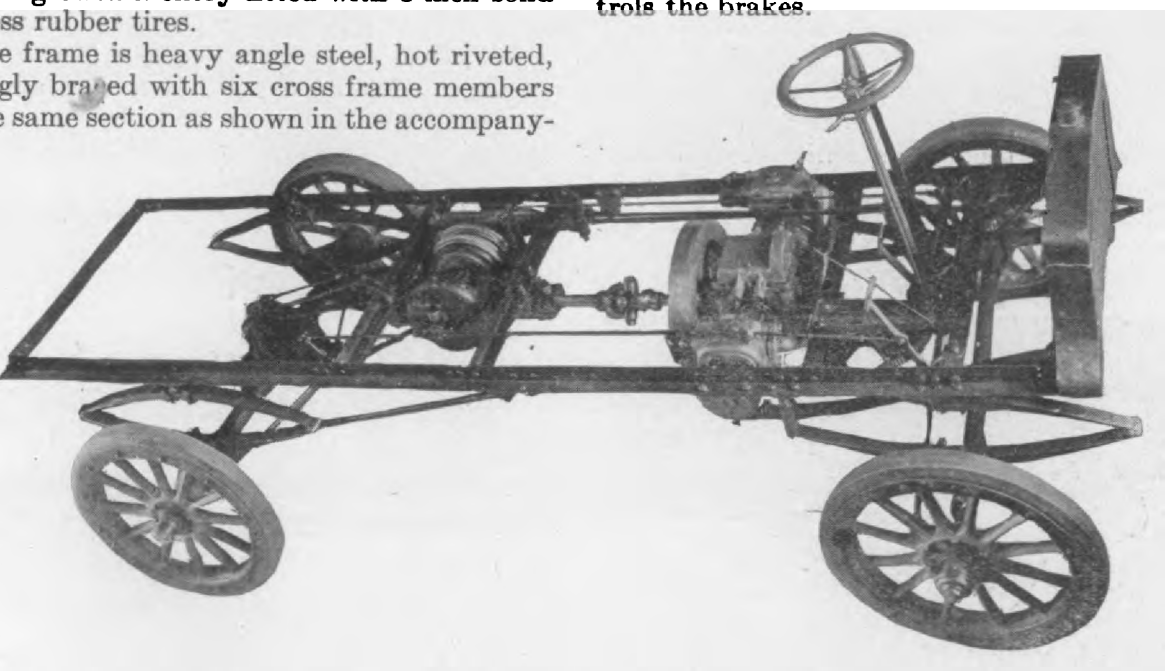
e Homer Auto Truck Co., Homer, Mich., placed on the market for 1908, a new, on, paying load delivery truck, fitted a two cylinder opposed motor, placed wise near the forward end of the chassis. wheel base is 96 inches, tread 56 inches, heels are either 30 or 36 inches of selected d growth hickory fitted with 3-inch solid ss rubber tires.

e frame is heavy angle steel, hot riveted, gly braced with six cross frame members same section as shown in the accompany-

Ignition is by jump spark and a double das coil is used.

CONTROL.

The spark and throttle levers are under th steering wheel. The high and low speeds ar both operated by a side lever and the revers by a foot lever, and the other foot lever con trols the brakes.



he 1908 Homer Auto Truck. Capacity 1 ton, motor two-cylinder, 5x5 in., opposed, 24 H. P., water-cooled, crosswi driver's seat. Wheel-base 96 inches, tread 56 inches, and wheel, second growth hickory either 30 or 36 inche ndless solid rubber tires. Front wheels ball bearing, rear on Hyatt's. Drive from motor to two speed and o planetary by universal joint, short shaft and bevel gear, and by center chain to the divided rear axle from th gear. Bodies to suit purchaser.

lan view of the chassis. The front axle I-beam section and the front wheels are ted on ball bearings. The rear axle is a ar housing with open differential and n by a center chain. The wheel bearings 1⅝-inch Hyatt rollers with ball thrusts. drive from the motor to the planetary l gear is by a short shaft and universal a bevel gear driving the planetary so the e is entirely free from any side thrusts.

The forward springs are three quarter el liptics perched on top of the axles, their rea free end being shackeled to the underside o the frame. The rear springs are full ellipti also perched on top of the axle. Radiu rods are fitted. A 12 gallon gasoline tank o galvanized steel carries the full supply.

BODIES.

The bodies are made to suit the purchase

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The Safir Automobile Company, Zurich, vitzerland, working under the Saurer patents, anufactures both passenger and commercial chicles. The motors are all 4-cylinders, cycle, water-cooled, jump-spark plugs with th battery and magneto, in three sizes, 24, 40, d 50 H. P. The 40 and 50 H. P. Motors are aced in touring cars, and the 24 H. P. motor used to drive a 2½ tons paying-load truck, d the 40 H. P. motor is placed in a 5 tons ying load truck. An English Company is so working under the Saurer patents and ese "System Saurer" motor-trucks have en highly successful in continental compe-ions and are regarded as the final thing by e same leading European motor-car engineers. The Safir commercial wagons, 2½ and 5 tons ying-load respectively are handled in the nited States by The Commercial Motor Car ompany, Times Building, New York City, . Y., Chicago Office, 414 First National Bank uilding, Dearborn and Monroe Streets.

A 5-tons paying-load Safir truck was on view the Chicago Show, and the illustrations here ven with a brief general description relate rticularly to the 5-tons Safir, though the me general construction is used in both the and 5-tons trucks.

symetrical, valves on both sides, worked w two cam-shafts. The exhaust cam-shaft c is advanced 90 deg. by a spiral groove feather to enable the motor to work as an compressor for brake effect. The cam-sh are driven by steel and fiber gears. The ca and shafts are integral. The motor-base oil-basin are of aluminum. The oil-basin two pits, with exterior stand-pipes, scr capped, which can be opened to regulate splash-pool to minimum depth, and to cl out dirty oil.

The ignition is by high tension magneto jump-spark plugs, and also by storage batt and coil.

NOTABLE FEATURES.

Besides the use of annular ball-bear everywhere except for the motor connect rods, the Safir truck is notable throughout excellence of design and workmanship.

An air self-start is employed, air being c pressed by a small crank-and-connecting- driven, trunk-piston air-compressor, gear dr from the line-shaft, just in front of the gear-b This pump is thrown in and out of action b solid-jaw clutch, splined to slide on the b shaft. The air-pump cylinder has inte circumferential cooling-ribs or fins. The c

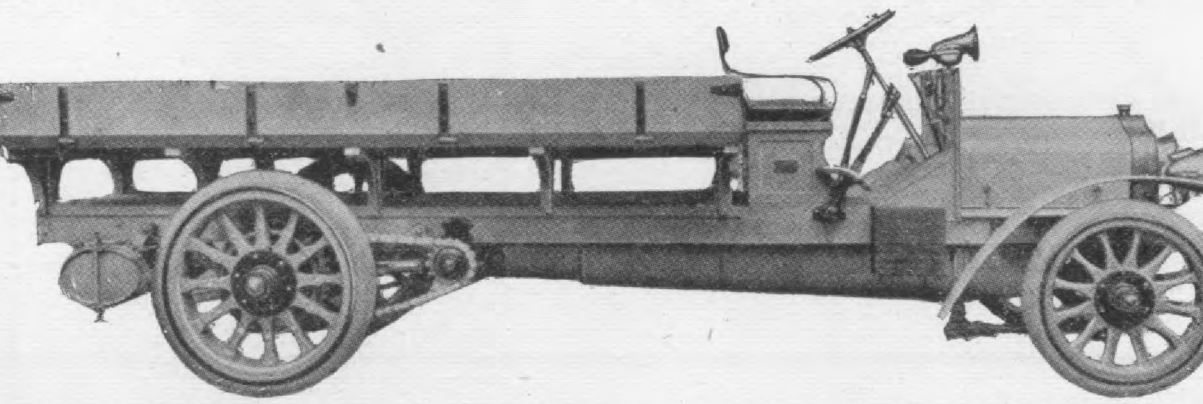
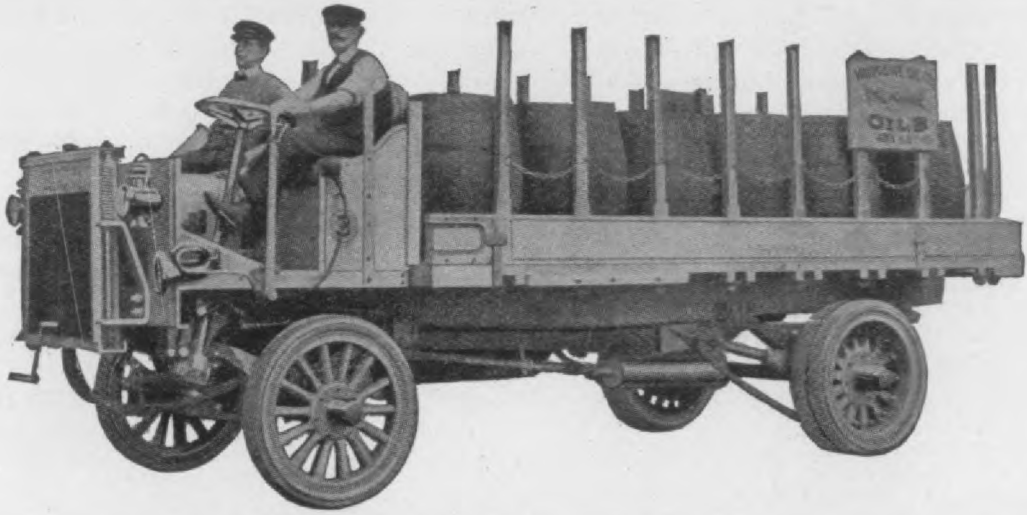


Fig. 1. Safir 5-tons paying load truck, wheel-base, 153 ins. Gauge, 65 ins. front, 68½ ins. rear, double face solid tires, 34x ont, 41½x8 ins. rear. Motor, 4-cylinders, 4 cycle, water cooled, 4–5-16 bore, 5½ stroke, 40 H. P. at 1000 R. P. M. Cone c re shown but is now being changed to small diameter mutiple disk. Selective sliding gear, four forward speeds and a r th bevel balance gear to divided counter-shaft, with sprokets and chains to rear wheels. Weight, 5500 lbs. Price, $5000 The air-self-starting assembly is not a part of the regular Safir truck equipment, but is fitted as an extra, to order.

The Safir design and construction are most aborate and most thorough in every particu-r, nothing overlooked and nothing shirked, ther in materials or workmanship, and, with ompetent drivers, superintendence and up-eep, these cars can unquestionably make a ost superior showing in any company. The rices, are, of course, high, both because of gh-cost construction and because of the im-ort duty, the 5-tons-paying-load truck being fered at $5,000.00. As shown in the illus-

pressed-air tank is piped to a pressure gaug front and the driver carries air pressur discretion. For self-starting the compre air is piped to an overhead branch-pipe br casting which has an opening to each cyli over the exhaust valve, this opening being ered by an automatic-valve opening to motor-piston. The compressed air is di buted to each cylinder by a rotating ver air-valve placed in the middle of the bran air-pipe and rotated by bevel gears from

TONHEWITT TRUCK



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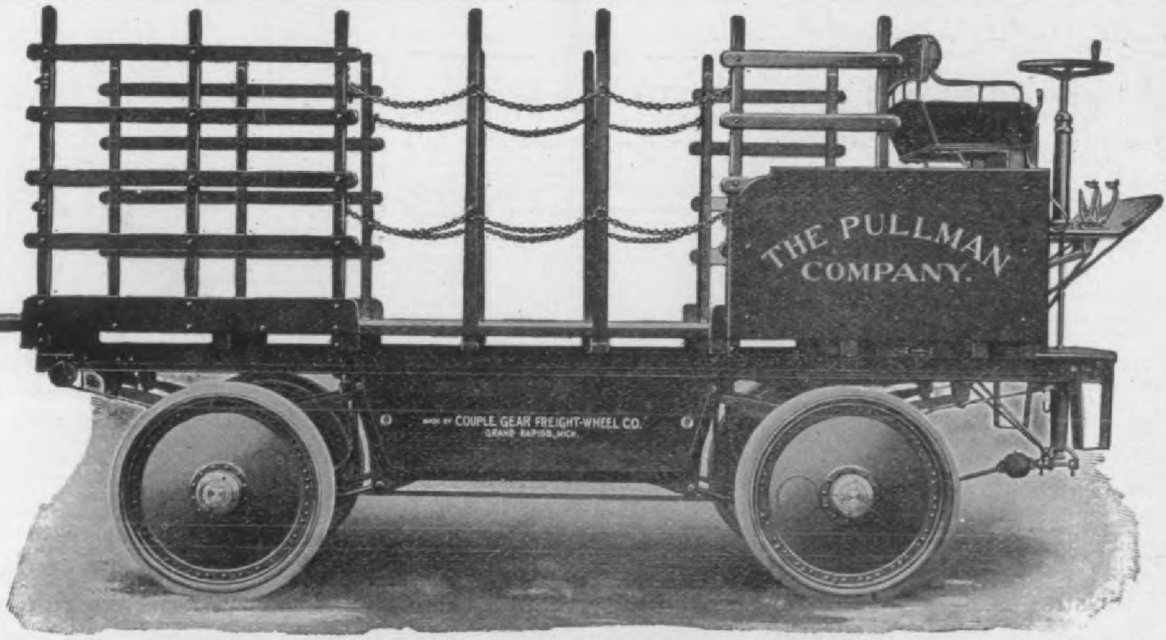
00-Pound Light Delivery. Simplest car Made. Best Record.

IEWITT MOTOR CO., 10 E. 31st St., New York City



IE "COUPLE-GEAR" GASOLINE - ELECTRIC TRUCK

Motors Contained in the wheels. Power applied at both sides of the wheel directly to the wheel rim. Single reduction of 25 to 1. Transmission losses practically eliminated. Equipped with "Storage Battery" or with engine and generator.

FRONT-WHEEL DRIVE AND FRONT-WHEEL STEER

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driver's release of the air-admission lever, the air tank pressure might be diminished needlessly. The air-start lever is normally spring-moved to shut the air off from the air-distributing branch pipe. The automatic branch-pipe valves, opening to each cylinder compression-space, close automatically as soon as the motor begins working itself, and so prevent any part of the burning charge from entering the air-branch. The air-start does not require any change of the motor or motor-valves or cam-shaft at all. The air-start is made by giving the air-valve lever a quick push and instantly releasing it, which permits the automatic spring-closing of the air admission-valve.

The air-start compressor cylinder is small, something like 2x2 ins., only, and high pressures are contemplated, the air-pressure guage being graduated to show 30 atmospheres, or 450 lbs.

Another unusual feature of the Safir control is the use of the motor as a brake, by converting the 4-cycle motor into a 2-cycle air-compressor. This is done by opening the intake valves to pure air, after shutting off the carbureter. The cam-shaft is then advanced 90 deg. by a spiral groove and feather and an endwise movement of the spirally grooved sleeve on the cam-shaft, When the cam-shaft is so advanced, opening the intake valves to the atmosphere causes the turning of the crank shaft by car-momentum to work the motor as an air compressor on the 2-stroke cycle.

BRAKES.

The Safir truck has steel casting, rear-hub brake-drums about 20x3 ins. with jointed, grey-iron, internal, expanding shoes, internal 3-hole-lever applied, and a brake band on the balance-gear drum in the counter shaft housing. This balance gear brake drum is about 12 ins. dia, by 3 ins. face, with exterior, jointed, grey-iron shoes, 3-hole-lever applied, metal-to-metal

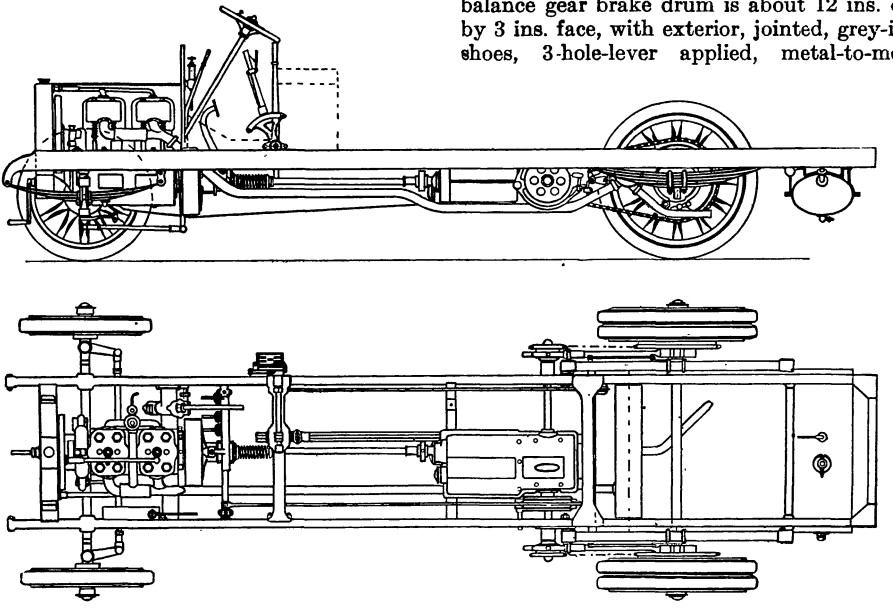

Fig. 2. Safir 5-ton truck, side-elevation and plan of chassis. The wheels are all on annular ball-bearings, with ball-thrust-bearings. Except the two ends of the connecting rods all the bearings, including those of the crank-shaft, are annular ball-bearings.

The springs are all half-eliptics, front springs jointed to the frame in front and linked in the rear. The rear springs are linked to the chassis frame at both ends, and screw length-adjusted struts are fitted between the rear axle and the chassis frame side. The chassis frame sides are channel steel, 4¾x2–3-16x¼, sides parallel, 39–⅜ ins. wide. The propeller shaft from the clutch to the gear-box has two universal joints. The change gears are all nickle steel, case hardened. All the sprockets are soft. The chain is Renold, roller, 1¼ ins. pitch, ¾ ins. wide. The line and side shafts are on annular ball bearings.

The fuel tank, oval, steel, 25 gallons capacity, is placed in the rear. The muffler is set cross-wise, a little way in front of the rear axle. The compressed air-tank, for self starting, is a copper cylinder, about 6 ins. dia. by 24 ins. long, hemispherical ends, heavy enough to resist 450 lbs. pressure and is placed at one side in front of the gear-box. This air-tank is not shown in these illustrations.

The air-start is always a convenience, and in crowded streets, where delays are numerous, an instantaneous air-start saves fuel by permitting the stoppage of the motor while traffic is blocked without delay or danger from inability to move when an opening is presented.

The fact that this Safir compressed air self-start does not require any change or end-shift of the valves or cam-shaft is worth repeating here with emphasis, as self-starting actions have been shown which involved abnormal valve action obtained at the cost of a shifting cam-shaft and added cams.

contact, run dry. The rear-hub drum-shoes are applied through a balance-gear on the brake-rocker, the brake-rod takes hold of a free rocker-arm which carries a bevel pinion engaging two bevel-gear sectors, one fixed to the rocker and one fixed to the sleeve loose on the rocker, so as to exactly balance the respective pulls on the brake-shoe applying levers.

CONTROL.

The spark is regulated by a small vertical lever on the rear of the front-board. The steering is by a worn and worm gear sector with eccentric-bushing adjustment. There is

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THE

ECONOMY-COPPOCK

A car without an equal for endurance, simplicity and econ-
my. We sent one of our trucks overland from Decatur, Ind.,
Cincinnati, Ohio, 156 miles in 18 hours, Feb. 5th, '08. Not
single part was broken and the roads were almost impassable
n account of snow and ice.

Cost of operation— 022 cents per mile.

**We have
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5,000
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repairs
45.00.**

Guarantee covers every truck for LIFE against imperfection in workmanship and material.

Most Attractive Proposition on the Market

Write us for Catalog

Coppock Motor Car Company

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one lever on top of the hand wheel which has a neutral position straight ahead and is moved to the right for throttle regulation. If this lever is moved from neutral to extreme left it advances the cam-shaft 90 deg., closes the throttle and opens the intake valves to the atmosphere, converting the motor into a 2-cycle air compresser, thus enabling the motor itself to become a brake to retard the car. This motor resistance, the ordinary brake of this truck, is highly efficient and causes no wear or heating. The 90 deg. advance of the cam-shaft causes the exhaust valves to act as both exhaust and intake valves, and so enables the motor, in connection with the intake valve, to work as an air compresser, 2-stroke cycle, giving two cylinders constantly in work as compressers.

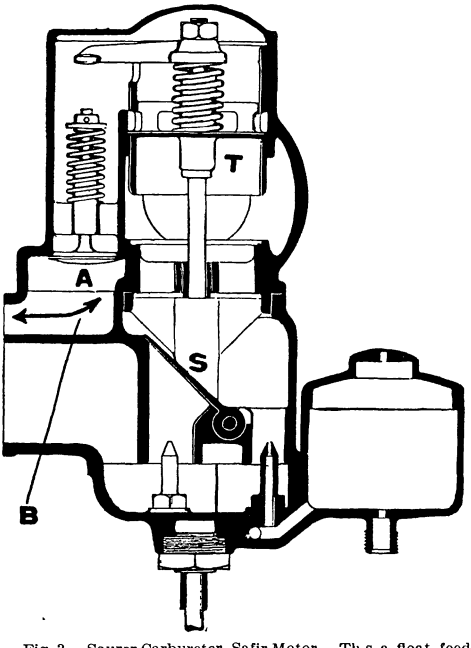

Fig. 3. Saurer Carbureter, Safir Motor. Th s a float feed to two stand pipes, that at the right, in a throat of fixed area, richly charges the air which enters at the left and passes the left stand pipe without effect. The left stand pipe is also in a throat of fixed area, covered by an inclined valve, S, spring-closed. Heavy piston suction opens S and permits parts of the charge to pass upward around the nozzle of the left stand pipe, which has a smaller opening than the right hand nozzle and makes the less rich charge. The throttle T, standing in the plane shown, is turned to regulate the cylinders charge. When T is depressed as far as possible, the passage from the carbureter to the cylinders is closed and the air valve, A, is depressed and opened so as to permit the atmosphere to move both in and out at B, while the motor is working as an air compressor to serve as a brake.

The outside hand-lever works in three planes and shifts the selective change gear. The inside hand-lever is pulled backward to apply the rear-hub-drum brake-shoes. There are two pedals on the foot-board; that at the left disengages the clutch only; that at the right applies the counter-shaft drum brake only.

ON THE ROAD.

A demonstration of the Safir truck was recently made for the National Brewing Co. of Chicago and observed by Mr. Wm. Rehm, its president, when the car carried a load of 4 tons to South Chicago, a distance of between 14 and 15 miles, in 1 hr. and 15 minutes, consuming two gallons of gasoline. The pavements over a considerable portion of the route were excellent, but in many places the streets were entirely unpaved.

On Wednesday morning of the same week it carried two loads of 4½ and 5 tons, respectively, for the Edelweiss Brewery to its La Grange distributing depot all the way over excellent pavements at a gasoline consumption of slightly over one gallon—a distance of 7 miles or approximately 7 miles to the gallon, which is exceptional performance for such a large truck.

The New Atlas 2-Cycle Taxicab

The latest production of the Atlas Motor Car Co., Springfield, Mass., is the small town car or Taxicab, herewith shown. It is powered by an Atlas vertical, two-cylinder, two-cycle, 22 H. P. motor, having only five moving parts, the crank-shaft, two connecting rods and two pistons. There are no cam-shafts, gears, springs or poppet valves, and the cooling is by thermo-syphon circulation, eliminating the pump and fan. A vertical tube radiator is used. The ignition is by jump spark with the timer mounted direct on the engine-shaft, and two coils on the dash. Current is supplied by dry cells, storage battery or magneto. All moving parts of the mechanism are enclosed and run in oil or grease.

PLANETARY CHANGE SPEED.

A two-speed and one reverse planetary is used, the high-speed clutch being of the multiple disc type. The gear ratios are low, 2 to 1, reverse 3 to 1. All shafts and studs are ground and polished and the inside bearings are of bronze, while the two main bearings are Hess-Bright ball. All gears and working parts are hardened and ground to exact size. The friction bands are Raybestos lined, are 10 ins. diam. and 3 ins. wide.

The drive is by shaft fitted with improved extra large splicer joints equipt with hardened and ground bushings and studs.

Two sets of brakes control the car when required. The service brake is 10 ins. dia. by 3 in. face, lined with Raybestos, and the emergency brakes on the rear wheels are of the internal expanding type and 12 ins. in dia., giving an unusually large braking surface for so small a car.

The springs are three-quarter elliptic front and rear, the front being 40 ins. long and the rear 48 ins. long by 2 ins. wide.

The frame is selected white ash, of arch construction, to eliminate sag and reinforced with steel angles.

The rear axle is of the floating type, with

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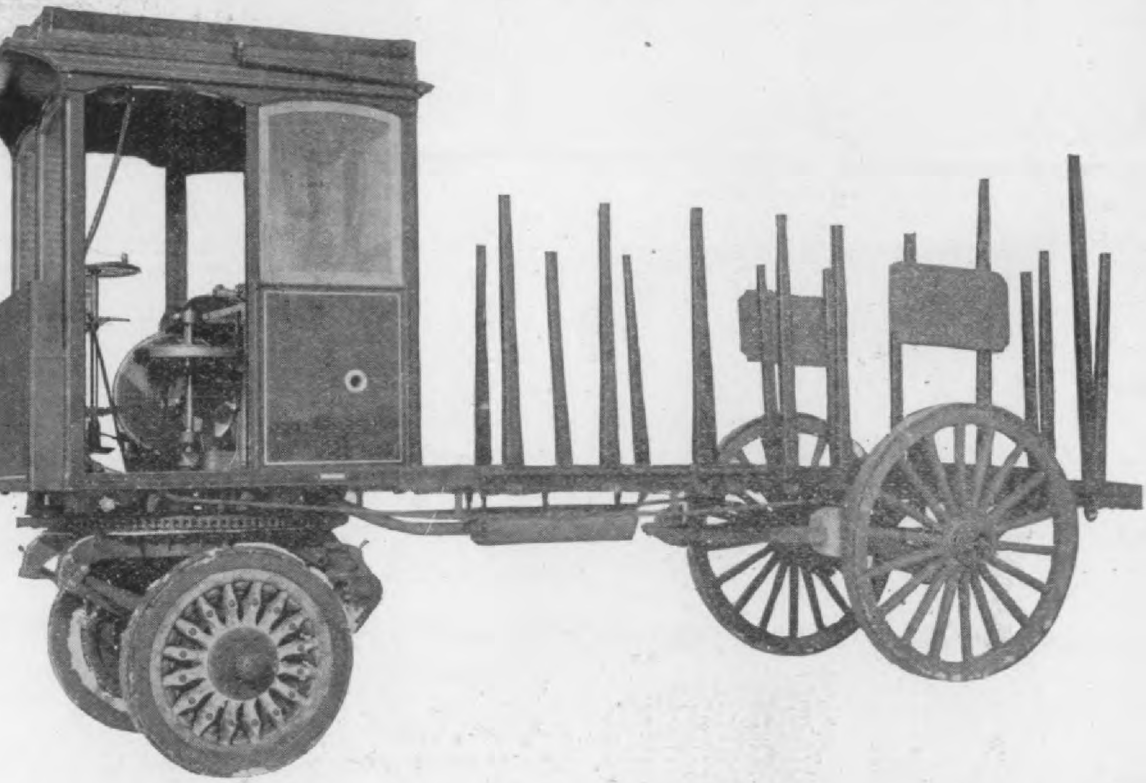
The International

The Different Kind of Truck



3 and 5 Tons Capacity.

OUR CONSTRUCTION overcomes high maintenance osts, and permits of predetermining a customer's costs by a uarantee allowing of the successful operation of heavy motor rucks under all conditions where speed, capacity and mileage re essential requisites.

THE ADVANTAGES CLAIMED are that it overcomes he objectionable features of present power wagon construc-ion, and admits of its successful competing with other nethods of transportation when given proper conditions and acilities to demonstrate its advantages.

Specifications and prices upon application.

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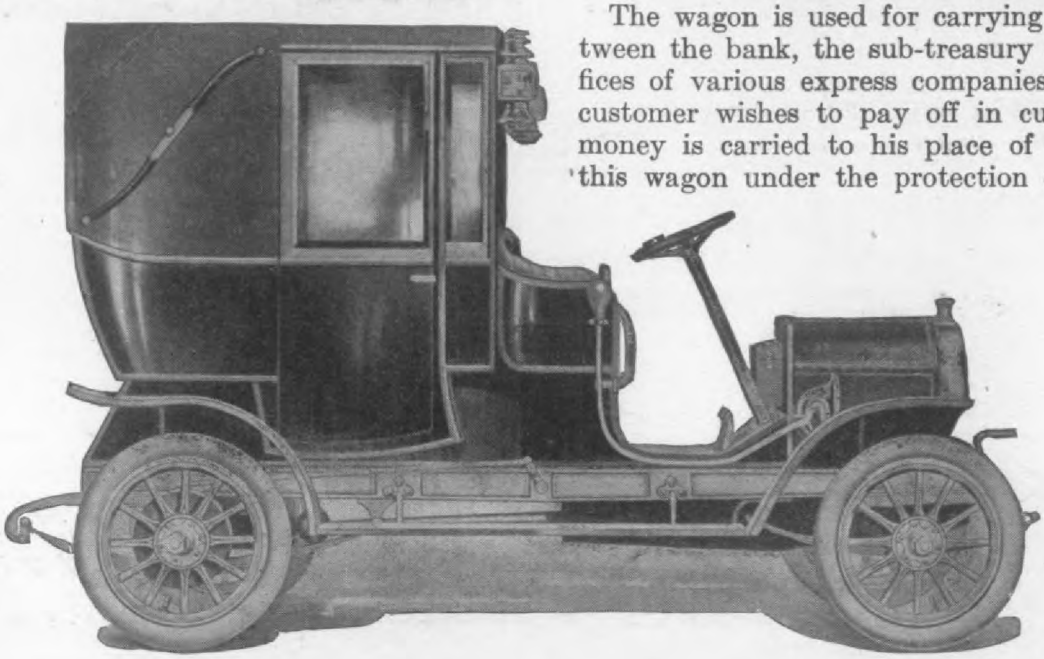
ings. The front axle is I-section and all the wheels are on roller bearings and fitted with 30 in. by 4 in. non-skidding tires and quick detachable rims. The wheel base is 100 ins. and tread 56.

BODY.

The body is of aluminum or sheet steel equipt with two permanent seats in the rear, these seats being 45 ins. wide, rear seat 20 ins. deep, front seat 12 ins. deep with 20 in. space between the two seats. The doors have a 22 in. opening. The front seat will carry one passenger beside the driver, and the carrying capacity, including the driver, is six people. The upholstering, painting and trimming are to specifications.

Studebaker Bank Wagon

The wagon is used for carrying mon tween the bank, the sub-treasury and t fices of various express companies. W customer wishes to pay off in currenc money is carried to his place of busin this wagon under the protection of a



The Atlas Taxicab

The car can turn inside of a 25-foot circle, has a maximum speed of 30 miles an hour, and, it is claimed, its speed can be regulated from 3 to 30 miles an hour by the engine control alone. The car weighs, complete, ready for service, 2300 pounds, and the list price is $2600.

Studebaker Electric Bank Wagon

The National Bank of Commerce of St. Louis, Mo., has recently put into commission an Electric Bank Wagon which was built for them by the Studebaker Automobile Company of South Bend, Indiana. The chassis of the wagon is a regular Studebaker Electric Chassis of 1500 pounds capacity. The body was built upon the Bank's specifications. A door opens on each side in the center. Just in the rear of the driver's seat and extending under it, and

There are times when the wagon tra over 9000 pounds of money between di parts of the city in one day. With pound load the wagon has a radius o miles and a speed of twelve miles per Since its installation it has not been commission for five minutes and the of the Bank are very much pleased wi wagon's performance.

The American Locomotive Auto Company of Providence, R. I., are re as building 100 Taximeter cabs for s in New York City.

Wm. W. Striker, a promoter of Butte, is using three special Cleveland Tour in and around Butte, for showing his cus various properties under his control.

A uniform schedule of charges for and supplies is being maintained

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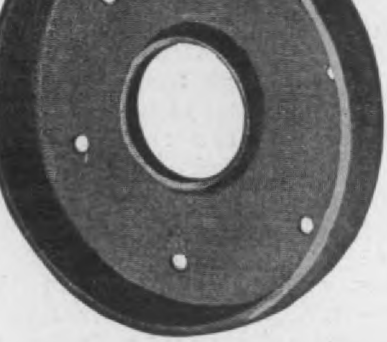


We make them, either large or small —over 75 different styles and sizes.

Specialists in heavy and difficult drawing work.

THE CROSBY COMPANY
BUFFALO, N. Y.

THE COMMERCIAL MOTORCAR CO.

INCORPORATED 1905

TIMES BUILDING - NEW YORK, N. Y.

We furnish Business Automobiles of all types and makes—machines xactly suited to any class of service.

We especially call attention to the SAFIR Motor Truck manufactured n Zurich, Switzerland. Descriptive circular and record of past performnces mailed on request.

The Richest Field For The Agent

Rapid Commercial Cars

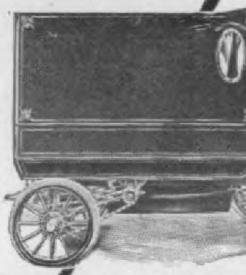
Do you realize how rapidly the power wagon is invading every branch of the commercial world? The demand is just beginning to assume large proportions and each year will see it grow, until horse-drawn vehicles will be the exception.

If you are prepared to represent the best line of commercial cars now built, and have a garage for properly caring for them, you should write me at once for full particulars about Rapid cars.

Besides standard models of delivery and passenger-carrying cars, we make trucks, busses, fire hose wagons, hospital ambulances and anything special desired. Write me to-day if you are interested.

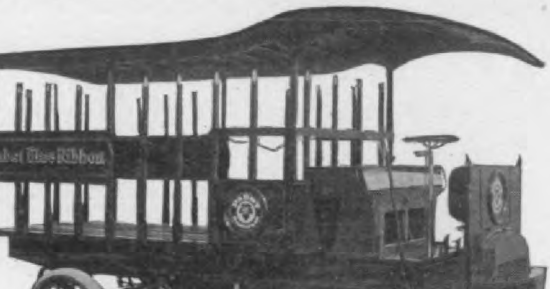
B. M. HENRY, Sales Manager

RAPID MOTOR VEHICLE CO:
125 Rapid Street, - - Pontiac, Mich.



ssengers, $2500

One Ton Delivery, $



THE MEISELBACH TRUCKS

One, Two and Three Tons

Friction Drive, Perfectly Supported. All Wheels on Timken Rollers. Powerful Brakes. The Simplest and Easiest Controlled Trucks yet shown. Thirty Horse Power.

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line of gasoline sight seeing and commercial vehicles, and also some heavy electric trucks. There have been very few changes in the mechanical details and a description of the motors was published in the January, 1907 issue, page 341. The motors of all the gasoline vehicles are of the 4-cylinder vertical, water-cooled type under the hood or as in the case of the 3-ton truck, under the driver's seat and foot boards. The bore and stroke are the same as in previous years, 4 11-16x5½ inches,

internal expanding brakes operat drums cast integral with the rear sprockets and bolted to the rear drums. The emergency brake is op by side lever and the running bra the usual pedal.

The frame has oak sills 2½ inches 7 inches deep, and these are reinfor steel plates 3-16-inch thick. The is 48 inches wide in the rear and long over all. Prest steel or angl will be furnished, however, if desi

Fig. 1. Ten-passenger car built by the Auto-Car Equipment Co., of Buffalo. Feature Motor, 4-cylinder, 4 11-16 by 5½ inches, three speed and one reverse sliding gear, doubl chain drive, armored oak frame, 36-inch wheels with solid tires.

all valves are mechanically operated and a three speed and one reverse sliding gear is used. The differential gear and bevel gears of the jack shaft are provided with roller thrust bearings and enclosed in the same aluminum casing with the transmission gears. Ordinary leather faced cone foot operated clutches are used, and the drive is by double side chains.

THE TEN-PASSENGER LIMOUSINE.

This 1908 model has the same general chassis arrangement as the other cars, but is fitted with a large limousine body with undivided front seat and extra seats inside, making the capacity ten persons beside the one with the driver. The enclosed portion of the body is eight feet in length.

The side doors are fitted with sashes, dropping into the body of the doors, and beveled best quality French plate glass. The trimmings are of superior quality imported cloth heavily over stuffed with genuine hair, and finished in nine shades

the purchaser, altho the makers the armored wood type of frame b the car in question.

The front springs are 42 inches lo 2½ inches wide, and the rear are 48 long by the same width. Thirty-si wheels are used on either Standard bearings or on plain bearings if d The wheels are fitted with endles rubber tires 3½ inches on the front inches wide on the rear. The tread inches. The axles are 2 inches squ solid hand forged steel. These ca make about twenty miles per hour o roads.

GASOLINE BRAKE OR STAGE.

The chassis specifications for this are virtually the same as for the lim but the body is of the sightseetin with the seats running transverse will seat twenty. The engine is u hood forward of the dash, instead o partially under the foot boards as

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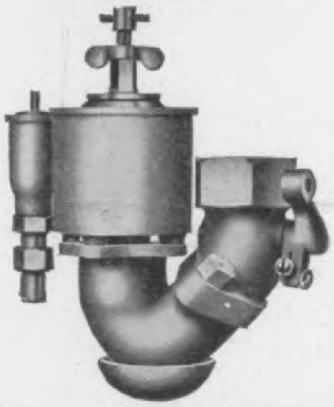
Carburetor

1908 MODEL



NO MOVING PARTS

ONE ADJUSTMENT (GASOLINE)

PATENT ALLOWED NEW PATENTS PENDING

WILL RUN PERFECTLY AT ALL SPEEDS

Stationary Hit and Miss, or Throttling Type; Four Cycle High Speed Motors, all Types; Two Cycle Two-Port; Two Cycle Three-Port; Convertible 2 or 4 Cycle.

FIT ANY MOTOR. Gasoline Connection Changeable for 3 Points. 45 degree Flange Connection Permits of Top or Side Outlet.

The North Chicago Machine Co.

North Chicago, Ill.

We Solicit a Trial and Guarantee Our Claims

Indestructible Steel Wheel

are never out of true cannot collaps

INDESTRUCTIBLE STEEL WHEEL CO

1221 Michigan Ave., Chicago

The Car of Quality

The SOULES LIGHT DELIVERY CAR, 22 H. P., two 5½ x horizontal opposed cylinders, sliding gear transmission, bev gear drive. THE CAR THAT HAS BEEN TRIED AND FOUN NOT WANTING. Agents wanted. Correspondence solicited.

Soules Motor Car Co.

Sales Dept., 736-740 WOODWARD AVE., Detroit, Mic

LOGAN 1908

Model T One Ton Truck

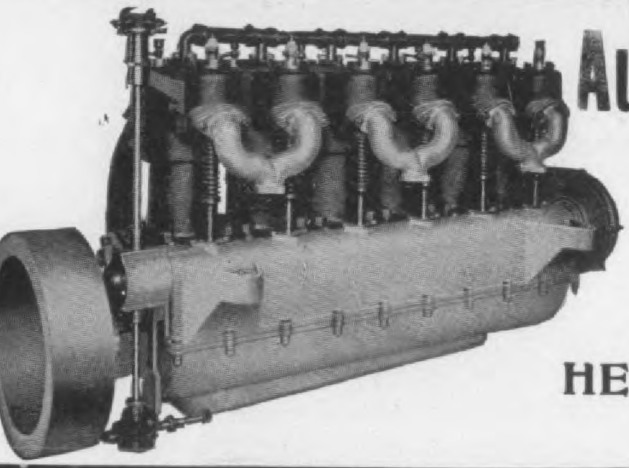
A truck equipped with a four cylinder air coole 20 H. P. Motor, built for service and fitted t carry its load day in and day out under all con ditions. For detailed description address

THE LOGAN CONSTRUCTION CO

CHILLICOTHE, OHIO

Peugeot Chains—"Strongest in the World."

296 BROADWAY, - NEW YORK.



Automobile and Truck

MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

HERSCHELL-SPILLMAN CO.

W. Tonawanda, N. Y.

Parsons' Manganese Bronze Axles

Stronger than steel. Thousands in use. None have ever broken.

The Wm. Cramp & Sons Ship and Engine Building Company, Philadelphia, Pa.

During a recent day of slush and rain, in w York, when Broadway was a sheet of a Studebaker auto truck showed the

The H. H. Franklin Mfg. Co., Syracus N. Y., informs us that it has entered t taxicab field with a light-weight car moderate wheel base.

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The car is furnished with a canopy top with forged steel stanchions attached to the iron of the main frame and fitted with storm boot for the driver's seat, pyraline being used instead of glass. The upholstering is Fabrikoid, an imitation leather, which it is claimed is more durable than the genuine article.

The three-ton gasoline truck has similar chassis specifications.

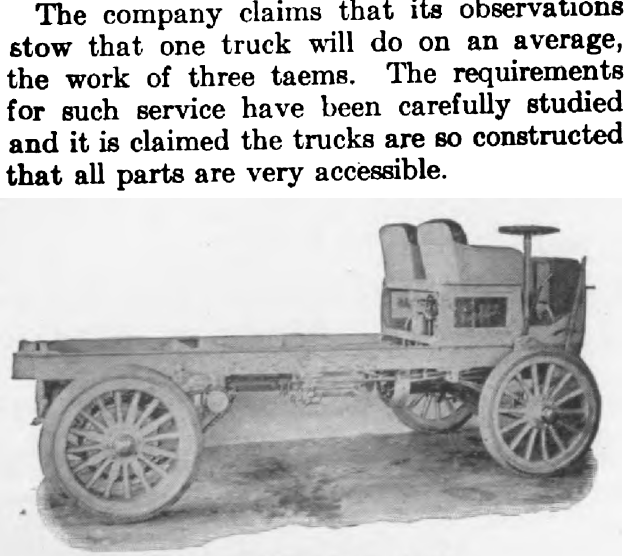
THE SIX-TON ELECTRIC TRUCK.

The details of the electric truck have not been materially altered since last year. It has 100 inches wheel base and 72 inches tread or narrower if specially ordered. The springs are platform front and rear, all springs three inches wide and ribbed. The front tires are 6 inches and the rear 7 inches wide. Forty-two cell, 13 W. B. National batteries are used in connection with Westinghouse motors. The bodies are platform or stake as desired. The speed is six miles per hour.

The 1908 Frayer-Miller Commercial Cars

The Oscar Lear Automobile Company, formerly of Columbus, now located at Springfield, Ohio, are offering for 1908, a three and 5-ton truck. The growing demand for truck has necessitated a move into larger quarters and the plant has therefore been moved from Columbus, Ohio, to Springfield where it is hoped the increased manufacturing facilities will allow of sufficient increase in output to meet the demand for such trucks.

The company claims that its observations stow that one truck will do on an average, the work of three taems. The requirements for such service have been carefully studied and it is claimed the trucks are so constructed that all parts are very accessible.



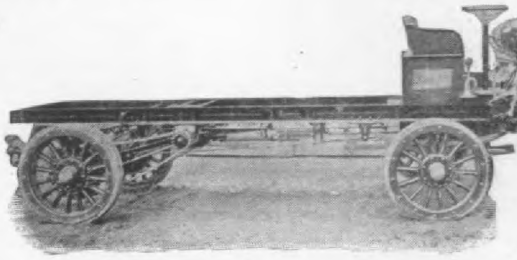
Frayer-Miller 3-Ton Truck

THE NEW 3-TON TRUCK.

The 3-ton truck herewith illustrated has a

dry cells. Oiling is by McCord precision assuring positive lubrication to all the bea

The change speed gear is of slid ng typ gears being 1 inch face and 6 d. p. made special steel, hardened. The bearings i transmission are Hess-Brighht, while the is of aluminum of a shape known as the type with removable heads, four speed ward and one reverse, are provided w direct drive on all speeds, the gear shifts the selective type, thus making the sh very simple, as the operation is all done one lever. Heavy side chains are used. tires in front are 36 by 4, rear 36 by 3½ owing to the large number of different of bodies that are required the Oscar Automobile Company are prepared to f styles of every description and to meet requirement.



Frayer-Miller 5-Ton Truck

5-TON TRUCK.

The 5-ton truck here shown has a base of 130 ins., and a tread of 66. Th axle is of steel 3 ins. square, the front heavy I-section, the frame is of channe 6 by 2 ins., braced with heavy channe cross bars and the sub-frame is made same material. The motor used in this truck is a 50 H. P. four-cylinder air-motor, of the same type as in the 3-ton The At-water Kent ignition system i used on this heavy car, as well as the M precision oiler. The transmission is same type, heavier in proportion and eq throughout with large Hess-Bright be This truck is equipped with two sets of internal and external on the rear The shaft from the transmission to th shaft is of nickel steel, and heavy side are used from the jack shaft to the rear Front tires are 38 by 4, and the rear, 3½ twin. The springs are of the platform 44 ins. long by 3 ins. wide, having 18 while the front springs, are semi-eliptic, by 3 ins. wide and 14 leaves.

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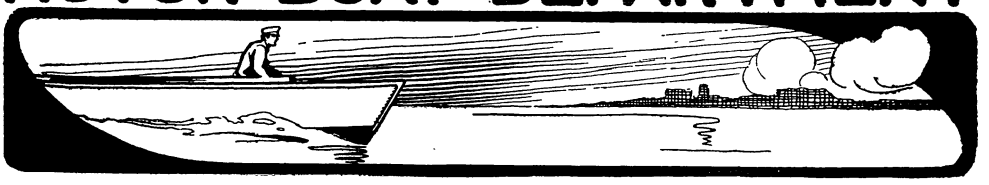
MOTOR BOAT DEPARTMENT



Marine Coming Events

April 1-13—Annual Motor Boat Meeting at Monaco, Monte Carlo.

April 6-11—Buffalo, Convention Hall, Motor Boat and Sportsmen's Show. D. H. Lewis, Mgr.

April 10-15—Regatta for Motor Boats, under direction of Nautical Club of Nice, France.

June—Bermuda Cup Contest for Sea Going Power Boats; New York to Bermuda. New York Yacht Club, Bermuda Yacht Club and Motor Boat Club of America.

July 18—Race for Motor Cruisers; Marblehead, Mass. to New Rochelle, N. Y. New Rochelle Yacht Club.

August 1—Race for British International Cup won last year by "Dixie," Huntington Harbor, N. Y. Motor Boat Club of America. Walter M. Bielings, Secretary, 9 Murray St. N. Y. City.

Marblehead to New Rochelle 270 Nautical Mile Race

The Marblehead, Mass., to New Rochelle, N. Y. power boat race, it is expected will this year be even more interesting than in previous years and the reports are that the number of entries will be large. The race is for cruising boats of not less than thirty feet over all and not more than forty feet over all, and with a water line breadth of not less than one-fifth of the water line length. The distance to be raced is 270 nautical miles. The crew shall not be changed during the race, and must consist of not less than four persons. No paid navigators or pilots will be allowed. Entry blanks and full information may be had from the following members of the Regatta Committee: W. B. Stearns, Marblehead, Mass.; J. A. Mahlstedt, New Rochelle, N. Y. and Walter M. Bieling, No. 9 Murray Street, New York City.

Conditions of New York to Bermuda Race

In the New York to Bermuda race in June, the competing boats must not be more than 70 feet over all nor under 50 feet over all. The rating and time allowance will be calculated in the same manner as last year. The Bermuda Cup, valued at $1,000 is presented by a member of the New York Yacht Club as a challenge trophy to be raced for by seagoing power boats. The trophy is placed jointly in the custody of the Royal Bermuda Yacht Club and the Motor Boat Club of America. It will become the property of the owner who wins it three times.

Prizes offered are as follows: The possession of the cup to the boat finishing first and $1,000 in cash, also offered by the same member of the N. Y. Y. C. This boat will also receive a commemorative shield, presented by the Motor Boat Club of America. Second boat, a commemorative shield, presented by the Rudder. If more than five boats start, a third prize will be given.

British International Cup Race

The challenge recently sent out by the Motor Yacht Club of Great Britain to the Motor Boat Club of America for the British International Cup which was last year won by the "Dixie," an American boat, has been accepted and the course has already been decided upon. The race will be run in Huntington harbor, on August 1.

If elimination trials are necessary for the selection of an American defender, they will be held over the same course during the week ending July 11. There will also be elimination races in British waters if more than three boats are built there to race for the trophy. The length of the course is fixed at between thirty and thirty-five nautical miles, and the only limitation to the size of the competing vessels is in the overall length of the hull, which shall not exceed 33 feet 11½ inches, or 12.18 metres. So far one entry, that of C. C. Wheeler, has been received by Walter M. Bielings, the secretary of the American Club. She is being built at Halesite, Long Island, but as the entries do not close until July 1, it is regarded as certain that several more entries will be made. Another boat is nearly completed at the B. F. Woods yard at City Island, and there is also talk of a turbine propelled boat to be entered by the West India Motor Car Co. The first of the Motor Yacht Club's challenging boats is the Wolseley-Siddeley, owned by Lord Howard de Walden. This boat was launched at Cowes on February 22. It is 39 feet 4 inches in length and has a 6 foot beam.

The Lamb marine engine manufactured by the Lamb Boat and Engine Co., Clinton, Iowa, will hereafter be handled by the Lamb Engine Co. of New York, 92 Chambers Street, which concern will act as general eastern and foreign distributors of the Lamb engine.

The Motor Boat and Sportman's Show closed on Saturday night March 8, in Madison Square Garden, New York City, after a two week's successful exhibition, which drew more than 200,000 visitors.

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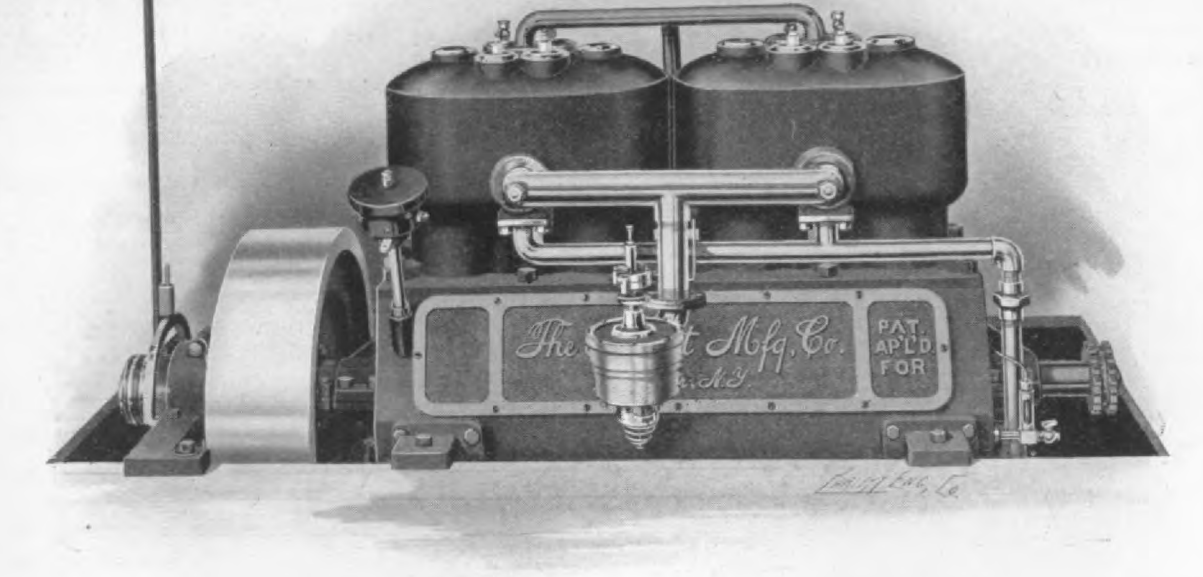


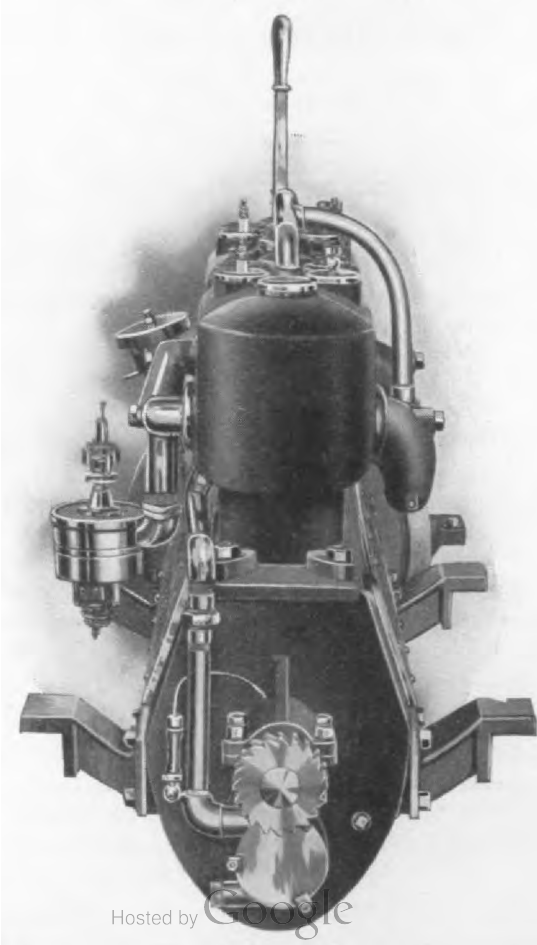
The "Perfection" 40-45 H. P., 4-cylinder, 4-cycle, marine engine; intake side.

The "Perfection" Marine Motors

We show herewith a 4-cylinder, 4-cycle, -45 H. P. marine engine manufactured by nry L. F. Trebert, 13 Grant St , Rochester, Y. It is also furnished for automobile use. The cylinders are made of fine gray iron, h a crank case of aluminum alloy or cast n. The valves are placed on either side ween the two cylinders and are operated a single cam shaft located in the bottom the crank case. The valves are inter-angeable. The cam shaft is driven by two ge gears located inside the crank case. The pump is mounted on the cam shaft inside the crank case and consists of four parts ich can be easily taken apart. Their is e straight oil pipe, with eight oil nozzles ecting the oil to places where it is required. e water pump is bolted to the outside of the nk case below the crank shaft and is driven the cam shaft.

All pipes are cast brass and highly polished. e aluminum base is not affected by the ain between the cylinder and lower half of e crank case. The bearings can easily be pected and adjusted by removing the side tes. The crank shaft is a solid steel forg- of high carbon steel, oil tempered and ound to size. The connecting rods are steel op forgings, fitted with large nickel babbitt arings on crankshaft end; the wrist pin end phosphor bronze bushings. The pistons fitted with three compression rings and ee oil grooves also with wrist pins of hard-

single unit spark coil, secondary distribut timer, carburetor, wire storage battery, sta ing crank and wrenches, listing at $7 Outfit No. 2 consists of 40-45 H. P. mot reverse gear in fly-wheel, universal joi



End view of the "Perfection" 40-45 H. P. marine engi

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It's good to see how quickly Mobo removes mud, grease and dirt from an automobile body. It doesn't matter how long the car has gone without cleaning, or how thick the dirt may be—off it comes, easily and quickly if you use

MOBO
Automobile Cleanser

Not only does it remove all the dirt, but does it without marring or scratching the varnished surface, and without dimming the lustre in any way. That's Mobo style.

Mobo is composed of pure vegetable oils, and contains nothing rough to mark the smoothest surface. It is the ideal automobile cleanser.

Prevents the varnish and paint from cracking and blistering. Keeps the car looking new. It's the best sold to-day. Try it once and you'll understand why.

Put up in 3 lb. and 6 lb. cans; also in tubs, half-barrels and barrels. Can be had at the following supply house:

JOHN WANAMAKER,
Automobile Supplies
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and at all good automobile supply stores in all leading cities.

Send for our Mobo booklet —*"How to Clean Well Varnish and Paint on an Automobile."* It's free.

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One Year Guarantee

The technical opinions of the best critics of Europe and America, reviewing the general tendencies of automobile construction in the world's leading cars, are given in a book we have just published and which will be sent to any address upon request. This book gives also **some unusually interesting letters of prominent men** of affairs who tell in their own words of the exceptional service qualities of their Matheson cars. These letters are especially instructive, as their authors represent the most experienced class of buyers who have, in many instances, abandoned their foreign cars for the Matheson.

Dealers

are wanted in all localities where Matheson cars are not now represented—write for our very attractive dealer's proposition.

Matheson Motor Car Co.

MAKERS

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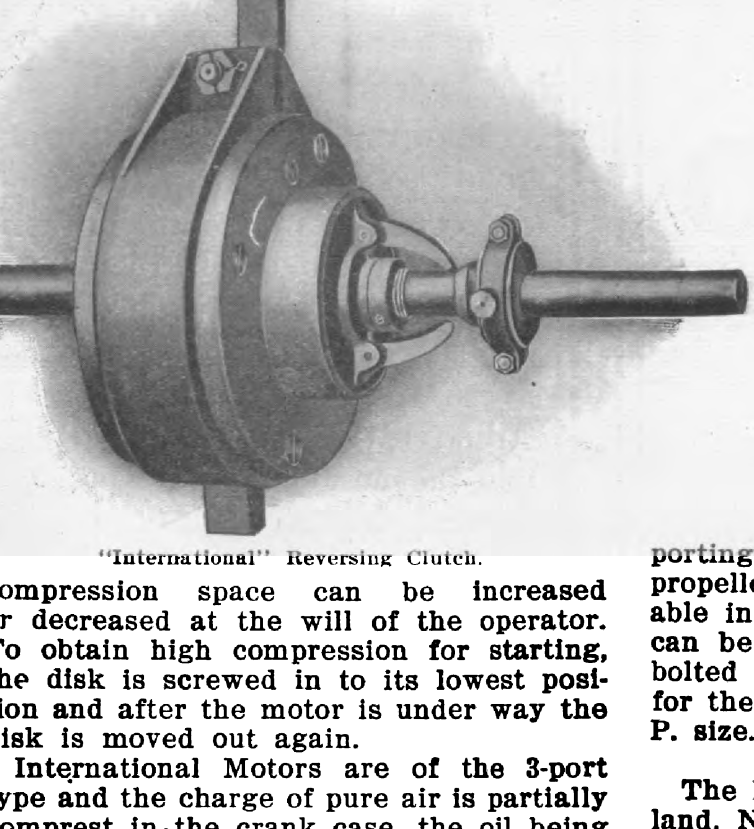
onn., is making oil engines for both tationary and marine use and we show erewith its 10 H. P. single cylinder larine Motor. The marine motors are ade in various sizes ranging in horse ower from 1½ to 20. These motors are f the 2-cycle type and the charge is fired y means of a hot tube in the head. The aker advises us that these motors can e started instantly without the use of a orch. A passage is provided above the ompression chamber and fitted with a isk on the end of a threaded stem which llows adjusting the position of the disk n the passage so that the area of the

The iron discs engage permanently iron case, and the bronze discs eng permanently the bronze spur gear, driven gear. When the clutch is enga that is, when running forward, these d are forced tightly together by mean a steel cone forced between two steel gers, thus locking the gears and cau the whole gear to revolve as a coupli

For reverse motion the lever tigh the brake band on the case, holding case and keeping the steel pinions sta ary, thus causing the internal gear to volve in the opposite direction. As be noted, this reverse gear is self



"International" Reversing Clutch.

"International" 10 H. P. Kerosene Marine Engine.

ompression space can be increased r decreased at the will of the operator. o obtain high compression for starting, he disk is screwed in to its lowest posi- ion and after the motor is under way the isk is moved out again.

International Motors are of the 3-port ype and the charge of pure air is partially ompresst in the crank case, the oil being nixt with the air as it passes into the ylinder. It is stated by the manufacturer hat these motors are also suited to the se of alcohol as fuel.

In the "International" reverse gear here is a bronze spur gear on the driven haft, a bronze internal gear on the pro- eller shaft and six intermediate steel inions with bronze bushings running on ardened and ground steel studs. All ears run in oil. A solid steel shaft runs hru both the spur gear and the internal ear rendering it impossible for them to

porting and no weight can come on propeller or engine shaft. Being ad able in both directions, perfect align can be obtained after the base is fi bolted down. List prices range from for the 4 H. P. size to $260 for the 2 P. size.

The New York Motor Boat Co., Cit land, New York, successors to H. Bo Co., has facilities for building power b of all types, from a 12 ft. tender to footer. This company also handles "Tuttle" line of engines and launche that territory, and are in a position t stal direct connected marine lighting tems. Its plant comprises about 2 sq. ft. of floor space.

Rathbun-Lacy Co., Toledo, Ohio, ma of the Ralaco marine engines have posed of their entire business, inclu book accounts, to the The S. M. Jone of the same city who have been eng

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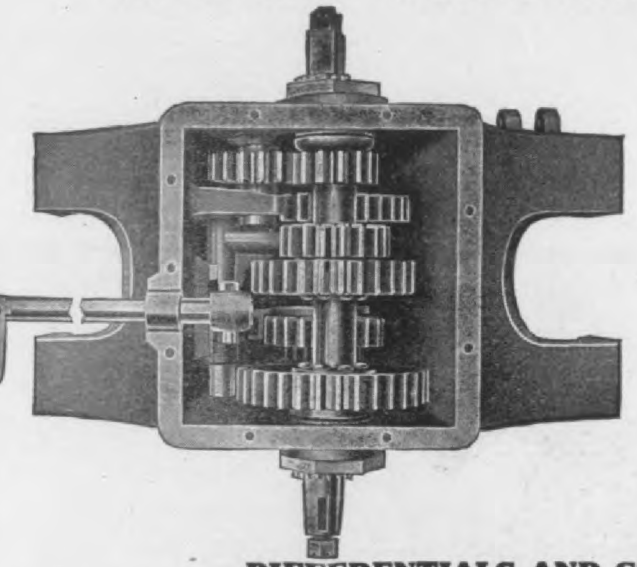
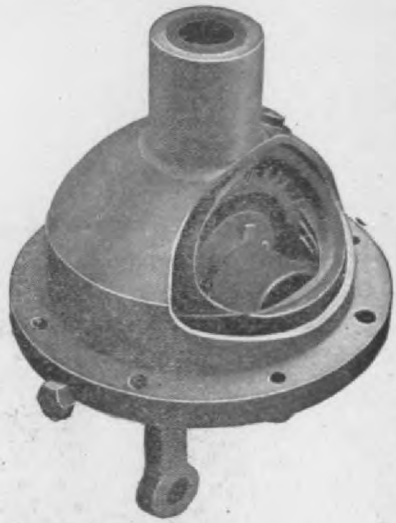
BROWN-LIPE GEARS

SELECTIVE AND PROGRESSIVE SLIDING GEAR TRANSMISSIONS





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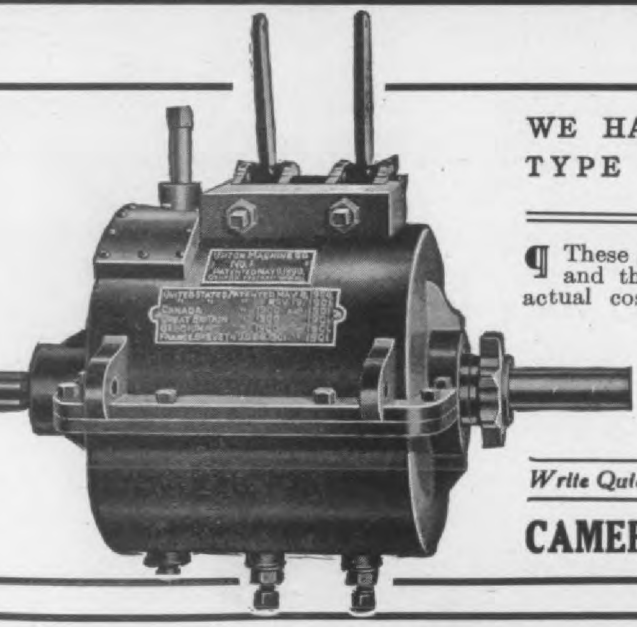
BROWN-LIPE GEAR CO., 206 S. Geddes St., Syracuse, N. Y.



WE HAVE A LIMITED NUMBER OF THIS TYPE TRANSMISSION TO SELL AT

$15.00

¶ These gears were built by a well known manufacturer, and the price we are putting on them is about ½ their actual cost to produce. They are all new and built of high-grade material.

¶ Suitable for use with motor of about 10-12 h. p.

Two Speeds forward and reverse. Weight 75 pounds.

Write Quick if Interested as There are Only a Few of Them Left

CAMERON CAR CO. : Beverly, Mass.

MODEL F. **ZIMMERMAN** **$650.00**

otor 12 H.P. Double Cylinder Opposed Air Cooled Under ood. 78 in. Wheel ase. 36 inch Artil-

Transmission Double Disc Friction Drive, no Lost Power; many speeds, forward and re-

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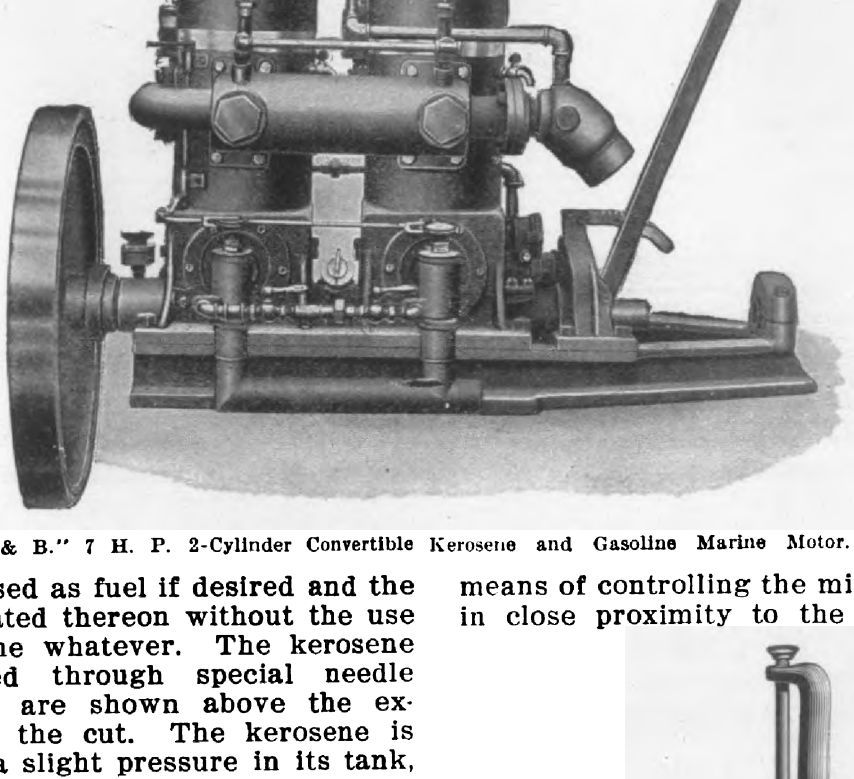
ylinder convertible kerosene and gaso-
e marine motor, built by the Fay &
wen Engine Co., Geneva, N. Y. The
inder construction is different, but in
eral appearance it differs but little
m the standard type of motor.

This machine has the complete gasoline
d the same as their regular type of en-
e and can be operated on gasoline as
fectly as their regular gasoline motor,
with the added advantage that kero-



The "F. & B." 7 H. P. 2-Cylinder Convertible Kerosene and Gasoline Marine Motor.

e can be used as fuel if desired and the
chine operated thereon without the use
any gasoline whatever. The kerosene
l is applied through special needle
ves, which are shown above the ex-
ust pipe in the cut. The kerosene is
ced under a slight pressure in its tank,
more than 7 or 8 pounds being re-
red, and this pressure is obtained by
ans of a power pump furnished with
machine and which on the smaller
es is belt-driven, but on the larger en-
es is direct-connected. The kerosene
k should be supplied with a low pres-
e gauge, and the pressure pump has a
ulating valve which can be adjusted to
intain a steady pressure.

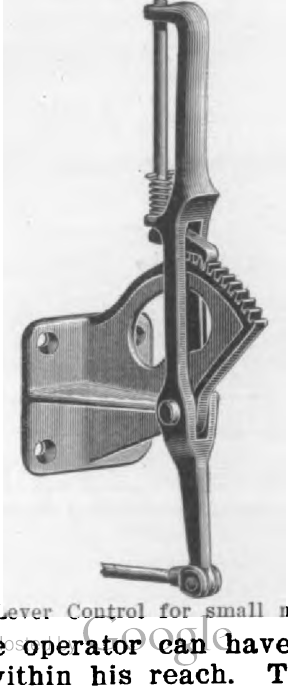
The kerosene charge is ignited by a regu-
electric battery outfit the same as if
soline were used. This also gives a
tly greater range of speed control than
usual in kerosene motors.

The manufacturers claim that with
rosene fuel there is a gain of approxi-
tely 5 per cent. in power over the use
gasoline, and that the consumption per
se power hour is almost identical under

Morse New Lever Control

A. S. Morse Co., 210 Commercial stre
Boston, Mass., the well-known distributo
of motor boat material lately brought o
a new lever control device for small cra
It has been designed to provide suital

means of controlling the mixture and spa
in close proximity to the steering wh



The Morse Lever Control for small motor boats.

so that the operator can have all cont
elements within his reach. This lever

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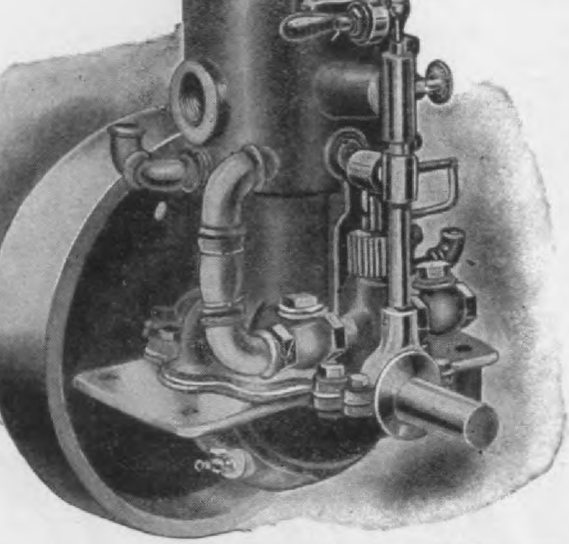

To Secure a Powerful, Speedy Dependable 2, 4, or 6 H. P.

Two-Cycle Marine Engine

We have recently purchased the entire plant of the St. Clair Motor Co., and offer a limited number of the **FAMOUS "LITTLE SKIPPER" MARINE ENGINES** at very interesting prices. They are selling rapidly. The price will be increased when the present lot is sold. Ask for Catalog T. J.

Gray-Hawley Manufacturing Co., Detroit, Mich.

MANUFACTURERS OF

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narch" Kerosene Marine Engine

Grand Rapids Gas Engine & Yacht rand Rapids, Mich., has recently t out a line of kerosene marine en- fitted with a special kerosene con- which is said to mechanically, auto- lly, continuously and reliably con- erosene into an ignitable mixture greater expansion or power-produc- rce than gasoline under the same ons.

converter consists of a peculiarly ed, built up, cast iron receptacle, onducting passage-ways for the in- g charge of air and atomized kero-

Monarch" Twin Cylinder Kerosene Marine Motor.

olution of a predetermined controlled tion by which the proper number of nits are communicated to and ab- by the inrushing charge. These s are made in single and multiple er forms with 5x6, 8x10 and 10x10 ylinders. The crank shafts are all adjustable, so as to always maintain perfect alignment as the crank wears down in the boxes. The cam rollers and pins and cams are all of hardened steel. The cylinder heads are removable to permit of easy access to the pistons.

The list price of the twin cylinder, 10 to 15 H. P. motor, here illustrated, with reversible propeller, is $645. This price includes standard equipment consisting of a Schebler float feed carburetor, friction reverse, three fluke solid grey iron propeller wheel, or reversing blade outfit, 6-foot steel propeller shaft with outside bearing and stuffing-box, battery and connections, spark coil, switch, insulated wire, brass circulation pump, brass bilge pump, screen and flange for circulating pump, screen for bilge, monkey wrench, squirt oil can and Monarch non-chocking water-cooled muffler. If salt water fittings are desired, a solid bronze propeller wheel and a bronze propeller shaft are substituted for the steel ones.

The Echo Co., Delaware and Young Sts., Tonawanda, N. Y., build launch hulls to order in any style or size, from 16 to 40 ft. in length.

The David Crockett Co. of Bridgeport, Conn., makes a spar composition for which great durability is claimed. It is made of the best procurable material, the hardest Zanzibar gums, the best oil and pure turpentine spirits being used. It has been used in marine work for years and is said to be free from cracking and blistering.

Kerosene Oil Engines

Marine, Stationary, Portable

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Every manufacturer of Lubricators in the U. S. is copyin the **Valveless** Idea of **The Hill Precision Oiler.** We are pr paring to prosecute all infringements,—**get posted—order cat log—you should know about the New Model C.**

The Shooting Oiler

Precision Appliance Co. : 833 Austin Ave., Chicag

The Cushman Motor

Has surmounted the difficulties of the past in the manufacture of two cycle engines.

It establishes a new standard of excellence in marine motor construction.

Its new features are striking and their practicability is at once apparent to one who is looking for a superior machine.

Address Cushman Motor Co., 2018 N St., Lincoln, Neb.

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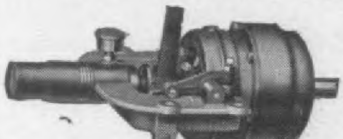
Reverse Gea

"THE GEAR FOR INSTANT ACTION" made by GIES B



You can easily yourself; clutch slips; smooth and in action. GIES making gears for s His gears are famou

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514 Wayne County Bank Bldg., - Detroit,

The Rajah Spark Plug Hood

"RAJAH"

Ignition Absolutely Sure.

Have stood the test for three years without any change in construction, none being found necessary.

No other Spark Plug made can show such a record.

QUALITY IS OUR MOTTO

PERFECTION
Marine Motors

2½ H. P.

$55.00

Sold on the "square deal" plan—we replace free of charge any engine that does not give absolute satisfaction.

1, 2 and 3 CYLINDERS.

2 to 12 H. P.

With Full Boat Equipment

Our prices include full boat equipment. Write for Catalog.

THE CAILLE PERFECTION MOTOR CO.,

1308 Second Avenue, Detroit, Michigan.

S & B MARINE ENGINE

The simplest and most efficient marine gines on the market to-day. Highest workm ship and finish. Write for circular about

6 H. P. 2-Cycle Marine Moto

SMITH & BALDRIDGE MACHINE

69 Amsterdam St. Detroit, Mich., U.

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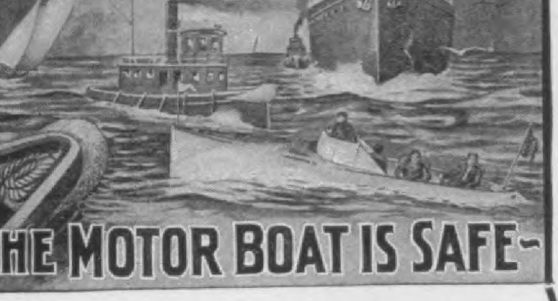


hen equipped with a Roper Safety ropeller. It is instantly respon- ve and absolutely controllable at l times and under all conditions— n be started, stopped, started gain, forward or backward, with- t jerk, jolt or jar; can creep, ide, speed, go at any pace desired, either direction, at the will of e man at the lever.

The ROPER Safety Propeller

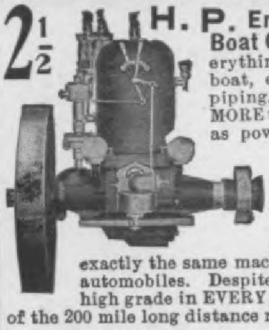
Only one man and one lever neces- ry to operate it. The control is mar- lous, the action accurate and reliable, there need be no mistake and no nning into danger.

No need to throttle the engine and sk its going dead. There is never a oment when the boatman is not aster of the boat if it is equipped with e **Roper Safety Propeller.**

"In response to your inquiry, I will say that I like your new propeller very much, after trying it about one month. I formerly used a steam engine on my launch on Lake Sunapee, N. H., but changed to gasoline a little more than a year ago. Now, the gasoline engine, with your propeller, gives me the flexibility and ease of control that the steam used to give, but without the disadvantages of steam. It is a great invention for launch owners and I can heartly recommend it,"—H. C. Clapp, M. D., 334 Commonwealth Ave., Boston, Mass.

The Roper Safety Propeller makes e racing of the engine impossible, akes the boat run smoother, saves achinery and may save boat and oatman.

Fr... Roper Safety Propeller is positively



$2\frac{1}{2}$ H. P. Engine with complete Boat Outfit (not bare) everything ready to install in your boat, except gasolene tank and piping. Guaranteed to develop MORE than 3½ h.p.—in fact it is as powerful as most 4 horse-power engi $67

1, 2, 3 and 4 Cylinders
2½ to 40 h. p.

We have the largest plant in the w devoted exclusively to building 2-c engines, (5 stories high) equipped exactly the same machinery used in building the high g automobiles. Despite their low price, Gray Motors are stri high grade in EVERY feature. Write today for interesting of the 200 mile long distance race on Lake Erie, also 1908 catalog.

GRAY MOTOR CO. 28 Leib St., Detroit, Mi

E. H. KELLOGG & CO.

OILS.

243 South Street, N. Y.

Putnam Motors for 1908

Air and Water Cooled Types. For Auto., Launch and Motorcycle. Also Full Sets of Castings. 1½ to 40 H. P. One to Eight Cylinders. Putnam Carburetors, 4 sizes.

PUTNAM MOTOR MFG. CO.
57 Lebanon Street Springfield, Mass.

The "Triumph" Reverse Gears

Triumph Gear Co., 6th and Congress streets, Detroit, Mich., lately placed on the market a reverse gear designed by Walter G. Morley, who is the main factor in the company. The gears and pinions are of high carbon steel, cut on an automatic cutter and hardened. Pinions run on large studs and are bronze bushed. The gear case and cover are also bushed with large wide bronze bearings. Exceptionally large bearings have been provided thruout and are lined with special anti-friction metal which is lubricated and will not cut the shaft if the bearing should run dry. All gears and pinions run in oil.

The reverse band, which is cam operated, is of large dimensions. On the full speed ahead position drive is thru a multiple disk clutch of the automobile type. The gears are then in mesh but do not operate. The clutch is connected directly with the engine shaft, which eliminates the need for couplings and extra shafts and prevents disalignment of the gears.

The Triumph gear can be operated from the right or left and from any part of the boat. Four stock sizes are made, ranging

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Thermoid Brake Lining

Positively Will Not Burn—Lasts Indefinite

IT IS

Absolutely Reliable

Manufactured by **TRENTON RUBBER MFG. C**

Principal Distributing Points

NEW YORK	CHICAGO	BOSTON	PHILADELPHIA	LOS ANGEL
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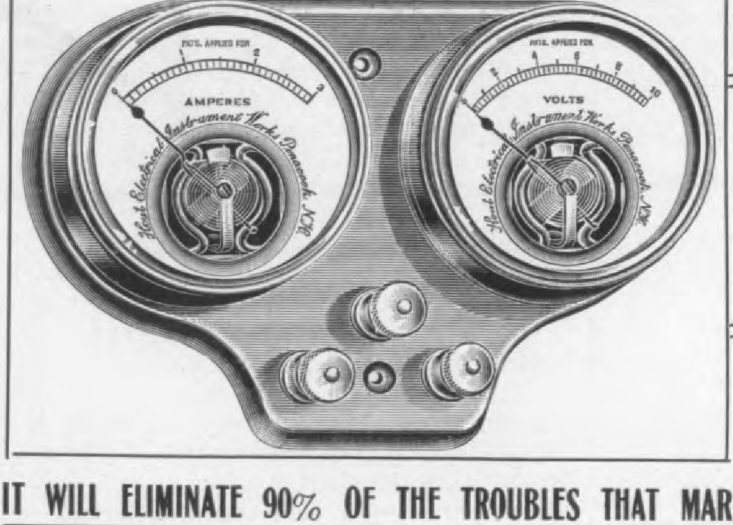
THE HOYT SYSTEM OF TESTING IGNITIO



Will tell you if there is trouble

With your Batteries
With your Coils
With your Vibrators
With your Commutato
With your Spark Plug
With your Wiring

—It will increase the—

Efficiency of your Engine
The Life of your Batteri
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IT WILL ELIMINATE 90% OF THE TROUBLES THAT MAR THE PLEASURE OF THE AUTO

IT WILL TELL YOU AT ALL TIMES THE MILEAGE REMAINING IN YOUR BATTERIES

When you install new batteries it will tell you whether they are reasonably pe and correctly installed. Our new bulletin T. J. just issued is **Free** for the ask

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FRANKLIN

Does it pay to own a heavy automobile?

Figure it out. Get the weights of a dozen of the best-known 5-passenger touring-cars. See them weighed yourself. The 5-passenger Franklin Type D weighs under 2200 pounds. The other makes weigh on the average a third more.

That means they use up a third more horse-power, a third more gasoline, and a third more tires, doing the same work as Type D. More gasoline than that, because the air-cooled Franklin engine gets more power out of the gasoline.

Another thing: There is less strain on Type D—or any Franklin. The Franklin does not jolt and rack itself. It lasts longer. It has 4 full-elliptic springs and a laminated wood frame. It has no water-cooling weight and complication. It is easy to ride in; easy to handle, strong, and safe. You can use all the power. The Franklin carries the same load on American roads further in a day than any heavy automobile.

The price of Type D is $2850, yet in six months it costs less than a heavy automobile bought at a considerably lower price.

The Franklin Type G family touring car at $1850 and weighing 1600 pounds does more work and costs less to use than any 2000-pound automobile. The 6-cylinder, 7-passenger Franklin Type H costing $4000 weighs only 2600 pounds and is more economical to maintain than the average 5-passenger, 4-cylinder machine.

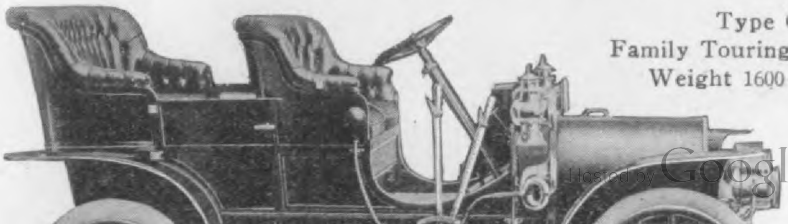
With a heavy automobile you cannot get the benefit of the excessive operating cost.

Is it good business to pay for useless weight?

Write for the catalogue describing Franklin models.

H H FRANKLIN MFG. CO. Syracuse N Y

Member Association Licensed Automobile Manufacturers



Type G
Family Touring Car, $1850
Weight 1600 pounds

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Hints on Care of Tires

BY WELL-KNOWN MAKERS.

(Continued from page 69, April number.)

The tire manufacturer has had many perplexing problems to solve and for a score of years kept experimenting, changing the quality of the materials used and seeking for better rubber until the present perfected tires resulted. However, much trouble is still experienced and the makers at least have decided that this trouble is directly due to the users and not to tire materials or construction. One trouble breeder has been the enormous weight of the large seven-passenger limousine cars, the limit of the weight of which was probably reached this last season. Manufacturers are now endeavoring to reduce this excessive weight, not only because tire makers objected, but because the popular demand is now for lighter weights and less expensive cars to operate.

The following pertinent suggestions are given by the Goodyear Tire & Rubber Co., Akron, Ohio. The best way to determine the proper tire pressure is to get a good gauge, and inflate the tire with it. But don't stop there; put the gauge on the valve once in a while and find out whether the tire actually carries the proper inflation at all times. This company believes that tires should always be kept pumped up until there is no perceptible depression where the tire touches the ground when the car is without passengers. Remember, however, that a big thick walled tire will show little depression under a heavy load even though the air pressure is too low for safety. Appearances are, therefore, somewhat deceptive. To make absolutely safe, get a good gauge—and use it.

WORN TREADS.

As soon as the tread wears down until the fabric is exposed, the tire should be immediately removed and sent to the factory for retreading. Otherwise the fabric will soon be destroyed and the tire permanently injured in consequence.

When embedded in rubber and not subjected to strains or weakened by bending as above, the fabric used to reinforce the tire will retain its strength indefinitely. As soon, however, as the rubber is removed and moisture from the road is permitted to penetrate, the fabric begins to disintegrate and in an incredibly short time its strength and resistance are gone forever.

Here are a few trite Goodyear warnings: Air costs nothing. Use plenty of it. Avoid curbstones. They are hard on tires. If tire bolts are used, keep them tight. Keep water out of the inside of the case. See that there is plenty of clearance between fender and tire. Never allow the weight of the car to rest on deflated tires, even over night. Don't turn corners at top speed. Make repairs at once—delay is costly. Don't let the car slide down hill. An extra tube will save a lot of time fixing punctures.

CARELESS USE OF CHALK.

With the modern up-to-date tire much less chalk is necessary than with the earlier tires. The insides of the shoes are now comparatively smooth and do not require the inside canvas protectors which were formerly used. An excessive amount of chalk is apt to agglomerate, forming a hard lump which will injure the inner tube. Careless dumping of chalk into the shoe with the expectation of its spreading by rotating the wheel is therefore a bad practice and may result in injury. A better method is to rub the tube with a soft rag that has been dipped into the chalk, getting on sufficient so the inner tube will slip in easily and not adhere to the inner shoe after running. Great care should be taken to prevent any particles of sand from getting into the shoe, as it will cut like a knife and very rapidly spoil the inner tube. Be careful not to carelessly pinch the inner tube, as this is probably next to punctures the most common cause of deflated tires. With the modern detachable rims, however, there is very little excuse for this, the chief danger being pinching under the head of stay bolts. Such an injury is patched in a similar manner to a puncture, care being taken to get a patch large enuf to completely cover the injured part. The edges of the patch should be thoroly chalked to cover the excess cement which may extend beyond the edges of the patch.

Much of the tire trouble can be traced to hurried and careless repairs made on the road. The growing use of the entirely demountable rim is, however, largely correcting this as the spare tire and rim can be instantly slipped into place and the injured tire repaired at leisure.

The Healy Leather Tire Co. give the following good advice in regard to excessive wear on the tires and this applies even if the rubber tread is protected by an extra covering of flexible puncture-proof leather.

"Excessive wear on the tires may be avoided by starting the car as gradually as possible so as to avoid the spinning of the wheels, which grinds away the tires. Equal in importance to this is the application of the brakes in slowing up. They should not be put on too hard so as to cause sliding of the tires. As far as possible, allow the car to slow up gradually before coming to the point where stop is to be made. The brakes should be adjust-

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cut in a very short time. The front heels should be looked to to see that ey run true, as this is one of the most mmon causes of wear on tires. Overading and speeding a car, while necesry in a great many cases, should be oided as far as possible. The lugs must kept as tight as possible. After the es have been run, the bead works down to place and the lugs become loose, but they are set up tight again they will reain so."

Dr. T. J. Cooper, inventor of the "Fearaught" punctureless, non-collapsible pneuatic tire, says: "The most serious dame done to tires is due to excessive speedg, overloading, stiff clutches, misuse of e brakes, and driving over newly metaled ads with the full power of the engine erating at the road wheels. Such abuses ind off the rubber of the tread faster an many miles of travel. Rusty and arp rims cause much damage. Rims ould be filed smooth and kept well paint or rubbed with a paste containing ench chalk and black lead. Another use of tire deterioration is allowing em to stand unprotected for a long time the strong rays of the sun, which over-

as rubber cuts much more easily wi wet than dry. A tire should never be u after the canvas begins to show throu the rubber tread, but should be sent the manufacturer or repair shop to be paired immediately, and in all cases wh it is possible repaired tires should used on the front wheels, as, they will g better satisfaction."

As cars are now being prepared for road close attention should be given rims and jammed or defective ones placed, as rims are cheaper than ti See that the rims are properly painted have all the small cuts in the tires canized. Carefully roll up separately spare inner tubes with the valve stem the outside of the roll. While pumping one tire don't let the weight of the rest on the other deflated tires, and all means use a gauge and know that y tires are properly inflated.

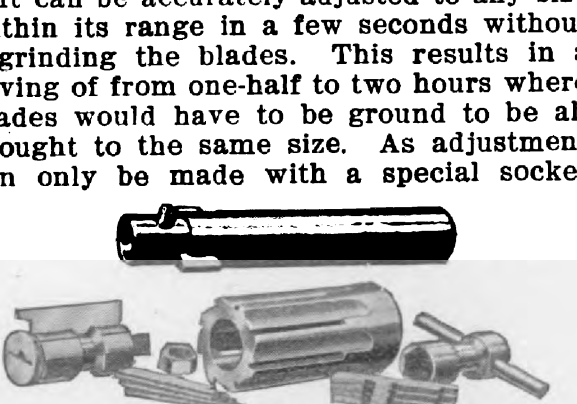
In conclusion, if the readers have c fully read the tire information here gi and will in any degree follow this adv unquestionably less trouble will be from tires and their term of active serv will be materially lengthened.

he Smith One-Lock Adjustable Reamer

An adjustable reamer of apparent merit made by William H. Smith Company, 0-422 State Street, New Haven, Conn., hich because of its simplicity and other mmendable features, has gained favor in e automobile and similar industries.

The Smith Adjustable Reamer.

It can be accurately adjusted to any size thin its range in a few seconds without grinding the blades. This results in a ving of from one-half to two hours where ades would have to be ground to be all ought to the same size. As adjustment n only be made with a special socket



or reamer, a cam bolt and a lock nut. shell or body is formed of one piece, bo and slotted to receive the cam bolt blades. The cam bolt has an angu sleeve to engage and lock the blades their adjusted position. The blades held rigidly against the hardened cam faces of the bolt by angular lugs engag the cam bolt sleeve. The blades be seated in the ends of the shell slots, also firmly supported laterally by the cial form of the shell.

Adjustment of the blades is from the tre outward or inward, effected by a rot movement of the cam bolt. The blades main longitudinally fixed, leaving the fr of the reamer free from obstructions reaming to the bottom of the hole. adjusting parts are housed within the b of the reamer, being thereby protec from grit or injury. The outer body of reamer is deeply fluted, leaving plenty chip room.

For compensation and alignment, reamer is made a floating fit on the ar To give strong driving contact, the s is left full diameter at the back All parts are interchangeable.

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Stilson Six

One of the recent entrants into the motor car industry is the Stilson Motor Car Co., Pittsfield, Mass., U. S. A., builder of the "Stilson Six," one chassis only being made, but fitted with various types of bodies giving several models. This machine is high grade, both in material and workmanship and contains many minor deviations from the usual practices, all of which, however, tend toward comfort and reliability. The location of the maker in the hills of western Massachusetts gives exceptional opportunity for trying out the car on strenuous work, and as each and every machine is demonstrated to be satisfactory under these adverse conditions it is but natural to suppose that the "Stilson Six" will make light work of the less trying road conditions which are usually met.

CHASSIS SPECIFICATIONS.

The motor is of the six-cylinder type, cylinders cast separately with integral water jackets. The bore is 4 11-16 ins. and the stroke 5½, the engine being rated as 50-60 H. P. The valves are located on opposite sides, are interchangeable, mechanically operated and as noiseless as it is possible to make a valve. Ignition is by high tension magneto and also as a reserve a full set of coils and storage batteries are installed. A special oiling system is used which will be described later. The wheels are of the usual artillery type, second growth hickory, 34 or 36 ins. in diameter and are fitted with clincher or Marsh quick detachable rims. 4 in. front tires and 4½ in. rear of any American make, constitute the tire equipment. The wheel base is 123 ins., tread standard.

Drive is by means of shaft and bevel gears and a three speed and one reverse sliding gear of selective type. A double set of brakes of internal and external type are fitted to the rear wheels. The standard body is of side entrance tonneau touring type, seating seven passengers and is ironed for top. The car with this body completely equipped weighs 3225 lbs. and sells for $4500. The equipment consists of two large acetylene headlights, B. & L. mirrors, generator, two square oil side lamps, oil rear lamp, whistle operated by foot lever, footrest, robe rail, pump, jack and full kit of tools. With limousine body the car sells for $5500.

THE POWER PLANT.

The motor, which is the vital part of any self-propelled vehicle, is a very compact, neat looking and powerful piece of mechanism, the very neat appearance being due largely to the fact that the multiplicity of small pipes, wires and linkages have been localized and carried thru conduits or other means which protect these small parts and keep them from cluttering up the engine. The six 4 11-16x5½ in. cylinders develop 60 H. P. at 1100 R. P. M. The base of the engine is an aluminum casting which forms the pan and also the engine support and rests on the sub frame, which is of the usual channel section prest steel, the narrow space between this sub frame and the main frame being filled by a thin sheet metal pan so that it is impossible for any road dirt or splash to enter the space underneath the hood. This case is divided in a horizontal plane, the lower half, as usual, forming simply an oil pan with three large hand holes on the under side covered by plates. The main bearings are of babbitt seven in number, and hung from the upper half of the case.

The cylinders are good examples of foundry work with symmetrical valve chambers on opposite sides, well provided with water jacket space, particularly around the exhaust valves. The tops of the valve chambers are fitted with screw plugs with castellated tops and are tapped to receive the spark plugs. The valves are 2 1-16 ins. diameter with 7-16 in. lift and are made with integral heads and stems with large fillets. The usual helical springs are used for closing them, the lower end of the springs resting on a flanged washer, the lip of which prevents an ordinary straight pin placed thru the stem of the valve from coming out of place, thus retaining the springs. The valve lifting rods are fitted at their lower ends with 1 1-16 in. diameter hardened steel rollers ½ in. wide, the rollers themselves working in slots in the valve lifting rod housings and thus preventing the lifting rods from turning. The guide housings are of bronze and are held by two cap screws each to suitable bosses on the crank-case, while the lifting rods, contrary to usual practice, are made of Shelby steel tubing, pack hardened and ground.

A neat arrangement for excluding dirt consists in making the top of the valve lifting rod guides in the form of inverted cup-shaped caps which move up and down with the lifting rods and are a sliding fit over the outside of the housings. The cams are of special contour fastened to the shaft by means of two pins each. The cam shaft runs in four bearings which are arranged as follows: a large bearing is placed at each end and two others are placed between the two sets of cams so that each end of each bearing comes outside of a cam and supports the same. The six throw crank shaft is cut from a solid bar of chrome nickel steel with a six-inch integral flange at its rear end, which by means of eight ⅝-in. cap screws and two dowel pins carries the 16-inch, 60 lb. flywheel. The connecting rods are H-section drop forgings, the lower cap being held by four Vanadium steel thru bolts with two

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; of bronze. The crank pin bearing is of bbitt of liberal dimensions. The wrist is of Shelby steel tubing, pack hard-ed and ground and prevented from side p by two set screws which pass thru e piston bosses into the hollow inside the pin and have a bent wire placed thru les in their inner ends to prevent them m coming out, this method being one of e simplest and most effective known. e pistons are of standard design, good ality, of gray iron and fitted with 4 rings ove the pin.

The gears at the forward end of the en-ne are enclosed and packed in grease, e crank shaft gear being of steel while e cam shaft gears are a combination of onze and fibre for quiet running. A gitudinal shaft on the left side of the

and of varying cross section to correspo with the volume of the exhaust gases be disposed of. The intake manifold peculiar, being a special patent of M Stilson and is so designed that it claimed the volume of gas conveyed each of the six cylinders is equal. T general layout of this intake can be se in the accompanying photograph of t right side of the engine. The design such as to minimize the effects of iner of the body of gas in the pipe, this bei accomplished by making the distance each of the six intake chambers equal.

A 23-gallon gasoline tank is suspend from the rear of the frame and suppl by pressure from the exhaust pipe th the usual reducing valve placed on t dash under the hood. About ten miles

Fig. 1. The "Stilson" Limousine which is claimed to be an absolutely noiseless 6-cylinder, 60 H. P. car. T otor is 4 11-16 bore by 5½ stroke, cylinders cast separately. Double ignition from Simms-Bosch high tensi agneto and accumulators and multiple unit vibrating coil, the latter being entirely closed in the hollow ca uminum dash which also contains an integral oil tank with window. 34 or 36-inch wheels, choice of Ameri res, selective sliding gear on Timken bearings, 22 gallon gasoline tank at rear of frame, extra long spring heel base 123 inches, tread, 56. Price fully equipped, $5500.00.

gine is driven from a small steel gear its forward end from the cam shaft and erates the magneto and the pump, which of centrifugal type.

The carburetor is a large size Schebler ed with a special balanced throttle of e company's own make.

Cooling is effected by means of this mp and a honeycombed type of radiator ich is claimed to be exceptionally ef-ent, so much so that the car can be run thout the use of any fan, although a all brass bladed fan on ball bearings is ovided, the fan support being held to the

the gallon is claimed for this mach which is extremely good for a six-cylin car of this weight. The aluminum da by the way, deserves special mention as serves the double purpose of a dash a a series of compartments, one of whi being cast integral with it, forms an tank. The dash is cast in a curved fo the back being neatly fitted with mahog and also forming a compartment for coil. The dash proper is clear of appara with the exception of a small hand pu to supply air pressure to the gasoline f when starting and a small window in

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the bearings, the overflow being suf-
ient to maintain the splash in the case
ich takes care of the cylinders. In the
of the connecting rod is a small cup
aped hollow which catches the splash
d conducts the same thru an oil hole to
wrist pin bearing and also thru holes
the inside of the hollow wrist pin from
ich place it runs to the ends, thus giv-
additional lubrication to the cylinder
lls.

IGNITION.

gnition is by means of jump spark, cur-
nt being furnished either by ten dry cells
by Simms-Bosch high tension magneto.
e battery and plugs are over the intake

of the usual helical spring of about
lbs. tension. The clutch shaft is carr
backward into the change gear case, wh
is of aluminum, but contrary to the us
custom is cast in one piece but the ge
are accessible as the top forms a la
hand hole cover. The gears provide th
speeds forward and one reverse and
selectively operated. The drive is dir
on the high, the gear reduction being
or three to one at the rear axle, as desir
The sliding members move on four integ
keys on the sliding gear shaft. The sha
are mounted on Hess-bright bearings, th
shafts being removable by unscrewing c
at the ends of the case. Gears of 6 pi
in width and 8 pitch in depth are us

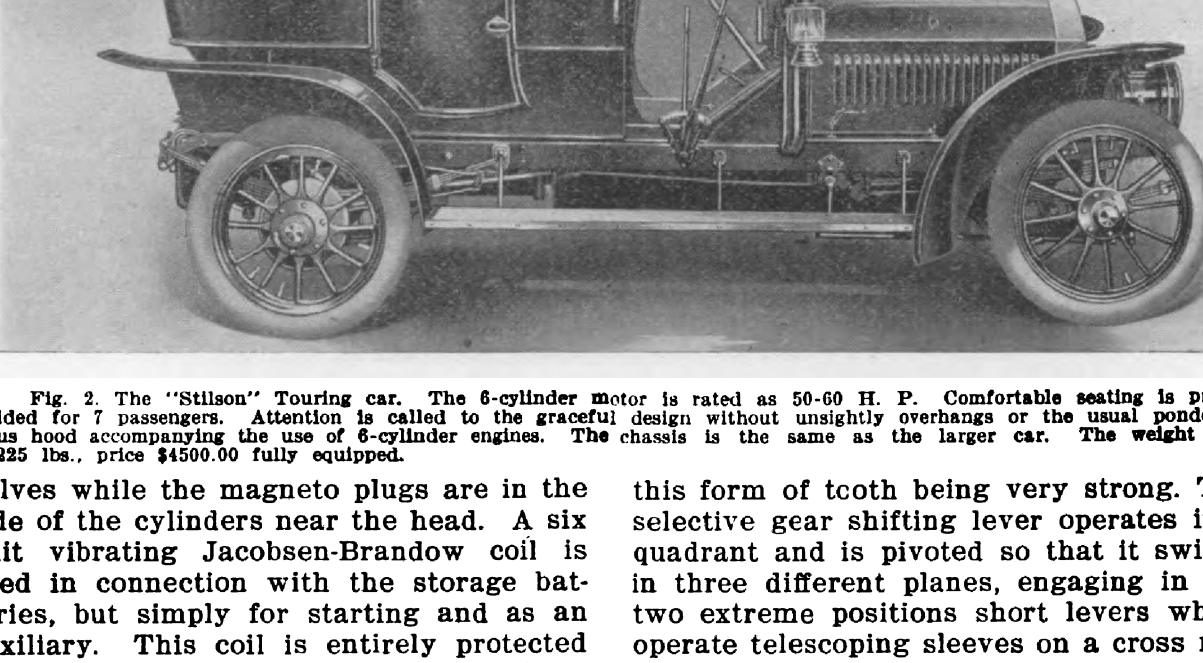

Fig. 2. The "Stilson" Touring car. The 6-cylinder motor is rated as 50-60 H. P. Comfortable seating is p
ded for 7 passengers. Attention is called to the graceful design without unsightly overhangs or the usual pond
us hood accompanying the use of 6-cylinder engines. The chassis is the same as the larger car. The weight
225 lbs., price $4500.00 fully equipped.

lves while the magneto plugs are in the
le of the cylinders near the head. A six
it vibrating Jacobsen-Brandow coil is
ed in connection with the storage bat-
ries, but simply for starting and as an
xiliary. This coil is entirely protected
om the weather by being placed in a
mpartment within the curved cast alum-
um dash, but is accessible by means of a
all swing door. This new coil has sev-
al distinctive features, among which may
mentioned a micrometer adjustment of
e vibrators, this adjustment being so
ranged that either the spring contact
the screw contact point may be entirely
moved and replaced without spoiling the
justment. The coil is made up in the
it type so that each part can be re-
oved as desired. No external wires are

this form of tooth being very strong.
selective gear shifting lever operates i
quadrant and is pivoted so that it swi
in three different planes, engaging in
two extreme positions short levers wh
operate telescoping sleeves on a cross
the sleeves being provided with arms
their inner ends which connect with
gear shifting rods. The gear case
mounted on four integral arms to the
frame on which the engine is also pla

FRAME AND SPRINGS.

The frame is of usual type, consisting
channel section prest steel, narrowed
the front and the sub frame is of sim
material and construction and extends f
the forward end to the extreme rear of
change gear case. Semi-elliptic spri

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ckled at their rear ends.

DRIVE BRAKES AND AXLES.

ower is transmitted from the gear case ı the universal-joint shaft to a full float- rear axle. Two new Hartford univer- joints are used, one at each end of the ing shaft. The rear axle construction itted with ball bearings thruout and is l trussed, the design being such as to eve the live axles of the weight of the

There are two pedals, one controlling t service brake and the other operating th clutch. The emergency brake is controlle by the outside hand lever, and followin the usual custom, the change gears a also operated in this manner. Spark a throttle lever control is supplied on t of the steering wheel which is of larg size.

The front axle is a one-piece I-sectio

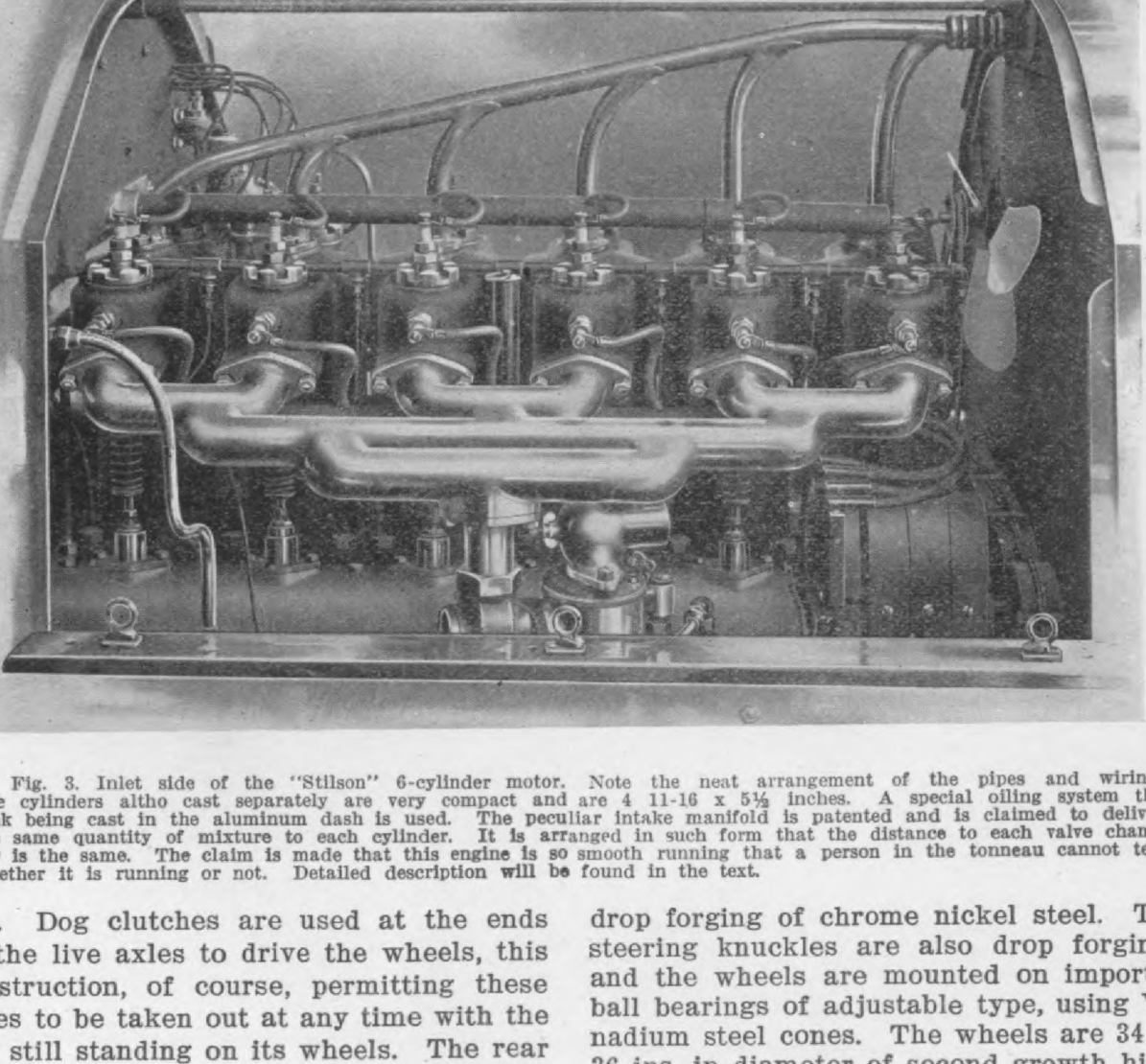

Fig. 3. Inlet side of the "Stilson" 6-cylinder motor. Note the neat arrangement of the pipes and wiring e cylinders altho cast separately are very compact and are 4 11-16 x 5½ inches. A special oiling system th k being cast in the aluminum dash is used. The peculiar intake manifold is patented and is claimed to delive same quantity of mixture to each cylinder. It is arranged in such form that the distance to each valve cham is the same. The claim is made that this engine is so smooth running that a person in the tonneau cannot te ether it is running or not. Detailed description will be found in the text.

. Dog clutches are used at the ends the live axles to drive the wheels, this struction, of course, permitting these es to be taken out at any time with the still standing on its wheels. The rear eels are each fitted with two brakes, expanding and the other contracting. h of these brakes are entirely independ- of the clutch. The outside or service ke is a camel-hair belting lined, double- ing contracting band, while the inside or

drop forging of chrome nickel steel. T steering knuckles are also drop forgin and the wheels are mounted on import ball bearings of adjustable type, using V nadium steel cones. The wheels are 34 36 ins. in diameter of second growth hi ory and fitted with 4 in. front and 4½ rear tires, the choice of any standa American make being given. The steeri gear is somewhat out of the usual ord consisting of a nut working in a ra which in turn operates a spur gear at t

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ig. 4. Stilson Six. View showing the rear of the ow cast aluminum dash, door to the compartment and aining the six unit vibrating coil is open so any unit be removed. This arrangement makes the coil abso- ly waterproof. The oil tank is at the right side and integral with the dash. It has a window showing the level. The small hand pump is for initial pressure on large gasoline tank at the rear of the car.

ering gear is the fact that all thrust is ken on ball bearings.

grade and the workmanship exceptiona good. The finish is what it should be o high grade machine, heavy fenders webb to the frame being used and well support to the running boards. Trunk racks, ro rails, foot rests and other minor neces ties of touring are arranged for. The is said to be extremely easy riding and specially good hill climber and one of t chief points claimed for it is the fact th the engine is so smooth running and w balanced that it is impossible for perso sitting in the tonneau to feel any vib tions from it or hear it. The muffler is special design and extremely efficient, tirely silencing the exhaust so that the is practically noiseless.

A new form of clutch which has recen been patented and here described and lustrated for the first time will be used the new cars.

The object of this device is to autom cally insure an easy starting of the independent of the operator, and it claimed that it serves very much the sa purpose as a change of gears in the sta ing operation, and that there is no seri heating of the oil under such conditions

Crown Motor Carriage

The Crown Motor Vehicle Company, th factories at Amesbury and Boston, ss., and Boston office at 23 Motor Mart, rk Square, has just placed upon the mar- a new carriage type automobile, which s several distinctive features. This new hicle owes its origin to a combination of erests. Mr. W. A. Shafer, well known the New England distributer of the de cars, is the president of the com- ny, and Mr. J. R. Graves, president of Graves & Congdon Company, of Ames- ry, well known, high grade automobile ly designers and builders, is the secre- y of the company, and Mr. Frank Dodge, chanical engineer and designer of auto- tic machinery, is the treasurer.

The bodies for the new vehicles are built the Amesbury factory, while the engine d other mechanism are constructed in ston.

ENERAL ARRANGEMENT AND SPECI- FICATIONS.

tected from road dirt and also provid protection for the wearing apparel of la operators.

Tiller steering is employed, the lever ing placed in front of the right-hand oc pant. The motor is of the two-cylinder, posed, air-cooled type, having a bore 4⅜ inches, stroke 4 inches, and devel 12 horse-power actual. All parts of t motor, which is of special design, are terchangeable, and as it is located in rear of the body and not under the seat is very accessible. It is mounted on three-point suspension, and drive is means of a shaft running forward to a ja shaft carried on an aluminum cross me ber attached to the side frame memb of the carriage, and at the centre of t cross member an integral aluminum ho ing carries the bevel gear pinion and s gear differential. The usual sprockets fitted at the ends of the jack shaft drive to the rear wheel sprockets by me

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during easy riding qualities. The wheel
base is 74 inches, the wheels being of spe-
cial design, using the Sarven patent, and
30 inches in diameter, fitted with 1⅛-inch
solid rubber tires, and are mounted on
large ball bearings. The transmission is
of special type, and will be described later.
It provides two speeds forward, and one
reverse, operated by an inconspicuous hand
lever conveniently located at the driver's
right, and by two foot levers.

THE MOTOR.

The motor, which is comparatively light
in weight and fitted with ample cooling
ribs, has all mechanically operated valves,
which are interchangeable. Cooling is as-
sisted by fan blades placed on the peri-
phery of the fly-wheel. The method of sus-
pension consists of two points on the en-
gine proper, suitable brackets being ar-
ranged on the cylinder ends and bolted to

effectively preventing it from [illegible]
or coming out. The main bearings are
of white brass, 2½ inches in length
1⅝ inches in diameter. The crank
is a high carbon drop forging, the
wheel being keyed on a taper seat on
forward end of the engine shaft, a
longation of which enters a two-s
planetary change gear, and is then
tended into the bevel gear housing on
channel section aluminum jack shaft
member support. The pistons are
gray iron, provided with three diago
split and pinned rings placed above
wrist pin.

A Schebler carburetor is used, an
placed at the rear, slightly below the
gine, in an accessible position, this
rangement always insuring a sufficien
gasoline in hill climbing, as the four-ga
galvanized iron fuel tank is forward o

The Crown Motor Carriage. Motor, two cylinder opposed, air cooled, bore 4¼, stroke 4 12 brake hor
power. The motor is cross-wise under the body at the rear, drive is by side chains. Weight 800 pounds, Pric
fully equipped, $775.

the side frame members, while the forward
end of the main shaft is supported in the
rack shaft cross member support, giving
a flexible, three-point suspension for the
power plant. The valve cages are so ar-
ranged that they can be quickly removed,
each bearing being held by a suitable yoke
and one bolt. The connecting rods are H
section drop forgings, with hinge caps at

engine under the left of the seat.
usual arrangement of cam shaft in th
per part of the crank case is empl
and a special roller contact timer; o
Coste type, is carried at the rear e
this shaft, where it is easy of access.
timer is provided with a light alum
dust cap.

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LUBRICATION.

cells are claimed to be unaffected by water, and the terminals are so arranged that they cannot jar loose. A single vibrating coil is used, but arrangements are made, as there is an extra spark plug hole in each cylinder, for using a double ignition system, if desired.

THE CHANGE GEAR.

The change speed mechanism, as before stated, provides two speeds forward and reverse. It consists of a two-speed spur gear planetary arranged on the engine shaft immediately forward of the fly-wheel. The low speed is obtained by means of a contracting band, while the high speed is provided by means of a metal plate clutch fitted with cork inserts, the entire device then rotating as one piece and simply adding its weight to that of the fly-wheel. The continuation of the driving shaft is carried forward into the bevel gear housing. At this point, two bevel gears on the ends of the live jack shafts mesh with the main bevel pinion. At one side is a spur gear differential, and at the centre of the jack shaft is a movable dog clutch, which is held in contact with the left bevel gear at all times by means of a spring, thus providing a forward drive, the speed being low or high according to the planetary. However, for reverse a slight pressure on the lever moves this dog clutch to the right, engaging the other bevel gear, which ordinarily runs free on the jack shaft, thus giving a reverse drive. As soon as the lever pressure is relieved, the clutch immediately engages, so as to drive the car forward. The reduction in chains to the rear wheels is 4 to 1 to 8 to 1, the rear sprockets being rigidly fixed to the wheels by means of band clamps, which encircle every other one of the spokes. The sprockets are so arranged that they can be easily replaced, and all sprockets will be made interchangeable. Adjustable length radius rods extend from the spiders which hold the brake shoe pivots to the outer ends of the jack shaft hangers. The jack shaft and hanger are arranged to slide forward or backward on the under side of the flat surface of the angle steel frame, and can be rigidly clamped in any position, thus providing a means of adjusting the chains. A square section slip is provided in the main driving shaft to allow of this motion.

CONTROL.

The control is extremely simple, consisting of a single side lever at the right of the seat, the forward position of which controls the high speed, and one pull backward disconnects the high speed clutch, and pushing the lever further backward produces the reverse. The right foot lever applies the internal expanding leather-lined brakes in the rear hub drums, which are in reality a part of the sprocket assembly. These brakes are cam expanded. The other foot pedal, which is to be operated by the left foot, controls the low speed forward by means of a contracting band on the planetary. A small spark and throttle lever projects slightly above the arm of the right end of the seat, so as to be conveniently operated by the thumb and finger. These are rigidly retained in position, but have a very small arc of movement at the upper end, so that they are easily operated by one hand. Steering is by means of a tiller, which is hinged at a point on the floor boards approximately in front of the driver. In the end of the handle, conveniently located for operation by means of the driver's finger, is an electric button for ringing the bell.

RUNNING GEAR.

The axles are a combination of wood and steel of the fan-tailed type, well known in carriage construction. The middle portion of these axles is spread and narrowed toward the ends. On top of this metal axle a wood bed is clamped, making a very light but rigid axle construction. Wood reaches are used, well braced at the ends. The yokes at the ends of the front axle are integral with it, and so arranged that the steering pivots are at a point very close to the centre plane of the wheels, making the steering easy. The cross connecting link is back of the front axle. The connections to the lower end of the steering tiller are by means of levers, no racks, bevel or worm gearing being used.

The full elliptic cross springs are perched on top of the axles, and rigidly held with solid double clips, and the body is supported at both ends from a cross hanger, each end of which is flattened out into a long support bolted to the under side of the angle steel side frame members, while the centre of this cross support is clipped to the centre of the cross spring. The front and rear supports are alike, except that the one in the rear is somewhat heavier, as the engine weight is carried mainly in this place.

BODY AND EQUIPMENT.

The body is Crown special type, very light in appearance, and with a carriage finish. The seat is extra wide, and very roomy, so that two grown persons and a child can be comfortably accommodated. The dash is of the regulation patent leather buggy type, without devices of any kind.

The equipment consists of top, two oil side lamps, bell and battery, no tire pump or tire repair outfit being necessary. The vehicle complete weighs about 800 pounds. Fully equipped and ready for the road, the price is $775, f. o. b. Boston, Mass.

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BAILEY'S

"WONT SLIP"

SKIDDING

That **one**
[**terrifying moment** when
if your car had been equipped with

BAILEY'S
"Won't Slip" Tires

The **accident** would not have **occurred.** Moral: "Do it now" and you will **avoid** such **accidents.** You see them **everywhere.** Ask the **rider,** he knows. For sale by all **dealers** in **every part of the world.**

There is no **metal** in the Bailey Tread to **heat** the tire, **pull** loose from the rubber or tear the **road bed.** The **rubber studs** of the Bailey Tread are the **true** principle that give **perfect traction** and prevent **skidding.** They are to the automobile what the **rudder** is to **the ship.**

TREAD TIRES

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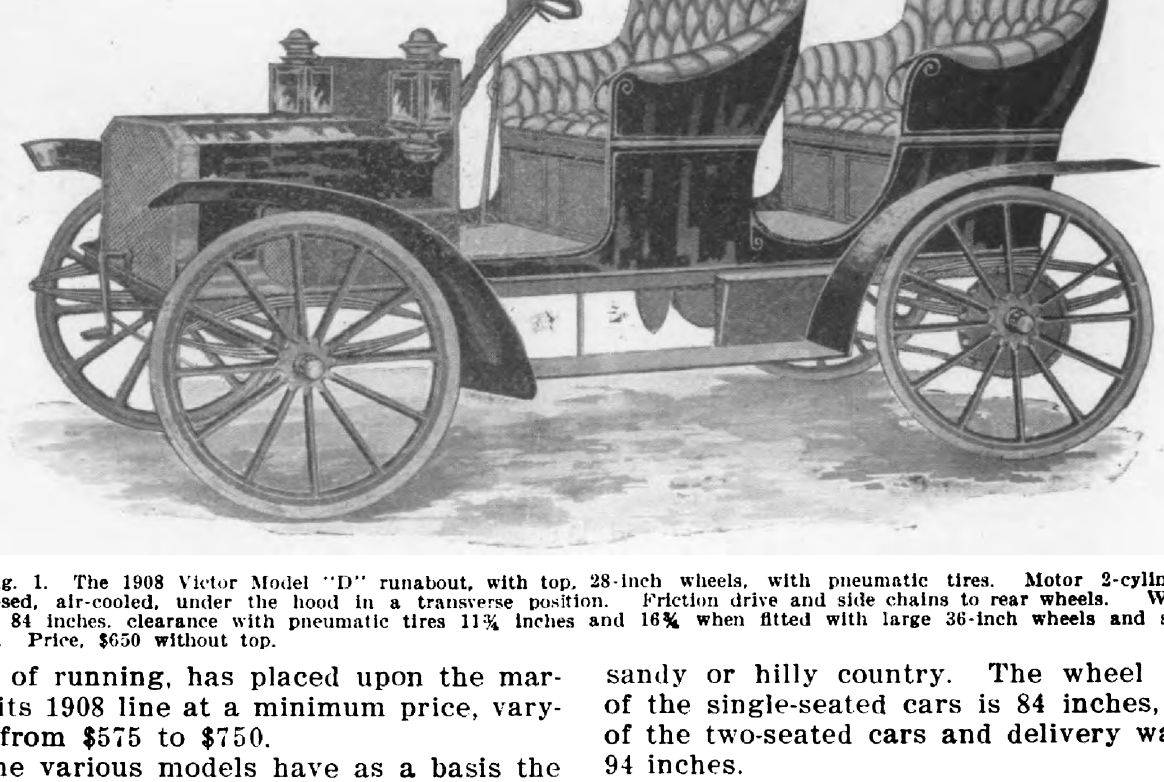
N.B. The extra cost of the Bailey

Write us for descriptive booklet.

s, Mo., still impressed with the idea the automobile that is destined to hold ermanent place in the economic life of people of this country is not the elab- e, cumbersome and expensive type, ch heretofore served only as a luxury the rich, but a machine that will travel ctly the same roads, do exactly the e work and do it at the very minimum

are removable, leaving a light top an protective front. A small delivery ca Model H, is also arranged on the sam chassis, price $650. This rig is suitabl for light delivery and for collection mail.

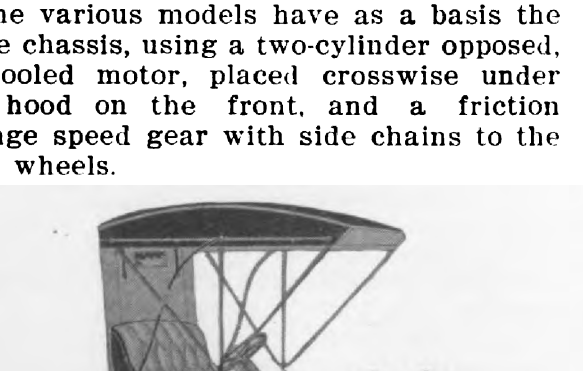
The machines are said to be able t make 30 miles an hour and negotiate easil



g. 1. The 1908 Victor Model "D" runabout, with top, 28-inch wheels, with pneumatic tires. Motor 2-cylinder sed, air-cooled, under the hood in a transverse position. Friction drive and side chains to rear wheels. Wheel 84 inches, clearance with pneumatic tires 11¾ inches and 16¾ when fitted with large 36-inch wheels and solid Price, $650 without top.

of running, has placed upon the mar- its 1908 line at a minimum price, vary- from $575 to $750.

he various models have as a basis the e chassis, using a two-cylinder opposed, ooled motor, placed crosswise under hood on the front, and a friction ge speed gear with side chains to the wheels.



g. 2. 1908 Victor Model "F." Same chassis spe-

sandy or hilly country. The wheel bas of the single-seated cars is 84 inches, an of the two-seated cars and delivery wago 94 inches.

THE POWER PLANT.

The motor is two cylinders, oppose with valve in the head, all mechanicall operated. The cylinders are of high grad air-furnace iron, with flanges of extrem depth to insure perfect cooling. All port are bored and ground to size. The pi tons and rings are of the same materi and ground to gauge. The crank shaft machined from a solid billet of low carbo steel, case hardened and ground. The can shafts and push rods are of machine stee also case hardened, and all run in oi The connecting rods are of phospho bronze, with Parsons white bronze bea ings. The valve cages are easily remov able for inspecting and grinding th valves. The carburetor is of the usua float-feed automatic type.

Ignition is by jump spark from two set of dry cells. Oiling is by force feed wit sight feeds on the dash.

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test of its cooling ability.

THE FRICTION CHANGE SPEED GEAR.

The oblique view of the chassis, Fig. 3, hows the general arrangement of the ower plant and friction change speed.

The motor is set slightly on an angle, so s prolonged crank-shaft extends back-ard and slightly downward, and carries t the end a plate faced with aluminum gainst which the fibre-edged transversely ovable friction wheel operates. This heel, as usual, is splined or feathered to e jack-shaft, which has a differential at ne side and drives to the rear wheels by de chains. These chains are 1 in. x ½ in. iamond, with 9-16 in. rollers, and are ested to 5000 pounds. This arrangement, f course, provides all speeds forward and

car complete weighs about 900 lbs. fitted with two seats. The bodies are ished in colors to suit. The seats ar inches wide, expanding to 42 inches the top, and are generously upholstere leather. A large carrying space is vided in the runabout body at the rear

The prices are f. o. b. St. Louis and clude two brass oil lamps, horn and t Brooks' Automobile Handbook is also g each purchaser in addition to the reg card of instructions. Tops and sea lights are extra.

Mora Company's New Plant

The Mora Motor Car Company, N ark, N. Y., is moving into its new p the main building of which is of brick mill construction, 406x60 feet, two sto high, with full skylight roof. It is loc on seven acres on the Northern Cen Railroad, giving exceptional facilities

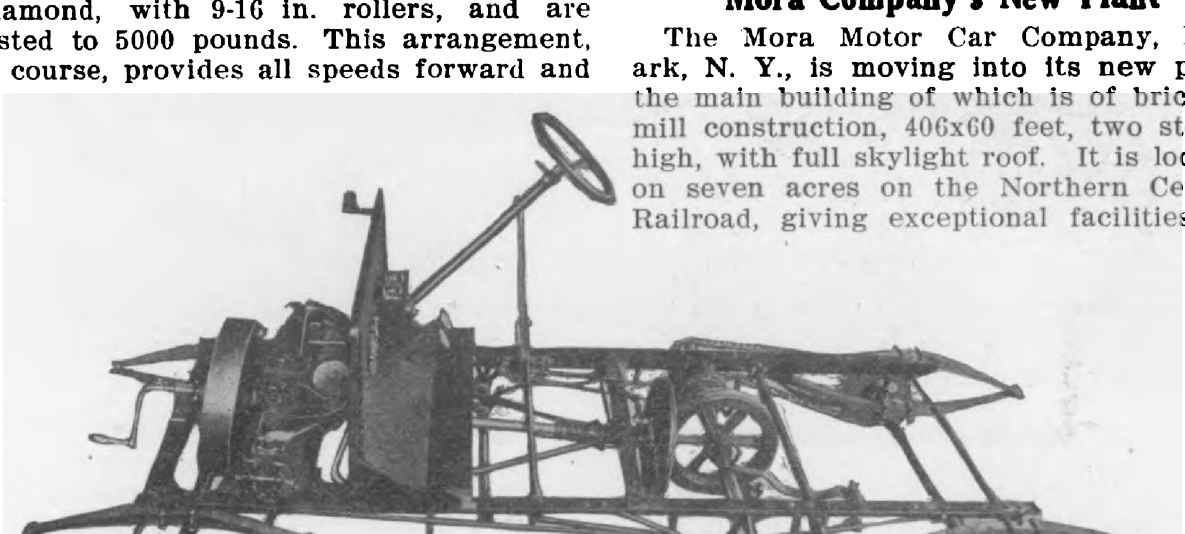

Fig. 3. Chassis of Victor "Hand-Forged Automobiles," showing 2-cylinder opposed motor under the hood the front, arrangement of friction driving wheel and disk chains to rear wheels and full elliptic springs around.

everse, and is easily operated by a single de lever and one pedal. The usual spark nd throttle control levers are under the teering wheel.

The internal expanding brake of the Vic-or is self-contained, and always concentric ith the brake-drum, so that when the rake is set it clutches with equal force e entire circumference of the drum, and hen released does not drag.

For 1908 both front and rear axles are section, giving a light, rigid construction. he wheels are 36 inches in diameter, of rtillery type, fitted with 1¼-inch solid ubber tires, giving the machine 16¾ ches clearance. Low wheels, fitted with 3-inch pneumatic tires, can also be had, e rig having a clearance of 11¾ inches

shipping. A special siding has graded down so the floors of the cars be on a level with the factory floor testing house, with doors the entire len with pits back of each, the pits being f with automatic ventilators, is a featu

An isolated building of concrete b for the heating plant is built at the end of the building next to the rail which allows of coal being dumped the car to the fire-room. The blacks shop is just beyond the boiler house, lating such work from the main buildin

Plans are made for other building be located parallel with the first building, and when completed the sev buildings are to be connected by a b ing across the south end.

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made its appearance on the market, is design of Mr. E. T. Birdsall, the en-eer of the company. The president of Selden Motor Vehicle Co. is the well-own patent attorney, Mr. George B. Sel-, of Selden patent fame.

ings which fit into the front and rear the I-beam axle and are bolted thru. T springs are all of the semi-elliptic ty the forward springs being 40 in. long 2 in. wide, banded and shackled at the re The rear springs are 50 inches long by

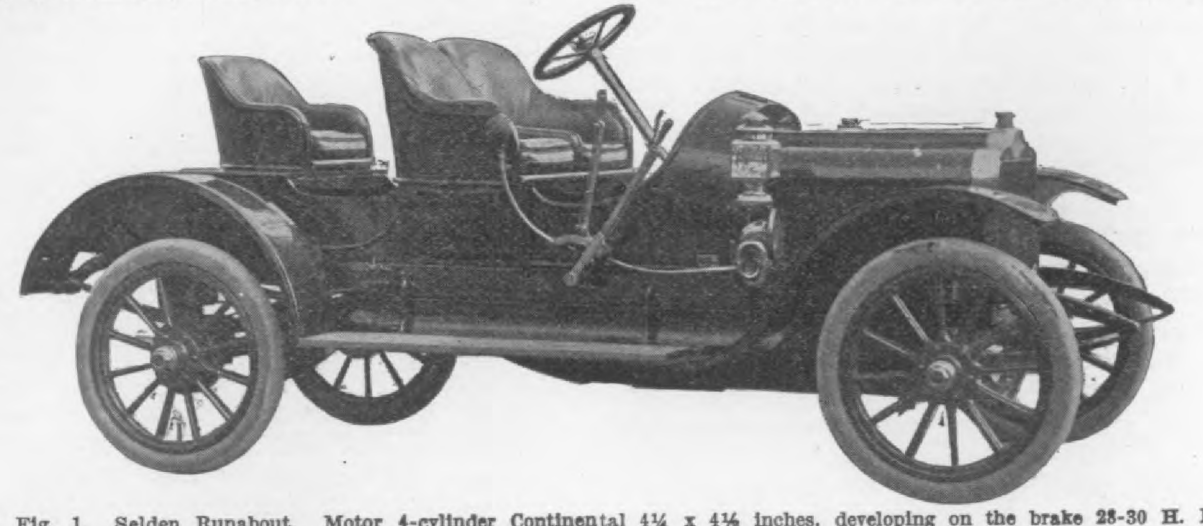

Fig. 1. Selden Runabout. Motor 4-cylinder Continental 4¼ x 4½ inches, developing on the brake 28-30 H. ree speed selective sliding gear, shaft drive. Wheel base 109 inches. Metal body straight line type seating fi ad clearance 10 inches, geared to rear axle 3½ to 1. Price $2000.00.

MODEL 25.

This car has a 4-cylinder special Conti-ntal engine, made to specifications of Selden Company. The cylinders are t in pairs with valves on one side, the e is 4¼ in. and the stroke 4½, the en-e being rated at 25 H. P. The regula-n Continental 3-ring clutch of bronze l steel is used, and a 3-speed selective

in. wide, shackled at the rear only. B brakes are on the rear wheels and are ranged in a similar manner to those the larger car.

No radius rods or torsion arm is fitt However, the cardan shaft housing is constructed and connected to the rear a housing that it acts as a torsion arm.

The steering gear is of the adjusta

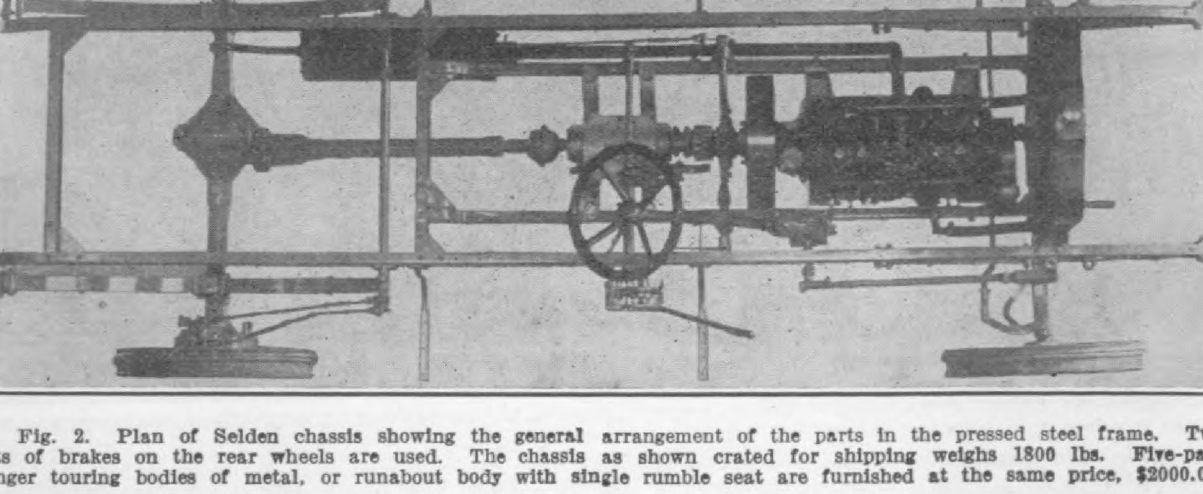

Fig. 2. Plan of Selden chassis showing the general arrangement of the parts in the pressed steel frame. T s of brakes on the rear wheels are used. The chassis as shown crated for shipping weighs 1800 lbs. Five-pa nger touring bodies of metal, or runabout body with single rumble seat are furnished at the same price, $2000.0

e speed gear is used, the lay shaft be-below the main shaft. This is housed an aluminum case supported by four

nut and screw type. The cross steering is in front of the axle, but well raised fr the ground. The clearance of the car

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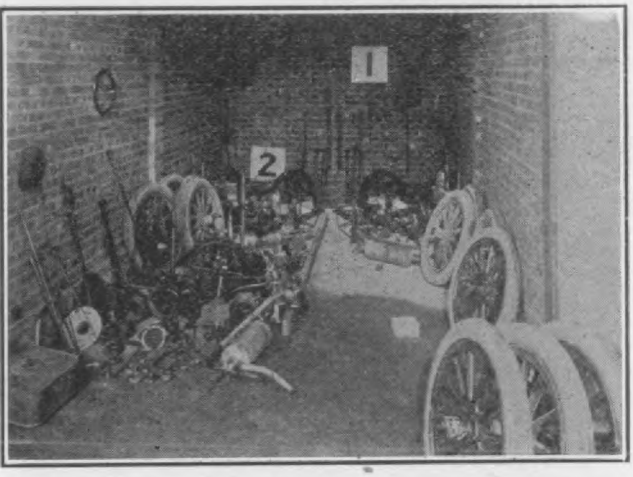
this bracket being supported on the front of the forward cylinder.

The wheel base of this car is 109 in., tread standard. Bodies will be supplied to suit the purchaser. The equipment consists of oil lamps, mats, horn, tools, tire, repair kit, etc., but does not include a top or headlights. The price of this machine, with either a metal 5-passenger touring car body or a runabout body, fitted with single rumble seat at the rear on a tool chest, is $2,000.

Remarkable Test of Interchangeability

What is probably the most severe test of standardization of the parts of a motor car were recently carried out by the Royal Automobile Club of London, Eng., on three Cadillac runabouts. The performance was carried out at the instance of the Anglo-American Motor Car Co., of London, British agents for the Cadillac product, to establish beyond a question the absolute standardization of the parts of these cars.

Three 10-horse power runabouts were selected at random from stock by the mechanical committee of the R. A. C. These cars were run under observation to the Brooklands track and there driven for



Parts of the three Cadillac Cars indiscriminately mixed.

fifty miles. The cars were then taken to pieces under the eyes of R. A. C. inspectors, the parts mixed indiscriminately, some withdrawn, and new ones from stock ordered to take their places, divided into three piles, and from these three new cars were assembled. On re-erection, not only did the motors start on the first turn of the handle, but all three machines successfully completed 500 miles on the Brooklands track at an average speed of 34

eral Superintendent of the Motorcar pany of Detroit, died at his home, Commonwealth Ave., that City, Mo morning, April 6th, after a week's s gle with pneumonia. Mr. Carter wa inventor of the friction drive for use automobile and the Carter car bear name.

Byron J. Carter, Vice-President and General Super ent of the Motorcar Co., who died April 6th, week's illness with pneumonia. Mr. Carter is with the introduction of the friction drive for mobiles.

He was actively identified with th dustry from its inception in Michiga ginning his experiments in 1887. He two machines and organized the Ja Automobile Company to build this In 1903 he resigned as General Manag work out his ideas on friction dr which resulted in the formation o Motorcar Company. He leaves a wif three children to mourn his death.

Salt Lake City Building Trac

Work has already begun on a big ci mile and a half automobile track a Lake City. The new track will be lo on the wide sandy shores southeast Saltan Beach and will be construct gravel and oiled shale. The track w 60 feet wide on the turns and 75 fe the straight-a-ways. At intervals o feet around the track huge reflector tric arc lights will be placed, making racing possible.

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On November 20th, 1907, Stevens

s has been well known in the trade some months, Mr. Hiram Percy Maxim Mr. T. W. Goodridge have been en- ed in the production of a new electric which was to have entirely new fea- s. This car has just made its appear- e, and in several details it is a strik- departure from conventional electric iage designs.

e first thing which attracts one's at- ion in the construction is the surpris- freedom from underneath mechanism. s effect is the result of using a worm wheel drive in place of the customary on and gear and sprocket and chain, in this respect the car marks a new arture in electric vehicles. All elec- s on the market to-day use either pin- and gear drive, or a combination of rs and chains, which makes the reduc- double.

WORM DRIVE.

uch has been written lately upon the at advantages which the worm drive sesses for the transmission of a motor

structors to the worm and worm whe drive has heretofore been the question loss, due to the working action being e tirely a sliding one instead of approximat ly a rolling one, as in the case of gear The irreversible feature of the commo worm has also been a hindrance to its f vorable consideration. With the ordinar type of worm and wheel these objection unquestionably hold, and the drive woul not be at all practical on a motor car, bu the makers of this car claim that all thes objections have been entirely overcome, a shown by the working of the car. It claimed the car moves so easily that it wi start of itself under the action of even slight wind or down grade unless one the two brakes are set.

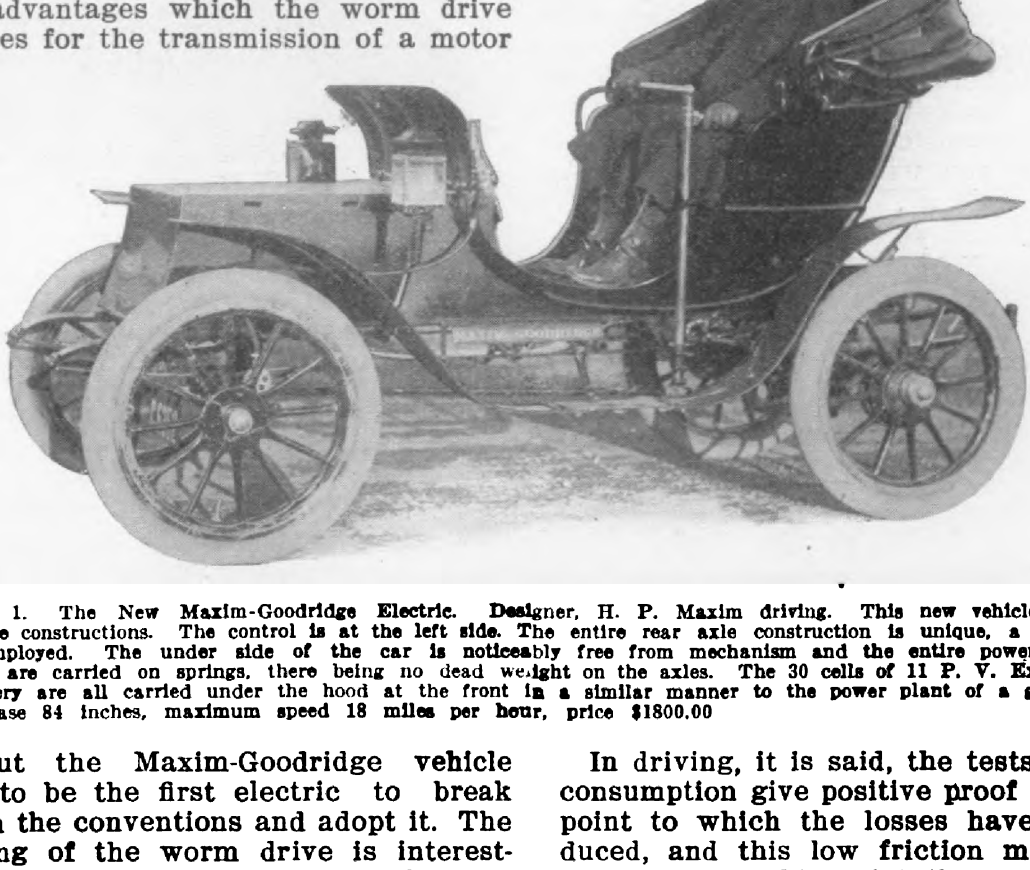

Fig. 1. The New Maxim-Goodridge Electric. Designer, H. P. Maxim driving. This new vehicle has many nctive constructions. The control is at the left side. The entire rear axle construction is unique, a worm drive g employed. The under side of the car is noticeably free from mechanism and the entire power plant and eries are carried on springs, there being no dead weight on the axles. The 30 cells of 11 P. V. Exide forming battery are all carried under the hood at the front in a similar manner to the power plant of a gasoline car. el base 84 inches, maximum speed 18 miles per hour, price $1800.00

but the Maxim-Goodridge vehicle ms to be the first electric to break ugh the conventions and adopt it. The nting of the worm drive is interest- as will be seen from Fig. 2. The elec- motor has its armature shaft prolonged the worm mounted directly upon it. worm wheel is supported in a separate sing which is divided vertically, and at- ed directly to the end of the motor. stub shafts of the differential project ugh this housing, as shown. This drive

In driving, it is said, the tests of pow consumption give positive proof of the lo point to which the losses have been r duced, and this low friction means slo wear, and on this point the makers sta that there is the best reason to belie that the life of the worm and wheel wi be indefinite. It is completely housed from dust and mud, runs continuously oil, and requires absolutely no adjustmen The worm is made of steel and harden and the worm shaft and motor armatu

ifferential stubs with the rear wheel hubs.

Fig. 2. Rear view of Maxim-Goodridge electric showing rear axle construction. The weight of the carriage is irely supported by the dropped solid axle and not by driving mechanism. The transmission is by worm l wheel driving thru universal joint-shafts to the wheels. e driving mechanism is supported on the carriage ings. Electric side and tail lights are used. For cial construction see text.

p-and-down motion of the body is allowed r by the universal joints. For average ads these shafts are, approximately, in straight line, and only on jounces and ecoils is there any motion in the joints. he rear axle is offset to allow for the

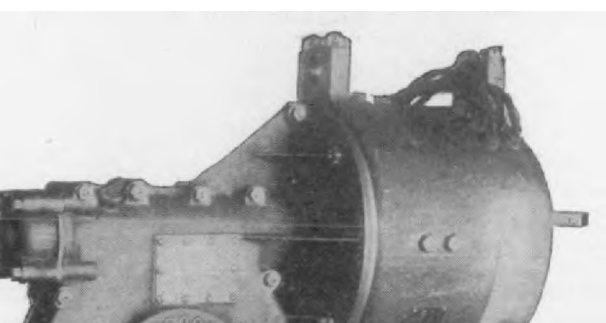

Fig. 3. The Motor and transmission of the Maxim-odridge Electric forming a compact unit.

earing of the universal joints, and except

pneumatics. In this new car it would s
that the chances of success with s
tires would be greatly augmented. In
ing in the car equipt with solid rubber t
the only difference noticed is that a sl

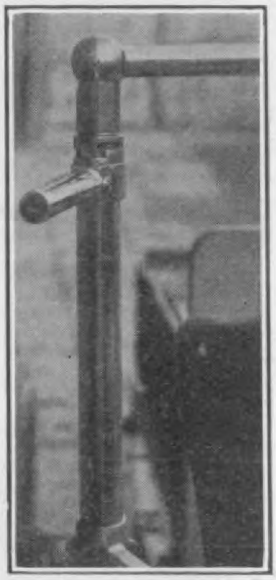

Fig. 4. Control levers of Maxim and Goodridge el car, showing the controller handle mounted on the ing post below the steering lever in which positi does not take up any seat room as when placed a side of the seat. Steering is from the left side.

noise is heard when crossing street tracks and similar sharp bumps.

The riding qualities, however, are no all different from what they would with pneumatics, and aside from hear it is doubtful if one could tell what l of tires were fitted. This is the re of the long springs, and the loading of the weight where it is supported by springs.

Another of the striking features of unique vehicle is the way the batteries carried. There are 30 cells of 11PV Ex and all of them are placed under a f bonnet, the same as the power plant gasoline machine. The makers do claim that this arrangement is followed cause it is a feature of approved gaso car design, but because it is the only in which the weight can be carried equ upon both front and rear axles. In r types of electric cars, where batteries carried at each end, the rear tires are quired to carry some 60 per cent. of total weight, and at the same time do the driving. In the Maxim-Goodridge the weight is just 35 lbs. more on the wheels when two passengers are in seat, than is the weight on the f wheels. This is claimed to have an

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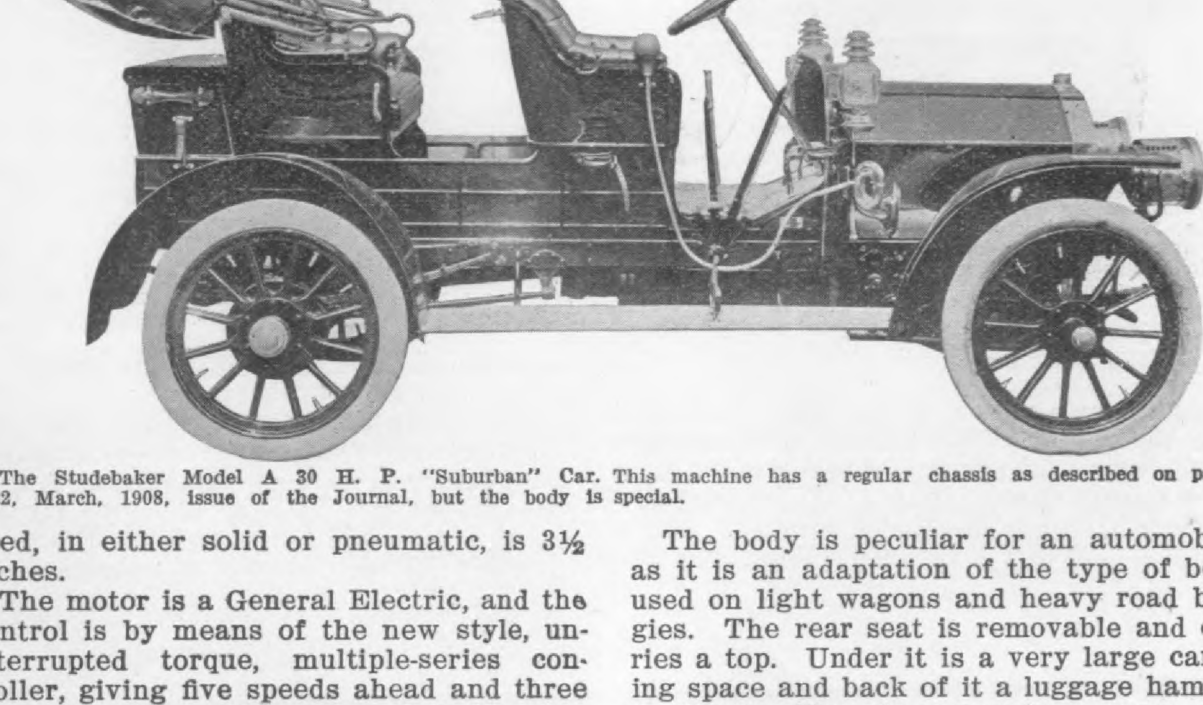
ndle is mounted upon the steering post st below the steering lever, as shown in e cut. This handle is stated to be more nvenient to operate than the convenonal style side lever, and entirely avoids e mutilation of the cushion and the occaonal dangerous catching of garments.

There are two brakes fitted, both conolled by foot levers projecting upwards rough the floor. One brake operates up- the rear hubs and one upon the motor aft. The wheel base is especially long, ing 84 inches, which materially adds to e ease of riding. The diameter of all ur wheels is 32 inches, and the tires

dium between the runabout and the to ing car, combining the smartness and light weight of the former with the ex seating capacity of the latter.

To meet this demand the Studeba Company has introduced its "Suburba This is a thirty-horse power car with chassis identical with that of Models A a H, but having seating capacity for f persons. The body of the car is consid ably shorter than the body of a regu touring car of the same horse power, the car presents an exceedingly smart pearance as shown by the accompany photograph.



The Studebaker Model A 30 H. P. "Suburban" Car. This machine has a regular chassis as described on p 2, March, 1908, issue of the Journal, but the body is special.

ed, in either solid or pneumatic, is 3½ ches.

The motor is a General Electric, and the ntrol is by means of the new style, unterrupted torque, multiple-series conoller, giving five speeds ahead and three verse. The maximum speed is 18 miles r hour. The mileage on one charge of e battery, with either solid or pneumatic res, is fifty on ordinary road surfaces, d, of course, much more on good city vement. The weight of the car is 2,100 s. with the battery mentioned, and corspondingly less with smaller battery and mpler body. The chassis is entirely selfntained, and any type of body is supied for especial purposes, although the andard is the Victoria-Phaeton shown in e illustration. The price is $1,800.00.

Japan is fast catching up to the Western rld in civilization. In regard to the recognin of the supremacy of the automobile in

The body is peculiar for an automob as it is an adaptation of the type of b used on light wagons and heavy road b gies. The rear seat is removable and ries a top. Under it is a very large ca ing space and back of it a luggage ham is fitted. The rig presents a very n appearance.

The receivers' report covering th transactions for the Pope Mfg. Co. dur the month of March shows a big incre in the cash balance. The total recei for the month amounted to $179,614 which includes $166,756.58 from sa made by receivers. The cash disbu ments for the month amounted to $1 429.11.

The decision made by Judge Buffing in the lower court in favor of the defe ants in the case of the G & J Tire Co. the Pennsylvania Rubber Co., which volved the G & J patents on the clinc

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Manufacturers Distributing Company

DETROIT, MICH.

Terms: Cash with all orders under $10.00; over this amount, cash with order or 25% cash, balance C. O. D. or D. B. L.

Our Reference: First National Bank, Peoples State Bank, Dime Savings Bank

Automobiles—New Detroit, 5-passenger touring car, shaft drive, double opposed motor, under hood, 22 H. P, wheels 30 x 3½, complete.... $750.00
Automobiles—New Detroit, divided seat, runabout, otherwise same as above..... $750.00
Automobiles—1906 Pope-Toledo touring car, equipped with seat covers and top. Finished in red, with red upholstering to match. Original cost $4,500.00..... 1,200.00
Automobiles—1906 Baker Victoria Electric. In first class condition. Batteries good for season without any battery expense. Original cost $1,600. Used a season and a half. Net price..... $600.00
Automobiles—1906 Oldsmobile touring car. Equipped with top, speedometer, extra storage battery, Prest-O-Lite gas tank, extra tire (new), just completely rebuilt and put in first class condition..... $1,200.00
Automobiles—1905 model G Cadillac 5-passenger touring car. Equipped with top..... $1,000.00
Automobiles—1904 Oldsmobile touring car, model T. 4-passenger capacity. Equipped with top..... $450.00
Automobiles—1906 Oldsmobile Limousine 1,750.00
Axles—40 Cadillac model L front, each.. $20.00
Axles—76, rear, bevel drive, complete with hubs, spring seats, brake drum, internal and external brakes, with bell crank, suitable for cars up to 2500 lbs., each $70 00
Axles—82, front, Lemoine pattern with hubs, bearings and connecting rods, tubular pattern, each..... $15.00

Bodies—10, model K, Cadillac runabouts painted and upholstered, each.....$37.50
Bodies—48, model M, Cadillac Victoria type, painted and trimmed.....$55.00
Boxes—206, battery, wood, size 9½ x 12⅛ x 9, each..... $0.40
Bodies—159, 5-passenger touring car, in prime, each.....$25.00
Bodies—62, 5-passenger touring car, painted to finishing coat, colors, red, gray, Packard blue, each $35.00
Bodies—64, 5-passenger touring cars, completely painted and trimmed, colors, gray, red, blue, ironed for tops, trimmings No. 1 machine buffed leather, spring edge cushions, each.....$65.00
Bodies—28, runabouts, divided seats, with rear rumble seat and tool box, in prime, each.....$31.00
Bodies—1, Northern, rear entrance, painted and trimmed, with top.....$65.00
Bodies—1, Limousine, completely painted and trimmed, ready for finishing coat.....$250.00

Fenders—1906 Cadillac fronts only, per pair. $3.85
Fenders—1907 Cadillac single cylinder, per set 6.50
Foot Rests—Brass, each..... 1.60
Frames—Pressed steel assembled, size..... 17.50
Frames—Pressed steel unassembled, size.... 12.50

Generators—200 medium size, each..... 4.25
Generators—100 large size, each..... 4.75

Lamps—325 pr. square French plate glass, side, oil, pr.....$4.25
Lamps—56 set 9½ in. Flare Bausch and Lomb mirror lens, per pr..... $11.50
Lamps—360 tail small, each..... 1.75
Lamps—270 " large, " 2.40
Lamps—37 pr. 8 in searchlight, barrel pattern, Bausch and Lomb mirrors, per pr.....$12.50
Lamps—25 pr. 6 in. Bausch and Lomb mirrors, per pr.....$10.50
Lamps—10 pr. 7 in. Bausch and Lomb mirrors, per pr.....$11.50
Lamp Brackets—Head forged solid bent or straight, each.....$0.55
Lamp Brackets—Head forged plain adjustable for any car, pr.. .....$1.50
Lamp Brackets—Head forged brass adjustable for any car, pr.....$2.10
Lamp Brackets—Dash forged plain, pr.....$0.55
Lamp Brackets— " " brass " ..... .85
Lamp Brackets—Tail " plain, each.... .12
Lamp Brackets— " " brass " .20

Motors—2 cyl. opposed 5 x 5 with pump $105.00
Motors—4 " vertical 4 x 4½ " " 205.00
Mufflers—Each..... 2.00

Radiators—Cadillac model D, each.....$25.00
Radiators— " " L " 25.00
Radiators—55, for 20 H. P. engine..... 20.00

Seats—Removable revolving folding, pr....$35.00
Springs—240 sets 43 in. and 46 in. x 2, 6 leaves, set..... $5.00
Steering Columns—Complete..... 17.50
Steering Columns— " 20.00

Tires, Standard Makes Seconds

2	32 x 3	Regular	Tread	each	$13.25
63	34 x 3	"	"	"	17.00
14	36 x 4	"	"	"	24.72
2	32 x 4½	"	"	"	27.30
9	36 x 4½	"	"	"	30.75
2	34 x 5	"	"	"	35.70
3	36 x 5	"	"	"	37.70
1	36 x 4	Bailey	"	"	25.85
1	36 x 4	Midgely	"	"	32.92
1	36 x 4½	"	"	"	40.50
3	34 x 5	"	"	"	48.69
1	36 x 5	"	"	"	51.56
2	30 x 3	Dunlop Casings	Universal	"	14.65
5	32 x 3½	"	" "	"	20.24
1	32 x 4	"	" Regular	"	23.36
12	34 x 4	"	" "	"	25.00
7	34 x 4½	"	" "	"	30.59
10	36 x 4½	"	" Universal	"	32.40

Tube, all sizes, prices on application.

Tops—Buick, models F D, 5 complete with 1 piece storm front, each.....$47.50
Tops—Buick, model 10, 3 bow with 1 piece front, each.....$20.00
Tops—Buick, model 10, 2 bow with 1 piece front, each..... 25.00
Tops—Maxwell touring cars with 1 piece front, each.....$47.50
Tops—Maxwell runabouts 2 bow with 1 piece front, each.....$25.00
Tops—Maxwell runabouts 3 bow with 1 piece front, each.....$20.00
Tops—Cadillac M & G touring cars with 1 piece front, each.....$47.50
Tops—Cadillac runabout S-2 bow with 1 piece front, each.....$25.00
Tops—Cadillac runabout, 3 bow with 1 piece front, each.. .....$20.00
Tops—16 Cadillac Victoria runabout, each...$16.00
Tops—Cadillac Victoria type bodies, each...$25.00
Tanks—50 Gasoline, 24 x 15½ x 11 ins., each $3.00
Transmissions—17 Hatcher Sliding Gear $60.00

Wind Shields—Folding plain glass, each....$15.00
Wind Shields— " plate " " 20.00

MANUFACTURERS DISTRIBUTING COMPANY, Detroit, Mich.

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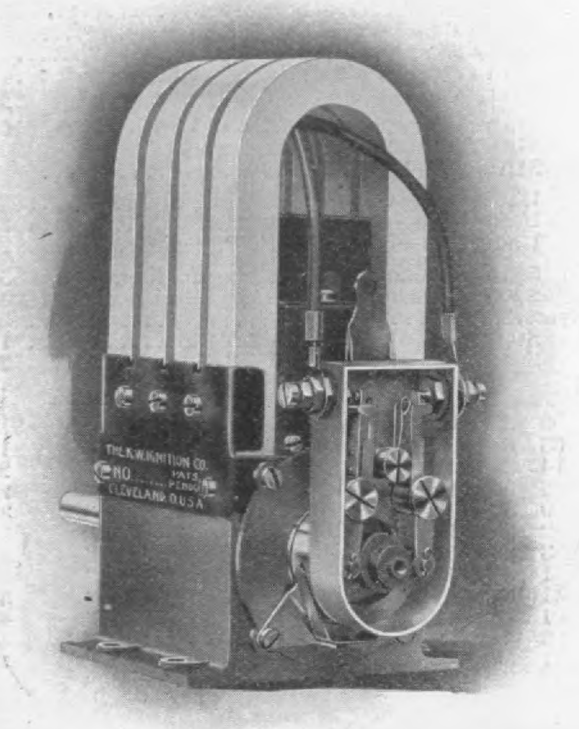
nue, Cleveland, Ohio, has recently add-
to its line of ignition apparatus a new
gneto ignition system, the particular fea-
e of which is that no high tension dis-
utor is used.

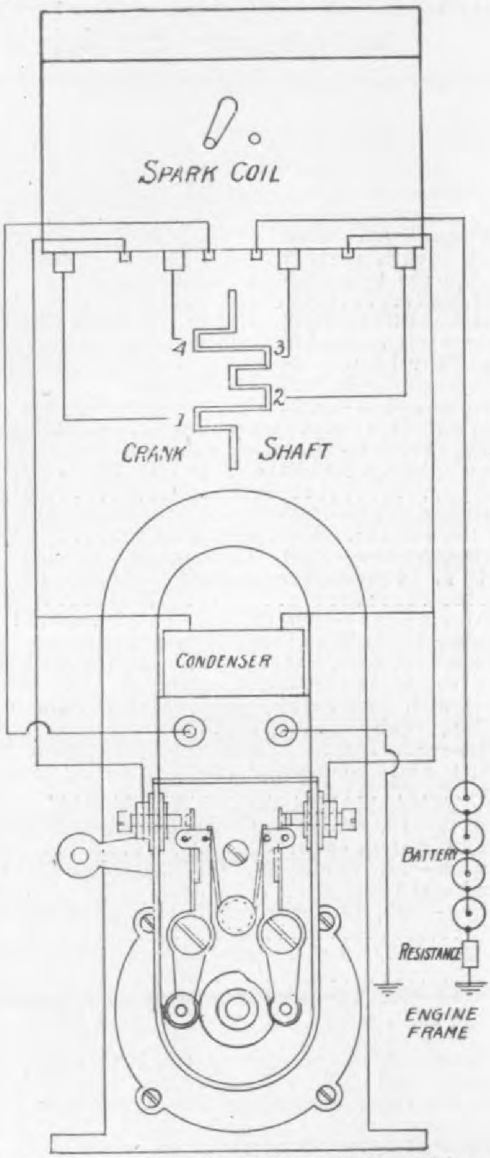
his company has now ready for the
rket the two-cylinder ignition system,
wn as model E-S2, and the four-cylin-
ignition system, designated as model
4, the latter being here illustrated. It
also soon have ready for the market
ix-cylinder outfit designed on the same
eral lines. The magneto is herewith
wn with the circuit-breaker cover re-
ved, disclosing the mechanism. In the
linder outfit a double rocker arm cir-



The New "K-W" Magneto.

t-breaker is used, while in the 2-cylinder
fit only a single rocker arm is employed.
e circuit-breaker is positively operated
a cam on the end of the magneto shaft.
e four-cylinder diagram is merely a du-
cation as far as coil and circuit-breaker
concerned, of the two-cylinder outfit.
the two-cylinder outfit only a single unit
is used to shoot two cylinders with, as
h secondary terminals of the winding
brought out and lead to the spark
gs, so that when the circuit-breaker in-
rupts the current, the spark is delivered
series to both spark plugs at the same
e, which however, will only shoot the
inder which is under compression, as

ders No. 2 and No. 3. The company clai
that if the engine can be cranked over
the rate of about 100 R. P. M. that it c
be started direct from the magneto.
however, the engine is too heavy to cra
over at that speed, the batteries can
switched on for the purpose of startin
The general construction of this magne



Wiring diagram of the new K-W magneto ignition sys
for a 4-cylinder motor.

is identical with all of their other m
netos—that is, it has no moving wir
no commutator or brushes, and runs
high duty ball bearings. The spark can
advanced and retarded by rocking the
cuit-breaker in the usual manner. O
cell of storage battery or two cells of
battery is all the batery power that is
quired to start the engine on, in conn
tion with this magneto ignition syste
The magneto generates about 12 vo

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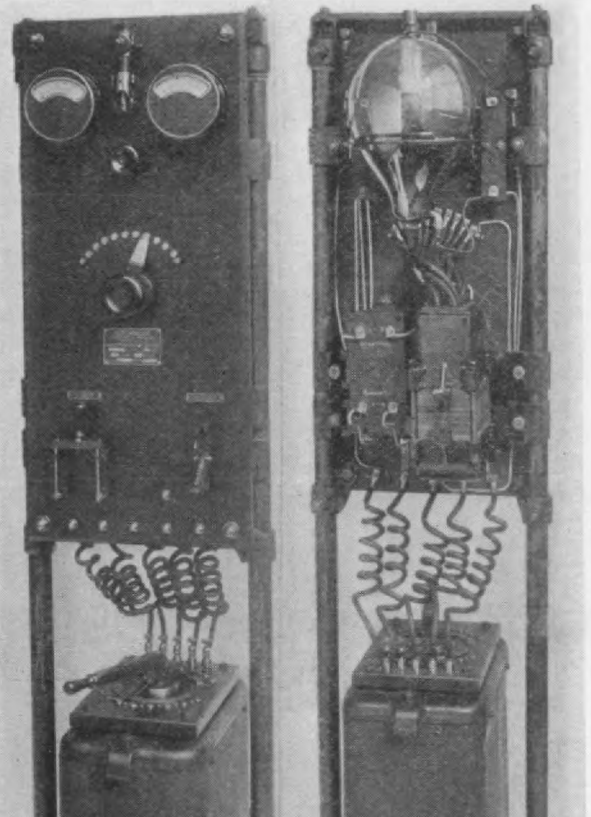
ed extensively for both business and easure purposes, most of them being oused, charged and cared for at neighbor-g garages. The maintenance cost, altho ot excessive, is no doubt decreased very onsiderably when the car is housed and ared for upon the premises of the user.

For users who desire to charge their vn batteries, Studebaker Automobile Co., outh Bend, Ind., the well-known makers electric and gasoline cars, are putting ut a rectifier so that the ordinary alter-ating current from public electric ser-



ront and Rear Views of the Studebaker Mercury Rectifier.

ices may be changed into direct current or charging batteries. This rectifier is of he mercury arc type and in its usual form onsists of a slate panel, approximately 6 inches wide by 36 inches high, arranged or mounting close to a wall, occupying mall space, and equipped with the neces-ary instruments and devices for accom-

vents those current waves which are in the right direction from passing. only renewals necessary are renewals the tubes about once a season.

Ford Special Commutator Bracke

The accompanying cut shows the F special commutator bracket manufactu by the Automobile Parts Mfg. Co., 12 Li ton avenue, Newark, N. J. This bracke designed especially for Models N, R, S, Ford runabouts, and is furnished c plete with full instructions for attach It brings the timer into a horizontal p tion, as shown in the cut, making it

The Ford Special Commutator Bracket.

accessible. This concern also manu tures hoods, tanks, fenders, metal das rumble seats, glass fronts, oil tanks, r netos, storage batteries, carbureters, c commutator brackets and handy auto spection lamps all for Ford runabouts. T. Pearsell, president of this comp was formerly with the Hygrade Motor Co., of Newark. The secretary and tr urer of the company is J. I. Baldwin.

The Jackson Automobile Company just moved into their new building, c pying a floor space of over 200,000 sq feet under one roof, and with an incre force of one-half, which will enable t to turn out 500 cars a month.

The Continental Motor Mfg. Co., of

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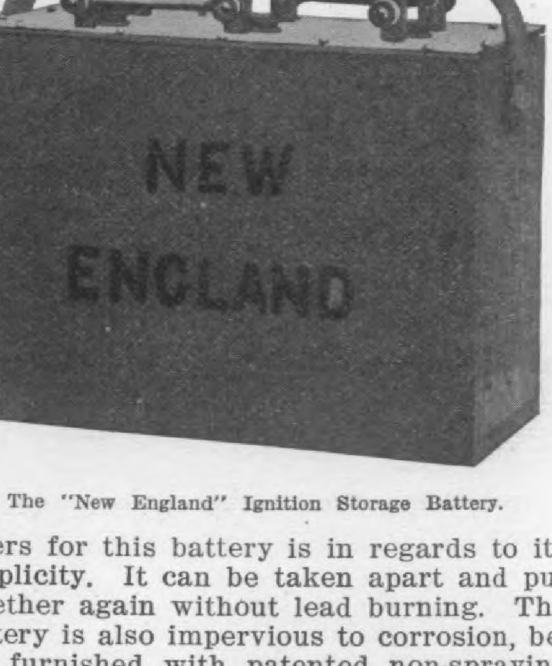
his battery is the product of the New
land Battery Co., of 295 Fountain
et, Pawtucket, R. I., and has been de-
ed specially for automobile, motor boat
gas engine ignition work.
he main claim made by the manufac-



The "New England" Ignition Storage Battery.

ers for this battery is in regards to its
plicity. It can be taken apart and put
ether again without lead burning. The
tery is also impervious to corrosion, be-
furnished with patented non-spraying
t caps. Each individual cell is sealed
a hard rubber cover and then care-
y sealed with a special compound. The
rying case is of quartered oak, held
ether with screws, the whole being
ed in parafin and then given three coats
cid-proof paint. The top of the case 's
finished with a hard rubber cover
ly held in place by screws. The han-
which can be easily taken off, is made
rubber. Antimoniated lead grids are
d in both the positive and negative
es, thus assuring great strength with
high capacity secured from a pasted
of plate.
he plates are entirely insulated with
perforated rubber and ribbed wood
arators, which prevent short circuiting
direct contact. The elements are as-
bled in thick hard rubber cases with
eighth inch lifts on the bottom, which
prevent all short circuiting from the
ve material falling to the bottom of the
The lugs from both the positive and
ative group of each individual cell come
ugh the case cover, and are connected
their neighbors by pure lead straps

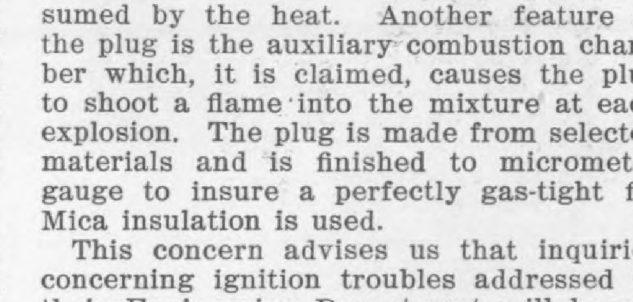
pere hour battery is 8½ inches long,
inches wide and 8½ inches high.
weighs 25 pounds and lists at $20.00.

Besides the storage battery, this co
pany is also putting out the "What Chee
dry cell, which is guaranteed free fro
acids and has a voltage of 1.7 and a
amperage of 24. It lists at 25 cents.
special discount is given to dealers a
manufacturers.

The "Cleveland" Spark Plug

In the Cleveland spark plug some ne
features are incorporated which are n
only unique but are claimed to render t
plug more simple, efficient and reliabl
The plug is the product of the Clevela
Spark Plug Company, 980 Power avenu
Cleveland, Ohio.

Particular attention is called to the spir
core, which is made of a special alloy th
is claimed to be proof against warping
flaking at high temperatures. The make
say that the spiral has two distinct fun
tions, viz.: first, it forms a powerful co
denser, producing an intensely hot spa
with a minimum of current consumptio
and second, at each explosion the spir
causes a centrifugal motion of the gas
that deposits all carbon formations on t
inside of the steel shell, where it is co



The "Cleveland" Spark Plug.

sumed by the heat. Another feature
the plug is the auxiliary combustion cha
ber which, it is claimed, causes the pl
to shoot a flame into the mixture at ea
explosion. The plug is made from select
materials and is finished to micromet
gauge to insure a perfectly gas-tight
Mica insulation is used.

This concern advises us that inquiri
concerning ignition troubles addressed
their Engineering Department will be a
swered free of charge.

Mr. Walter Edgar, formerly connect
with the Merchant & Evans Co., of Ph
adelphia, Pa., has recently associated hi
self with the Columbia Smelting & Ref
ing Works, New York City.

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iladelphia, Pa., have placed a new type plug upon the market. It is made from ¼ in. square brass rod, turned to fit any e tap in the cylinder, with apertures on e sides for the electrodes and on top for mica window. The electrodes and mica e held in place with supplemental caps keepers bolted to the body of the plug.

The plug is double, or in other words, has o independent electrodes which are inlated from the body of the plug, and so from the engine. Therefore, the plug ay be operated from a groundless circuit, one electrode may be grounded and the ug worked from the general system as w used.

The plug can also be run from two or ree different sources of electricity, procing the high tension or jump spark, one ectrode being entirely independent from e other; when fitted for this service ere is a slight change made in the elecode washers to meet the altered condions.

e Naylor Spark Plug, operated in the ordinary way or on the groundless system.

The electrodes are entirely different om any upon the market at present, havg a flat disk-like surface that gives off any sparks from different places, thus t only tending to keep the surface clean, t allowing of many different paths for e spark to jump.

The electrodes may be cleaned by slackg the adjusting nuts on either one and essing one electrode against the other, d twisting or moving it back and forth the other.

The purpose of the mica window is to rmit observations being made as to hether the spark is actually working hile the plug is in the engine; it also disoses the fact as to whether there is an ition and thus clearly determine wheth-

the electrodes, thus not only cleaning th if they require it, but giving certain ig tion at starting.

The body of the plug is hollow and electrodes are further away from the plosion chamber than usual. This is no detriment as popularly supposed, bu decided advantage as the mixture in t chamber when fired shoots out a fla which in turn fires the whole mixture the cylinder, thus causing a stronger pulse to be given to the piston.

After the plugs have been used seve days, if they are removed and taken ap examination will show that the lubricat as well as the mixture may have been tirely different in the various cylind This will be shown by the nature of fouling or deposit on the interior of plug. One or two will probably show bare discoloration, while another may quite blackened, showing a surplus of inder lubrication as well as a rich smoky mixture in that one. Moisture t a small jacket leakage will also show a slight deposit of rust on the outside ameter of the electrodes, the face be kept clean by the spark as before m tioned. The color of the electrodes also show when one cylinder has ho combustion than another.

The plug will spark on any source electricity as now used on automobiles launches. When it is used on the grou less system, it saves battery power gives a stronger spark. It is also ea on magnetos and is said to reduce amount of fuel used per horse-pow These plugs sell for $2.50 each.

Monarch Motor Mfg. Co., of Chic Ill., has leased commodious quarters 1592-1600 North Halsted street, into wh it has moved, from Kinzie & Cass stre Considerable new machinery is be added and facilities increased genera Pattern and drafting departments h been added and a department for doing eral machine work on contract. This cern makes automobile and marine mot clutches, starting devices, etc.

David Apstein, Bridgeport, Conn., nounces that he holds a patent grante 1896, covering plugs for repairing tires hose, and having an elongated or ro head hinged to a stem or shank so tha may be swung snugly against said sh preparatory to inserting the head int cut or puncture in the tire; said head

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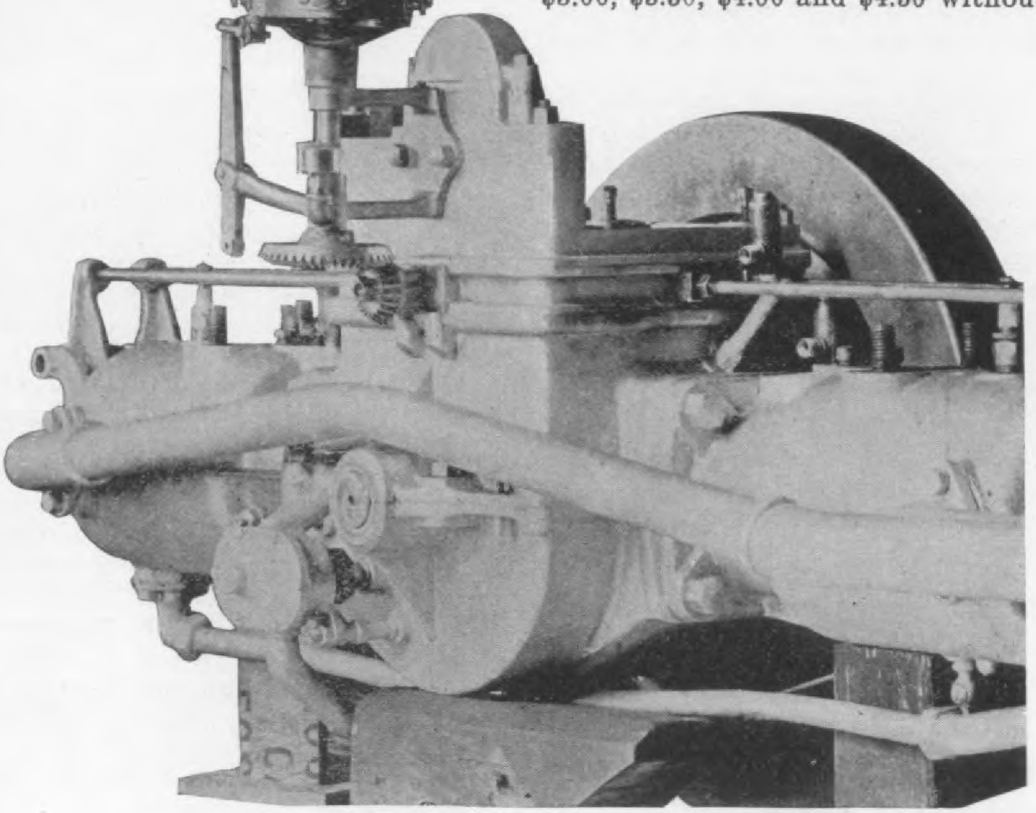

The "P. N. S." Timer shown attached to a Buick Motor.

The "P. N. S." Timer

he Philadelphia Novelty Supply Co., N. cor. 33rd and Fontain streets, Philadel- a, Pa., has recently developed and ed on the market a new timer, one of main features of which is its substan- construction. This timer can be used any two or four cylinder motor, but is cially adapted to the two-cylinder Buick or, as shown in the cut.

he timer is provided with a bracket which it is attached to the cover of crank case, thus bringing the timer in ertical position in which it can be easily mined and adjusted. The timer is en by means of bevel gears from the er shaft. It is made with four machine steel adjustable contact blocks which vide for the timing of each cylinder urately. The timer as shown in the with bracket lists at $20. The 4-cylin- type lists at $10.

New Small Size Gray Muffler

he Gray-Hawley Mfg. Co., Detroit, higan, manufacturer of the well known y muffler described in our December, issue, page 150 has recently placed on

The "Atwater-Kent" Gasoline Gauge

The Atwater-Kent Mfg. Co., of 42 Nor Sixth street, Philadelphia, Pa., w known manufacturers of the Atwater-Ke generator and ignition sy tem, have just brought o a gasoline measure as show by the accompanying cu which they offer to se gratis to any automobi owner on request. T measure is essentially a in. boxwood scale, which graduated into inches, and to be used to determine t depth of gasoline in t tank. It is shellacked make it proof against a tion by the gasoline, and t black strip is given a gas line-proof dull finish, whi resembles the surface of blackboard, and like a blac board turns glossy when w with gasoline, thus showi clearly the height of t gasoline in the tank.

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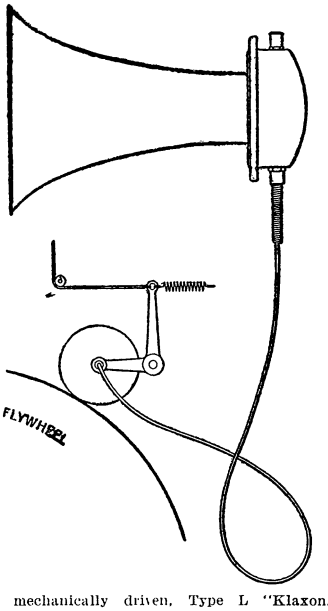
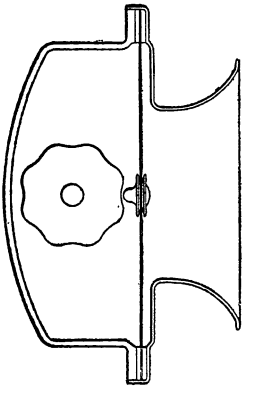
The "Klaxon"

The "Klaxon" is a new type of alarm for motor cars and its name is derived from the Greek word "klaxos" meaning a "roarer." It is the invention of Mr. Miller Reese Hutchison, Madison Ave., N. Y. City, and is manufactured by Lovell-McConnell Mfg. Co. of Newark, N. J., either of whom are prepared to promptly fill orders. This alarm consists of only two parts, a Vanadium steel diaphragm, and a cam-wheel. As this cam wheel is revolved the cams strike against a hardened steel anvil affixed to the centre of a diaphragm, causing the diaphragm to vibrate violently and produce a sound, which besides being distinctive has tremendous volume and can be heard at a great distance. The intensity of sound, however, is regulated at will and covers the entire range from a low "growl" to a piercing "shriek."



The mechanically driven, Type L "Klaxon."

The "Klaxson" is put out in two forms, one for mechanical and the other for electrical drive. The mechanical drive outfit includes the "Klaxon" complete in a highly ornamented polished brass case which may be attached to either side of the dash, a flexible shaft connected to the cam wheel (or rotor) of the "Klaxon" and a friction wheel that is grooved on its periphery, the apexes of the ridges formed by the grooves being knurled so that the wheel is sure of gripping the periphery of the fly-wheel. Any grease or other substance that is on the fly-wheel is forced up into the grooves, as the knurled edges cut thru the film of grease, oil, etc., and take hold without slippage. The friction wheel is mounted on a substantial bracket screwed to the dash at any convenient point. A brass chain leads from an arm of this bracket to a point on the steering column convenient to the hand of the operator. A pull of the chain brings the small friction wheel into contact with the fly-wheel and causes the "Klaxson" to "roar" or "growl" according to the pull given the chain. When the chain is released the friction wheel flies back against a brake which instantly stops its revolution.



Type S Klaxon, showing diaphragm and cam wheel.

The electrically driven "Klaxon" includes a small but powerful motor which is operated from the ignition current or from a separate battery. It is actuated by a push button located on the steering wheel, or by a chain if desired.

Two styles of the "Klaxon" are made; Type S for use in cities and immediate suburbs and Type L which throws the sound far ahead and is especially suited for country use or on motor boats. Type S, either type of drive, lists at $35 and Type L at $40.

The Goodyear Tire and Rubber Company, Akron, Ohio, is running a night force in its automobile tire department to keep up with orders, which surely is an impressive indication of the condition of the tire branch of the automobile business as well as of generally improved conditions.

Dow Portable Electric Company of Braintree, Mass., makers of ignition apparatus, have arranged to sell their entire output thru the Geo. Q. Hill Company of Boston, Mass. There is no change in their local representatives, however, W. J. Connell, 36 Columbus Ave., Boston, continuing as New England representative, Factory Sales Corporation, 235 Randolph St., Chicago, western representative and L. H. & B. J. Bill, 132 Valencia street, San Francisco, Pacific coast representative. Mr. Dow, with whom Mr. Theodore M. Muller, graduate of Stuttgart University is now associated, will devote his entire attention to the manufacture of the Dow line. Mr. Muller was until recently with Robert Bosch of Stuttgart, Germany.

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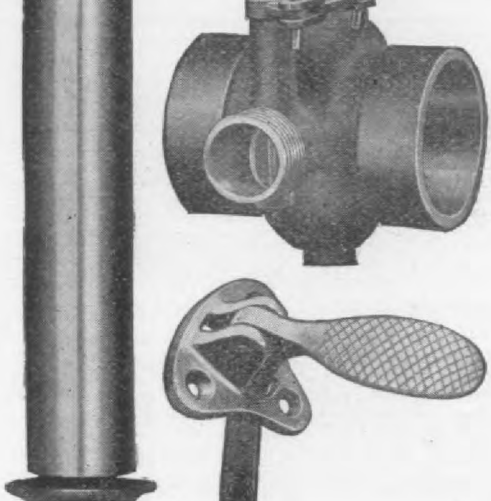
ll four-tone motor chime, manufactured ecially for use on automobiles, motor ts and launches. The cut also shows foot pedal and operating valve used connection with the chime. The device manufactured by the Barco Brass & nt Company, 56 North Jefferson street, icago, Ill.

The chime is 2½ inches in diameter and out 14 inches in length. It is made of cial seamless brass tubing, having four npartments of harmoniously blended es. The chime can be used in connec- n with any class of motor, and will pass vernment inspection for launch work



"Norwall" Four-Tone Motor Chime Pedal and Valve.

l under favorable conditions the manu- turers claim can be heard for a distance five miles or more. A double opposed tterfly system is used in the construction the valve, which is unaffected by heat soot and throttles the tone perfectly. e valves are made in diameters of 1½, nd 3 inches and will fit standard iron naust pipes of corresponding size.

The price of the chime, complete with lal and 1½-inch valve, is $9.00; with nch valve, $9.50, and with 3-inch valve, .50. This concern also manufactures a l strainer cast in one piece of bronze tal, which precludes the possibility of leakage. The strainer is made of fine sh wire cloth and cotton gauze, both which can be easily removed and

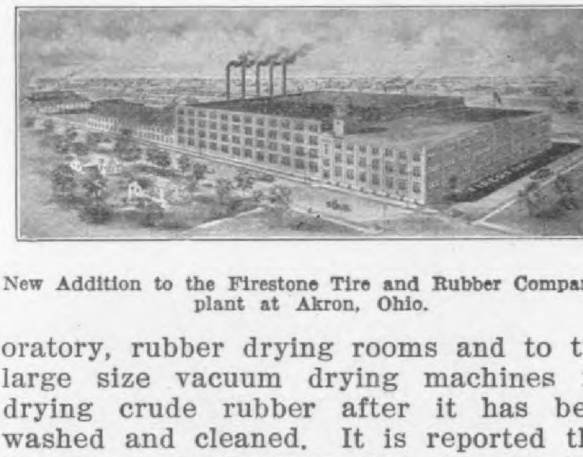
is $2.00.

This company makes a specialty manufacturing all kinds of light artic in brass and iron to order, such as au mobile specialties, metal patterns, also s cial tools for working in brass.

Recent Additions to Firestone Plan

The accompanying cut shows the n four-story addition made to the Firesto Tire and Rubber Company's plant at A ron, Ohio, this addition giving the conce 47,900 sq. ft. more floor space.

The first floor is devoted to calende mills and heavy machinery, and to a per cent. increase in the facilities for sm sizes of the side wire tires, such as a used on motor-driven buggies. The seco and fourth floors are devoted to the la



New Addition to the Firestone Tire and Rubber Compa plant at Akron, Ohio.

oratory, rubber drying rooms and to t large size vacuum drying machines drying crude rubber after it has be washed and cleaned. It is reported t the sales of Firestone tires for the fi three months of this year were the bigg ever made by the company, and were tw as large as in the same period last ye The factory is working both day and nig

Mr. Carl Kaufman, General Manager a Treasurer of the Motor Car Equipm Company, 55 Warren Street, New Y City, is sailing to Europe on April 7 where he will spend two months in gett in touch with the leading manufactur of Automobile Equipment and Supplies.

We are informed that in accordance w its long-established custom of mak early deliveries of its product, the Pa ard Motor Car Company, of Detroit, is b to the full capacity of its immense pla getting out the last 400 cars of this s son's output. Already one thousand 1 Packard "Thirties" have been delivered

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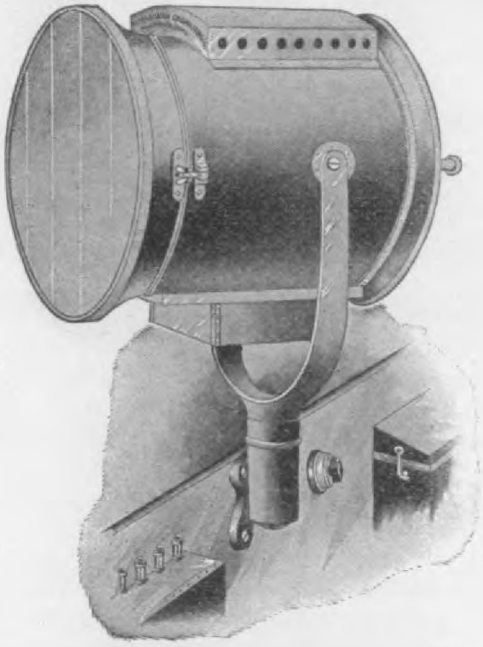
artford, Conn., recently placed on the arket the electric searchlight, illustrated rewith, and which is designed especially automobiles and launches. It is aimed to light up objects easily one-quar- of a mile ahead on the darkest nights. Current for the lamp is supplied by a nerator, which can be belted to the fly- heel of the motor. It weighs 45 pounds d is 7½ inches in diameter. The lamp 8 inches wide, 12 inches long and 12 ches high from the dash up. The stand- d finish is full polished brass, although y finish may be had on order. It is aimed that the light not only operates cely at wide variations of engine speed, t does not go out until the engine speed reduced to a mere walk. The search-



The "Richardson" Baby Arc Searchlight

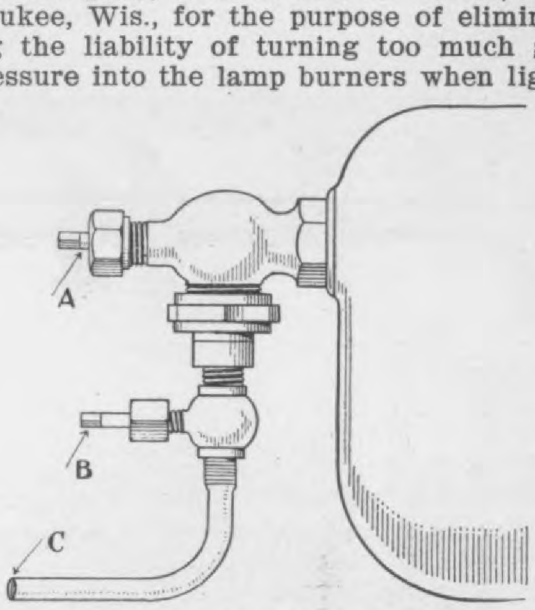
ht is fitted with a handle on the back to ide it for vertical and horizontal motion, d is furnished with pedestal for launches swivel bracket for automobiles.

A switch on the dash allows of the light ing instantly turned off or on without y inconvenience. The carbons are oper- ed by an automatic shunt feed; that is, e carbons feed together automatically as ey burn up. The price of the search- ht is $120, and of the entire outfit con- sting of lamp No. 4-G generator and sed connecting switch $165. The lamp also furnished with a storage battery tfit, consisting of a 30-cell, 20-ampere ur storage battery marine (sealed in) pe, and suitable switchboard with pilot

battery is $425.

The "Autogas" Burner Supply Valv

This attachment for gas tanks has b brought out by the Avery Portable Lig ing Company, 18-20-22 Martin Street, I waukee, Wis., for the purpose of elimi ing the liability of turning too much pressure into the lamp burners when lig

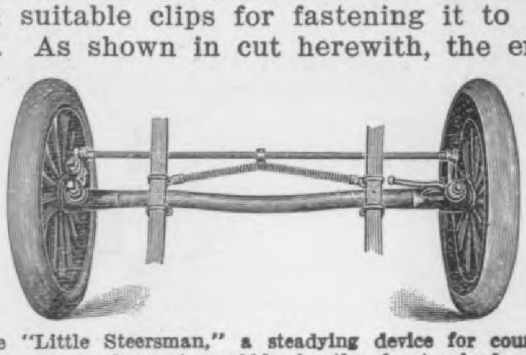


The "Autogas" Burner Supply Valve.

ing up. The valve B is adjusted to g proper flame to the burners and the gas turned on and off as usual at valve A, it ing necessary to adjust valve B from ti to time as gas is used out of tank. T valve is easily applied to any gas tank in the pipe line, and lists at 60 cents.

The "Little Steersman"

The "Little Steersman" is a steady device for the front wheels of motor ca being intended to automatically keep wheels from wobbling. It is the prod of The Abrams-Mason Co., of Chath Columbia county, N. Y., and consists sol of a helical spring about three feet l and suitable clips for fastening it to car. As shown in cut herewith, the e



The "Little Steersman," a steadying device for cou acting any tendency to wobble in the front wheels motor car.

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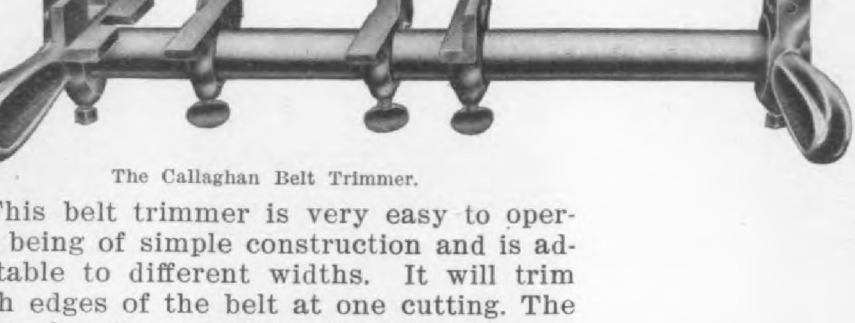
of the spring are fitted with clips for

n. are manufacturing a device which l interest factory superintendents and rs of driving belts generally. This de- e is the Callaghan Belt Trimmer, a dy apparatus enabling the user to keep ts straight, cut off curled up edges, use old belts and work up odds and ends standard sizes to keep on hand for ck repair work in case of a break- wn.



The Callaghan Belt Trimmer.

'his belt trimmer is very easy to oper- being of simple construction and is ad- table to different widths. It will trim h edges of the belt at one cutting. The ge bar is marked in eighth-inch spaces l can be raised or lowered to accommo- e belts of different thicknesses. Four des are provided guiding the rough and aight edges of the belt. Three sizes of s tool are made 12, 18 and 24 inches in th respectively.

ortland" Adjustable Nibs for Shifting Rails

'he Cortland Forging Company, of Cort- d, N. Y., is manufacturing an adjustable or bolt for shifting rails, as shown ewith.

'his nib slips on the oval of the shifting and allows the user to adjust the bear- to any variation in the seat irons. The draws the nib tight into the seat iron

"Cortland" Adjustable Nibs for Shifting Rails.

e, firmly securing the rail so that it will become loose and rattle. These nibs

manner, carefully machined to insure p fect alignment.

The "Westchester" Dry Cell

The accompanying cut shows the We chester dry cell manufactured by the We chester Appliance Company, of Tarrytow N. Y. In placing this cell on the mark this concern is endeavoring to produce t

The "Westchester" Dry Cell.

best dry cell that can be made, irrespecti of the cost. The cell is gotten up especia for automobile ignition work. It is put c with an initial amperage ranging from to 32, and after three months on the sh is claimed to still show 22 to 25 amper The manufacturers state that they ha taken a number of large contracts for the cells, both under their own label and und special names for some of the largest j bers in the country. The list price of t cell is 35 cents.

The Bosch magneto has been marketed years under the firm name of Robert Bos New York, Inc. With the idea of emphasizi more clearly the name of the magneto, t manufacturers will hereafter be known as t Bosch Magneto Company.

The Autocar Company takes pleasure announcing that they are fortunate in h ing again secured the able services of M Marcus I. Brock, who will assume the G eral Management of their Sales Depa ment. Mr. Brock is no stranger to T Autocar Company or its dealers, havi

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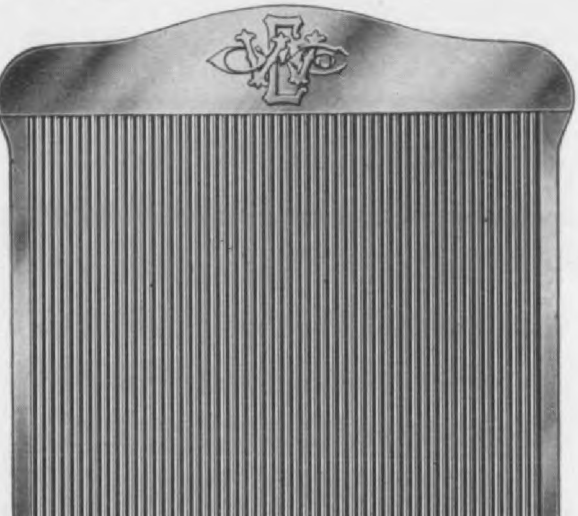
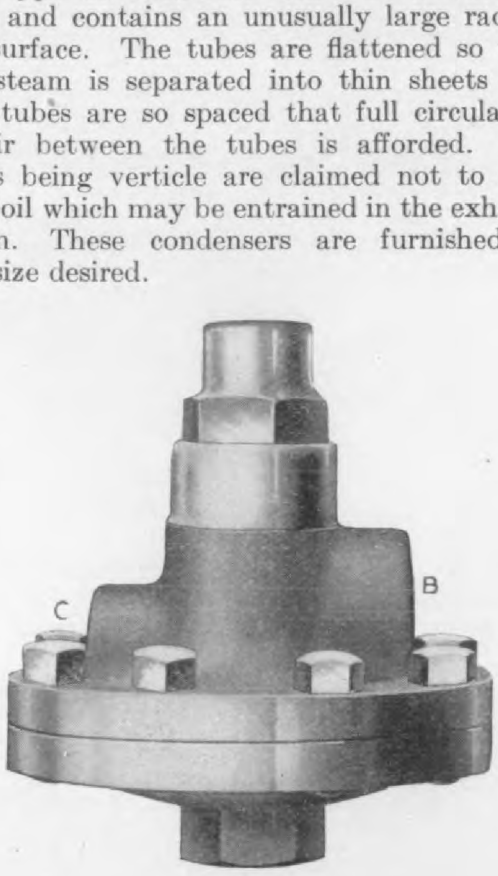
The E. C. Walker Mfg. Co., 311 Nelson St., ouisville, Ky., who offer a complete line of o-to-date steam car appliances, have brought ut a new design of steam condenser and a ew automatic water regulator for use with ash boilers.



The New Walker Condenser.

The accompanying illustration shows this ew type of condenser which is of the flat ype and contains an unusually large radiat- g surface. The tubes are flattened so that e steam is separated into thin sheets and id tubes are so spaced that full circulation air between the tubes is afforded. The bes being verticle are claimed not to clog th oil which may be entrained in the exhaust eam. These condensers are furnished in y size desired.



desired. The cap A is removable in o to make adjustment for different pres and when once adjusted, no further atten is required.

From a T in the water delivery pipe, a connection is made to the regulator at From the outlet C, pipe connections are m either back to the water tank or to the suc pipe of the water pump. The steam pres connection is made at D by means of a w trap or siphon to prevent the diaphra from becoming overheated, as would be case were no trap used.

The manufacturers of these applia also offer a new automatic fuel regul which may be successfully used on any st car for regulating the fuel supply to the bur This fuel regulator is of the diaphragm t and embodies some new features not hith employed. It has no stuffing boxes to cri the action of the valve which is of the floa type. It is easily and quickly adjusted the use of a wrench and adjustment ma made while steam is and the fire is burn This fnel regulator is guaranteed to act wi of variation in pressure and can be furhis for any pressure up to 800 pounds.

The "Bonney" Portable Automobile V

The accompanying cut shows the Bon portable automobile vise, brought out the Bonney Vise and Tool Works, 3 3015 Chestnut street, Philadelphia, Pa. meet the demand for a neat, servicea vise, large enough for moderate sized w yet small enough to be carried in the a mobilist's tool box.

A feature of this vise which make particularly useful to the automobilis that it can be instantly clamped on running board and as quickly detac

The "Bonney" Portable Automobile Vise.

Size No. 115, here illustrated, is suit for a medium sized car. Other sizes made with from 1½ to 3 inches width

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Trade Printed Matter

A strong piece of advertising was recently sent out by The Semi-Dry Battery Co., of Harrison, N. J., in the form of a folder, one page of which is in the form of a postal, intended to be returned to the company by prospective purchasers for the purpose of giving the company necessary information to enable it to properly meet the customer's requirements. The rest of the folder contains convincing arguments regarding the merits of Dunn Semi-Dry Cells and explaining the reasons why certain information, such as type of ignition, make of coil, type of engine, etc., is necessary to enable the manufacturer to furnish exactly the right battery for any particular case.

Pope-Toledo 1908 Cars, made at the Toledo, Ohio, plant of the Pope Motor Car Co., are very handsomely illustrated and well described in an elegant catalog which recently came from the press of The B. F. Wade & Sons Co. Double page illustrations, in three colors, beautifully blended, of the complete cars are given, while smaller but none the less handsome illustrations are shown of the chassis and parts. The brown cover is beautifully decorated in red, blue and gold, and is bound to the book by a silk cord.

An exceptionally neat announcement was recently sent out by Graves & Congdon Co., of Amesbury, Mass. It is in the form of a wedding or other engraved invitation, the lettering being in old English, and invites the recipient to examine the company's work in closed body building at the Boston Show.

Matheson Motor Car Co., Wilkes-Barre, Pa., make plain in their 1908 catalog their intention to build cars for the best trade, and consistent with this policy, has issued a very high grade catalog to advertise the Matheson car. This catalog is elegant in the extreme, all decorations, colors, etc., showing very refined taste, while the reading matter is at once interesting, practical and convincing. Accompanying the catalog is a good sized pamphlet containing technical opinions of experts and editors which are compared with features of Matheson design. Testimonials of satisfied users are also given, the contents of this pamphlet constituting a mass of technical and lay opinions as evidence of the correctness of Matheson design.

The latest catalog of Cullman Wheel Co., 1022-26 Greenwood Terrace, Chicago, Ill., contains descriptions of several new products, notably detachable sprockets for motor buggies and new differentials for both light and heavy cars. Besides the Cullman Co.'s own products, lines of chains, etc., handled by this company are also shown. This catalog contains 48 pages and cover.

We are in receipt of a new and attractive booklet issued by the New York Gear Works, 56 Greenpoint Avenue, Brooklyn, N. Y., sole manufacturers of the Ball improved reverse gear for motor boats. Particular attention is called to the clutch, which is one of the main features of the Ball reverse gear, and its simplicity of construction is strikingly shown. There is also a valuable table of dimensions, giving weight and prices of the different size gears. The booklet has an embossed cover of unique design, and presents a very fine half-tone of the Ball reverse gear of the latest type.

A neat little brochure has been issued by Putnam Motor Mfg. Co., of Springfield, Mass., descriptive of Putnam 4-cycle marine, automobile and cycle motors, which are made in various sizes and types. While the descriptive matter is brief, it is to the point, and quite a number of illustrations liven up the pages, each of which contains a neat two-line border in red.

1908 customers' and trade price lists of Goodyear automobile tires and accessories have been issued by the Goodyear Tire & Rubber Co., Akron, Ohio, in the form of small booklets, 3½ by 6 in., and containing 16 pages each. To avoid confusion the two booklets each have different colored covers.

"Faith and Its Realization" is the title of a very attractive book of 24 pages and cover recently published by Maxwell-Briscoe Motor Co., of Tarrytown, N. Y., containing an account of the beginnings of their new factory at New Castle, Indiana, and including a speech delivered by Vice-President Fairbanks at the laying of the corner-stone of the new factory.

The North German Lloyd Steamship Co., Oelrichs & Co., agents, 5 Greenwich st., New York City, have made special arrangements for handling motor cars for tourists, and have published a booklet entitled "How to Ship an Automobile Abroad," in which is explained their very convenient and inexpensive method of handling motor cars on their steamships. While the service is intended primarily for patrons of the North German Lloyd Lines, Oelrich & Co.'s forwarding department will attend to shipments on other lines as well.

"British Highways and Byways from a Motor Car," a beautiful volume of travel, thoroughly covering the town and country roads of England which are available for motoring, has just been issued by L. C. Page & Co., of Boston. The author, Thomas D. Murphy, details in a most interesting way his experiences in old England at the wheel of his Winton Model C.

For the benefit of the "show me" class of persons, Supplementary Spiral Spring Co., of St. Louis, Mo., have issued a brochure of testimonials under the title "Missouri Proof," containing a large number of very strong letters from users of "Supplementary" springs, setting forth the great satisfaction given by these shock absorbing devices The text is mostly in black, but important statements are underlined in red, and brief quotations are also in red, making the pages both attractive and readable.

The Hess-Bright Mfg. Co., Philadelphia, are sending to car makers and other parties interested in anti-friction bearings sheets containing principles of application, practical examples and data relative to the use of Hess-Bright ball bearings. The sheets measure 9 by 12 in., and are punched for tying in a binder, which will be furnished when asked for.

"The Wise Man's School is the Experience of Others" says the Mott Clincher Tire & Rubber Co., of Akron, Ohio, in a four-page folder issued to call attention to the good points of Mott tires for motor cars. The most prominent feature of this folder is a chart containing curves, indicating, it is stated, the results of tests of pneumatic and solid tires to ascertain the mileage obtainable on one charge of a battery with different makes and types of tires. The Mott shows up well on the chart, having run the car 91 miles at an average speed of 18½ miles per hour.

Nyberg Automobile Works, 2437-39 Michigan ave., Chicago, Ill., make a specialty of buying, overhauling and selling second-hand cars, and they publish catalogs from time to time, listing the cars on hand for sale. One of these catalogs before us contains illustrations and specifications of over 50 cars, testimonial letters from satisfied patrons, an explanation of Nyberg methods and a number of newspaper comments on the unique business of the Nyberg Company.

A unique but pleasing plan has been followed in the make-up of the 1908 catalog of Jackson Cars made by Jackson Automobile Co., Jackson, Mich. The general matter is not given in one lump, followed by specific descriptive matter as is customary. One page of introduction, facing a page colored illustration of a Jackson Car in pastoral scenery, is followed immediately by a page cut of Model C, opposite which appear the specifications of this car preceeded by a paragraph of general matter. Thus the general arguments and information is broken up and distributed over a number of pages in conjunction with specifications of different Jackson models. On the top of each reading page appears an outdoor scene in a delicate blue and a blue border encloses each page. The contents of this catalog are presented in conservative language which, by its lack of bombastic claims, has an air of sincerity that carries conviction. The general excellence and fine style of the catalog are also strong points in its favor.

A new section of the Interstate Automobile Tourists' Guide, published by F. S. Blanchard Co., of Worcester, Mass., has lately appeared. This section is number 3 and covers New England. It contains a gazetteer of cities, towns and villages, information regarding touring routes, automobile stations, hotels, selling agents, and repairers thruout this section. The touring routes are all indexed alphabetically under the names of the cities and towns from which the various routes radiate. The trunk routes are also fully indexed and reference numbers given to the touring routes so that any particular route is easily found. Under the heading of Tourists' Guide, a larger amount of information regarding each city, town and village is given in regard to facilities for charging and repairing, post offices, telegraph offices, express companies, population and similar data. Not the least important part of the publication is a large number of advertisements of hotel keepers, dealers in motor car supplies, etc. The price of the book is $2.

The Neustadt Automobile & Supply Co., St. Louis, Mo. have issued for 1908 a 188-page catalogue in a yellow and red cover which lists a complete and very extensive line of parts and supplies. Included in the line of goods shown are a number of their own products, such as axles, frames, bodies, wheels, complete chassis and motor buggy outfits. A prominent feature of the catalog is the complete detailed instructions regarding the sending of orders, shipments, etc., and this idea of completeness is carried out in the descriptive matter and illustrations which fill the book. The Neustadt catalog is therefore an easy catalog to buy from, as complete information is given to enable the reader to know exactly what to get and how to get it.

The Corbin Motor Vehicle Corporation, of New Britain, Conn., has issued a large folder containing illustrations of the Corbin models and their various important component parts, together with illustrations of a number of Corbin cars in various contests which have taken place during the last year, and in which the Corbin has distinguished itself.

As in the past, Charles E. Miller, 97-101 Reade St., N. Y. City, manufacturer, jobber, exporter and importer, has issued for 1908 a very large and comprehensive catalog covering parts, fittings, sundries, etc., sold to the motor car, motor boat and motor cycle trades. This is Miller's tenth annual catalog, and as each successive issue has excelled its predecessor, this latest catalog is ahead of the rest. It has been revised and brought up-to-date so as to include every important accessory on the market and to exclude discontinued lines. Prominence is given a notice in regard to prices, and Mr. Miller calls attention to the fact that while dealers are allowed substantial discounts, his list prices should not be compared to extraordinary discount prices based on inflated values. Besides manufacturing a number of lines which enables him to furnish goods at the lowest possible prices, he maintains a large number of branch stores thruout the country which enable him to do a very large business, and he is therefore in a position to sell at favorable prices.

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Now is The Time

This cut illustrates our Quick Detachable Terminal which can be applied to the spark plug cable instantly without tools. It makes perfect contact, cannot jar off, but allows quick disconnection when desired.

to equip your engine with better ignition. The heart of the ignition is the plug, and since gasoline costs money, cheap plugs are dear at any price. The Cleveland Spark Plug is exceedingly well made of selected materials, standing alone in its class as the only plug both practically perfect and scientifically correct. Finishing each part to micrometer gauge renders it gas-tight without the use of springs, taper-joints or packing. The spiral core acts as a powerful condenser, producing an **intensely hot** spark, that shoots a flame right into the mixture resulting in **maximum power** at all times. The action of the spiral core renders the plug absolutely proof against short circuiting since it **positively** prevents the deposit of carbon on the insulation surface.

"It shoots a flame"

Write ***to-day*** for our introductory offer (for a limited time) which gives you ***free*** with each order for spark plugs, your choice of Battery Connectors or Cable Terminals.

Our printed matter contains interesting information on ignition and explains in detail the wonderful action of the "spiral core," the feature of the plug that "shoots a flame."

THE CLEVELAND SPARK PLUG CO.

980 Power Avenue, **CLEVELAND, O.**

The Cleveland Battery Connector is a little wonder and like all our products is extremely well made; easily applied or removed by a twist of the wrist.

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contain ample descriptions of a large number of ac-
ories. In order that goods may be easily found in
catalog a very extensive index is given in the front
the book and contains about 450 headings. All the
ling lines of automobile accessories are listed in this
log and the Motor Car Equipment Co. calls attention
he fact that anything on the market not illustrated in
catalog can be furnished on request. This company
shown very good judgment in using good white paper
which the cuts and text matter show up very clearly
distinctly, and besides being of practical advantage,
makes a good impression on the reader. Sending out
oor-looking catalog is like sending out a shabby sales-
to sell goods, and on the other hand, a bright, at-
tive-looking catalog makes a good impression, same as
vell-dressed, affable salesman makes upon a possible
omer. On the back page of the catalog appears a guar-
ee that all goods must be exactly as represented, and
be exchanged in case they turn out different from
t the customer expected. This catalog is a strong piece
advertising matter and is bound to make a good im-
sion upon the recipient.

irelli & Co., 296 Broadway, N. Y. City, have issued
ew price list of Pirelli tires, which has been sent out
older form under date of March 15th.

he Lozier Motor Co., 55th St. and Broadway, N. Y.
, have commenced a publication of a new House Organ,
third in the series of Lozier publications of this char-
r. Their first House Organ was issued by the Lozier
when it was manufacturing Cleveland bicycles, and
called "On the Square." The second in the series
the "Propeller," published in the interest of the
ine Department of the Lozier Company, and this third
se Organ, called "Lozier Logic," is published in the
rest of the automobile business of the Lozier Co. The
number of "Lozier Logic" is a newsy publication of
pages and cover. It is in charge of C. A. Emise, mana-
of their Publicity Department, and will be published
intervals as circumstances demand.

he Joseph Dixon Crucible Co., of Jersey City, N. J.,
e just issued two new books on Dixon's Lubricants. One
these relates to Dixon Graphite Lubricants for the
smission gears of automobiles, and the other contains
umber of questions and answers regarding automobile
rication. Both are therefore of interest to automobile
rs and can be obtained by writing to the Dixon Com-
y.

booklet recently issued by Breeze Carbureter Co., of
vark, N. J., is not only a good advertisement of Breeze
oureters and fuel strainers, but a comprehensive treatise
he carbureter and fuel question generally, containing as
loes a large amount of informative data on this subject.
nder the title "Proof of the Pudding," Stewart &
rk Mfg. Co., 532 Diversey Bldg., Chicago, Ill., have
lished a large poster size sheet containing on one side
umber of testimonials from users of the Stewart Speed-
ter, and on the other side a number of large illus-
ions showing the various styles of this device alone and
combination with clocks. Accompanying this poster
et is another sheet containing suggestions in regard to
purposes to which the Speedometer may be put in
oing track of gasoline consumption, mileage of battery
rice, life of the car, engine efficiency, etc. An order
nk also accompanies these pieces of advertising matter.

combined folder and mailing card has been sent out
the Supplementary Spiral Spring Co., 4524 Delmar Ave.,
Louis, Mo. The data in this folder is under four heads,
nely, "We Say," "They Do," "They Say," and "You
." Under "We Say" the company gives their argu-
nts in favor of the use of the supplementary spiral
ing. Under "They Do" is told what the springs ac-
nplish. Under "They Say" is given statements of a
nber of satisfied users of supplementary spiral springs,
under "You Say" appears a form letter to be used
persons who may be induced to investigate the merits
the spring. On the back of the folder a list of
ords taken from the A. A. A. year-book is printed in

he Atwater Kent Spark Generator is very fully de-
bed and clearly illustrated in a neat booklet which has
ly been issued by the Atwater Kent Mfg. Works, 46 N.
th St., Philadelphia. Several of the illustrations are
cuts showing interior and detail views, and in addition
these there is a half-tone illustration of the generator
lf, exterior view, and an illustration of the generator
the dash of an Elmore car. The book is very taste-
y gotten up and the information it contains is clearly
sented, making it an attractive piece of advertising
ter.

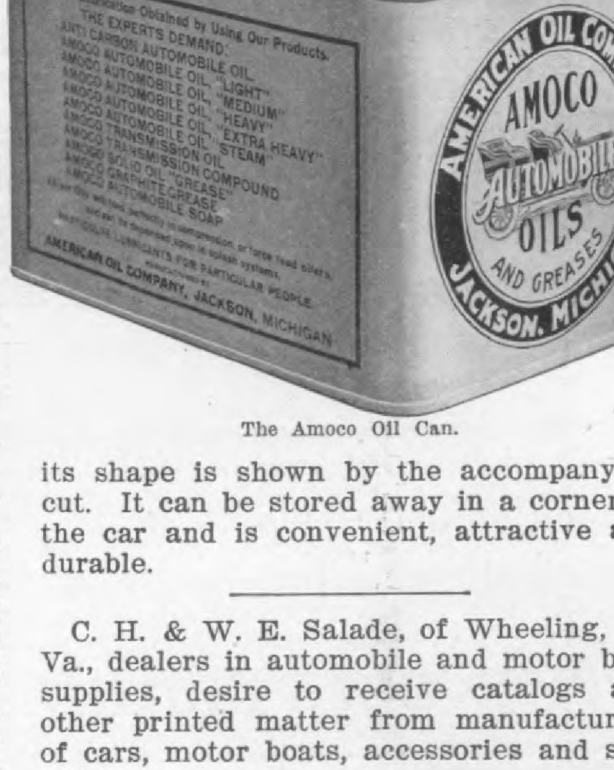
he Klaxon, a new alarm for use on motor cars, motor
ts, etc., is very fully described and illustrated by a

grease, and an illustration of a 500 H. P. engine wi
hand-made grease cup in which Albany grease is used
features of this folder.

The Touring Bureau of The White Company has
issued the sixth in the series of White Route books.
new issue covers the route from Philadelphia over
National Highway as far west as Springfield, Ohio,
then southward thru the Southern States to Savan
This book gives definite data on the roads of Kentu
Tennessee, Alabama and Georgia, and road directions
following the National Highway thru Maryland, Penn
vania, West Virginia and Ohio. The new route book,
sides giving detailed directions for over 1800 miles of r
contains articles descriptive of the route, embellished
numerous illustrations. There is also a fine double-
map of the country traversed. Tourists may obtain co
of the new route book free of charge on application to
of the branches or agencies of The White Company, o
the Touring Bureau of the company, 1402 Broadway,
York City.

The Amoco Oil Can

American Oil Co., Jackson, Mich., mal
of the "Amoco" line of oils and greas
is furnishing to automobile users an
can which will not tip over. It is 8½
long, 5½ in. deep and 5½ in. wide, a



The Amoco Oil Can.

its shape is shown by the accompany
cut. It can be stored away in a corne
the car and is convenient, attractive
durable.

C. H. & W. E. Salade, of Wheeling,
Va., dealers in automobile and motor b
supplies, desire to receive catalogs
other printed matter from manufactur
of cars, motor boats, accessories and s
plies.

The Metallic Specialties Co., of Ph
delphia, manufacturers of robe rails,
rails, tire holders, lamp brackets, cut-
pedals, etc., has moved from 322 No
Broad Street to larger quarters at

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Following the past custom of the Rain-
r Motor Car Company, only one chassis
offered for 1908. This is the design of
r. J. G. Heaslett, who has charge of the
ew Saginaw, Mich., plant.

The new factory stands on a tract of
ver sixty acres owned by the company,
e buildings including machine, assem-
ing, test and painting and body-fitting
ops, a power house and a separate
ilding for the offices and drafting rooms.
l the structures are of brick, built in
hat is known as mill construction, with
ass monitor roofs. On the surrounding
ound is a half-mile track for testing.

The grinding machinery is in a separate
om, enclosed by glass and equipped with
large suction ventilator for carrying off
e dust particles. Thruout the plant the
test and most improved automatic ma-
inery and jigs can be seen, making ex-
t duplication of parts possible.

the front axle, thus adding to the ral
appearance. The wheels have been
creased to 36 inches in diameter.

THE MOTOR.

The four 5 x 5¼-inch cylinders are
in pairs with unusually large water jac
spaces, the jackets being cast integ
A large removable aluminum plate co
the top of each pair of cylinders and
as an expansion plate in case of a fre
up and also permits of ready access to
water jackets for inspection or clean
The cylinders and pistons are of a spe
grade of hard grey iron of light but r
construction, and both are accura
ground and lapped so that the pistons
a perfect fit in the cylinders. All th
castings are made in baked molds.
valves are nickel steel forgings, are
chanically operated, interchangeable
located on opposite sides. The valve
ing rods are adjustable in length by me

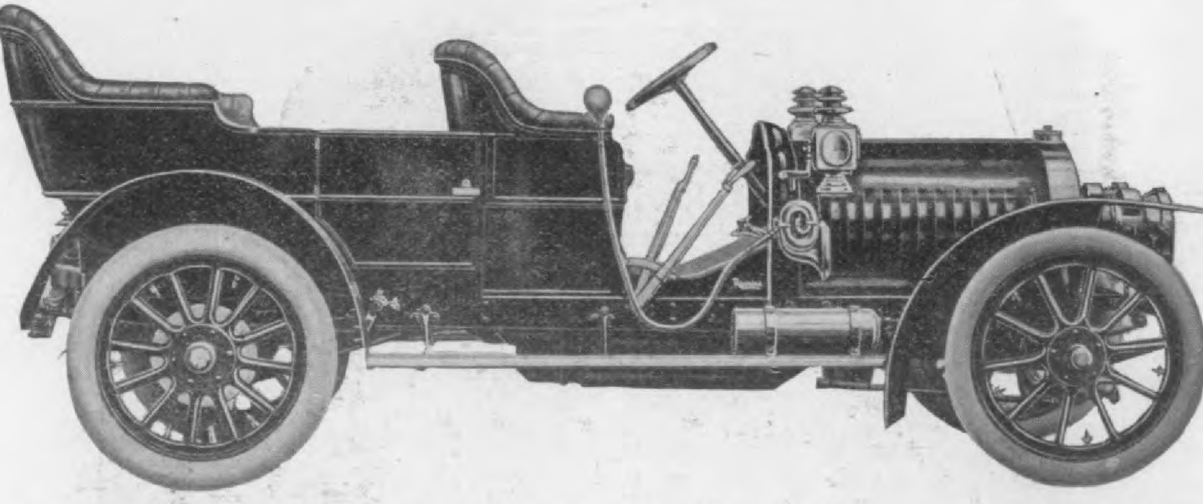

Fig. 1. Rainier Model D Touring Car. Motor, 45-50 H. P., 4 cylinders, 5 x 5¼, cast in pairs with integ
ater jackets; special make and break ignition from Simms-Bosch low tension magneto; positive feed mechanic
brication; 4 speed forward and 1 reverse change speed gear, direct on the third speed, shafts mounted
nported annular ball bearings; multiple disc clutch; shaft drive to floating rear axle; two sets of internal e
nding brakes on rear wheels; 36 in. wheels with 4 inch front and 4½ inch rear tires, make optional; whe
se, 119 inches; weight, 2950 lbs.; 20 gallon gasoline tank under the front seat; equipment, 2 headlights,
de lights, 1 tail light, generator, horn, coat rail, foot rest, tire carriers, trunk rack, tool box, kit of too
cluding pump, jack and tire repair kit; price, with touring body, $4500; limousine, $5750; landaulet, $5800.

The output for 1908 will be kept down
300 cars, the present capacity of the
nt without overtaxing men or ma-
nes. The Rainier yearly guarantee sys-
n will be continued and it is claimed
t nothing but the very best of material
allowed to enter into the construction.

THE NEW MODEL "D."

The new Rainier is known as model
." This new car is of higher power to
et the popular demand and embodies
ny desirable improvements, altho the
ential characteristics of previous Rain-
cars have been retained.

of screws and lock-nuts. The cam sha
with their integral cams are case ha
ened and ground to shape. Special bro
bearings which have been used on all
previous Rainier models with satisfacti
are used in the 1908 construction.
cam shafts are housed in the crank ca
The crank shaft is machined from a so
block of nickel steel, and its bearings,
well as those of the connecting rod, are
large surface and of the inserted ty
that is, are bronze shells with babbitt
terlining, which gives the advantages
each type of metal without the disadv

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d can be seen in the view of the ex-
ıst side of the motor. The construction
such that the cross sectional area in-
ases and thus prevents unnecessary
:k pressure.

LUBRICATION.

)iling is by means of a positive me-
ınical oiler, gear-driven. Leads supply
not only to the engine bearings, but
o to the magneto and pump shaft bear-
s. The cylinders and pistons are sup-
ed by means of the splash. The oiler
self-contained and can be easily re-
ved. It is supported on the engine
nk case. The half-time gears are en-
sed in an oil-tight aluminum case not
en to the splash and are packed in
ase.

'he engine is water-cooled, circulation
ng maintained by a gear-driven pump
bucket type. The radiator is of the
ıeycomb type and a large fan is mount-

steering wheel and an auxiliary pe
is also fitted. A tickler is provided so th
if necesary the carburetor can be flood
without raising the hood. It is claim
the car can be throttled to five miles
the direct drive or speeded up to 50 mi
per hour.

Accessibility is one of the features
the motor design and the pump and m
neto can both be removed without displ
ing the half-time gears. Compression
lief cocks are not fitted, but a device is
arranged that the exhaust valves can
partially lifted giving the same result,
that the motor can be started without
due effort.

IGNITION.

Make and break ignition, the curre
being furnished by Simms-Bosch low t
sion magneto, is used. This system h
been used by the Rainier Co. for seve

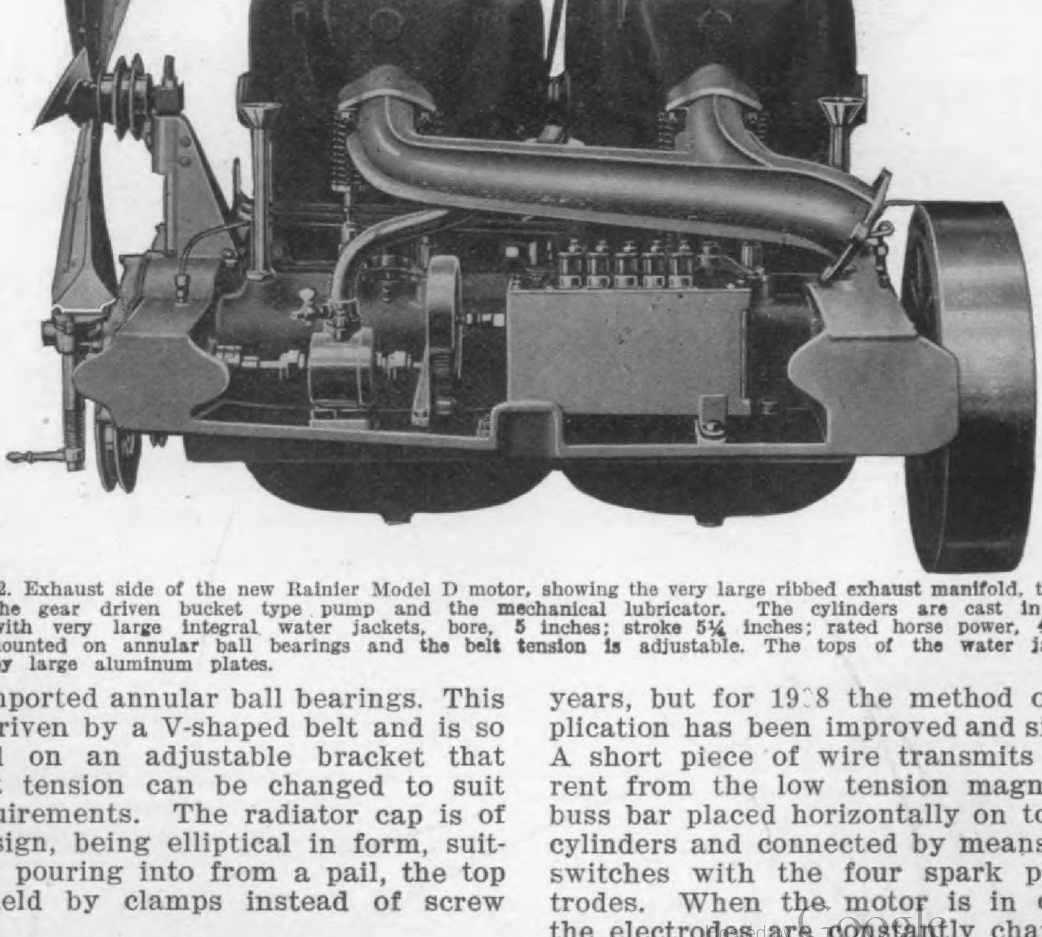

Fig. 2. Exhaust side of the new Rainier Model D motor, showing the very large ribbed exhaust manifold, the mount
: of the gear driven bucket type pump and the mechanical lubricator. The cylinders are cast in pairs
own, with very large integral water jackets, bore, 5 inches; stroke 5¼ inches; rated horse power, 45-50. Th
ı is mounted on annular ball bearings and the belt tension is adjustable. The tops of the water jackets a
vered by large aluminum plates.

on imported annular ball bearings. This
is driven by a V-shaped belt and is so
unted on an adjustable bracket that
belt tension can be changed to suit
requirements. The radiator cap is of
v design, being elliptical in form, suit-
e for pouring into from a pail, the top
ng held by clamps instead of screw
eads.

THE CARBURETOR.

years, but for 19:8 the method of its
plication has been improved and simplifi
A short piece of wire transmits the c
rent from the low tension magneto to
buss bar placed horizontally on top of t
cylinders and connected by means of kn
switches with the four spark plug el
trodes. When the motor is in operati
the electrodes are constantly charged, b
give sparks only when the hammer leav

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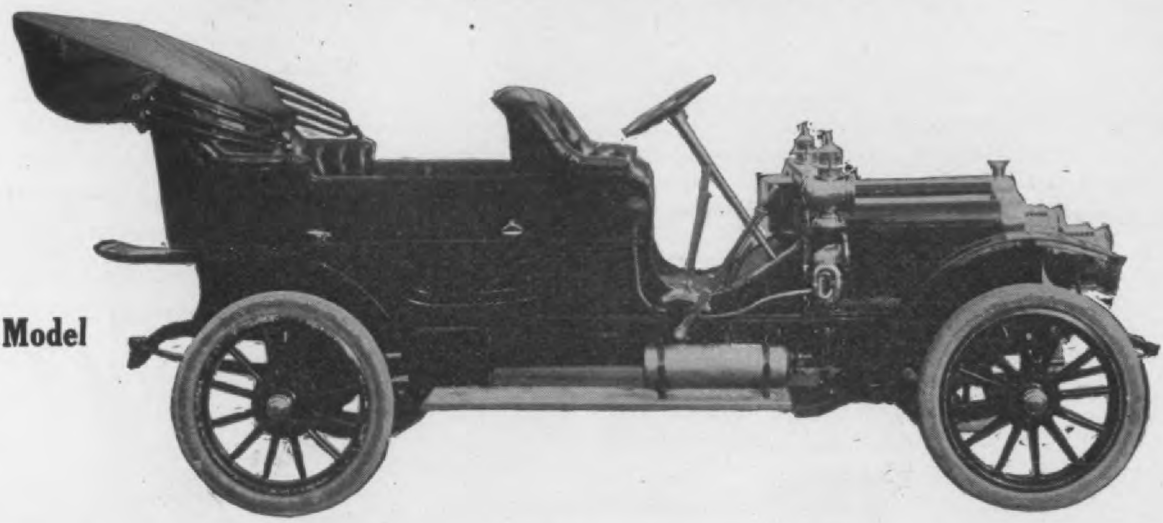
THE SELDEN CAR



Model

Five Passenger Touring Car, $2000
Three Passenger Runabout, $2000

AN ATTRACTIVE CAR
AT AN ATTRACTIVE PRICE

SPECIFICATIONS

Engine—4 cylinders $4\frac{1}{4} \times 4\frac{1}{2}$, 28-30 brake horse-power.

Transmission—3 speeds forward and reverse, selective, Timken bearings.

Wheel base—109 inches; tread, standard; clutch, cone leather.

Body—sheet metal, straight line type, roomy and comfortable.

Tires—$32 \times 3\frac{1}{2}$, quick detachable; mak optional.

Frame—pressed steel, $4\frac{3}{4}$ inches deep.

Front axle—single I-beam drop forg ing, ball bearings.

Rear axle—Bevel gear drive, enclose type, roller bearings.

Ignition—synchronized jump spark.

Weight—empty, 2,200 lbs. (actual not catalog.)

REPRESENTED IN GREATER NEW YORK BY
The Palmer & Singer Manufacturing Company, 1620 Broadway

SELDEN MOTOR VEHICLE CO.

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ers formerly used, a single rotating ft which brings the hammers into con- with the electrodes, is used. Imme- ely after the cams have passed the aking point, the hammers spring back rply under the impulse of a powerful pression spring which works in oil and he only spring used on the entire mech- sm. The ignition shaft is rotated by ns of spiral gears through an upright ft from the cam shaft and is provided h a ratchet device to take care of any k back of the motor. The time of

can be easily removed by loosening a fe nuts and screws and does not necessita disturbing the transmision or motor. new style of universal joint is interpos between the clutch and transmission.

CHANGE SPEED GEAR.

The general construction of this mecha ism is along the lines previously use but in model D an extra speed has be added, giving four speeds ahead and o reverse. The control has been changed the selective type and the direct drive on the third speed, which has a ratio

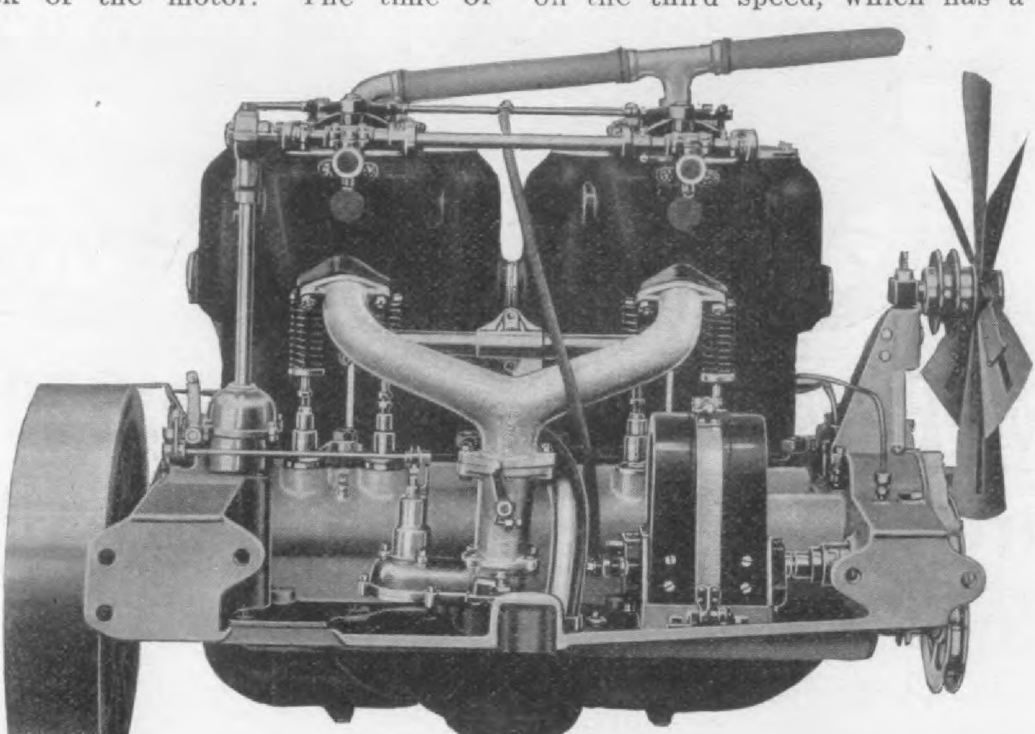

Fig. 3. Inlet side of the new Rainier Model D motor, showing the location and connections of the new carburetor; mounting of the low tension Simms-Bosch magneto, which supplies the current for the new make and break ion system, which is driven by the vertical shaft shown at the left, which operates a horizontal ignition t at the top of the motor. The details of the ignition mechanism are shown in Fig. 4. The crank case he engine is of aluminum, the casing forming an integral pan construction.

tion is varied by means of a sleeve he upright shaft which raises and low- the driving spiral gear and thus nges the time of rotation of the igni- shaft. The timing of the engine is simple and is accomplished by turn- the fly-wheel to the mark correspond- with the respective cylinder, adjust- the cam until it touches the hammer and then tightening the special clamp- device. The hammer and the anvil self-contained mechanism in each k plug. These plugs are held in place nickel steel yoke held by a single bolt nut. The contact points have been im- ed and their life lengthened by the of iridio platinum points which do not appreciably. This system, it will be

3 to 1, while the fourth speed is throug gears with a ratio of 2¼ to 1. This mak it possible to run practically all the tim on the direct drive, and if it is desired make very fast time, the fourth speed ca be used, in which case the tail shaft r tates at a higher rate of speed than th engine. All the shafts and gears are nickel steel, heat treated. The gears ar bolted to flanges integral with the shaf and all the nuts are cotter pin retaine Non-adjustable annular ball bearings ar used thruout. The counter-shaft or la shaft is placed below the driving shaf thus permitting of the use of sealed bea ings, preventing oil leakage. The gea case is of aluminum fitted with a large r

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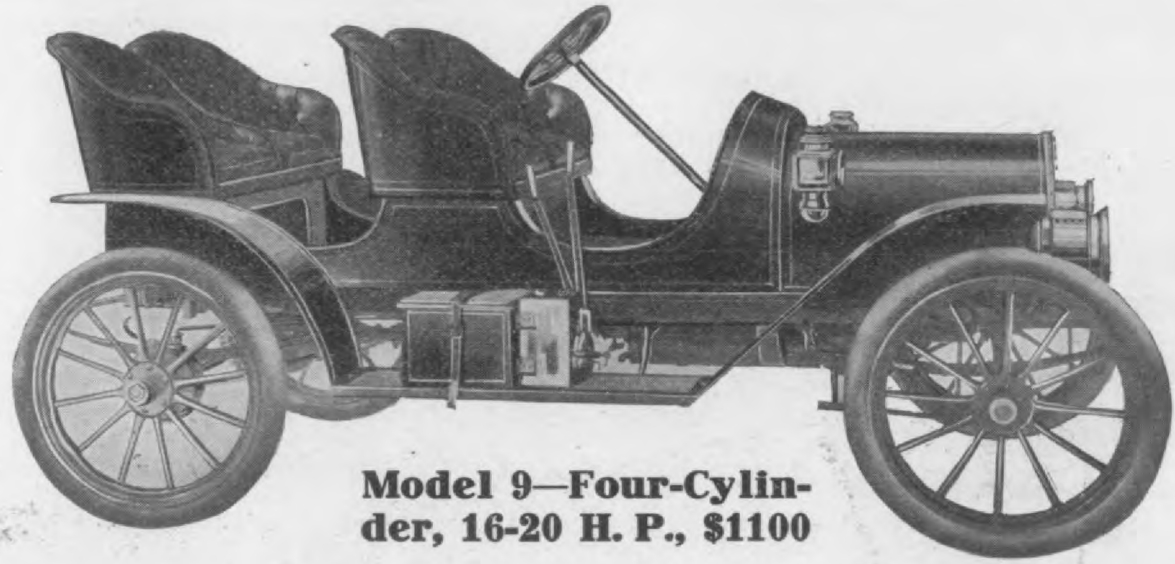
3 Speeds Forward. Direct Drive on every Speed. 45 Miles per Hour, and a Wonderful Hill Climber.



Model 9—Four-Cylinder, 16-20 H. P., $1100

WITH our system of transmission (direct on all speeds) we apply to the rear wheels a greater proportion of the power developed by the motor, than any car built. Combining this with our light-weight, elastic spring suspension and large wheels, gives us the smoothest running, most economical 4-passenger car on tires, in the world.

Our air-cooled motor is the result of five years' development, and is perfect in every detail. This car will *average* twenty-five miles to a gallon of gasoline.

We build three other models beside the above, all four-cylinder, and all equipped with our patented transmission.

Model 6—Runabout, $850 **Model 7—Runabout, $935**

Model 8—Roadster (3-passenger), $1050

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Cameron Car Company

axle, as in all the other models, is of floating type, the wheel bearings be- mounted on the tubular axle which ries the weight of the car, leaving the ating shafts to transmit the power to wheels by means of dog clutches at the er ends of the wheel hubs. The bear- s are non-adjustable and the axle nuts be screwed on as tight as desired hout in any way affecting the bearings. e differential case is a drop forging tead of the usual casting, and the hous- s are all manganese bronze. The gears propeller shaft are all of nickel steel, driving pinion and its shaft being in- ral, the pinion being supported by a ring on each side of it. Two universal its of new and improved type are used. e front axle is a forging of manganese el of I-section. The front wheel hubs

being prest into shape. It has a 2½-in drop forward of the rear axle. All of t bolts and nuts are cotter pin retained. short aluminum pan extends under t clutch and transmission gear, and as pre ously stated, the motor base forms a p tecting pan.

The wheels are of the very best grad second growth hickory, known as "A," a are mounted on imported annular b bearings. The front wheels carry 4-in tires and the rear 4½-inch tires. A American make can be supplied wi standard clincher rims. Other styles rims are furnished without extra char if desired.

The Rainier muffler has been retaine but has been increased in size. It placed transversely at the extreme re of the chassis and is provided with t

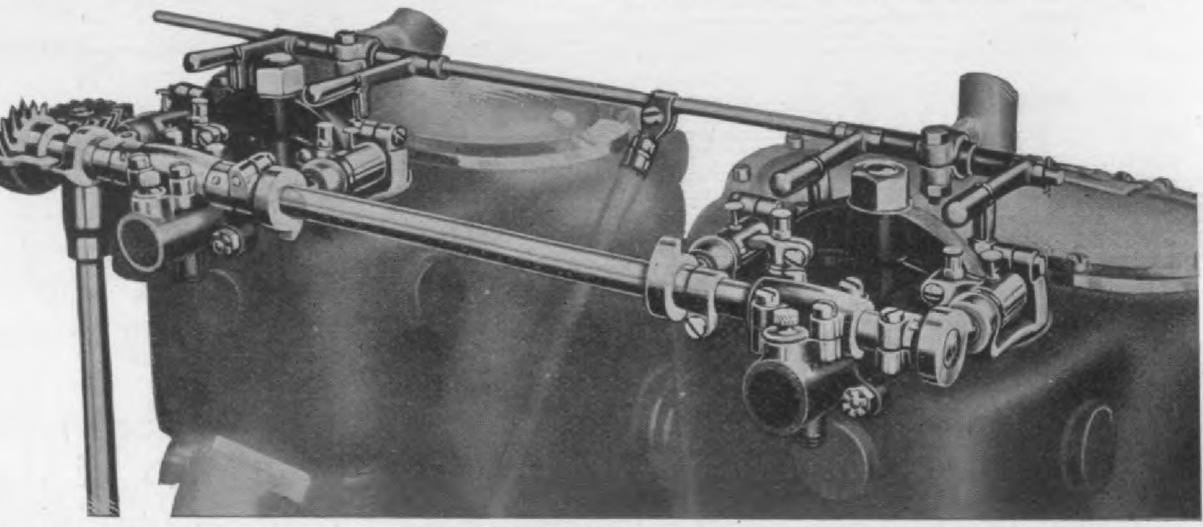

Fig. 4. Detail view of the Model D Rainier make and break ignition mechanism. This mechanism has bee plified, and instead of four vertical shafts, a single shaft at the rear of the motor operated from the car ft, drives by means of spiral gears a horizontal ignition shaft carrying four adjustable-in-position ignite s held by special clamping devices. The rotation of this shaft and the timing of the ignition can be varie a vertical movement of the spiral gear on the vertical driving shaft, making the timing as simple as o jump spark system. A short piece of wire leads from the dynamo to the center of the buss bar, which i nected to the plugs by means of knife switches. When in operation the electrodes are constantly charged only give a spark when the hammer leaves the anvil. In place of the small springs and the trippers an ers formerly used, the cams bring the hammers to the contact points, and immediately after the cams hav sed the breaking point, the hammers spring back rapidly under the impulse of a single powerful compressio ing, which works in an oil bath and is the only spring used in the whole mechanism.

also mounted, as in the case of the r wheels, on annular ball bearings, all these parts, including the steering ckle, being of generous dimensions. e knuckle is fitted with a hardened steel hing and hardened steel pin and an oil on top provides constant lubrication.

he front springs are semi-elliptic, 2¼ nes wide, and are of extra length. The r spring suspension has been altered 1908 and is now of the platform type differs from the ordinary construction the rear frame member is carried out kwardly at the centre and rests di- ly on the rear cross spring, which is

duck-bill vents so placed that the dischar of the exhaust gas is directly in the pa of the rear wheels, thus preventing t dust from rising and also doing away wi any chance of the gas coming up throu the floor boards. The exhaust pipe is 3 inches in diameter and the entire pipe h no sharp bends or angles, but runs bac ward from a rounded elbow, thus givi as little back pressure as possible. Ea car is fitted with a muffler cut-out co trolled by the pressure of the operato heel.

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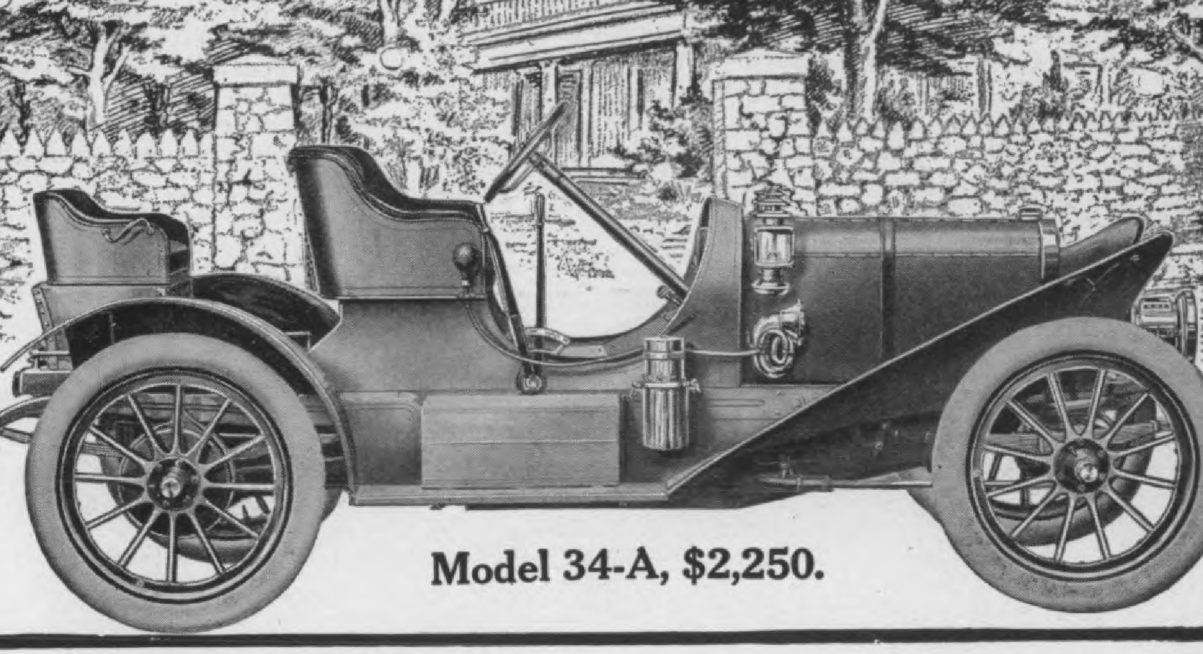
BRAKES AND CONTROL.

Both brakes for 1908 are mounted



The Ideal Transportation

The gentleman's roadster is the ideal connection between the suburban home and city office. It changes the hot, dusty journey on a crowded "local" to a pleasant ride in the clear, fresh air that fits you for the business of the day.

Rambler

The Rambler roadster, Model 34-A., is a speedy, classy car with the power and endurance of a touring car and the convenience of a runabout.

Mechancially it possesses every valuable feature found in any car at any price, such as offset crank shaft, straight line drive, large wheels, etc., and in appearance has a distinctive character of its own that marks it a thoroughbred.

An examination will convince that

It is the Right Car at the Right Price

Two other models, touring cars at $1,400 and $2,250.
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Thomas B. Jeffery & Compan

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sequently, should have the greater ring surface and durability. For this e brake a very slight pressure of the is required. The usual spark and ttle levers are mounted on a station- sector on top of the steering wheel.

hardened and the reach rods and knuck are all of angle steel. The steering colun ends in a quadruple thread screw. On th a square nut travels, the back of the n being cut in the form of a rack whic engages a pinion and gives an oscillatin

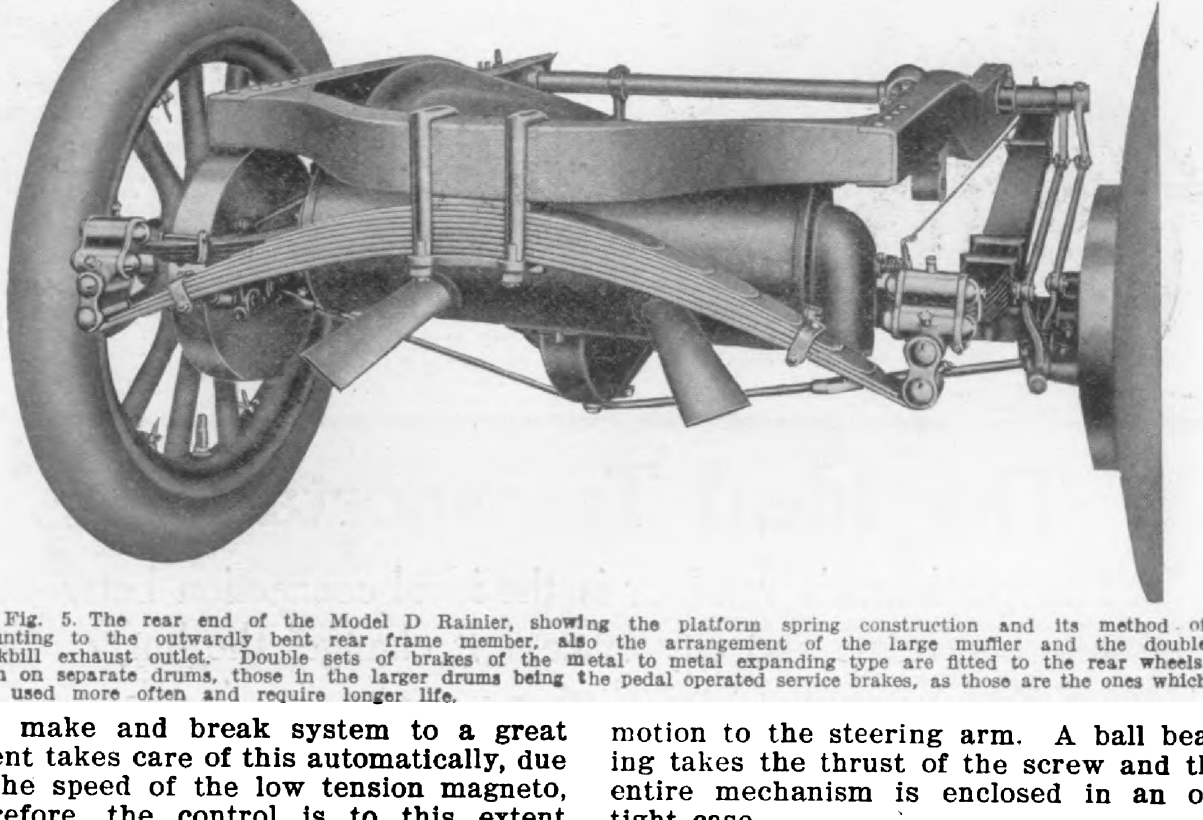
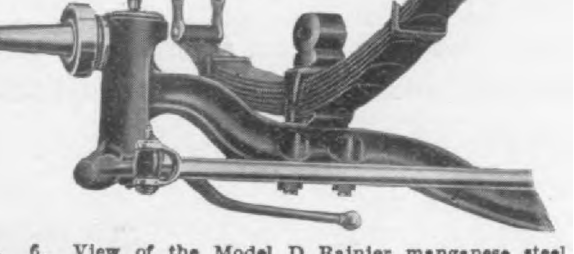


Fig. 5. The rear end of the Model D Rainier, showing the platform spring construction and its method of nting to the outwardly bent rear frame member, also the arrangement of the large muffler and the double kbill exhaust outlet. Double sets of brakes of the metal to metal expanding type are fitted to the rear wheels n on separate drums, those in the larger drums being the pedal operated service brakes, as those are the ones which used more often and require longer life.

make and break system to a great ent takes care of this automatically, due he speed of the low tension magneto, efore, the control is to this extent plified. Attention is called to the foot elerator for use in negotiating crowded ets, as the speed of the car can be antly increased or decreased without oving the hands from the wheel, the



6. View of the Model D Rainier manganese steel tion front axle and steering knuckle, showing the d of mounting the front springs. Attention is called e generous dimensions of these parts. The knuckle is led with an oil cup on top for lubricating. The axle is fitted with non-adjustable annular ball gs.

ch and brake pedals being on a pivot ned forward instead of downward. The rgency brake levers are in the usual tion at the side of the driver's seat.

motion to the steering arm. A ball bea ing takes the thrust of the screw and th entire mechanism is enclosed in an o tight case.

The weight of this car complete is 29 pounds, and although the increase in th power over 1907 is nearly 50 per cent., th corresponding increase in weight is b 20 per cent.

BODIES.

The accompanying cut shows the ou line of the new convex body. These bodi are all of aluminum with ash frames, an are upholstered in hand-buffed leather ov curled hair and spiral springs. All th touring bodies are ironed for tops an have two removable folding seats. Th passenger capacity is seven, comfortab acommodations being accorded to all, the rear seat measures 52 inches betwe cushions. Limousine and landaulet bodi are also supplied and fitted with eve comfort and luxury, including electr dome light, speaking tube, push butto card case, clock, silk curtains and two r movable opera chairs.

The Rainier Co. wish it understood th this is not to be known as a 1908 or 19

The Model Automobile Co., Peru, Ind., . S. A., for fifteen years manufacturer of as engines of from 2 to 500 H. P., has laced on the market a line of cars known s the "Great Western," which is supplied several different models. These machines re fitted with four-cylinder and two-cylin-er opposed motors, and one of the chief eatures claimed for them is the power as ompared to weight, making them excep-onal hill climbers. This will be seen hen it is stated that the company claims e 4-cylinder machines will climb as high s 25 per cent. grades on the high gear nd will pick up speed on the high gear n 18 per cent. grades, and all this without earing the car so low as to require high ngine speeds.

this finish and the equipment, consis of two acetylene headlights, one acety generator or gas tanks, two oil side la oil tail lamp, tool kit, including jack, p and tire repair kit, the price is $4 The top is $175 extra and a triple bination wind shield fitted is $95. motor of this car is four cylinders rated at 50 H. P.

The chassis of Model 16, slightly alte the transmission being of the progres type and using a three-plate metallic with cork insert clutch, is known as M No. 15. This car with practically the s equipment as Model 16 sells for $3,500

The two-cylinder 24 H. P. No. 14 has its motor located lengthwise under body. Economical fuel consumption is

Fig. 1. 1908 Great Western Model 16; motor, 4 cylinders, 4 cycle, water-cooled, 5 x 5½ ins., 50 H. louble ignition system by Bosch high tension magneto, storage batteries, coils and two sets of spark plugs; posi eed mechanical oiler and also splash; sliding gear selective type change speed, 3 speeds forward and one reve nultiple disc clutch, 29 discs, 9½ ins. in diameter, running in oil; shaft drive mounted on large ball bearin loating rear axle also on ball bearings; wheel base 122 ins.; tires, 36 x 4 ins. front and 36 x 4½ ins. rear; arge internal and two large external brakes on the rear hubs, each wheel having a braking surface of 185 sq. i 1 in. road clearance. Price, fully equipped with two acetylene headlights, generator, two oil side lamps, amp, tool kit, jack, pump and tire repair kit, $4000; top and combination wind shield extra.

The accompanying photograph, Fig. 1, hows the "Great Western No. 16" with lass front and top. It will be noticed that e tonneau is provided with extra revolv-g seats, making the passenger capacity even. The folding seats can be quickly emoved if desired, making a five-passen-er car. The seats are commodious, the idth of the front seat cushion being 18 ches and the length of the front seat

of the features claimed for this mach The drive is by means of planetary and a centre chain to the rear axle. F shows the external appearance of two-cylinder car, the tonneau of whic detachable, and in its place a torpedo may be used, making a powerful runa of graceful lines. An extra top is also plied as a special when the car is cha into a runabout. This combination ca

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an equipment including two gas
ps, a generator, two side oil lamps,
, set of tools, pump and tire repair kit,
for $1,350.

ie same chassis, but fitted with a dif-
nt body, seating five passengers, is
vn as No. 12. This car, with a similar
pment, sells for $1,250. It is also ar-
ed to take a torpedo deck which sells
$35 extra. This completes the line of
models built on two distinct chasses.

THE FOUR-CYLINDER MOTOR.

Fig. 3 is shown the exhaust side of
four-cylinder 50 H. P. motor of Models
nd 15. Cylinders are 5x5½ ins. and
cast separately from the best grade
lose-grained iron. Special attention is
n to the moulding of these cylinders,

vided with two extremely large hand hole
and has integral channel section arm
which support it upon the frame. Th
bearings are made of nickel babbitt cas
in steel dies which are brought to a ce
tain temperature and the metal is the
cast under air pressure of about 150 lb
They are provided with tongue and groove
for taking up wear and are interchange
able.

The crank shaft has five of these bea
ings, which are each 1¾ ins. in diamete
The pins are hollow and the bearing su
faces, flanges and collars are accuratel
ground. This crank shaft is offset fro
the centre line of the cylinders, thus r
lieving the engine of the excessive sid
thrust due to the angularity of rod on th

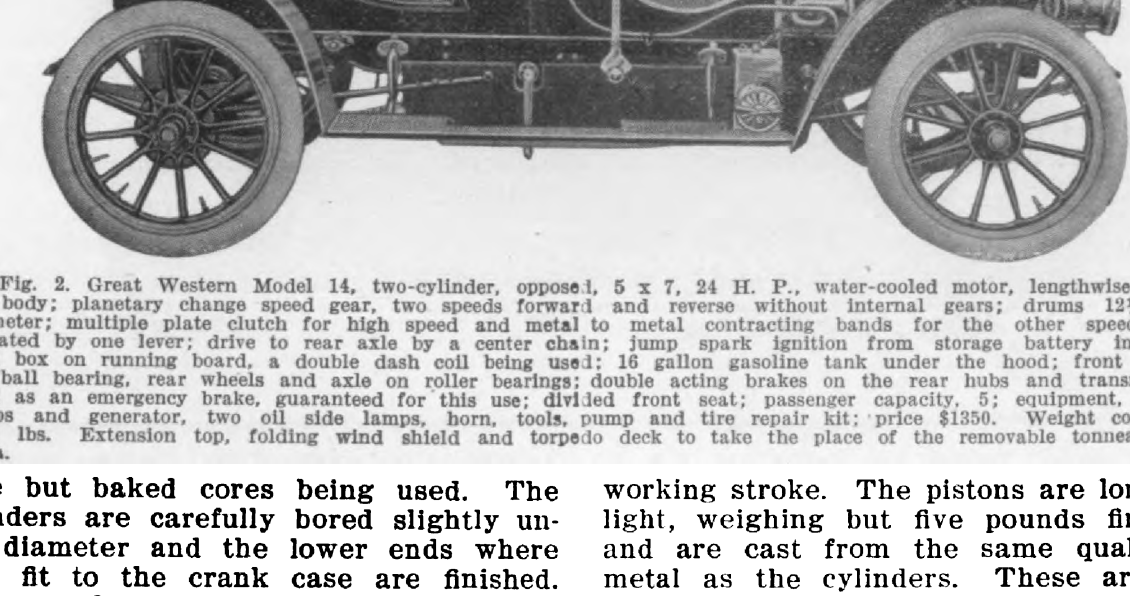

Fig. 2. Great Western Model 14, two-cylinder, opposed, 5 x 7, 24 H. P., water-cooled motor, lengthwise under body; planetary change speed gear, two speeds forward and reverse without internal gears; drums 12½ ins. eter; multiple plate clutch for high speed and metal to metal contracting bands for the other speeds, all ated by one lever; drive to rear axle by a center chain; jump spark ignition from storage battery in prest box on running board, a double dash coil being used; 16 gallon gasoline tank under the hood; front wheels ball bearing, rear wheels and axle on roller bearings; double acting brakes on the rear hubs and transmission as an emergency brake, guaranteed for this use; divided front seat; passenger capacity, 5; equipment, 2 gas s and generator, two oil side lamps, horn, tools, pump and tire repair kit; price $1350. Weight complete, lbs. Extension top, folding wind shield and torpedo deck to take the place of the removable tonneau, are .

e but baked cores being used. The
aders are carefully bored slightly un-
diameter and the lower ends where
fit to the crank case are finished.
are then laid aside to allow them to
in their normal shape, after which
are placed in a jig and the bore
nd to exact size so that the cylinders
claimed to be absolutely interchange-

The water jackets are cast integral
the cylinders, giving a large volume
vater at all points, but especially so
nd the exhaust valves, insuring uni-
cooling. The crank case is cast from
best grade of aluminum alloy and
rever possible I-section reinforcements

working stroke. The pistons are long an
light, weighing but five pounds finishe
and are cast from the same quality
metal as the cylinders. These are als
turned almost to size and then allowe
to anneal, taking out the unequal strain
in the metal and are then finished to siz
by grinding. They are each fitted wit
four eccentric rings with step joints, thes
rings being ground on three sides. O
grooves are also cut in the pistons at the
lower ends. The piston pin is hollo
hardened and ground, and is prevente
from side slip by a steel snap ring, thu
making it impossible for the pin to sco
the cylinder.

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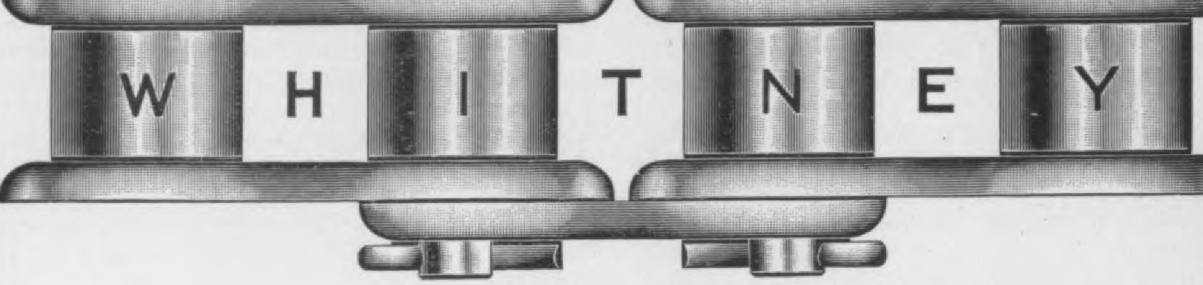
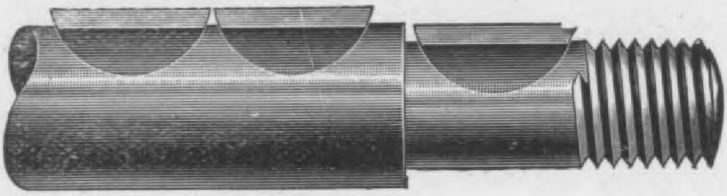


We are now well settled in our new factory and READY TO SHOW RESULTS.

Prompt delivery and constant improvement in quality.

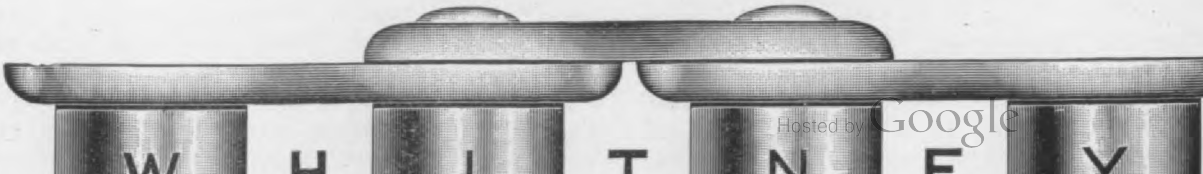
In our effort to possess the finest chain plant in existence and to maintain the highest degree of Accuracy, Efficiency and Finish, we are going to the very limit.

We will now make all sizes of Roller and Bushing Chains for which there is a reasonable demand.



If you are not taking advantage of The Woodruff Patent System of Keying, it is high time to investigate same. It has been adopted by most of the leading automobile manufacturers, who report better results and a great saving in cost.

THE WHITNEY MFG. CO., Hartford, Conn



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r upon it, without disturbing any of the ustments of the motor. The cams are ıpered tool steel and are separate from shaft proper.

'he exhaust manifold is shown in Fig. It consists of a single conduit from h chamber having a gradual sweep into main pipe, the diameter at the cylin- s being 1½ ins. and gradually increas- to 3 ins., there being no sharp bends. e half-time gears are all separately en- ed and are provided with special lubri-

oiling chambers are provided with draw- cocks and the lower portion of the cra case is divided into two compartmen each of which is also provided with drain. The mechanical sight feed oil supplies oil thru independent leads to ea cylinder, main bearings and crank ca the oil being delivered by a positive pu forcing it at a pressure of about 150 l The crank case is also provided with se arate filling cups.

Accessibility is one of the chief featur

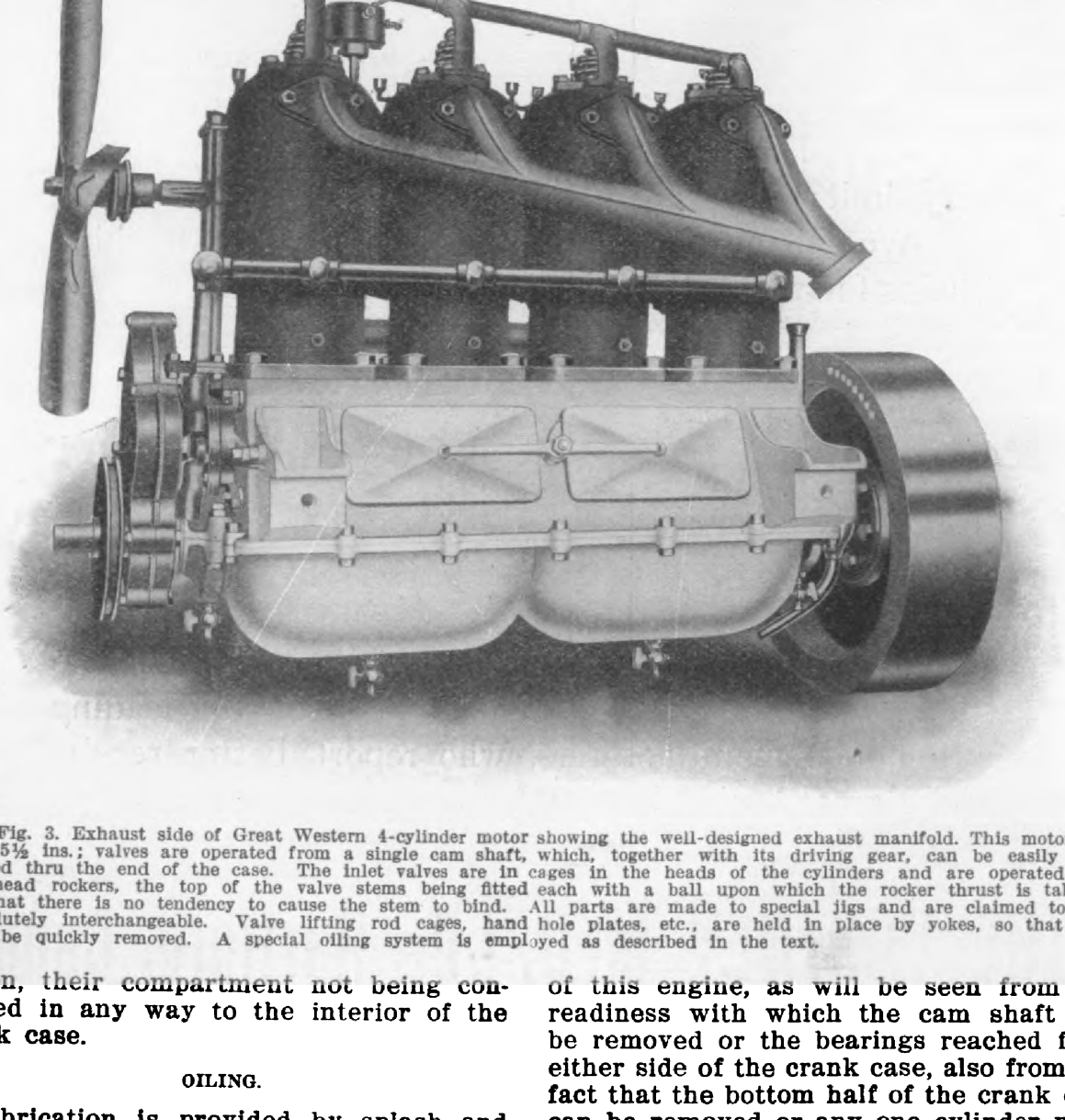

Fig. 3. Exhaust side of Great Western 4-cylinder motor showing the well-designed exhaust manifold. This motor t 5½ ins.; valves are operated from a single cam shaft, which, together with its driving gear, can be easily re ved thru the end of the case. The inlet valves are in cages in the heads of the cylinders and are operated b rhead rockers, the top of the valve stems being fitted each with a ball upon which the rocker thrust is taken that there is no tendency to cause the stem to bind. All parts are made to special jigs and are claimed to b olutely interchangeable. Valve lifting rod cages, hand hole plates, etc., are held in place by yokes, so that al be quickly removed. A special oiling system is employed as described in the text.

on, their compartment not being con- ted in any way to the interior of the nk case.

OILING.

ubrication is provided by splash and by force feed to the cylinders and n bearings. The end main bearings

of this engine, as will be seen from t readiness with which the cam shaft c be removed or the bearings reached fro either side of the crank case, also from t fact that the bottom half of the crank ca can be removed or any one cylinder wit out interfering with any of the other par It is claimed that every part of this mot

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KISSEL

KAR BREAKS NEW RECORDS ON THE PACIFIC COAST

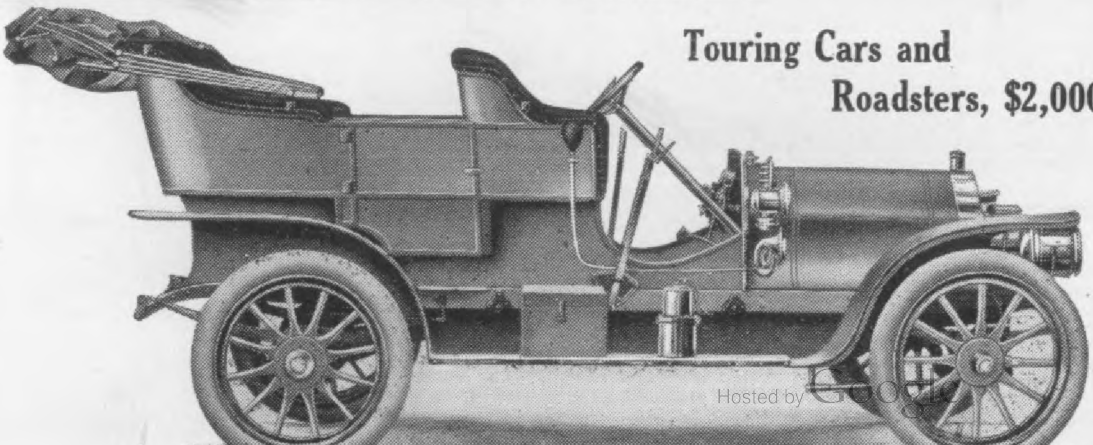
March 20th the Kissel Kar broke Los Angeles to Dagget record. On the same day broke Los Angeles to Victorville record—105 miles in 3 hours, 50 minutes. Also Los Angeles to San Bernardino record—65 miles in 2 hours, 5 minutes. Two events in the big Altona Hill climb, Pasadena, Cal., you remember were won by the Kissel Kar competing with cars costing more than a third more than the price of the Kissel Kar. The Kissel Kar is a

$2,000 CAR WITH A $3,000 EQUIPMENT

40 H. P., 4 CYLINDER
FLOATING TYPE REAR AXLE
SELECTIVE TYPE TRANSMISSION
TIMKEN ROLLER BEARINGS

It will save you actually a thousand dollars to get our free catalogue and investigate. Write for it today and name of representative who will give demonstration.

Touring Cars and Roadsters, $2,000



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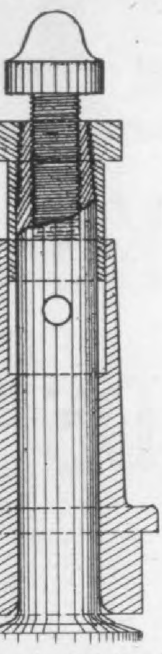

g. 4. Detail of lifting rod and ng. The length is rod is adjust- by means of the piece, which, can rewed in or out. as a round end n comes in con- with the valve No rollers are and the rods off center with ct to the cams, e equalizing the

end, as shown in the sectional view, Fig. 4, which provides for jacent valve lifting rod housings or guides are held by yokes so that these may be removed by loosening a single nut. The valves themselves are combination, the heads being of cast iron to withstand the heat without warping while the stems are steel hardened and ground. These valves are of large diameter, thus allowing the use of a short lift in securing the full area of opening. The intake valves are lifted by the valve lifters direct, and from the illustration of the lifters it will be seen that the upper end is ball shaped, coming in contact with the center of the valve stem, thus avoiding any transmitting of side thrust to the valve stem itself. The lower ends of these lifting rods are not, as usual, vided with rollers, but are formed into circular disks which rest on the cams are sufficiently off centre so that they be continually rotated while in opera-, thus equalizing the wear. The ad- ment on these valve lifting rods is y simple and can be permanently ed. The exhaust valves are located in rocker.

IGNITION.

A double system of ignition, both high tension type, is used. One consists a Bosch high tension magneto with a se arate set of plugs and the other of a qua ruple coil, timer and storage batter Either system may be used entirely ind pendent from the other, the storage ba tery being used mainly for starting.

THE COOLING.

Circulation is maintained by a gea driven, brass-geared pump with a capaci of one gallon for every hundred revol tions of the motor, the circulation bei from the bottom of the radiator thru t pump to the bottom of the water jacke leaving at the top, from which it passes the top of the radiator. The cooling fa of rather large diameter, belt driven fro a pulley on the cam shaft, extended, mounted on a fixture on the forward cyli der and is not in any way supported on t radiator.

CHANGE GEAR.

The change speed mechanism is of t sliding gear type, selectively operated, t gears being of nickel steel. The case of aluminum, oil tight, as it is without t usual horizontal divisions, but the enti top forms a removable cover, the counte shaft being placed below the main sha These shafts are mounted on Ti ken roller bearings and can be co pletely removed thru the ends of t case, these openings being covered screw caps. A special locking devi is arranged to insure the gears b ing perfectly in mesh and remaining the and also making it impossible to enga

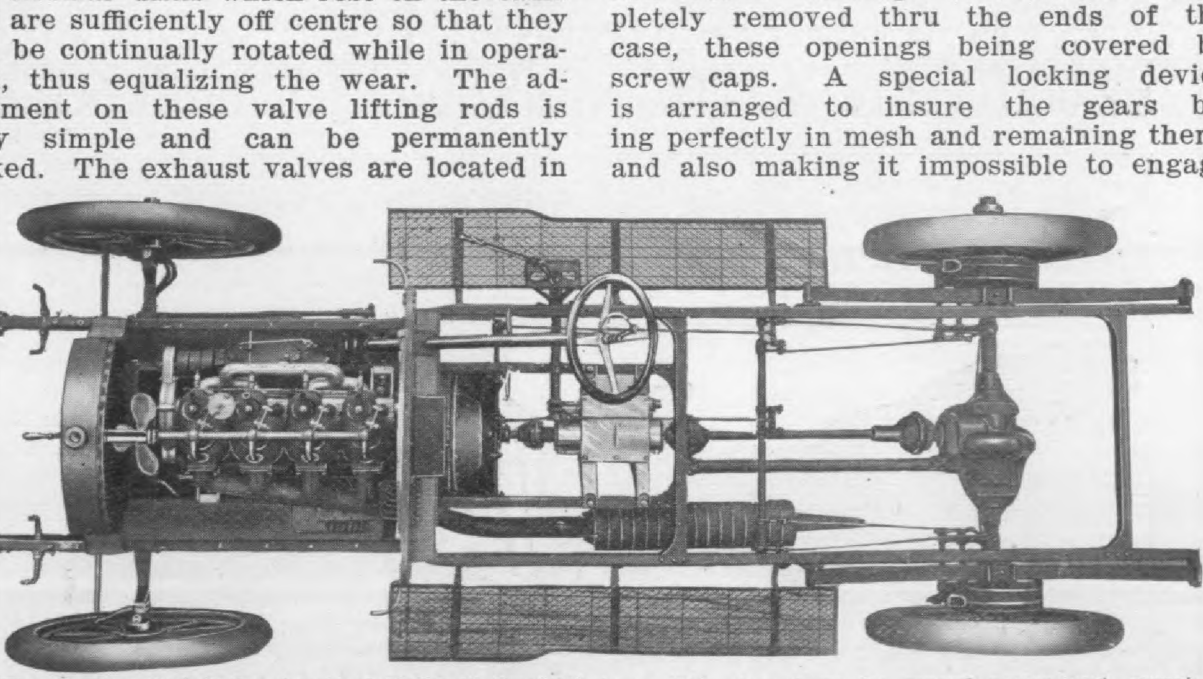

Fig. 5. Plan view of the chassis of Model 16 Great Western. This view shows the general arrangement, mount- of the engine and change gear on the sub frame, a flexible joint being interposed between them, also the ct line of the exhaust pipe to the muffler without any sharp bends. The very large rear wheel double set of es are operated as shown thru eveners, all the rods being on the inside of the frame, leaving the outside and unencumbered. Very long rear springs are used and are mounted revolvably on the rear axle.

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ust and oil-tight case, transmits the pow-
r from the engine. The size of these
iscs is such that the life of the clutch is
ractically unlimited and it never requires
djusting, as this is taken care of by the
pring. From the change speed gears the
ower is transmitted thru a driving shaft
rovided with dust-proof universal joints
f extra large size and a flexible connection
also interposed between the clutch and
hange gear. This is done, not only for
he purpose of relieving these parts of
ny undue strains but also making it pos-
ble to easily and quickly remove any of
hese units. This entire mechanism is
rotected on the under side by a metal
an, and same is so arranged that it is
nnecessary to remove it in case it is
ecessary to take the motor clutch or
hange gear case out of the car.

on the rear.

Semi-elliptic springs of unusual le
and made of the best alloy steel are
at both front and rear. Both springs
shackled at their rear ends and conne
positively at their forward ends. They
mounted on spring seats that move fr
upon the axle, adding easy riding quali
to the car, at the same time relieving
springs of strains which they are not
tended to bear.

The steering gear is of the irrevers
worm and segment type, all parts of
forged steel and encased in a dust-p
steel housing. These gears are made
the Warner Gear Co., of Muncie, Ind.,
need no further description. The fr
is cold prest channel section nickel s
with four cross members. The flange
the junctions are integral gussets and

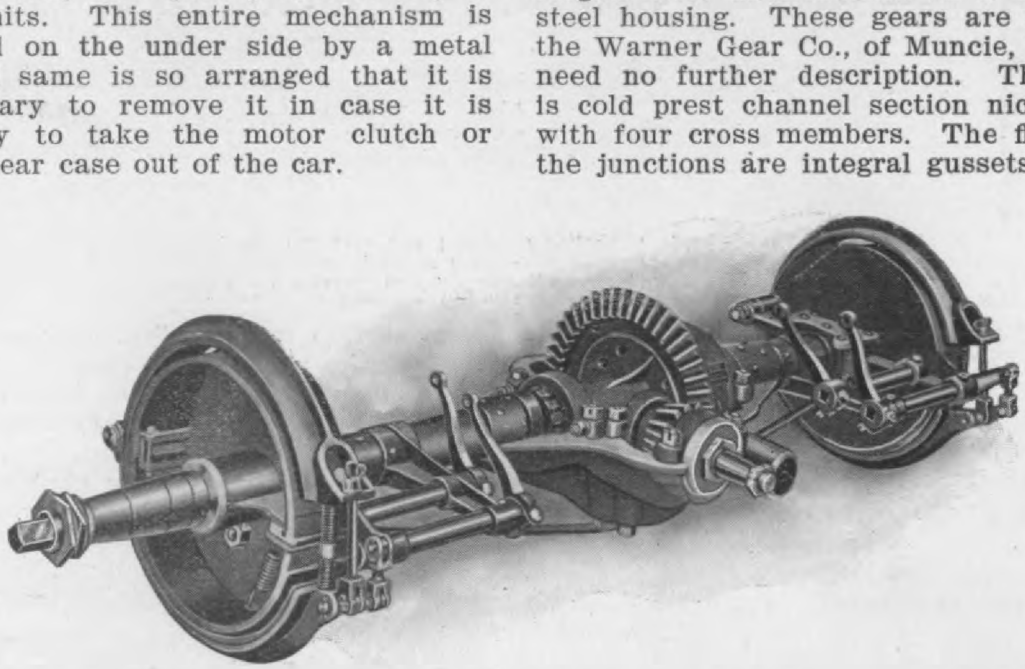

Fig. 6. Detail of the rear axle construction of the Great Western 4-cylinder models. This axle is of the fl
ing type, driving the wheels by means of squared ends. A spur gear differential is used. The entire construc
s mounted on ball bearings. The large brakes are operated by pull rods to the small levers and shafts which
shown mounted on the rear axle housing.

AXLES.

The rear axle is of the live floating type,
evel gear driven. The rear universal
oint forms a slip joint, thus allowing for
he action of the springs. The differential
of the spur gear type, three pairs of
nions being used. The rear axle hous-
g is provided with an aluminum cover,
hich being removed, makes all the gears
ccessible. The wheels are attached to
he driving shafts by means of squared
nds, these driving shafts carrying none
f the weight of the car. Both the ball
rusts and bearings of these shafts are
oused in dust-proof cases.

The front axle is a one-piece nickel
eel I-section drop forging. The pivots
nd steering knuckles are mounted on
rge ball bearings and the wheels are
ed in about 2½ degrees, giving easy
eering. The steering knuckles are very

cold riveted, making a very rigid and
liable construction. A sub-frame of sin
material and design is used to support
engine and change speed gear. The
frame is narrowed at the front, increa
the steering range. The motor can be
moved without removing the radiator

BRAKES.

Two large external expanding bra
operated thru eveners are supplied on
rear wheel drums. These are operated
means of the emergency lever at the
and hold either forward or backward.
double-acting internal foot brakes
trolled by pedal are also operated
the equalizers and are on the inside of
same drums. The actual breaking sur
on each wheel is 185 sq. ins., the bra
being large in diameter, affording not
powerful brakes, but ones which will

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lers of graceful design fitted with lds extending between the guards and body and also from the front to the between the running board and the ne are used. This construction makes mpossible for mud to splash on the y or passengers.

ning. In regard to fuel consumption it claimed that on a 600-mile trip over ve bad winter roads in the west with fo passengers the car averaged a little ov 15 miles to the gallon, which, consideri the road conditions, was exceptional.

Fig. 7 is a view of the external appea

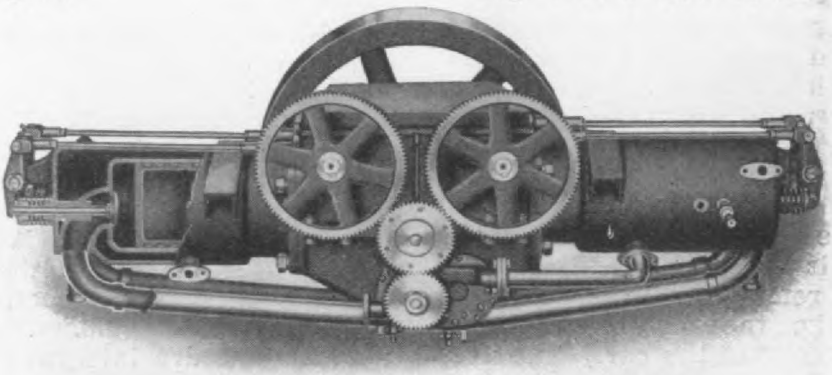

Fig. 7. View of the 24 H. P., 5 x 7, two-cylinder opposed motor of the smaller models of the Great West cars. This motor is claimed to be exceptionally economical of fuel. One cylinder is shown partly in section wing the valve arrangement and the gear housing is also removed showing the half time gears and the metho driving the circulating pump. All valves are mechanically operated.

he other model on this same chassis, 15, differs very slightly from the previ- model, mainly in the body arrange- nts, which are not quite as elaborate, the clutch is a three-disc metallic one d with cork inserts, while the sliding r, giving three speeds forward and one

ance of this motor. Fig. 8 shows a pl view of the complete chassis, showing t arrangement of the engine lengthwise u der the body, the planetary change ge and the single centre chain drive to t rear axle. This planetary change gear designed without internal gears, spurs b

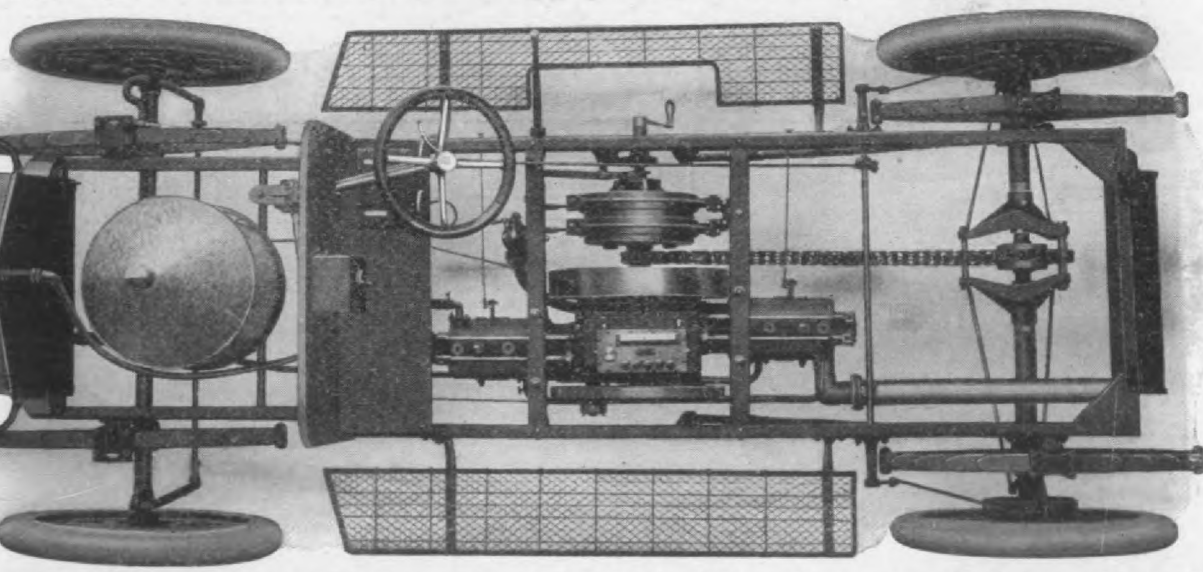

Fig. 8. Plan view of the Great Western two-cylinder chassis, showing the arrangement of the engine on it st steel cross members, the planetary change gear and the center chain drive to the rear wheels. A hood o four-cylinder type is used but nothing is placed under it except the large gasoline fuel tank. Q. & C nwood steps with prest steel step hangers are fitted and full elliptic springs of large size and opening are use around. One brake is fitted to each rear wheel, and the planetary, which has no internal gears, is guarantee be used as an emergency brake, thus simplifying the control.

erse, is of the progressive type. The el base of this machine is 118½ ins. the clearance is 11 ins. The car ghs, complete, 2,900 lbs. and sells for 00. Special revolving seats for the ton-

ing used. These gears are 7 pitch wi 15-16 in. face, made of steel, proper hardened and guaranteed to stand t strains of using the transmission as brake. The transmission shaft and t

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WHITE

THE CAR FOR SERVICE

A Touring Car in the True Sense of the Term

The man who gets the most pleasure from his touring car is not the ma who limits his touring to the macadam roads; for the most interesting sectio of the country and those of the greatest natural beauty lie, for the most pa beyond the regions of improved highways. For that reason there is no qua ity of a motor car more important than the ability to traverse bad roads.

In unique degree, the White possesses the qualities of a "bad roads" ca Owing to the perfect flexibility of the engine, the White tourist can accomm date the speed of his car, yard by yard, to the condition of the road, speedi up on each little stretch of good road, and slowing down for each hole a "thank-ye-ma'am"—without shifting of gears or any manipulation exce of the throttle. The tremendous pulling power of the White engine und all conditions means immunity from getting stuck in the mud or sand. Ru ning through deep water, as in fording streams, is easy for a White. And for climbing grades in mountainous regions—there is no other machine whi can approach the White in hill-climbing qualities.

DRIVE A WHITE STEAMER AND SEE THE COUNTRY

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THE WHITE COMPANY

reverse are employed, but are of nze and are suspended from a prest el cross member so that they cannot g. These bronze bands act against the t iron drums, which are 12½ ins. in meter, so that very little pressure is uired to make them positively grip. e high speed clutch is of the three plate tallic disc type. This is metal to metal l well lubricated so that it takes hold dually, but when once engaged does not . The frame is cold prest nickel steel, nnel section, with similar cross mem- s, including the cross members on ich the motor and transmission are unted. Even the step hangers are prest el and the steps or running boards are the Q. & C. Stanwood make, which al- the dirt to fall thru.

Full elliptic springs are used both front l rear, giving plenty of freedom to the ly, and, combined with the long wheel se, make an easy riding car. The radia- and tank are combined. The radiator ntains 132 tubes and it is claimed does t overheat when running continuously slow speed. The pump throws three- tor giving exceptional cooling qualit There is nothing under the hood but t 25-gallon gasoline tank. External bral acting directly on drums on the r wheels are used. A thumb button on t brake lever makes it possible to lock th brakes so that the car can be left sta ing on a grade if desired.

Ignition is by jump spark, two sets batteries in a metal box on the runni board being used. The steering gear is the screw and nut type and is, of cour practically irreversible. The body is special design and is claimed to be ceptional for a car of this price. The t neau is removable and a torpedo deck be used instead, making a runabout. T car weighs, complete, 1800 lbs. and se for $1,350.

The same two-cylinder chassis, exc that the wheel base is 100 ins. with a fra of angle steel and a somewhat differ body, but otherwise practically the sa as No. 14, constitutes the No. 12 mo This car weighs 1,800 lbs. and sells $1,250.

'Bertolet" 35 H. P. Convertible Car

Dr. J. M. Bertolet of Reading, Pa., has ced on the market a convertible 35 H. P., ylinder gasoline car, which can be used as ring car or runabout, a rear deck being nished to take the place of the rear seats en the car is used as a runabout. With ing top, at $2,250. As a runabout with top the price is $2,000.

The body is so ingenious y designed constructed that its inte:changeabi ity s perceptible in either touring car or runab form. The body is made of the best obta able materials, handsomely finished and tr med with the best hand-buffed leather. S

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stroke. The cylinders are cast in pairs and are offset. The valves are all mechanically operated and are all on one side of the engine. They are of nickel steel and have adjustable tappets. The connecting rods and the crank shaft are drop forged of high carbon steel and have long bearings 2 inches in diameter, with Parsons white metal bushings. The crank case is of aluminum and is provided with pockets to catch sediment from the oil. Large hand holes are provided to give access to the working parts.

speed gear. At each end of the propellet a Spicer universal joint is applied. The axle is of I section and the rear axle is fixed type, both Timken make. Fou elliptic springs of ample strength and flexi are rigidly and neatly bracketed to the and give very easy and comfortable qualities to the car.

The radiator is of costly constructio claimed to be very efficient and durabl consists of a large number of small thin securely fastened between two sheets closely together with but a small water between the tubes. This type of ra has been found to be strong and free leakage and easy to repair in case of acc

Steering is thru worm and gear se enclosed and irreversible. The steering

"Bertolet" 35 H. P., 4-cylinder car fitted as a runabout. Price, as shown, $2,000 including lamps and horn. T chassis is furnished with convertible touring body, folding top, lamps and horn at $2,250, or can be had with both body and rear deck for converting into a runabout for $2,400.

Splash lubrication is employed in the crank case and the pistons and main bearings of the crank shaft are oiled direct. All gears are hardened and enclosed in the oil tight casing. A gear driven oil pump at the bottom of the crank-case circulates the oil constantly between a two gallon reservoir at the top of the engine and the overflow stand pipes in the crank case.

The clutch is a spring steel expanding ring faced with leather, is 14½ inches in diameter by 2 inches wide and is operated by means of a sliding sleeve and bell crank with toggles for expanding the clutch. This is found to be an

is operated thru a hand wheel which the spark and throttle control levers. lower connections to the throttle and timer are as direct as is possible to make

Internal and external brakes act upon on the rear wheels. The external brak brought into play by means of a neat a conspicuous pedal which is connected short rocker shaft mounted on a cross the frame, the rocker shaft in turn connected to a crank and rod by an equ bar sliding in a suitable bracket und side bars of the frame. A rod on eac of this equalizing bar attaches to a contr

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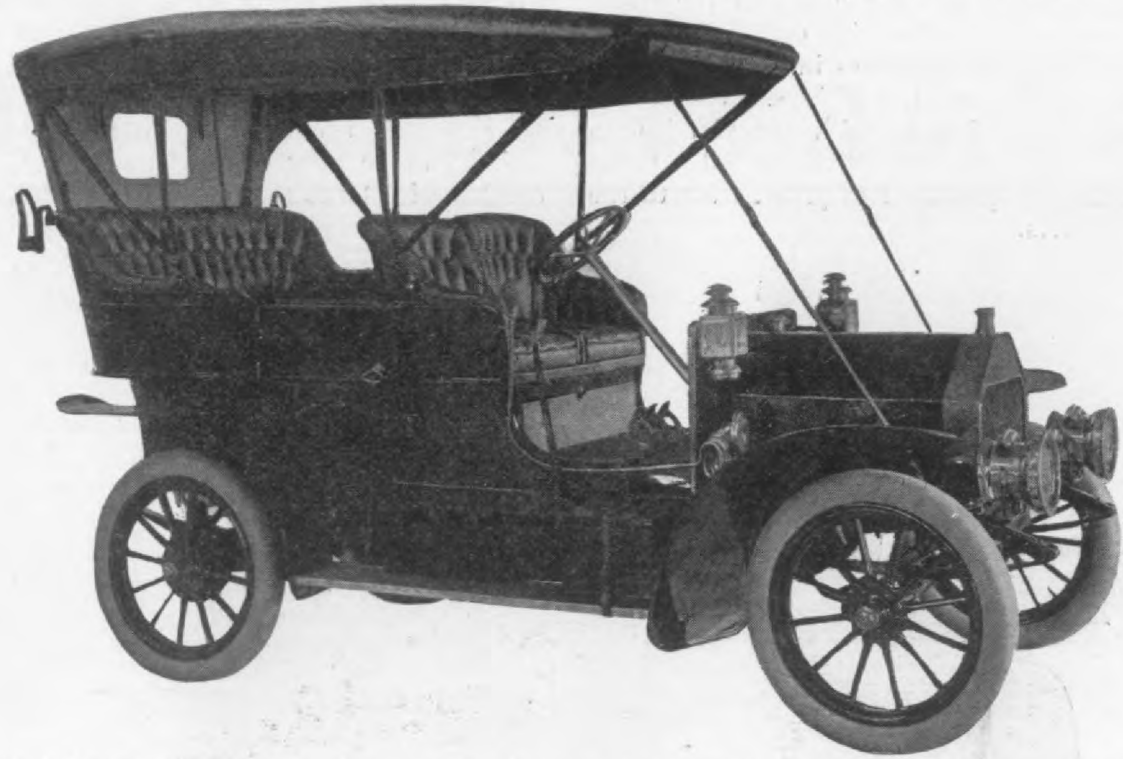
U. S. A., offers for 1908 two models similar chassis. The touring car here-illustrated, Fig. 1, and the runabout, 2. The model H is a 5-passenger car

of the axles. This model complete weighs 2000 lbs. and is fitted with three oil and two gas lamps with tank or generator at the purchaser's option, a four bow black

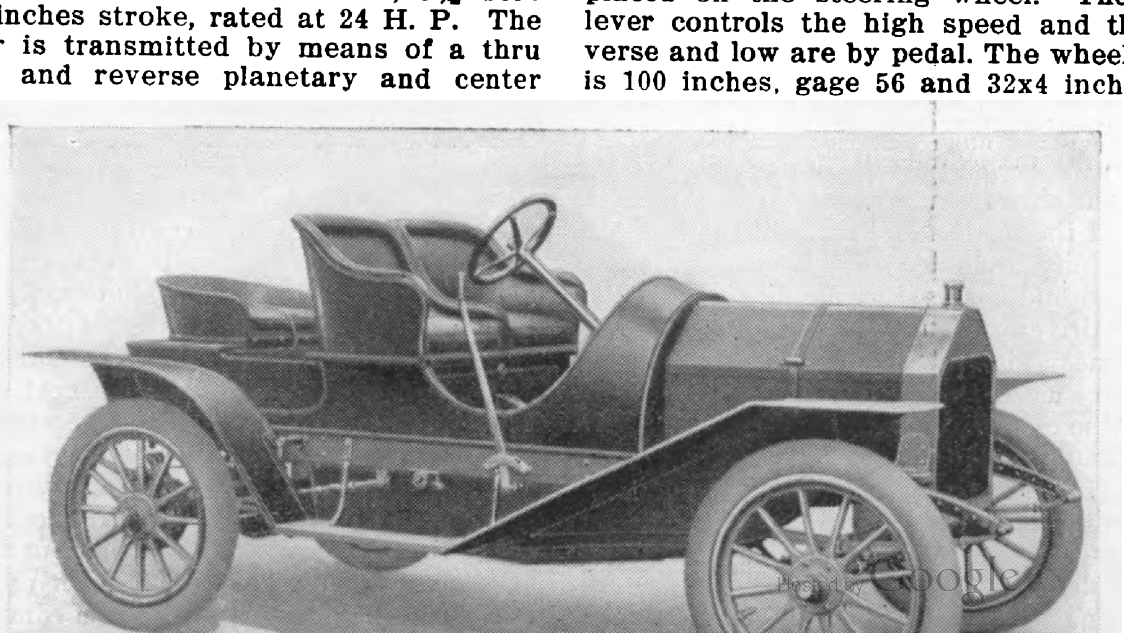


ig. 1. Auburn 1908 Model H. 5 passenger touring car, wheel base 100 inches, gauge 56 in., tires 32 x 4 in., two cylinder opposed, water cooled 5¼ in. bore x 5 in. stroke, 24 H. P., planetary transmission, 2 forward and reverse, chain drive, divided rear axle. Weight 2,000 lbs. Price on application, including 3 oil and lamps with tank or generator; four bow black top (extra quality) storage battery, complete set of tools metal apron full length of car. Model G same as H with 32 x 3½ in. tires, less top, gas tank and stor-attery and gas lamps, price $1,350.

ving the general lines of a 4-cylinder ine altho the motor is two-cylinder ed located lengthwise under the body. cylinders are water cooled, 5¼ bore inches stroke, rated at 24 H. P. The is transmitted by means of a thru and reverse planetary and center

tip extra quality and complete set of tools.

Ignition is by storage battery and coil the usual spark and throttle levers being placed on the steering wheel. The side lever controls the high speed and the reverse and low are by pedal. The wheel base is 100 inches, gage 56 and 32x4 inch tires



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Recent Public Demonstrations

OF THE

ACME SEXTUPLET

prove it to be in the VERY FIRST RANK of American Cars

In the Long Island Automobile Club's Economy Test, February 25, a stock car made the run from Brooklyn to the end of Long Island and back (252 miles) in eight and a half hours, or at the rate of 30 miles per hour.

At Savannah, March 19, a stock car, untried after leaving the assembly floor, gained third place and established A WORLD'S RECORD for consistency by making an average of 52 miles per hour and making fourteen out of twenty laps between 19:18 and 19:42.

THE ACME LINE IS THE BEST AGENCY PROPOSITION IN AMERICA

Agencies Established:

BOSTON, MASS, Boston Motor Co., 91 Church St.
NEW YORK, N. Y., J. B. Brewster & Co., 49th St. & 7th Ave.
PHILADELPHIA, PA., John L. Scull, 258 North Broad St.
BALLSTON SPA, N. Y., West's Garage, Milton Ave. & Front St.
PITTSBURG, PA., Arlington Motor Car Co., 5971 Center Ave.
CHICAGO, ILL., Webb Jay Motor Co., Harvester Bldg.
PECOS, TEXAS, Pecos Auto Co.
PLAINVIEW, TEXAS, Ellerd Bros.
BROOKLYN, N. Y., J. W. Mears, 7 Ocean Parkway.
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OTHER TERRITORY OPEN. Write for Catalogue C and Agency Proposition.

The Acme Motor Car Company,

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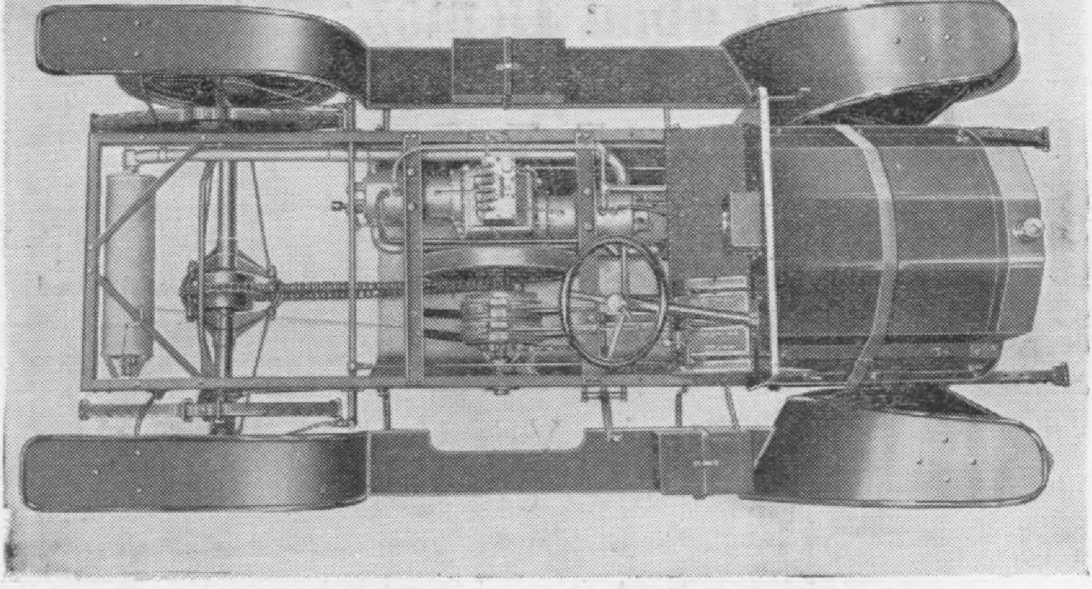

Fig. 3. Auburn Model G chassis, shows the arrangement of mechanism, the ease with which the transmission be reached, the location of mechanical oiler, the foot pedal plate, battery and tool boxes. The pressed steel e, with side members of channel section, 1½ in. x 4 in. by 3-16 in., with drop forged spring bar and yoke is especially adapted for hard use. The sheet metal work on fenders, bonnet, etc., is of neat design, and e gauge metal.

used. Large power in proportion to ht, ease of control, accessibility and licity, are the features claimed for car.

ie model K roadster, Fig. 2, has the e general chassis specifications, but the ratio and the valve setting of the

Lubrication is by a positive force fee oiler located on the top of the engine cas and feeds lead to the top of each cylinde and to the crank case. A small tube ca ries oil from the top of the piston to th wrist pin bearing a chain in the sectiona view of the motor, Fig. 4. The noteworth

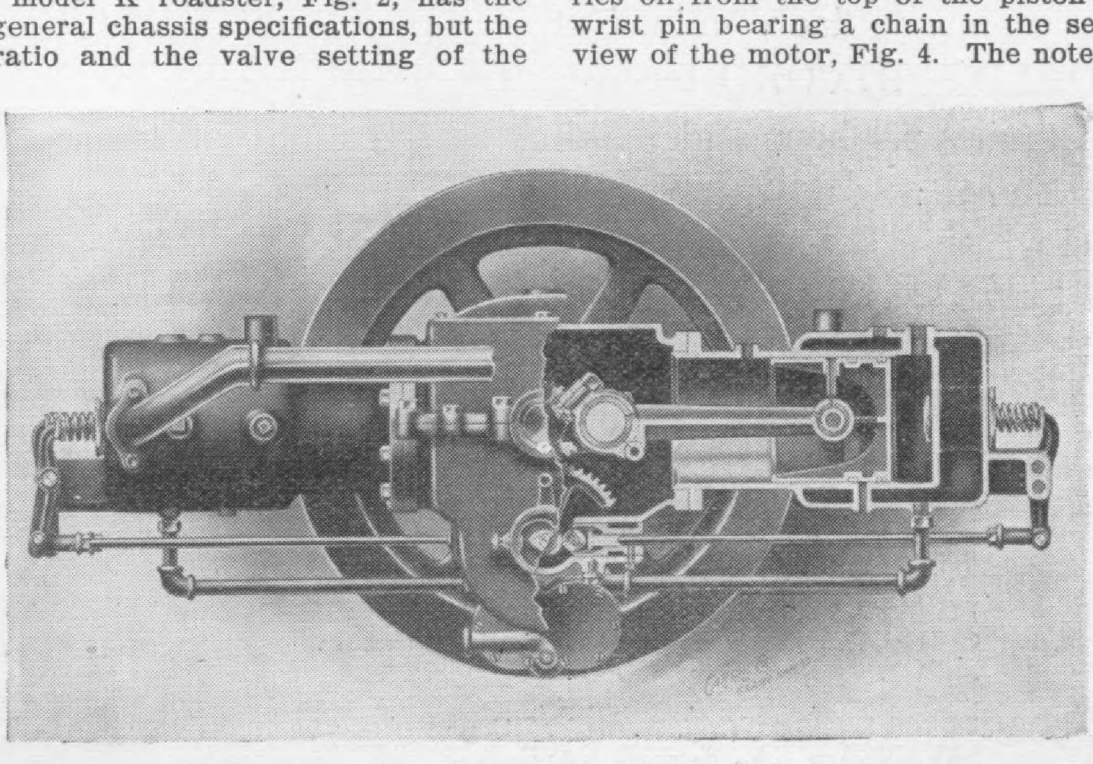

Fig. 4. Sectional View of 1908 Auburn Motor, showing arrangement of cam shaft below the main shaft, nanical operation of valves and the special provision for oiling the wrist pin by means of the oil from the nder walls passing thru the tube in the piston wall.

ne are adopted for higher speeds, the ht being somewhat less. The frame

features of the motor are, steam hammere crank, 1⅞ in. main bearings, and 1¾ i

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GEARS
For 1909

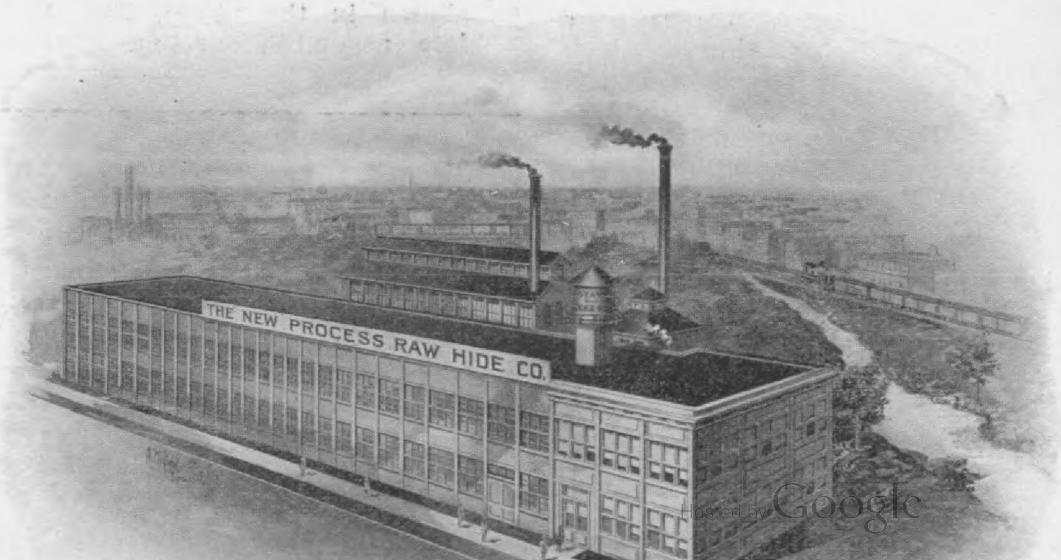
ACCURATE WORK GUARANTEED

WE have one of the largest and best equipped plants in the country for turning out accurately cut gears of any kind and material, and in any quantity. Have 36 gear cutting machines, including Fellows Gear Shapers, Brown & Sharpe and Gould & Eberhardt Rotary Cutters and 12 Gleason Generators for bevel work and a special hobbing machine for spirals, herringbone and helical gears. Our lathe equipment is in keeping and includes the best types of automatic screw machines and turret lathes taking stock through the spindle up to $4\frac{1}{2}''$ diameter. We have two large hardening furnaces fitted with a pyrometer system and are thoroughly familiar with the proper treatments of the special steels. And we have a reputation for the high quality of our work which is second to none.

SEND US YOUR BLUEPRINTS FOR ESTIMATES

THE NEW PROCESS RAW HIDE CO.

Syracuse, - - - - - - - New York



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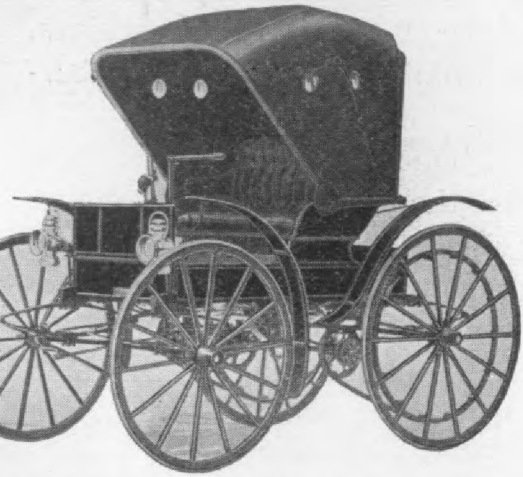
ssible position. The cam shaft is at lower side where it is copiously oiled, at its outer end the timer is located. w is the circulating pump driven from cam shaft gear. All valves are me-ically operated as shown and the ex-t escapes thru a long pipe to the muf-

tary type with large gears of special Mid vale Steel, with a low gear ratio or 2.4 to 1 make car especially fast, and accuracy in machining makes them run smoothly and without noise. All cars are thoroly tested before leaving factory and are ready for the road when received by purchaser.

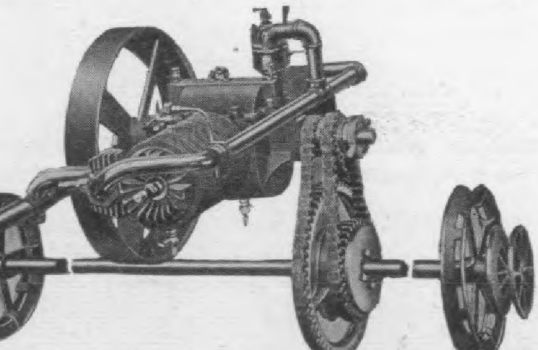
The Enlarged Holsman Automobile Factory

e Holsman general offices occupy the e south end of the fourth floor of the adnock Building, Chicago, which is to be the largest office building in the d. The factory is claimed to be the st producer in the world of the car-



1. The new Holsman Model 5 which conforms in ral way to the previous models but has a lighter box body.

or buggy type of automobiles. The model No. 5 is just being completed s herewith shown, Fig. 1. This car he same general power plant as the cars, consisting of a two-cylinder sed air-cooled motor driving the jack by silent chains, as shown in Fig. 2. is one of the simplest and lightest r transmissions used in automobiles, is an important factor in making a



The machine shop is on the first floor Every inch of space is utilized with iron working machinery and is a very busy place. Here the grinding and blacksmithing is done. Automatic saws are used for cutting up stock.

The motor assembling department is on the next floor, and here the assembling and

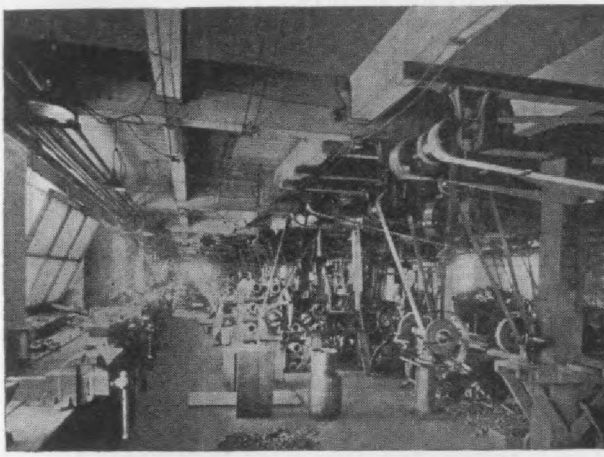
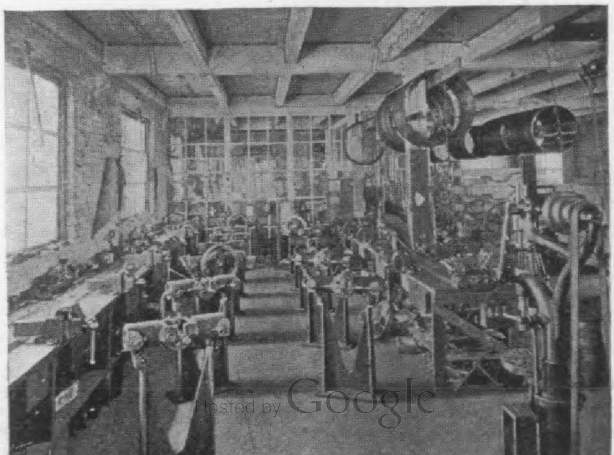


Fig. 3. An aisle in the Holsman machine shop.

fitting of the various parts of the motors is carried on, the main motor castings being mounted on special cast-iron stands, as shown in the photo, Fig. 4. In the vehicle assembling room, illustrated in



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the same time at the rate of 1200 to
0 revolutions per minute. Each motor
driving a large fan which absorbs a
nite amount of power and indicates
ether the motors are up to standard.
'he trimming room is on the top floor.
re the humming noise of the sewing
chines is about all there is to be heard.

g. 5. View of the general assembling department in Holsman factory.

this department leather is cut, formed
stitched, the buttons put into place, the
sh put to artistic designs of backs and
ts. The paint shop is also on this floor.
e vehicles lined up for painting are
wn in Fig. 6. A crating department
also constantly at work. Here the men
ve nails all day long, making the frame-
rk to protect the vehicles from damage

shipment to India and other foreign por
For such shipments an elaborate box
made and lined with waterproof roofi
paper, as vehicles which go to such fa
away countries must be protected fro
moisture as well as from damage in trans
After crating is completed a large elevat

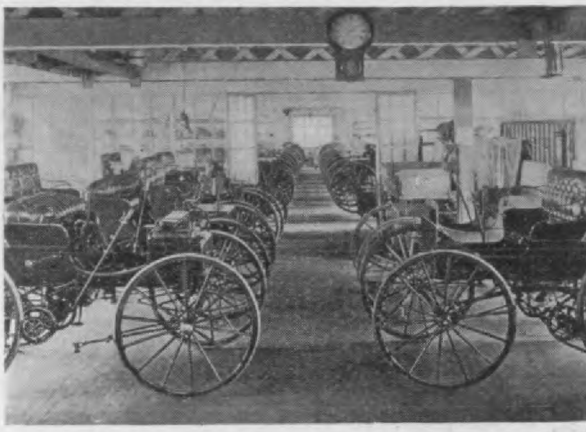


Fig. 6. The Holsman painting and finishing department

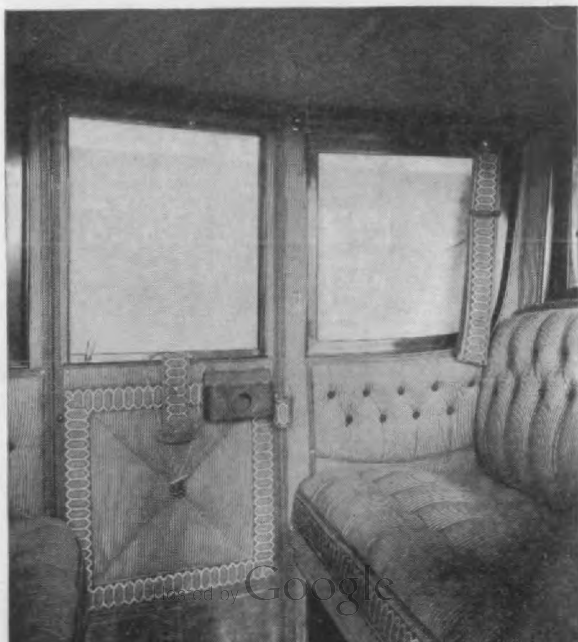
drops the crates to the door of the ca
which are waiting on the private tra
which connects with the main lines.

This busy plant which has grown fro
a humble beginning but a few years ag
is the most assuring proof that the ide
of the pioneer buggy type automobile bui
ers, the Holsman Automobile Compan
were fundamentally correct and that the
is an ever increasing demand for this ty
of self-propelled vehicle.

ample of Modern Motor Car Interior Finish

Refinement in the interior finish of
sed automobiles is one of the striking
velopments of the industry within the
t two or three years. Automobile manu-
turers and carriage builders have been
ing in their efforts and the result is
own in interior trims of the greatest
ury and beauty.

A striking example of artistic trimming
shown in the accompanying photograph
the interior of a special 4-passenger
anklin coupe. This is finished in striped
ff French whipcord with lace to match.
e broad lace around the door and the
nt edge of the seats was specially de-
ned to harmonize with the whipcord
th. An excellent and quite unique ef-
t has been produced by lining the roof
th the same cloth which is used for the
t of the interior. In the roof is placed



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Are you in earnest about wanting to cut down your tire expense? If you are, buy an

If you really want to know what the Elmore saves in tire wear watch a heavily loaded street car vainly endeavoring to start up a slight incline when the tracks are slippery or icy.

If you want to know just what wear and tear on the tires the Elmore does not cause, watch those same wheels to which the power from the motor is applied whirl helplessly around and send forth a shower of sparks while the ponderous car barely moves.

To still further realize what an economical car on tires an Elmore is, watch another car on similar tracks slide along for many feet after the brakes have been applied to the wheels to keep them from rotating.

When you've seen these examples of wear and tear on car wheel tires you've seen wear and tear which is analogous to the wear and tear on the tires of any four cycle automobile. Perhaps not to so marked a degree, but analogous, nevertheless.

This wear and tear in a four cycle car is simply unavoidable because the inherent principle of the four cycle car is at fault. It is caused by the uneven and broken application of power.

In any four cycle car first there is a power stroke and then there follows an idle stroke causing a scuffing and jerking on the tires that hastens their annihilation.

The only possible remedy to this condition is the two cycle principle, as exemplified in the Elmore two-cycle valveless car.

In an Elmore such wear is impossible because the power application is continuous, and the wheels rotate at the same speed as the car moves.

Any agent will verify these statements---see one at once. In the meantime write to us for literature.

The Elmore Mfg. Co.

904 Amanda Street, Clyde, Ohio

MEMBERS A. L. A. M.

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Gasoline vehicles—Chas. E. Duryea, Consulting Engineer, A. M. C. M. A.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

TROUBLE AFTER OVERHAULING.

Halifax, Nova Scotia.

Through the columns of the Journal will you kindly tell me what is the trouble with my engine? It is a 20 H. P. 4-cylinder Argyll Landaulette, fitted with a Longuemare carbureter, and has recently been thoroughly overhauled by an engineer, but as we have no motor experts in this town, I fear he has done something to the engine that is giving trouble, but am unable to locate it.

The engine is started with the ignition opened about five notches on quadrant on the steering wheel and the throttle open about 60 degrees. When it is going the ignition is opened up a bit more and the throttle closed to about 10 degrees on the quadrant, but if I am not careful she will stop dead, so I have to humor her by opening out a few degrees, then slowly closing her again. She races when opened out slowly, and even one notch will cause her to race or stop according as it is put ahead or back. I think she is getting too much gasoline, as she seems to choke, then clear suddenly and race. When I stop her, immediately the engine ceases to work; she throws out about a wine glass full of gasoline from the spray side of carbureter. I have examined the spray and needle valve, and they appear to be in order. and the latter seems tight. She was not like this before, and the man says the carbureter has never been altered, only cleaned out. The float is not leaking and valve is not stuck on float. When should this engine spark at cylinders with ignition lever nearly closed and when full open? Mine sparks from 30 degrees in advance to 30 degrees after centres.

W. G. S., "Subscriber."

It seems evident that some adjustment about the carbureter has been changed. What, I cannot say. Watch for loose parts at the critical point. If the throttle can flop or shift it may close itself and stop the engine, or open itself and let it race. Watch the exhaust and note if there is black smoke when it chokes. If so, this is proof that it is getting too much liquid. There is some adjustment wrong and you must fix it, and can only find it by observation. The position of the spark lever is of little importance so long as it has motion enuf each way to give you the advance and retard wanted. Try it and see if it can be advanced too much so as to cause loss of power or preignition. If so, it is more than enuf.—C. E. D.

TIRE INFLATION PRESSURES.

Lynden, Washington.

I have a 1907 Model "F" Buick and would like to ask thru the Journal about what pressure I should have on the tires with the ordinary load of five people? I have on my machine one Diamond, one Fisk, one Goodyear, and one International tire. Should the pressure be the same on both front and rear tires? When you say a tire should be pumped to 75 lbs. pressure do you mean with the wheel jacked up as a person ordinarily pumps up after making a repair or with the weight of the machine on the tire? On page 44 of your February issue, opposite 3½ in. tires you have two sets of figures for both load and pressure. If but one were used I would construe it to mean maximum and minimum load and pressure, but where two are used I do not understand it. Would you kindly explain? I am a subscriber to the Journal.

G. L. ALDRICH.

I do not see how the table can be more explicit than it is. A tire of 3½ inches diameter should never be loaded more than 900 lbs. Run your car on a scale and find out what it weighs and how heavy each end is. Then you will know how to inflate according to the table. If the weight is up near the limit, inflate to 78 lbs. If near 770 per wheel, inflate to 71 lbs., and if near 550 inflate to 57 lbs. Of course, if about midway between these figures, inflate to a middle pressure. Of course, these figures are not absolutely correct. Few figures can be in such a table. The user must use judgment. If the wheels are small the tires must be inflated harder than if the wheels are large, for there is less surface on the ground to take the pressure. If the tires are thick, they distribute the load over more surface than is in actual contact, so they will be too hard if inflated to as hard a pressure as a thin tire requires.—C. E. D.

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HOW TO USE ACETYLENE AS FUEL.

Platteville, Wis.

In the February issue of your Journal I noticed a short item concerning the use of acetylene gas for fuel in automobile motors.

I would like to know how this is applied, if it is generated in the regular type of generator and how delivered to motor; also if any type of motor can be fitted for same and what fittings are necessary. Any information on this line will be greatly appreciated. I am not a subscriber, but am a regular reader of your journal.

WM. G. JARRETT.

I have had no experience with acetylene for motor fuel. I would handle it just as any other gas is handled and watch the result for possible improvement. Generate it in a generator and near the motor admit it to the air pipe with a valve in each pipe so only proper amounts of air and gas can get in. Some gas engine mixing valves are so made that as the gas is shut off the air opens and at the proper point there is the least resistance to the passage of both. This style of valve is best, for it does away with the necessity of trying to adjust two independent valves at one time with the result that you may get them both open or both nearly closed at the same time. A gas bag should be used to suck from and a light check to prevent the flow of gas while the engine is not sucking and while the gas bag is taking the flow. If you can see an engine using city gas you will get a lot of help. Gas engine catalogs often show the fittings needed for city gas; and acetylene would, I believe, only require a smaller size. It is a gas that is very rich in carbon and so requires much more air than common. It gives good power and much heat.

There has been some use of acetylene to enrich the alcohol mixtures, and this was secured by drawing the alcohol vapor past carbide. The water in the alcohol attacked the carbide and freed the gas. It would doubtless be possible to spray water on the carbide by the incoming air and so enrich the air by the gas thus generated. You could regulate the amount of water by a needle just as gasoline is regulated and so control the mixture. If you try the experiment we would be pleased to learn how you succeed.—C. E. D.

(Mr. Avery, of Avery Portable Lighting Co., Milwaukee, Wis., I believe has experimented along this line.—Ed.)

WHICH REQUIRES MORE POWER TO DRIVE, CHAIN OR BEVEL GEAR CARS?

Springfield, S. Dak.

Kindly answer through the Automobile Trade Journal the following questions:

Does it take more power to propel a shaft-driven car, up to 3000 lbs. weight, than a chain-driven car, and less for a shaft drive above 3000 lbs. than a chain drive?

Does not a piston with a six-inch stroke travel faster than one with a three-inch stroke, the shaft making the same number of revolutions in each case?

HANS MILLER.

To compare two cars as you ask is not easy in the space at command in this column. There is, however, no dividing line above or below which one is better than the other. The propeller shaft uses bevel gears and they lose some power. If a single direct chain is used, the loss is very slight, but a single chain is not considered good practice for a heavy car. Therefore two chains must be used and a counter-shaft provided with a propeller shaft to drive it. This may eat more power than a live axle and propeller shaft alone. Much depends on the bearings and design and on the protection from dirt. If chains had been protected, as gears have to be, there would probably have been fewer shaft-driven cars, for the chain is the most flexible and economical driving device. A piston making a long stroke in the same time as a short stroke, one must of course travel faster.—C. E. D.

(This question arises so often, a word of warning may not be out of place. In comparing a double side chain driven car with a shaft bevel gear driven machine it is not a question of the relative efficiencies of a bevel gear and shaft as compared to side chains, but simply whether one or two universal joints eat up more or less power than two side chains. This, it will be seen, is true, as a side chain car has two chains and four sprockets in addition to a regular bevel gear drive to its countershaft, while the shaft-driven car has two universal joints which the other has not.—Ed.)

BEVEL GEAR AND SHAFT VS. CHAIN.

Henry, Ill.

Will you kindly answer thru the columns of Cycle and Automobile Trade Journal the following questions:

By which drive, chain or shaft, do you lose the most power and in what particular part is it lost? Thanking you in advance for your kindness, I remain,

LEIGH LINCOLN.

Your question cannot be answered in a very satisfactory manner because of its lack of conditions or specifications. With a motor at the extreme front of a long chassis, there is little use of considering the chain. It would be longer than is good practice. But with the motor near the work, where it ought to be, the chain is the simplest and best. It has been estimated that single chain drives lose but five to ten per cent. of the power they transmit and that shaft drives lose probably twice this much, but this is not a fair comparison, for the reason that the motor is differently located in the two best cases. With the chain it is common to have the motor shaft parallel to the rear axle so there are no corners to turn. The chain wears at every pin, and when it gets longer does not fit the sprockets. It then must be forced down on the teeth which requires power, and this is the point of loss. The shaft loses at the gear teeth which have friction much as do the sprocket teeth; also at the bearings of which there are many. The universal joints are also a source of friction and trouble in many cases.—C. E. D.

(Attention is called to the fact that this is a comparison between a single chain and a shaft, and not the arrangement used with double side chain driving. See comment at end of inquiry, "Which Requires More Power to Drive," etc.—Ed.)

WORM GEARING.

Cleveland, Mo.

Would you please answer the following question in the columns of the Cycle and Automobile Trade Journal. Would a worm gear be a good gear to use where it is desirable to reduce from a high to a low speed?

G. W. McGILL.

A worm gear is used where there is a large reduction to be made with one set of gears. In the most common form of worm there is but one thread on the pinion, and the large gear moves but one tooth to each turn of the worm shaft. Originally the pinion was not made of pins, but of a single round rod wound spirally around the shaft, whence the name of the device. In auto work it is customary to use several teeth in the small gear and it is properly a spiral gear. Several makers now use this device, the Mitchell truck being one of them.—C. E. D.

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CHANGING THE GEAR RATIO.

Bridgeport, Conn.

Your letter received, and it is certainly good advice from start to finish, but in this particular case I meant to ask you if in your judgment a car weighing 2100, with four 4x4 cylinders, of course with everything in good condition, would the engine handle a 3 to 1 gear, and what I meant to say was, what would be the difference in actual ratio of power (not bore) demanded from the engine between a 4 to 1, which is now on the car, and a 3 to 1.

In the first place, I did just as you advise. I consulted the auto car people, and their engineer wrote me that the outside casing covering the differential and gear was not large enough to get a 3 to 1 gear in, but I found out here that it was, and had the gear made and put in. They claimed it would be all right, but advised me to buy an all new rear axle, claiming that the housings would have to be chiseled away to the danger point to get the gear back in, which, of course, so long as I could get that gear in, I would not do.

I suppose my car was in perfect shape, having paid a good round price at a local garage to have it made so, and all these things I wrote you about I discovered myself, after having got mad and gone to work at it myself. I am not quite satisfied with a 4 to 1 gear, as it makes my engines race so to make 30 miles an hour, and still I am perfectly contented with any car with maximum speed 30 miles an hour.

I could have a 3½ to 1 put in, and between the 3 to 1 and the 3½ to 1, which in your judgment would be the best? I figure about 30 miles an hour at 1200 revolutions, 31-inch wheels, 3½ to 1 gear. Am I right?

C. H. SHANNON.

At thirty miles per hour your wheels are covering a half mile in a minute; 31-inch wheels make about 650 revolutions to a mile or 325 per minute. If the gear is 3½ to one your engine must go that proportion faster or about 1170 revolutions. In figuring a gear better keep in mind that you do not wish the maximum speed very often, but that the average or most common speed is the one to consider. Get it at the handiest and best ratio and let the maximum take care of itself. Of course you must see that the low gear is low enuf, for you desire ability to extricate yourself from bad places without the aid of a horse.—C. E. D.

WET CELLS FOR CHARGING STORAGE BATTERY.

Bonesteel, S. Dak.

Will you kindly inform me how to make a wet battery to recharge storage batteries? There is no electric plant here and we have to send our batteries away to have them charged. Any information you can give will be appreciated by the undersigned.

F. L. CROSBY.

Charging storage cells from wet ones is not very satisfactory work. You must have enuf wet cells to show more voltage than does the battery you are to charge or the electricity will not flow into the storage. There is some resistance, so if the charging is to be rapid there should be a considerable excess voltage. I have charged ignition batteries very nicely by connecting a dozen to fifteen wet cells in circuit against one four-volt storage cell. I left them at work all night and always had a full ignition battery. The trouble is to keep the wet cells at it and alike. Some give out quicker than others and then they are much like a half balky team. The willing can't work because the others won't. If you can possibly get power, better use a small dynamo. A little windmill should serve if nothing else is handy.—C. E. D.

MAKING A DRY CELL.

Tacoma, Wash.

I have been experimenting in the manufacture of dry batteries, but have not obtained the results looked for. Will you kindly furnish me a formula and details of manufacture that will show an initial amperage of 16-20? I made the batteries as follows: A zinc cup of the usual size, No. 6, was lined with three layers of fine blotting paper, the bottom with oiled paper, the blotting paper wetted with a saturated solution of sal ammoniac, the carbon filling was made with the following proportions: Gas coke ground coarse, 1 oz.; sal ammoniac, ½ oz.; manganese dioxide, Commercial, ½ oz.; zinc chloride, ½ oz.; water, 1 oz.; glycerine, ½ oz. This was packed around the usual carbon rod, and when tested showed 6 amp. The addition of a little graphite brought it up to 8 amp., but this was the best I could get. Do the battery manufacturers add any acid to bring up the initial amperage? Can a zinc cup be used from a discharged battery provided it shows no eaten effect? Must the carbon filling be ground fine and pressed in hard?

FRED G. BORDEN.

Not being a practical battery maker, I cannot give you the exact process nor do my battery-making friends care to have their secrets given away. The coarse gas coke is probably where your trouble lies. Use powdered or fine granulated carbon such as is used for battery carbons or for electric lights. The graphite is used with this to reduce the resistance. If fine and prest hard it has less resistance than if coarse. Much depends on getting it in evenly, for if hard at one end or one side and not compact at the other the one side will do most of the work instead of all sides working evenly. If packed hard it will take and hold more water without spilling. I think you have used too much glycerin.

If the old cup shows no effect, it ought to be all right; but if it gave current once, it is hardly possible that its full surface will be clean and in good shape for a second use. Your manganese should be free from impurities, as should everything else, for every impurity or irregularity sets up a centre of trouble and detracts from the output.—C. E. D.

STARTING AFTER A YEAR'S STANDING.

Watertown, N. Y.

Kindly advise me what to do to my runabout before I can start it. It has been standing on the tire for a year or so. The engine has been standing idle all this time. Please advise me what to do about it.

CHAS. E. Mc.

Long range advice on a specific case like this is not worth much. If the tires have been flat, they are probably cracked at the flat portion and worthless. If the rubber is still good there is nothing to do to the tires but inflate. If they leak, patch them. Much depends on the condition of the motor. If it has been in a dry place and was well oiled when put away, it should be ready for business at once. See that you have spark and fuel and turn it over. If you put a little gasoline into the priming cocks it will cut the gummy oil and help get it started. Be sure not to run it much, if any, till all the bearings are known to be oiled and free from dirt. One beauty of the auto is that it can stand a night or a year and be ready for work when wanted. If it is rusty, you must clean off the rust and get it back in proper condition as nearly as possible before starting it.—C. E. D.

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HARDENING STEEL.

I am a reader of Cycle and Automobile Trade Journal. I would like to have you give directions through Journal for hardening nickel steel. A blacksmith here heated automobile cones a good red heat and put them in water, but they did not harden and had to be thrown away. I think they were nickel steel. Please give what steel they are made of and how hardened, and oblige

J. D. BUCHER.

It is impossible to advise you as to hardening steel unless its composition is known. The makers can probably advise you how to handle it. If the usual 3½ per cent. nickel, it is likely to crack and get brittle if heated very hot. The lowest possible red is hot enuf. —C. E. D.

SPARK PLUG ELECTRODE MATERIAL.

Camden, Ark.

As a subscriber may I ask of the proper department for information: Of what material are spark plug electrodes or sparking points made? Does it require some soft special material? Your reply will be appreciated.

J. W. BROWN, JR.

Ignition points, whether for high or low tension, should be of some material that is not easily carried away by the spark or destroyed by the heat. Platinum is probably the very best material, but because of its cost this is seldom used except as tips. The jump spark is of so little quantity that it is easily carried and does not burn away the points rapidly, so it may be carried by most any material, but if the points get a coating of oxide, it acts as an insulator and decreases the spark size. A material that does not oxidize easily is therefore best. A number of alloys are sold for this purpose, copper, silver and nickel being used in their composition.—C. E. D.

Steam Cars

J. A. KINGMAN

ALCOHOL AND ACETYLENE FOR STEAMERS.

Will you kindly answer the following questions through the columns of the Cycle & Automobile Trade Journal?

1. Has alcohol or acetylene ever been used as fuel for steam automobiles? With what results? 2. In a general way, what are the principal advantages, if any, and the serious drawbacks in the use of either of these fuels? A. D. KELLOGG.

Alcohol has been experimented with to a limited extent for use in steam car burners, but owing to the greater difficulty of the vaporization of the gasoline is decidedly inconvenient. The matter of convenience is one of the very first things to consider and it is very easy to conceive of a fuel which would be ideal but which also might be very scarce and this latter quality would make it absolutely worthless, because an automobilist must be able to get the same kind of fuel in all parts of the country at all seasons of the year without any difficulty whatever. For this reason it is difficult to say why acetylene gas should be seriously considered owing to the unstable character of the chemical compound from which the gas is made as well as to other equally great, if not greater, objections.—J. A. K.

2-Cycle Engines

HUGH DOLNAR

WANTS 2-CYCLE ENGINE DESIGNED.

Williamsburgh, Pa.

We are going to build a gasoline marine engine of the 2-cycle type, 5½ bore x 5½ stroke. We would like to know what H. P. this engine will develop at 600 revolutions a minute, also what thickness the I. S. and O. S. walls should be and what size the exhaust should be; which is better, round or square? What dimensions should the intake valve be? Would 2½ in. from the exhaust port be far enough for the carbureter? What size should the base be? The thickness of the iron and what size and weight fly-wheel would be most suitable for this kind of an engine? You will greatly oblige us by giving this information.

B. B. SUPPLY CO.

This communication is typical. In reply, first, granting that the Journal stands ready to design 2-cycle motors without charge for all applicants, the H. P. depends on so many variables that nothing definite can be determined from what is stated in this letter; a single 5½x5½ in. 2-cycle cylinder might show as much as 20 H. P., or as little as 4 or 5 H. P. at 600 R. P. M., depending on the charging system employed.

The cylinder walls may be 5-16 or ⅜ thick, and the water jacket walls may be ¼ thick, if these are the dimensions implied by "I. S." and "O. S." The exhaust pipe should be of greater cross-section area than the exhaust port area, and is made very much greater in some late 2-cycle designs. The cylinder exhaust port may be 4½ in. wide x 1 in. long, giving 4½ sq. ins. area. Pipes are commonly made round in form.

The carbureter might be undesirably warmed if placed 2½ ins. from the exhaust. Two-cycle motors do not commonly employ an intake valve. If an automatic valve in the cylinder head is to be used, it should be 2½ to 2¾ ins. dia. The fly-wheel may be 24 to 30 ins. dia., to weigh 150 or 200 lbs. Four cubic ins. of gray iron weigh about a pound and you can easily find the weight of your fly-wheel after you decide upon its form and diameter.

Nothing shows whether this proposed motor is to be horizontal or vertical; nothing can be told of base dimensions, save that the base walls should be not less than about ¼ in. in thickness.

Correspondents should give some careful thought to "Journal" queries. In this case the items specified are not sufficient for an enlightening reply.—H. D.

PATENTS AND REAR WHEEL STEERING.

Will you please answer the following questions in your two-cycle column?

Is the form of piston used in the Atlas motor broadly covered by patent, or could the same general arrangement be used by anyone? Using this form of piston with an air-cooled motor, it seems to me the best practice would be to distribute the ports circumferentially around the cylinder, in order to avoid distortion from overheating one side. If this is correct, will you be good enough to state what, in your opinion, would be the proper dimensions for exhaust and inlet ports, using a cylinder 4 in. x 4 in. What distance should be allowed for compression space, same having a diameter of 4 in., and of semi-spherical form.

I was very much interested, as well as instructed, by the valuable articles published in your February number. The motor I contemplate uses an extended piston to fill cylinder with pure air, and fuel pump to inject fuel on compression stroke. I am counting on injecting fuel one inch piston travel below

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dead centre. Would this be too early? The motor in question would be used for a commercial wagon, and I would like to know if there is any objection to using a longer stroke in order to obtain a slower speed engine, instead of using smaller ports, as suggested in a recent article published in the Journal.

Is there any well founded objection to utilizing the rear wheels to steer the car? I believe that the distinct advantage of applying the power through the front wheels more than offsets any disadvantage which I can figure from steering by rear wheels.

If you will be good enough to answer these questions in an early number of your Journal I shall greatly appreciate it, as, while probably all of them are very elementary, my knowledge of the two-cycle problem is comparatively small, and of recent acquisition.

CHAS. ROBERTS.

The Atlas piston and arrangement is believed to be covered by patents either issued or pending. The circumferential exhaust is best in theory if the mere escape of the gases is the only thing wanted. But if allowed to escape all around they must be carried away and this means that the cylinder is surrounded by a hot chamber which is not conducive to best and easiest cooling.

I think ⅝ in. and ⅜ in. would be about right for the ports and I would use low compression making the compression space about half the displacement of the piston after the exhaust port closed. 4 x 4 x .7854 x 3⅜ in. equals 42½ cubic inches, so your compression space should have about 21 inches capacity. The semi-spherical head will contain half as much as a sphere and the contents of a sphere are found by cubing the diameter and multiplying by .5236. This is nearly 17 inches, so your cylinder bore must extend ⅜ of an inch beyond the piston at dead centre in order to get the remaining 4¼ inches.

The quicker you inject after the exhaust port closes, the better, for it gives the mixture more time to become homogeneous. In this method of feeding it is difficult to get a nice mixture, and if the mixture is not proper the exhaust is foul and much fuel is used with little resultant power. When you have it going we will be pleased to hear how it works and what sort of pump you employed for injection. It is well to work the engine at a fairly high speed, for this permits expanding the gases before they have time to cool off. 750 ft. of piston speed per minute is not too fast for a business wagon, and you will do well to lengthen the stroke so as to get this at the turns you expect to use.

There are many reasons why rear steering is not good. A rear steering cannot get away from the curb except by backing, and it must turn across a car track in order to get out of it. Try leading a cycle backwards and see how much trouble it is compared with the usual way. If you much prefer front drive, make the rig also front steering. I believe this will be much used in future for business wagons. Many people are trying to get a four-wheel drive, for this certainly overcomes the faults of slippery pavements and icy spots. It adds something to the complication, but it is really astonishing how much can be left off if one gets at a problem and hunts for simplicity. Now that the public are coming to their senses and looking for economy, it will be doubtless bring about much simplification.—C. E. D.

2-PORT VS. 3-PORT MOTORS.

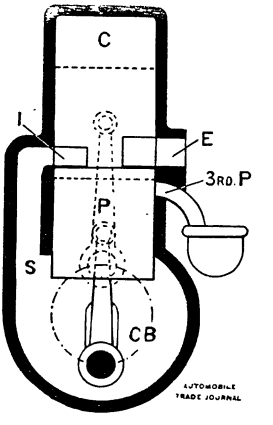
Lethbridge, Alberta.

May I ask of you to give me a description of the difference between a 2-port 2-cycle and a 3-port 2-cycle engine, with their respective merits and demerits?

Have you ever published, and if so, in what numbers, any working drawings of a 2-cycle motor engine that a fellow could work from with a reasonable assurance of success. Of course, I mean for his own pastime, as I would like to build a 2 or 3-cylinder 2-cycle air-cooled of about 20 to 25 H. P. I may say the first engine I built two years ago was a 2 H. P. air-cooled 4-cycle and it is still running a 16-in. swing lathe and grinders. I am now building a 4¾ bore x 5 in. stroke water-cooled 4-cycle, but tho I know practically nothing about the 2-cycles, I want to learn.

"IGNORAMUS."

The term "3-port" is applied to crank-box-pressure cylinder-supply, 2-stroke-cycle motors only, and indicates that the piston is made to serve as intake and exhaust port valves for the working cylinder at its head, or, if the cylinder is vertical, top end, and also to serve as the crank-box intake-valve at the crank-end or lower end of the piston which last is known as the third port, and



distinguishes this type of 2-cycle engine from one in which the intake into the crank case is thru a valve of some type, these being known as 2-port engines. The accompanying figure shows a 3-port engine, the full line piston is at the bottom of its stroke with I (intake port) and E (exhaust port) open. I allows the crank-box charge transfer to the cylinder, while E communicates with the muffler. In this position the third port, 3d P. is closed by the top of the piston. The third port communicates with the carbureter. In dotted lines the piston is at the head end of its stroke with the charge compressed in the compression chamber, C, which is merely the top portion of the cylinder bore. The piston covers, I and E, but opens the 3d port to give communication between the carbureter and the crank-box. In traveling up from low point to high point the piston displacement has reduced the crank-box pressure to considerably below atmosphere, and as soon as the 3d port is uncovered by the ascending piston, mixture from the carbureter rushes into the crank-box to supply the partial vacuum. The 3d port is closed very early in the descent of the piston in making its working stroke.

It will be seen that the 3d port can be open but a short time, only 60 or 70 degrees of crank time at most, and that part of the charge sucked into the crank-box must be forced back through the carbureter before the piston closes the 3d port, and it is evident that the 3d port should be as short as possible axially, and have its area made sufficient by extending it circumferentially. It will also be noted that the carbureter is first violently sucked and then has part of the crank-case

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charge returned to it through the 3d port. All of this tends to make carbureter action uncertain with the 2-cycle 3-port motor.

Instead of the 3d port a rotary valve may be mechanically worked even turns with the crank-shaft, see "Armature's" crank-box illustration, or an automatic valve opening to the crank box, may be placed between the crank-box chamber and the carbureter. This mechanically worked disk valve should open the passage to the carbureter when the piston begins to rise, and close the passage from the crank box to the carbureter as soon as the piston reaches its high position, thus opening communication between the crank-box and carbureter for 180 deg. of crank time. The automatic crank-box intake valve is spring closed and cannot deliver quite so great a volume of mixture to the crank box as the mechanical valve, which is the best of the three, and gives no trouble if lubricated, as it must always be if the lubricating oil is mixed with the fuel in the fuel tank.

As to working drawings of 2-cycle motors, several 2-cycle cylinder drawings with dimensions have been printed in the Journal, and if you read the Journal constantly you should be able to build a good 2-cycle motor, crank-box supply. Use the rotary valve for crank-case supply.—H. D.

2-CYCLE ENGINE DEFLECTORS AND FUEL INJECTION.

Napanee, Ontario, Canada.

I am in receipt of your letter of February 16th, for which I wish to thank you. I would infer from your letter that you suggest pumping directly into the cylinders. My reason for not doing so is as follows, and I thought I would write you so that you embody the answer thereto in any criticism you were making in the paper.

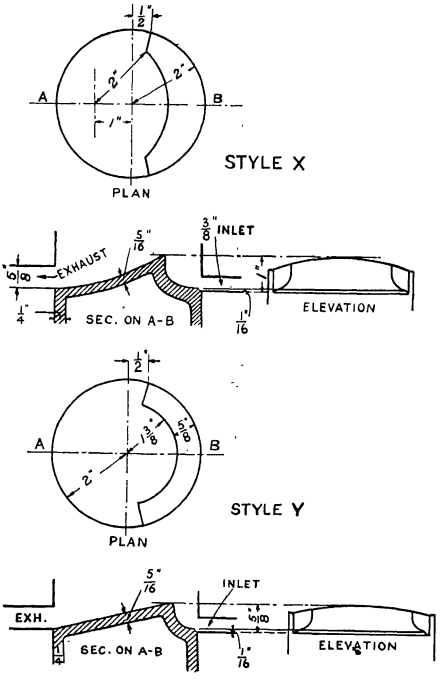
My experience has been that a weak mixture does not fire very regularly (especially on a four-cylinder engine) and below a certain percentage of gasoline you are not likely to get an explosion at all. In throttling down and using a pump spraying directly into the cylinder of the engine you would have when throttled below a certain percentage no explosions at all. A small increase in percentage would give you misfires and above that regular firing. My object was to have, even when throttled extremely low, pocketed in one part of the cylinder a mixture carburetted at its most efficient percentage so as to have sure firing at all throttled points.

I will probably this summer try an engine which I can shift from one to the other when I propose to build a three-cylinder 4x4½ engine. I am enclosing a drawing showing a couple of styles of deflectors, and in sending in your criticism on the engine please state which you would consider the best or any change you would suggest in the shape of either of them. Let them go in as before under "X." I think the sketches are self-explanatory, as I have marked several dimensions on them. I use, as you will notice, a 1-16 in. under-cut on inlet side of the piston. The distance between the inlet and exhaust port on the side would be 1 in.

When my designs are complete for the engine I would like to submit them to you for examination, but do not feel that I should do it through the paper. I would prefer meeting you and discussing the matter and paying you your charges for the consultation, as, being a civil engineer myself, I do not like to be a dead-head on another engineer on a subject of which he is a specialist.

(Signed) X.

Replying to X, I do believe that pumping fuel directly into the cylinder is the best method of 2-cycle motor fuel supply. I am now making drawings for a 6x6, 2-cycle, air-cooled motor, new mechanical movement for driving a separate supply cylinder which will a little more than fill the working cylinder with pure cold air from the top to the exhaust port. This cylinder is fitted with 6 pumps, 3 circulating force pumps and three supplying pumps, so that two kinds of fuel and water can be supplied to the cylinder in any desired quantity and at any time during the compression stroke of the working piston. I am greatly pleased with my design for this new motor, and am sure that it will tell me some things I want to be sure about. As to partial charge misfires and "4-cycling" of the 2-cycle motor when throttled close, see my long reply to Sherbondy. I am sure, from experiments, that a local rich charge of very small bulk can be placed about the spark in a charge of pure air, full compression, and so make the most "flexible" gas engine possible, and I believe this placing of a small quantity of fuel in the spark plugs immediate vicinity can be better ef-



Signature "X" Deflector Suggestions.

fected with a pump than with a carbureter, as the carbureter cannot handle the heavy liquid fuels I wish to burn. I have pumps which are ideal in construction and action, and have perfect control of fuel volume and injection time, all with an exactness quite impossible with a carbureter.

I believe your "style X" of deflector is much superior to "style Y," because it will direct the charge upward closer to the cylinder wall. Even with a pure air charge I believe the charge should be first carried up as close to the cylinder wall on the intake side as possible, so as to take the longest possible path to the exhaust port.

I am carrying my deflector straight up to within ⅛ of an inch of the cylinder head, as the pure air charge is in no danger of pre-ignition or self-ignition.

I will examine your 2-cycle design with pleasure, but I hope to be able soon to speak with such certainty as to 2-cycle motor performance that there will be no question as to the value of pump fuel supply, constant maximum compression and correct deflector form.—H. D.

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A QUESTION OF EXHAUST PORTS.

Louisville, Ky.

I want to build a two-cylinder, two-cycle gasoline motor, four and one-half inch bore by four-inch stroke. I intend to build the ports like sketch inclosed and would like to know if ports are arranged right, and if the size is correct, to give free exhaust; also if the compression space is too small to allow ample size deflector. Could the thickness of the iron in cylinder be reduced without its being too thin, and get a good casting? In

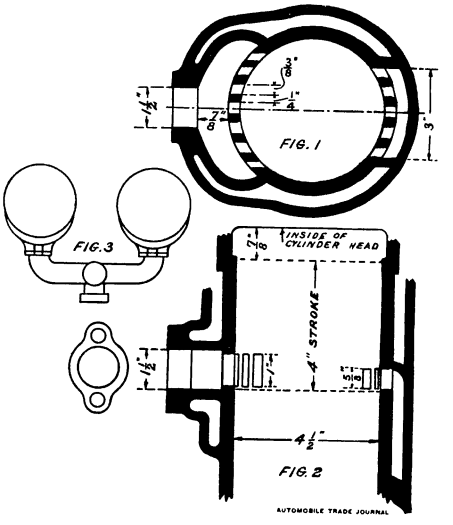


Fig. 3 of sketch, could the exhaust pipe be cast as shown without the exhaust of one forcing itself around the piston of the other cylinder, as I intend to have the cranks set 180 degrees apart and have the impulses follow after each other. It is the height and width of the slots in the exhaust port which I would particularly like to know about.

SIDNEY C. PROBERT.

Your ports are far too narrow in circumferential extent, and have far too many bridges. Carry your ports through 120 deg. of cylinder circumference at least, and do not place more than three bridges in each port. You can reduce your crank-box clearance by making the intake port only ½ in. long, where you now have ⅝. You do not show your deflector form. Make the deflector as high as you can and clear the cylinder head.

The exhaust pipe you show is very bad. Place the muffler to one side and lead both exhaust branches to it with large radius curves, both pointing the same way, ordinary form. Make your exhaust piping large and free and give the exhaust one direction only.

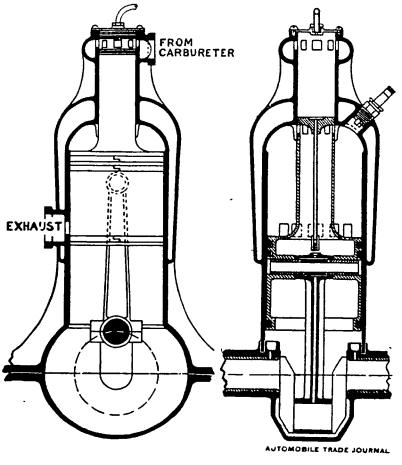
A quarter of an inch is plenty thick enough for your cylinder walls and 3-16 is enough for the water jacket walls.

See Perry Okey motor in March Journal. This whole 3-cylinder Okey motor, crank-box, base-lugs, cylinders and water jackets, made in one piece of gray iron casting, is only 3-16 thick, one of the finest jobs of gray iron work I ever saw. It requires very accurate pattern and core-box making to produce such a thin job, and you had better try ¼ for cylinder walls and 3-16 or 7-32 for water jacket walls.—H. D.

ANOTHER HENDERSON DESIGN.

Buffalo, N. Y.

Having benefited by your criticism of my former design, I will appreciate your opinion of the accompanying sketch. Interested parties have mentioned certain difficulties with my previous design, one being serious, that of the piston tube overheating, the other increased motor height. On studying the matter over I concluded the pure air port scheme was bad, and by admitting the gas at the top I entirely overcame the overheating condition. As to increased motor height, it is not what it appears to be, being only about two inches in a motor of 4½-inch stroke. My reasons for abandoning the pure air port idea are these: I think it would be liable to have the reverse effect of what I expected of it, because a light mixture causes back firing. It would also have to have a throttle



in connection with the carbureter throttle, which would add complications. The oiling system shown works out in this manner. The oil enters at the top of small cylinder, oils small cylinder walls, passes thru tube shown, distributing thru wrist bearing to cylinder walls, thru hollow conn. rod to crank pin bearing. The drip from cylinder walls takes care of main bearings. The points of advantage I see in this design are improved crank case compression, oiling, carburization, charge placing and durability. I have not built a motor of this design, but have entered application for a patent, and would like to hear from any interested party who has the capital to push this design as an automobile motor.

WM. G. HENDERSON,
191 Hoyt St., Buffalo N. Y.
Formerly 10723 Olivet Ave., Cleveland, O.

This is a 3-port motor in crank box charging operation, and has the advantages of effecting a working cylinder charge entrance at the top of the cylinder, as far from the exhaust as the cylinder dimensions permit, without the disadvantage of an automatic intake valve in the cylinder head.

The castings are simple, the engine is easy to build and the double travel of the charge, first downward from the carbureter to the crank box, and then upward from the crank-box through the top ports of the top trunk into the cylinder, ensures cooling of the top trunk and also imparts a part of the piston and trunk superfluous heat to the incoming cylinder charge. The oiling is neat and certain. I regard this design as highly creditable.—H. D.

"NEMO."

A number of correspondents have sent requests for Nemo's address. All such letters have been forwarded to Nemo, who writes that he has replied to such, as he wishes to hear from at greater length. H. D.

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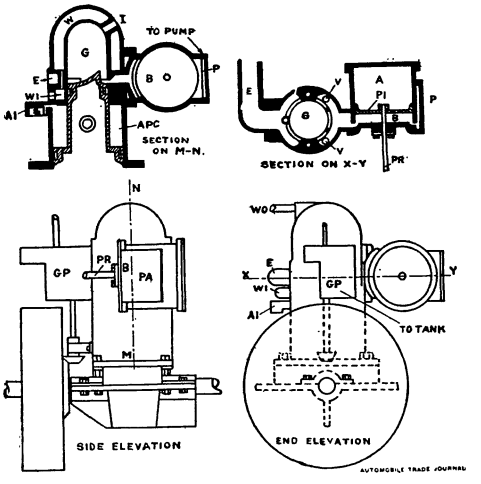
A NOVEL 2-CYCLE SUGGESTION.

Wapanee, Mich.

Please find enclosed sketch for a 2-cycle engine upon which I would like your opinion.

The object of this engine is to first scavenge the burnt mixture with pure air and then admit enough (when working at full-load) mixture to fully fill the cylinder and compression chamber and when working throttled more air would be admitted and the perfect mixture would follow at the latter part so as to remain as much as possible along the inlet side of the cylinder and be compressed in that part of the compression chamber and fired there. To accomplish this I enlarge the lower part of the cylinder and piston so as to make an air pump out of it. At one side I have another cylinder which acts as an air chamber or rather two air chambers A and B separated by a piston P. I. See section of cylinder on X. Y. This cylinder is bolted to the side of the engine so that Chamber B. is directly connected by a passage to the inlet port of the engine. The air pump is connected to this passage by two check valves V. which can be readily removed to grind. Chambers A and B are connected together by an outside passage P. G. P. inside view contains a variable throw gasoline pump operated by the engine crank shaft through a set of bevel gears. The variations of the gas-



oline pump are obtained by shifting levers, not shown, in connection with the movement of Piston, P. I. so that when chamber B. is at minimum (capacity) the gasoline pump is working at its maximum stroke and when B. is at maximum the gasoline feed is completely cut off. The gasoline pump is connected to the passage P. between A. and B. so that the gasoline is sprayed into that passage. The volume of the air pump is such that it will compress the air into chambers A. and B. and connecting passages to a pressure of about ten to fifteen pounds (gauge). Now when the pump forces air into chambers A. and B., that portion going into chamber A. is carburetted by the gasoline sprayed into passage P. The piston then makes its downward stroke and (the air pump sucking in the fresh air through the air inlet A. I.) on reaching the lower part of its stroke will uncover the exhaust port E. and afterwards the inlet port connected to B. allowing the fresh air in chamber B. and passages to reach the power cylinder G. and scavenge the burnt gases first to be followed by the carburetted air in chamber A. When working at its maximum stroke chamber A. is of such a size that the carburetted air in it will fill the engine cylinder and compression chamber and passages B. On the up stroke of the piston the fresh air in the air pump will open the valves V. and drive first the carburetted air into passages and B. back into A. and the mixture in the engine cylinder will be compressed and fired at the upper part of the stroke. With throttled charge, the chamber A. would be reduced in volume and B. increased while the volume of gasoline or other liquid would also be reduced to correspond to reduction of A. In this case of course there would not be enough mixture in A. to fill B. and passages and G. would then be only partially filled with best mixture on inlet side and be fired upon that side. When completely shut off mixture in A. would just fill B. and passages driving out air while gasoline pump would stop and engine could then be used as a brake if in an automobile.—(Signature) X.

"X" sends sketches and specifications as reproduced above. As X is doubtless aware, the 2-diameter piston supply is well known, and can be well used with a 3-cylinder, 2-cycle motor, cranks at 120 deg., the supply or charging piston of one cylinder being used to charge the working cylinder next preceding in firing order: see "Euclid" motor, patent applied for, page 134 March issue. With a 3-cylinder motor the charge compression is about 15 pounds gauge, "Euclid" arrangement, if memory serves correctly.

X seeks to add another function to his single cylinder motor, that of scavenging by a separate pure air scavenging pump, and then, after the working cylinder has been swept clean by the pure air charge, X proposes to introduce the combustible mixture in such a way as to drive out more or less of the scavenging pure air according to the mixture volume passed into the working cylinder, G., from the mixture cylinder A., all as described in the specification and illustrated by the accompanying sketches.

The questions on this design are, is the intended action desirable, and are the results gained in the simplest way?

First, is it needful to ensure complete scavenging by filling the working cylinder more than full of pure air before supplying any part of the combustible charge? It is not necessary as the cubic displacement of the piston in A. P. C. can be made to force volume enough of pure air into the working cylinder, G. to more than fill G., wholly displacing the burnt residue with pure air.

Second, the gasoline pump, G. P., is specified as delivering a variable quantity of gasoline in form of spray to the interior of passage P. at the desired time. When so readily vaporized a liquid as gasoline this means that G. P. can if desired spray the fuel into the pure air charge in G. at any time after the working cylinder intake port is closed by the piston, so that the compressed charge will be either of nearly uniform composition throughout its entire bulk when compressed, or so that the charge will be richest in the immediate vicinity of the spark plug or point of ignition.

What, then, remains to be gained by the action of the piston, P. I., in the third cylinder, A?

The writer is convinced that the 2-cycle cylinder is sufficiently cleared of burned charge residue by the sudden opening of a large and unobstructed exhaust port area, to enable the working cylinder to be filled down to the top line of the exhaust pipe, with pure air from A. P. C., without blowing pure air out through the exhaust, and, also, that this pure air can be perfectly carburized by pump injection of either gasoline or kerosene.

If this belief is correct, then the working cylinder, G., the supply cylinder A. P. C., and the gasoline pump can do all that need be done, and the remaining agencies shown by X are redundant and should not be placed.—Hugh Dolnar.

(The supply cylinder A. P. C., as shown cannot be used on a single cylinder motor without some storage chamber between it and the combustion chamber proper as there is no compressed charge in A. P. C., at the time the piston uncovers the intake to the cylinder G., and this design is probably intended by X for a single cylinder motor only.—Ed.)

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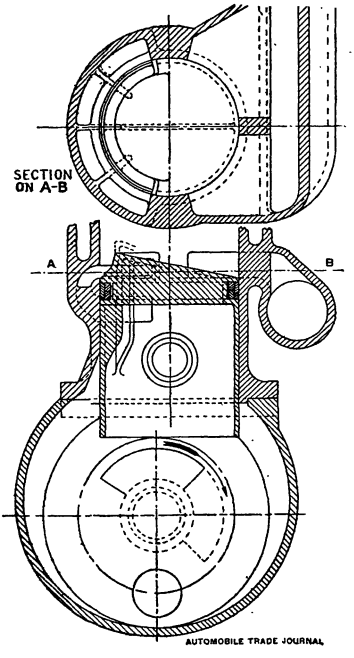
2-CYCLE ENGINE DESIGN CRITICISM.

Erie, Pa.

Will you kindly check over the following dimensions and construction of a two-cycle engine that I intend to build? I am also sending you drawing of same. You can do as you see best with it.

(1) Bore, 4 in.; (2) stroke, 4½ in.; (3) connecting rod, 6¾ in. C to C; (4) cylinder offset, ⅜ in.; (5) inlet port, ⅜ in.; (6) exhaust port, ¾ in.; (7) bottom of inlet and exhaust ports to be in line; (8) deflector and piston as shown; (9) inlet and exhaust ports to be separated by bridges 1 in. wide; (10) inlet to crank case by revolving disc valve; (11) three ring piston packing, wide ring outside. I think by making these rings this way I can dispense with bridges in the inlet port, thereby giving the fresh charge a clean sweep in the cylinder.



"Armature" Suggested 2-cycle Motor.

What size carbureter would you suggest for this engine? Is the deflector high enough? and what do you think of the shape of same? Crank shaft to be 1⅜ in. diameter; wrist pin, 1⅜ in. dia. x 1½ in. long; piston pin, 1 in. dia. Disc valve to be driven by crank arm engaging two lugs on disc. What do you think of closing disc valve about 20 degrees late or after the piston has passed the out-centre? Could I not get the benefit of the ramming action of the gas this way? and in so doing get a larger and purer charge into the cylinder. Are there any patents on any of the constructions I have shown?—ARMATURE.

The drawing shows a crank-box having more clearance than is needed if the crank-wrist end of the rod is made as small as possible by bringing the cap screws close to the wrist as may be. The other points noted are, (3) rod, 6¾ ins. C to C. This should be not less than 9 ins., two strokes. (8) The deflector should, I believe, be as high as it can be and clear the cylinder head, increasing the height as shown in dotted lines. There seems to be nothing gained by carrying the charge passage in the piston to an exit above the packing rings, if that is what the dotted lines in the piston head are intended to show. The drawing shows a piston port below the rings, also, and does not make the piston head construction clear. (11) I believe the 3-ring packing far better than the ordinary single packing rings, but would advise at least 1-inch width of wide ring, and should also place at least 3 bridges in each port, intake and exhaust. The port area is more than ample.

The mechanically operated crank-box intake valve is favorable to carbureter action and a pipe 1¼ ins. dia., carbureter to crank-box would seem large enough. The crank-box valve should close when the crank is on its low centre.

I believe this design does not infringe any patent, but am not sure as to the disk valve in the crank-box.—H. D.

(The Atlas Motor Car Co., Springfield, Mass., hold a patent on a disc valve intake into the crank case.—Ed.)

"NEMO" AGAIN.

"Nemo" writes a second characteristic letter to Hugh Dolnar, in which he details his experiences, which have cost him real money, in endeavoring to obtain original 2-cycle motor designs from "Experts." Each of these experts proposed to furnish Nemo an all-new and surely-best 2-cycle motor "design," complete working drawings for an up-set price, Nemo to pay the price before drawings were supplied, and to take whatever the expert sent in, regardless, and be good natured about it. Nemo complains that this may be fair to the highly skilled and of course fully competent expert, but does not really seem certain to give him a run for his money.

This whole matter can be correctly exhibited in a few words.

First, a new 2-cycle motor design to be of real value must show a motor which is not only patentable, but can show good B. P. H., fuel economy, is good to build and is durable.

Experts capable of producing a 2-cycle motor original design meeting these specifications, are not likely to offer their services for a small set price.

The Journal is forwarding "Nemo," communications from Victor Jakob, Plattsburg, New York, The Perfect Automobile Mfg. Co.; Walter C. Willard, 2353 E. 79th St., S. E., Cleveland, Ohio, and R. Foote, 4 Van St., Rochester, N. Y.—H. D.

MALCOM'S ENGINE WAS DESTROYED.

Please inform me about Mr. C. P. Malcom's engine that ran, as stated in the Journal for 24 hours at a total cost of 18 cents. I expected to hear about same in your columns and have looked for it every month.

ANTHONY ORTH.

This engine was destroyed by fire near Chicago soon after the 24-hour run, probably about 1904. It is believed that it had a 6x6 cylinder. The cylinder supply was by crank-box pressure, with side pipe to the top of the vertical cylinder which had an automatic intake valve in the head. The low cost of this 24-hour run developing 10 H. P. constantly, was due, mainly to the low cost of the fuel which was raw petroleum, costing in that particular instance, less than two cents per gallon, as the writer was informed by Mr. Malcolm.

H. D.

INTAKE THRU PISTON CENTRE.

Thompsonville, Conn.

I wish to thank you for your criticism of my "flying piston" scheme. I herewith send you a sketch of a deflector for discussion in the Journal.

You will see, when you consider, that when four-cycle machines come in with cylinders and pistons worn out, the owners, wishing more power, think that two-cycle cylinders could be substituted, since they must have new ones anyway. New if we could do this

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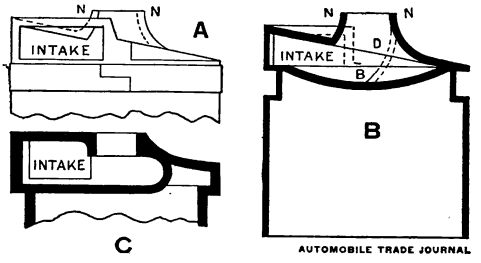
without too much extra machinery, you will understand that some of us would have fewer worries.

The object of this deflector is to get the central charge effect so that motor will have "flexibility" and also to avoid both the piston valve and cutting ports in two planes.

More particularly I wish to apply this to engines already existing which have the side deflector. When re-bored, they will have to have new pistons, and if this type will locate charge so they will run throttled down, would like to use it.

I wish to use three rings in one groove, but do not like the appearance of piston with



Repairman Piston. A, elevation B, section C, suggested form.

ports in two planes unless snap rings are used.

To explain deflector: The whole top slants towards exhaust side except nozzle. The ports are cut clear around cylinder except bridges. The intake looks short in the drawing, but this is really a projection, and it is nearly half the piston circumference in width.

Will this device work all right?

Will the depression in piston head catch oil and make trouble from "carbon"? Should the nozzle be higher than the proportion shown? Should the area of nozzle opening be same as intake port? Will any part heat unduly? The depression in head is made to give plenty of room under nozzle. It is cored out farther toward exhaust port than necessary for gas flow to keep that part cool.

Would it be better to turn passage right up and core out below piston head for this purpose? What, in your opinion, is the best way to put charge in cylinder?

I note on page 60 of the February Journal you do not advocate fan or crank box pressure. If there is some good and simple way to put in a charge without using either of these or an extra piston, or rotary blower, or double piston or another cylinder for compression, or a bellows, it would fill a "long felt want" for those of us who are fixing over old engines.—REPAIRMAN.

Repairman's letter is printed in full, as it presents actual conditions, and the changing of existing 4-cycle motors to 2-cycle motors will probably be often attempted.

First, as to Repairman's piston, shown in Figs. 1 and 2. I am not an advocate of the 2-plane port placing, as I prefer the simple form of cylinder.

I do not think oil would collect in the basin, B, Fig. 2, but would suggest changing the floor to the form shown by dotted lines, D, to ensure sweeping the basin clean by the inrushing charge.

Central charge delivery nozzles have given self-ignition and pre-ignition by heating the thin top end of the central nozzle, N, N. To avoid this I have considered the form shown in Fig. 3, in which directing length of nozzle is obtained by carrying the nozzle wall downward instead of upward.

I am a firm believer in the supply cylinder in some form, in the pure air charge of constant volume, ensuring constant compression, and in pump fuel supply, eliminating the carbureter.—H. D.

OPEN CRANK CASE 2-CYCLE ENGINE.

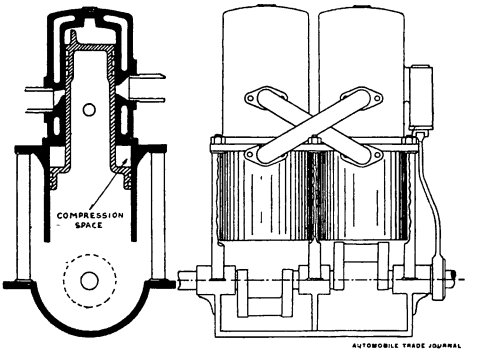
Hoquiam, Wash.

I am sending you photos of drawings of a compound cylinder two-cycle engine that I have recently built. Have not made a thorough test of the engine yet but have run it some and it appears to work well; should say that I have speeded it up to 1000 or 1200 R. P. M.

I contemplate building another about 5 in. x 5 in. on the same lines, what horse power should I get from it on 600 R. P. M.; I want this next one to be slower for a boat, and as the pistons are necessarily heavier in this class of engine, I think a moderate speed would give best results.

How many pounds compression will give best results in the compression or pump cylinder? I thought from 10 to 12 pounds should be about right. What size should my inlet and exhaust ports be? Would you advise taking the gas through check valves in the offset or a third port? Will you please criticise this design. I have run gas engines more or less for 15 years but this is my first attempt at design.—Geo. H. Hitchings.

The Hitchings 2-cylinder 2-cycle motor, with 2-diameter piston supply, is not what is com-



monly understood by the term "compound," which signifies that a working charge after being used in the cylinder in which it was first fired, is exhausted into a second cylinder to drive a second piston. Compound gas engines have had extensive trials but, so far, are not known to have achieved a commanding commercial success.

The engine shown in Mr. Hitchings drawings, has four cylinders, two integral tandem pairs, the lower cylinders being the larger in diameter. Each cylinder is fitted with two pistons, integral and tandem, the lower end of one cylinder acting as a supply cylinder for the other working cylinder.

The ports for a 5 x 5 cylinder should, in my opinoin, be 4 inches wide, by ⅝ intake length and ⅞ exhaust length.

The charging cylinder pressure will depend on working cylinder intake port length and on the passage volume between the supply cylinder and the working cylinder intake port. For as slow a speed as 600 R. P. M. 3½ to 5 pounds charging cylinder pressure is ample, and since charging cylinder work is an entire loss the pressure should be as low as will cause the charge to go to the working cylinder in the time available. There should be valves between the carburetor and the supply cylinders, and also between the supply cylinders and the working cylinders. The 3d port makes a fluc-

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tuating demand on the carburetor which is not easily satisfied. A pair of 5 x 5 cylinders, as shown, should give 25 to 30 H. P. at 600 R. P. M.—H. D.

COMPRESSION AND IGNITION.

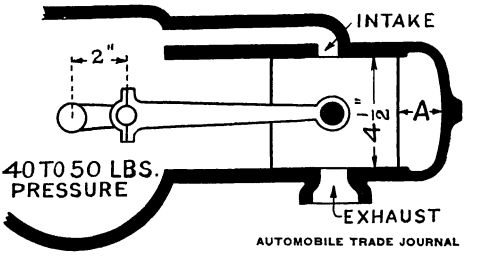
The Editor of the Journal, April issue, page 79, foot of first column, asserts that it is a "fact" that the charge is more easily ignited when only moderately compressed than when it is more highly compressed. In view of the "facts" that the Diesel and other high compression motors ignite the charge by compression alone, and that all recognized authorities assert that the higher the compression the more ready the ignition becomes, and that many motor builders favor comparatively low compression as making the charge less liable to pre-ignition and self-ignition, it is evident that the Editor either has information not generally known, or has made an erroneous statement.—H. D.

(H. D. is perfectly correct in his statements above in regard to self-ignition, etc., in stationary engines of Diesel type, in which compression pressures of four and five times those used in automobile motors are employed. There is no discussion in regard to compression pressures sufficient to raise the temperature of the mixture to or near the critical point. Furthermore the temperature due to compression was not what was referred to in our editorial comment on 4-cycling of 2-cycle motors nor was that comment intended to be generalized to cover other than the small 2-cycle engine conditions in question, in which probably the maximum compression pressures are not over 80 or 85 pounds. What we intended to convey was the idea, that the pressures due to compression are not the cause of 4-cycling of a 2-cycle motor and have very little if anything to do with it and that if there is any difference, a charge is more difficult to ignite regularly at 80 or 85 pounds than at lower pressures owing to the irregularity and poorness of the spark under high compression. This is shown by the failure of plugs to spark under compression which spark readily at atmospheric pressure. That 4-cycling is not caused by low compression will be appreciated when it is remembered that a correct mixture will explode regularly and without a miss, even when not compressed at all if a good spark is supplied, and the commonly accepted theory of 4-cycling is that given in our comment.—Ed.)

PECULIAR IDEA OF CRANK CASE PRESSURES.

Will you please tell me how much space I will have to have for compression at A with 40 to 50 pounds in the crank case.—J. A. N.

(This communication is not sufficiently clear to indicate just what J. A. N. desires to know. However, we judge the proper clearance space, ordinary practice in a 4½ bore, 4 inch stroke, 2-cycle motor is desired. About an inch to one inch and a quarter according to the shape of the head will be sufficient. But the crank case pressure 40 to 50 pounds marked on the drawing shows J. A. N. is laboring under a



delusion. No such pressure is possible without the use of an auxiliary piston and is not even desirable. From 4 to 8 pounds can be had by piston displacement, possibly more by carefully reducing crank case volume.

The crank case pressure has practically no effect on the compression pressure in the cylinder except that at high speeds a low crank case pressure will not cause a sufficiently rapid charge transfer to place in the cylinder even an amount equal to the piston displacement, while at a higher pressure slightly more will be transferred during the same limited intake port opening duration.—Ed.)

Opinions and Suggestions

Under the above heading we will be pleased to publish letters from our readers, expressing opinions, stating how they have overcome difficulties, or making useful suggestions. In this department will also be published longer communications or articles, of either a general or technical nature. This department succeeds the "Difficulties Overcome By Users" department, owing to its growth and the varied nature of the matter received.

FINISHING CYLINDERS WITHOUT GRINDING.

In the April number of the Trade Journal is a letter from S. D. F. asking for information on the subject of cylinder finishing without grinding. As I have had some experience along this line will try and help the gentleman out. I think the best way to finish cylinders without grinding is to lay them in with cylinder oil and ground glass, machine oil will do but cylinder oil is better. Run them for about 3 hours, driven from the line shaft sometimes it is policy to run them six or seven hours, but usually 3 hours will give a good job. Emery should never be used, except in the form of a wheel, the writer has never known any trouble from emery being imbedded in the cylinder walls when used in wheel form and work well cleaned with gasoline before putting cylinder on motors.—J. F. Richman.

IN FAVOR OF STANDARD JIG BUSHINGS.

Woonsocket, R. I.

I was much interested in Mr. F. Wertheim's article in Trade Journal of March 1 in regard to standard bushings for jigs, and I am quite sure they could be sold in very large quantities if made right and sold at a fair price, and I think very few shops would make their bushings if they could buy them right, and I should thing some one with the proper facilities would put the smaller sizes on the market at once.

E. R. DARLING.

COIL DAMAGED BY DISCONNECTING SECONDARY WIRES.

Apparently few motorists realize the damage which may be done to a coil by disconnecting a secondary wire from its plug and running the engine without grounding this wire. Under these conditions the full voltage of the secondary current is discharged thru the air gap of theoretically infinite resistance and grave danger is run of breaking down the insulation of the coil. Secondary wires when disconnected should always be grounded upon the engine or frame if the engine is turned over with the switch on.

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EXPERIENCES WITH WOOD TIRES ON A RUNABOUT.

Dover, N. H., U. S A.

Perhaps you will be interested to know the result of my experience with wood tires as described in my article in the February issue of the C. & A. Trade Journal.

I have tried out these tires on the rear wheels of my automobile. The method of attaching the tires proved to be very good as they were firm on the rims as long as I used them. When I first used these tires the roads were frozen and somewhat rough. Driving my car over the frozen ground made a noise equal to a freight train. There was no use for a horn.

The car did not ride hard with the wood tires, and going over crossings there was not as much recoil as with pneumatics. The traction of wood tires, while good is not equal to that of pneumatics, as my car skidded more than when I used pneumatics.

Soon after applying the wood tires, we had a snow storm which was followed by rain, leaving the roads icy. I was obliged to use chains on the tires and then my trouble began. After a short run I found one of the bridges broken, which connect the rear axle housings over the sprocket. I put in a new bridge forged from good machinery steel, and in a day or two, both the threaded ends of this bridge dropped off. I then set Norway Iron studs into the bridge, and the next run I made with chains on, one of these studs jarred off.

After repairing my rear axle for the third time I felt that I had had enough of wood tires and took them off. I have been using pneumatics since and have had no more trouble with the rear axle.

A serious objection to wood tires is that it requires much more power to drive them than pneumatics. Hills which I could take easily on the high gear with pneumatics had to be taken on the low gear with the wood tires. There is no perceptible give to a wood tire, and the whole wheel and axle has to raise up over every obstacle, which is of course not so with pneumatics. Even chains on wood tires make a continual jiggling of the wheels, which not only jars things to pieces below the springs, but eats up the power of the engine. I found that my wood tires wore uneven and soon became out of round.

From my experience with these tires I am satisfied that no solid tire is practical for an automobile, unless it be of some material much more resilient than wood.

GEORGE WILLS.

VALUABLE INFORMATION?

One of our worthy contemporaries in its question department, in answer to a subscriber who complains that his dry batteries run down very rapidly, says: "The fault is probably due to the ignition. See that it is correct and powerful, and if the trouble still exists, investigate the carburetor." We have no doubt the recipient of this answer now has no further battery trouble.

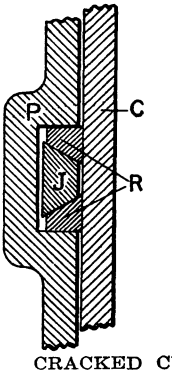
ANOTHER SLIPPING CLUTCH PREVENTIVE.

An oily clutch leather can be prevented from slipping by first cleaning it with gasoline and then coating it with a mixture of "Fullers Earth" and glycerine, mixed to a creamy paste.

The Toledo Automobile Club, of Toledo, Ohio, has recently been added to the membership list of the American Automobile Association.

A tally kept for one hour on upper Broadway, New York, this winter, while the streets were coated with ice, showed that just 63 per cent. of the traffic, outside of trolley cars, was motor driven.

A SPECIAL PISTON RING.



In the accompanying cut is shown a new method of forming a gas-tight piston ring as used in a new European truck. In a single groove in piston P, three rings are placed as shown, the outer rings R being forced not only against the cylinder wall C, but also against the sides of the groove by the wedge-shaped junk ring J; thus making a gas-tight joint. The rings and also the groove in the piston are ground accurately.

CRACKED CYLINDERS AGAIN.

Still another method of repairing a cracked cylinder is to place over the crack a mould tightly clamped in place. Fill this with a mixture of dry plaster of paris and iron filings. Fill the jacket with water. This will moisten the mixture which will swell and force itself into the crack where it hardens, stopping the leak.

Low temperature reduces the efficiency of dry cell batteries and often when one seems to have given out, the simple expedient of warming the cells will re-vitalize it sufficiently to take the car home, or to a place of supply.

In the absence of other means, if it is suspected that there is water in the gasoline this can be proved by pouring a little of the fuel upon a coin. The gasoline will quickly evaporate and the water if any, even in small quantities, will remain and can be detected.

An ingenious method of disposing of the rear light nuisance, these having a decided tendency to go out, is to arrange a small box set within the lower part of the rear of the body. In this is placed a small electric light while the back has a stencil of the license number and also a small round hole, the letters being covered with opal glass and the box with red.

According to recent tests by Professor Goss: "A combination of graphite and lard oil makes a lubricating mixture which, when applied to ball bearings, will accomplish everything which lard oil alone will do and which at the same time will give a lower frictional resistance of the bearing and permit a large increase in the load which it may be made to carry. An oil as light as kerosene, when intermixed with graphite, will be converted into an effective lubricant for ball bearings when operated under light or medium heavy pressure."

When preparing the engine for summer it is well to see that the valve push rods or toppets are properly adjusted so there will be no hammering. This should be done with the engine warmed up as the length of the valve stem particularly that of the exhaust is greater when hot. The correct adjustment can be determined by placing a piece of rice tissue paper, which is about one one-thousandth of an inch thick, between the toppet and valve stem and adjusting until the paper is just gripped, but can be pulled out.

At the recent annual meeting of the Automobile Club of Philadelphia a motion was introduced to amalgamate all the automobile clubs of Philadelphia and vicinity. This combination would include the A. C. of P., 500 members; Quaker City M. C., 300 members; Germantown Automobile Club, and the Delaware Automobile Club.

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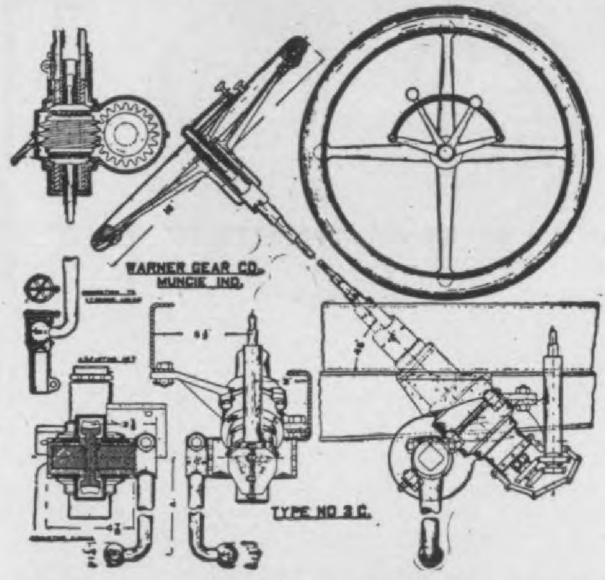
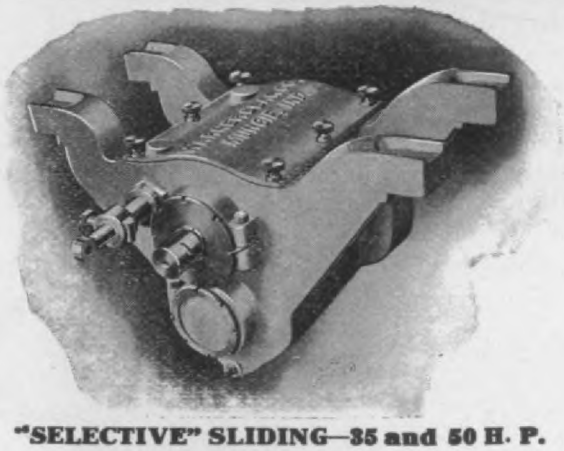
1908 GEARS



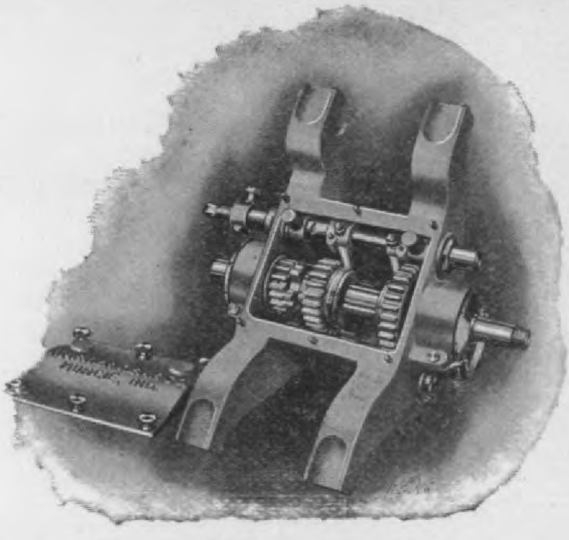
STEERING GEARS

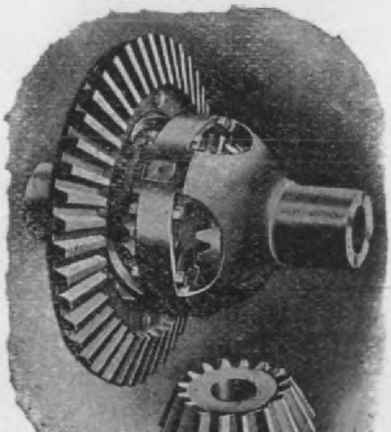
that are built to **"Stand Up."** Worm and sector adjustable, hardened and ground to size. Control levers mounted on top of 16 inch wheel, ribbed aluminum spider. Ball Bearings.

TRANSMISSIONS



"SELECTIVE" SLIDING—35 and 50 H. P.





For Timken Roller Bearings and Annular Ball Bearings.

GEARS are made from **SPECIAL GEAR** forgings, hardened, ground and "treated." We also furnish **"SELECTIVE"** control levers. We build both

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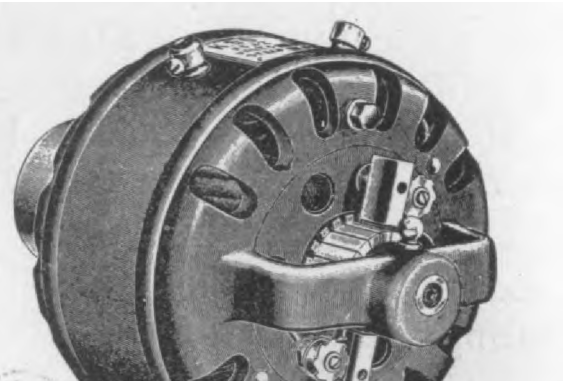
npshire, are putting out a 20-volt, 4-
ere, 80-watt dynamo especially designed
charging large storage batteries. It
be driven from any convenient source
power, one-eighth to one-fourth H. P.
g required according to belt conditions.
The machine is also furnished wound
motor.
P. M., is well ventilated and has self-
is designed to run at a speed of 2000
g bearings. The field is bi-polar; the
s are form wound and taped. In the



The "K & D" No. 12 Charging Dynamo.

ature, which is slot-wound and lami-
ed, the best charcoal iron disks are
l. The commutator segments are of
l drawn copper carefully insulated with
a. The brushes are of woven wire with
lers of the radial type of a new design
med to permit perfect adjustment, and
brushes may be renewed without dis-
ing the adjustment.
he shaft is 8¾ inches long; pulley 2¼
es diameter by 1½ inch face. The
amo weighs 23 lbs. and occupies a space
x6¾x8 inches. Price is $25 wound
er as a dynamo or a motor.

The Ideal Automobile Switch

he Ideal Ignition Switch Co., of Plain-
, Conn., have lately placed on the mar-
a new ignition switch which, while be-
very simple in construction, is claimed
be exceptionally efficient. The blade
which connections are made is remov-
, and as connection can only be made
this blade, tampering with the vehi-
in the absence of the operator is im-
ible. It is not possible to connect the

tion marked "Off" can be used to grou
the wire of a high-tension magneto. T
base is of hard rubber and the metal par

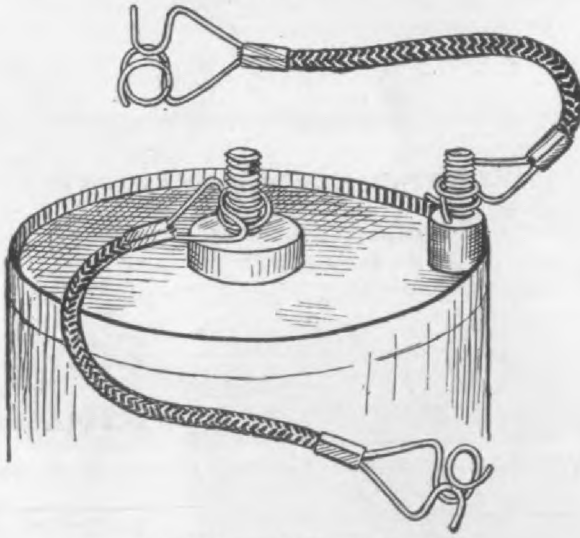
Details of the Ideal Automobile Switch.

are furnished either in nickel or pla
copper. The price is $1 and extra blad
are furnished at 35 cents each.

J. D. Kearney, Monadnock Block, Ch
cago, Ill., acts as Western representati
for the Ideal Ignition Switch Co. and ca
ries a stock of these switches.

Brown Spring Battery Connector

A new battery connector has recent
been placed on the market by F. G. Brow
of Torrington, Conn. The connecting po
tion of this device consists of a small spir
into which slides a hook portion formin
a clamp for the battery terminal. Th
hook and spiral have a tendency to sprea
and therefore tightly hold the battery te
minal. It is claimed for this connecto
that it cannot jar loose and that a full s
of batteries can be connected in a minut



The "Brown" Battery Connector.

No tools are needed in applying this co
nector, and there is therefore no chan
of breaking off battery screws in the ope

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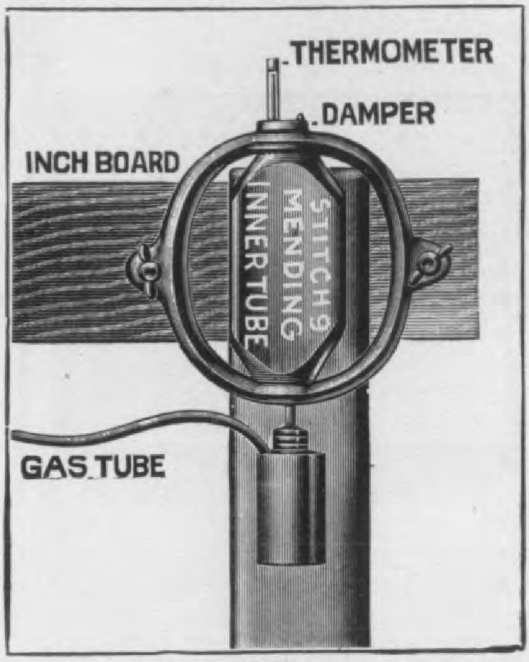
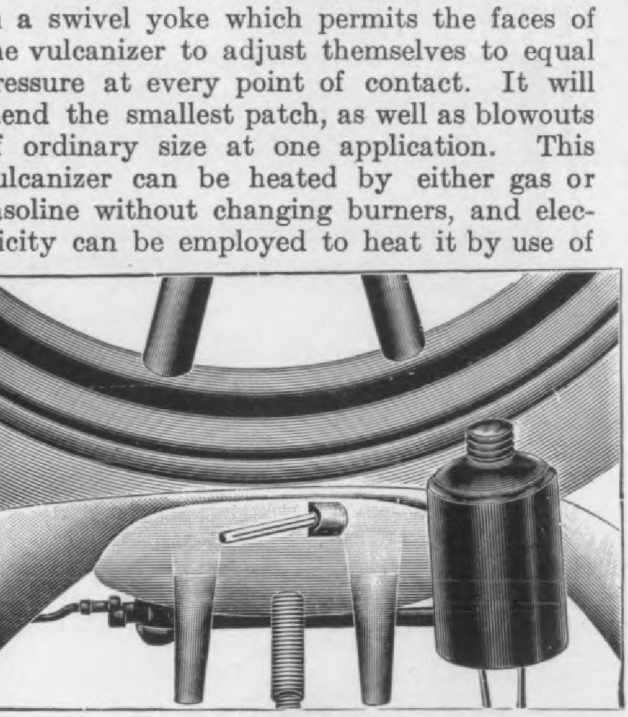
Kansas, are offering two new vulcanizers to the trade which are known as the "Pig" and the "Stitch Nine" respectively.



The "Stitch Nine" Vulcanizer.

The Stitch Nine is their latest product, the special feature of which is that it has four faces—three for vulcanizing outer shoes and one for inner tubes. The vulcanizer is mounted on a swivel yoke which permits the faces of the vulcanizer to adjust themselves to equal pressure at every point of contact. It will mend the smallest patch, as well as blowouts of ordinary size at one application. This vulcanizer can be heated by either gas or gasoline without changing burners, and electricity can be employed to heat it by use of



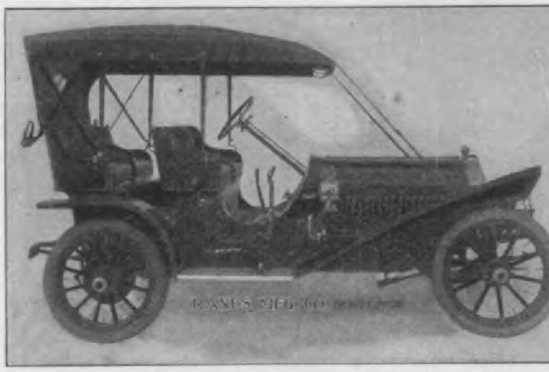
The "Pig" Vulcanizer.

attachments furnished at a trifling additional cost. It is made of aluminum and weighs lbs. The size of each face is 3½ x 5 inches. The Stitch Nine lists at $11.00, which includes

the inside of the hole in the casing at the time the outside rubber is being vulcani This vulcanizer is made of aluminum weighs from 2½ to 5 pounds according to The sizes and prices are as follows: 2½-and 3 inch tires, $8.00; 3½ inch tires, $10 3½–4-inch tires, $11.00, and 4½–5-inch t $12.00. For an electric heater, $5.00 e is charged.

New Rands Top for Rumble Seat C

The popularity of the double run seat on touring runabouts has brou about the necessity of designing a top able for this type of car, and to meet demand the Rands Mfg. Co., Detroit, M has brought out the new design here i trated. As will be noted, this top is m without any bow extending across the



Rands Extension Top for Double Rumble Seated C

trance to the front seat. When fol back, this top does not project much yond the back seat, and also leaves it tirely clear, so that the passenger's c fort is not interfered with. The desig this top meets the requirements of case and, as well, allows light construc without sacrificing strength.

Edmund E. Hans Co. has opened office at 25 West 42d St., New York charge of Howard Greene, for the sal the Hans gasoline indicator.

Mr. L. Anderson, of Quincy, Ill., info us that he is the manufacturer as wel the patentee of the Anderson carbur described in our February, 1908 issue, p 124.

Mora Motor Co., Newark, N. Y., opened a New York City branch at southeast corner of Fifty-second and Br way. W. W. Burke, who was formerly n ager of the Electric Vehicle Co.'s New Y branch, is in charge.

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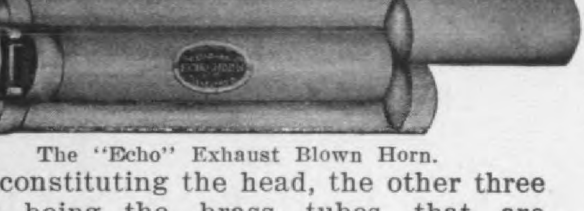
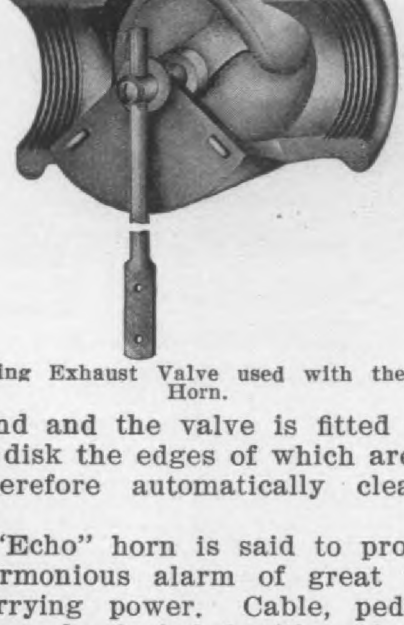
, Cleveland, Ohio, makes the "Echo" here illustrated, which consists of 5 pieces, two of which are brass cast-



The "Echo" Exhaust Blown Horn.

constituting the head, the other three being the brass tubes that are ved into the head. All parts are sub-ial and no soldering or brazing is em-d in assembling the parts.

elf-cleaning exhaust valve is furnished each horn. The body of this valve



eaning Exhaust Valve used with the "Echo" Horn.

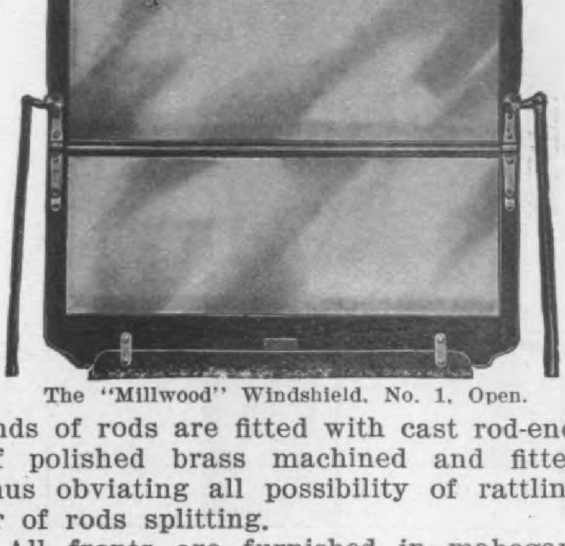
ound and the valve is fitted with a ng disk the edges of which are sharp therefore automatically clean the .

e "Echo" horn is said to produce a harmonious alarm of great volume carrying power. Cable, pedal and g are also included with each horn.

"Millwood" Windshields

o styles of folding windshields are by The Millwood Mfg. Co., of 55th t and South Park avenue, Chicago, No. 1 with fancy, heavy, brass strap es, listing at $40, and No. 2 with con-us polished brass hinges, listing at The frames of "Millwood" wind-ds are made of selected, straight-ed timber, thoroly seasoned. Corners mortised and tenoned to an exact fit the inner edges of the frame are rab-d to receive the glass, which is firmly in place by stops made of quarter-cold drawn steel, which is easily re-

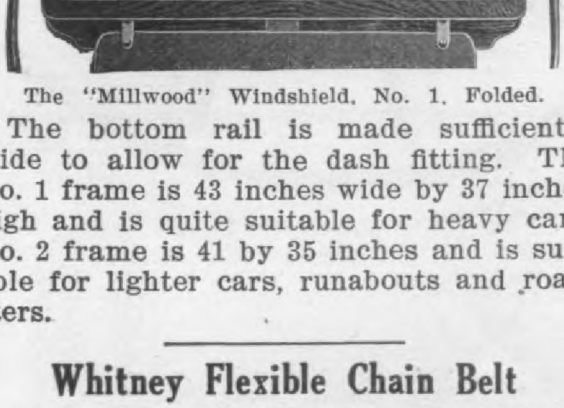
When the sash is lowered the same screws are used to hold the frame, engaging in threaded holes in the lower sash. To the ends of the brackets extending upward and outward are firmly fastened the stay rods. No other rods are necessary. Both



The "Millwood" Windshield, No. 1, Open.

ends of rods are fitted with cast rod-ends of polished brass machined and fitted thus obviating all possibility of rattling or of rods splitting.

All fronts are furnished in mahogany finish, unless otherwise specified. All edges are trimmed with half oval polished brass and metal parts are highly polished brass.



The "Millwood" Windshield, No. 1, Folded.

The bottom rail is made sufficiently wide to allow for the dash fitting. The No. 1 frame is 43 inches wide by 37 inches high and is quite suitable for heavy cars No. 2 frame is 41 by 35 inches and is suitable for lighter cars, runabouts and roadsters.

Whitney Flexible Chain Belt

A new driving belt has recently been devised by the Whitney Mfg. Co., Hartford Conn., the well-known chain makers. This is known as a chain belt and has all the quietness and flexibility of a belt combined with the strength and non-stretching qualities of a chain. It is, in fact, a combination of chain and belt, the leather coverin

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THE THOMAS

AMERICA'S

CHAMPION

NEW YORK—PARIS RACE

BULLETIN

$1,000.00 REWARD

All We Ask is a Square Deal and No Favors

While many competitors are fair and realize our victory benefits the whole American industry, certain knockers, to boost their sales and injure ours, have made false and malicious statements that the Thomas Flyer was not a stock car, that cylinders were changed, and that the car was necessarily rebuilt during the race. We hereby notify them that their statements are false and malicious and must cease, or they will be prosecuted to the fullest extent of the law.

We make the following statement in order that our friends and the public may know the truth, and we offer $1,000.00 reward for proof to the contrary.

WE HEREBY CERTIFY that the Thomas Flyer in the New York-to-Paris race, IS ABSOLUTELY AN ORDINARY STOCK CAR selected only six days before the race, and was not especially prepared or tested. Furthermore, it is identical in motor, clutch, driving shaft, radiator, carburettor, transmission gears, frame, wheels, bearings, and in all other essential features of its mechanism with hundreds of Thomas cars now in use by Thomas owners.

WE ALSO CERTIFY that the Thomas Flyer ran from New York to Cheyenne, a distance of 2,028 miles, almost entirely over roads made practically impassable by snow and mud, climbing mountains, plunging through ruts and fording streams, without overheating once; without repair or replacements of cylinders, spark plugs, transmission, radiator, bearings, clutch, carburettor or other mechanical parts—except at Buffalo, not having time to do so before shipment to New York, a regular stock axle, such as Thomas owners have been using for two years at Tonopah and Goldfield, was substituted for the dropped type—which, however, was in perfect condition. In fact, the only breakage was two chain links, easily replaced, and a sprocket housing.

Detailed reports beyond have not been received, but telegraphic reports state repairs were insignificant, and that the car arrived in San Francisco in splendid condition, ready to proceed on the long journey, a feat unparalleled in the history of automobiles—the longest and severest endurance contest in the history of the world, and one that makes the Glidden Tour on well

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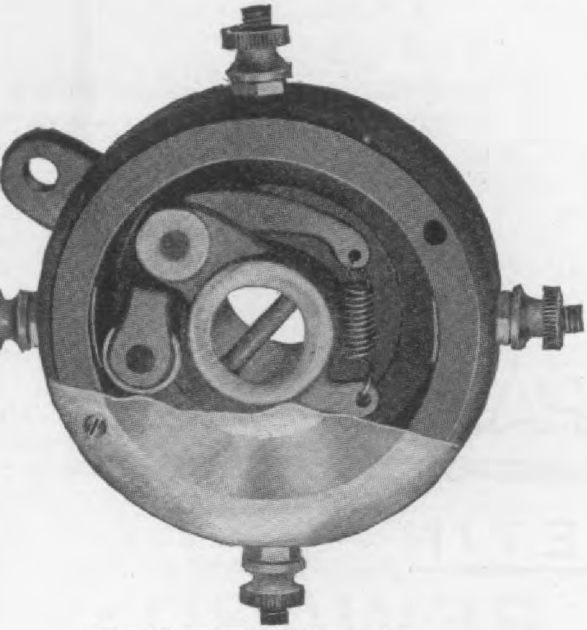
rew machine products for various uses, d has, since its organization some years o, paid special attention to the auto- bile trade. It is equipt to make any- ng turned or milled from the bar and, ving been in close touch with the auto- bile trade and cognizant of its needs, s designed a number of articles such as



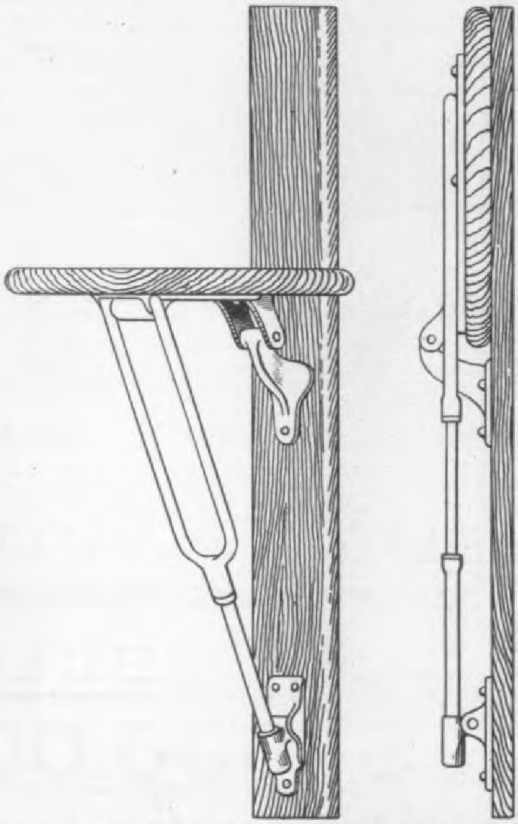
The "Penninsular" Commutator.

mmutators, small ball and socket joints spark levers, etc., lock nuts and other ned pieces for which it has received a nber of duplicate orders and therefore nd it necessary to keep them in stock account of the general demand for the ne. Besides these, the company manu- tures spark plug shells, universal joints, shers, rollers, clevises, cones, turn- kles, steel taper pins, steel planer bolts, led coupling bolts, malleable iron thumb s and screws, finished and case-hard- d nuts, set and cap screws, etc., and

The "Penninsular" Ball & Socket Joint for spark, and throttle rods.

o does case hardening for the trade. The all ball and socket joints referred to for timer and carburetor pull rods, l as there are not very many concerns ering to this particular demand, this duct should be of special interest to the

facturing folding stools for stores, offic etc., for some time, and have lately co menced catering to the automobile tra by furnishing auxiliary folding seats



Brown Folding Seat, Extended and Folded.

automobile tonneaux. The drawings he with very clearly illustrate the operati and construction of this seat, so that extended description is not necessa These seats are upholstered for auton bile use and they can be attached to t body either by permanent screws or slipping into the clasp attached to the bo

"Churchill" Coil and Battery Boxes

The Churchill Cabinet & Box Co., 70 Churchill street, Chicago, Ill., makes a sp cialty of the manufacture of coil cases a battery boxes for motor car and motor bo trade and all kinds of electrical woodwo It has its own lumber yards and dry kil and maintains a factory equipment of t best, realizing the necessity of the high grade material and work in producing the cases. This company understands thoro the technical requirements of this class work in the matter of proper boring a slotting, giving the boxes a weather-pro finish, etc.

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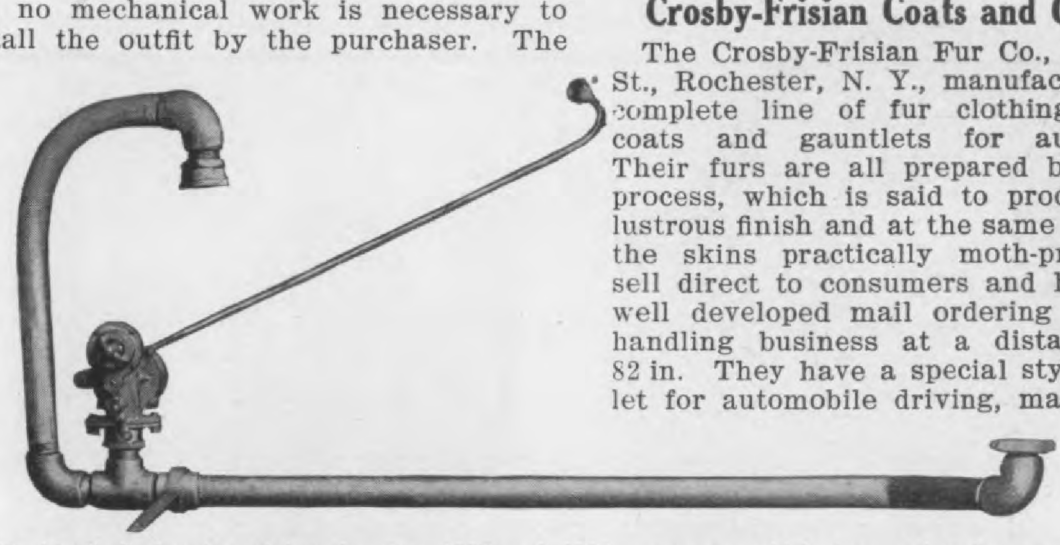
Jenkins Specialty Mfg. Co., Sumter, uth Carolina, recently placed on the rket an outfit for Reo 1905 and 1906 rs, the outfit consisting of a "Breeze" rburetor, a manifold leading to each in-ke and an operating rod. These models re originally fitted with two carburetors d this "Jenkins" outfit is to permit the e of but one. Each outfit is tested and justed on a Reo motor, with speed in-ator on the flywheel, before shipment d no mechanical work is necessary to tall the outfit by the purchaser. The



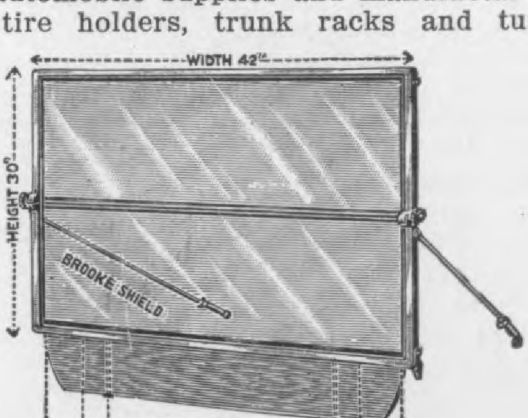
"Jenkins" Carburetor piping for Reo 1905 and 1906 cars on which two carburetors were fitted in the original equipment.

rburetor is placed in front of the front inder. The object in bringing out this fit was to obtain greater fuel economy, adier running of the motor, more elas-control and easier starting with a cold tor.

This outfit is also furnished for Ford, xwell, Cadillac and Buick cars. Prices ge from $18 to $24.

The "Brooke" Windshield

The Brooke Automobile Supply Co., 195-Fulton street, New York City, jobbers automobile supplies and manufacturers tire holders, trunk racks and turn-



stay rods are adjusted and fitted with lo nuts. When the top half is folded do it is held from rattling by means of a ho and button. This windshield is 42 inch wide by 30 inches high. Straight curved filler boards are furnished to different shaped dashes. This windshi lists at $55 and discounts are given to t trade. It may be obtained thru jobbe or direct from the manufacturers.

Crosby-Frisian Coats and Gauntlets

The Crosby-Frisian Fur Co., 114-118 M St., Rochester, N. Y., manufacture a ve complete line of fur clothing, includi coats and gauntlets for automobilis Their furs are all prepared by a spec process, which is said to produce a ve lustrous finish and at the same time ren the skins practically moth-proof. Th sell direct to consumers and have a ve well developed mail ordering system handling business at a distance. Th 82 in. They have a special style of gau let for automobile driving, made of ho

also make a complete line of lap robes automobile use, which are furnished four sizes, ranging from 55 x 64 in. to 7 hide, buck tanned, slate color, dark bl light drab or reindeer color, as desir This gauntlet is lined with sheep leat and lists at $3.75 per pair, or with moh fleece, at $4.25 per pair.

S-W Ajax Insulating Varnishes a Impregnating Compounds

The Sherwin-Williams Co., 601 Ca Road, N. W., Cleveland, Ohio, manuf turer of the well known S-W auto bile body finishes, is now offering t trade a line of insulating varnishes a impregnating compounds, their lead being known as the Ajax Insulating V nish Black Elastic (Baking). This is black baking varnish which possesses ve high powers of insulation, from 1000 1500 volts per one-thousandth of an in depending upon the method of making t test. It is particularly satisfactory insulating armatures and field coils a any other apparatus subjected to long co tinued heat and vibration. It is oil a moisture proof and bakes in 7 to 10 ho

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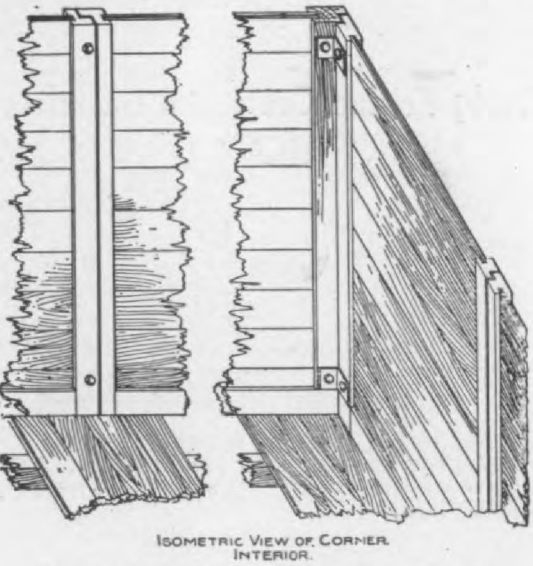
liam St., New York City, is manufacturing ne of portable garages, built exceptionally ong, and made of thoroly seasoned, care- y selected lumber. They are built of solid, erchangeable sections, tongued and grooved, urely bolted together, and made with water nt joints. The windows and doors are

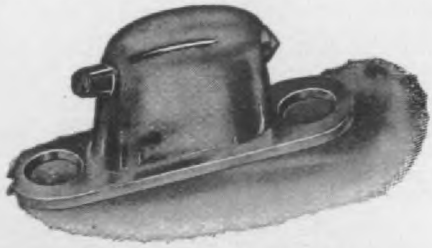


Details of construction of "Portable" Garage.

de of air and kiln-dried material, cut to The wood is given a coat of special pre- ed primer and two coats of the best quality white lead and linseed oil tinted to suit. The drawing herewith illustrates diagramati- y the method of construction employed in se houses. The sections are rabbetted and securely held together by key-bolts and le irons.

The Jitsu Curtain Fastener

The L. & D. Mfg. Co., 86-90 Broad St., ston, Mass., have lately placed on the rket a new curtain fastener called the tsu," which possesses the advantages of ng both quick and simple in action. The ly of this fastener is made of prest



The "Jitsu" Curtain Fastener.

ss and is of such size that it almost npletely fills the eyelet, so that rattling curtain above the fastener, the greater pressure the stronger the fastener hol yet to unfasten the curtain it is only nec sary to give the lower edge of the eye a pull.

The "Perfect" Mud Hook

This is a new device recently placed the market by the Garage Equipment C Milwaukee, Wis., which they guaran will get an automobile out of mud, sa or snow when everything else fails.

The hooks are intended for emerger use and are put on the tires when wheels are in the mud, and taken off soon as the machine is released. T

The "Perfect" Mud Hook.

hooks are made of malleable iron, whi makes them unbreakable, and weigh 5 l per set. For long stretches of mud deep sand two or three sets can be us to good advantage. They will fit any s tire from 3½ to 5½ inches. Price of a of two, with four straps, is $2.50; witho straps, $1.50.

The Freeman Maxfield Co., 210 E Madison Street, Chicago, Ill., are manuf turing a line of automobile caps, made black goat, tan goat, and assorted m tures, also of black silk.

The Standard Welding Co., Clevela Ohio, will soon begin the manufacture the well-known Midgley rim, arrangem to that end having been made with Hartford Rubber Works Co., Morgan Wright, and the G. & J. Tire Co.

Henry W. Brooks, Jr. & Co., 15 Wall New York City, auditors and system

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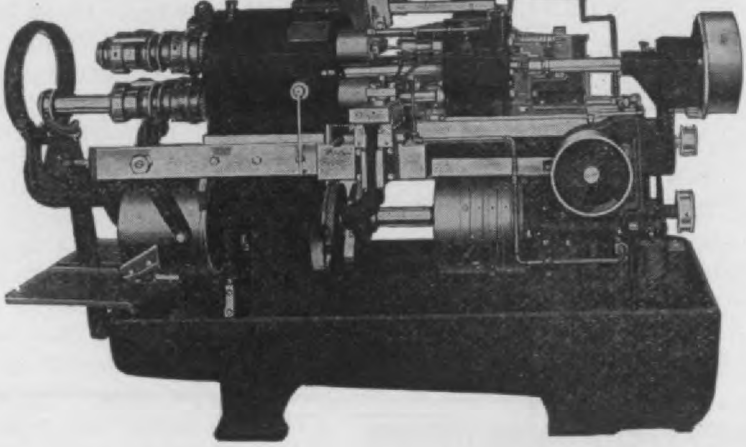

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Factory and Main Offices

CLEVELAND, OHIO

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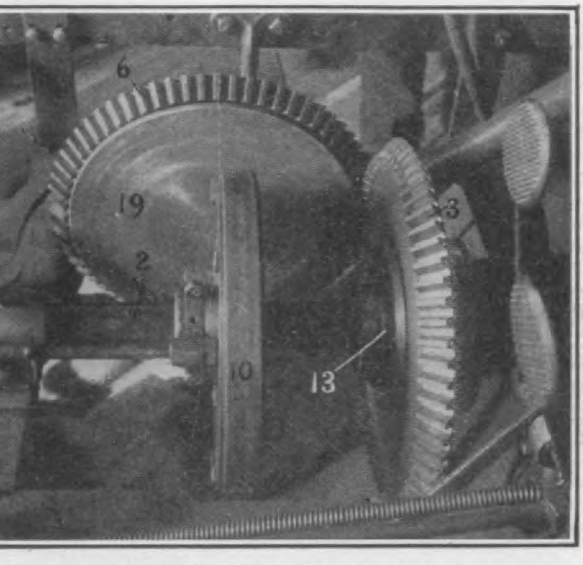
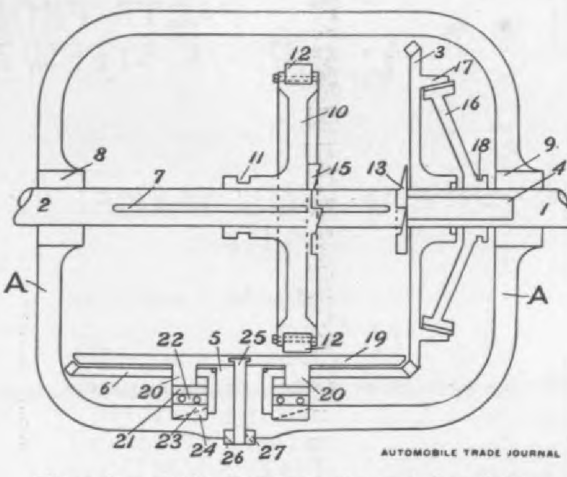
ange Gear Co., Rensselaer, Indiana, and here illustrated by photographic and di-amatic views. One of the features of s change gear is that on the highest ed it automatically locks itself thru medium of a jaw clutch, at the same e separating the friction plates from h other, thereby giving a direct posi-e drive on the highest speed. This pro-ure, of course, saves wear of the fric-n plates and also loss of power thru tional contact of the plates.



lique top view of the Parkinson Transmission Gear.

he following description of the device ers to the letters and figures on the ac-panying illustration: A A represents frame for the transmission gear. 8 and re bearings for shafts 2 and 1. Shaft 1 onnected with and driven by the motor shaft 2 is connected with and drives differential or axle. 16 is a cone ch; 17 indicates a cone recess on bevel r wheel 3. Bevel gear wheel 3 has a ring and rotates upon shaft 1. The e clutch 16 is keyed to shaft 1 and ro-s concurrently therewith. Clutch 16 itted with a collar 18, to which is at-ned a lever or other suitable device engaging the clutch with wheel 3. 6 resents a bevel gear wheel which is ned by and is constantly in mesh with l gear wheel 3. 5 represents a bear-on which wheel 6 rotates. 19 repre-ts a circular friction plate, faced with minum. Friction plate 19 has lugs 20, ch neatly fit in and pass through wheel and said lugs rest upon and are sup-ted on ball thrust bearings 21, 22 and 23 is part of a ball thrust bearing and the same time a cam lever which raises

friction wheel 10 is keyed to a shaft 2 key 7, rotates concurrently therewith, a turns and controls shaft 2. 15 represen one part of a jaw clutch or gear. It is part of and turns and controls frictio wheel 10. 13 represents the other part the jaw clutch, and is part of shaft When shaft 1 is being driven by the mot cone clutch 16 is pushed into recess thus engaging cone clutch 16 with bev gear wheel 3, causing wheel 3 to rota concurrently with clutch 16 and shaft Bevel gear wheel 3 is thus made to rota bevel gear wheel 6, which in turn rotat friction plate 19 concurrently with bev gear wheel 6. Cam lever 23 then raises b thrust bearings 21, and in turn frictio plate 19 against friction wheel 10. friction wheel 10 is pushed to the rig and approaches gear wheel 3 its speed creases, and the speed of friction wheel approaches that of gear wheel 3, and wh friction wheel 10 has obtained the sa speed as wheel 3, jaw clutch 15 and 13 a then engaged and shafts 1 and 2 becom locked and rotate as one shaft. At th instant, friction plate 19 is lowered a disengaged from friction wheel 10 by t reverse cams 26 and 27, and cone clut



Plan view of the Parkinson Transmission Gear.

16 is disengaged from gear wheel 3. Ge wheels 3 and 6, as well as all other ge parts, then become idle. Shafts 1 and now rotate as one shaft, with friction whe 10 and cone clutch 16 acting as fly-wheel

This gear can easily be converted into double friction by adding another bev gear wheel similar to 6 and its attac ments, and placing the same just opposi the said wheel 6.

The new five-story building recently co pleted by the H. H. Franklin Mfg. Co., Syracuse, N. Y., makes the fifth additi

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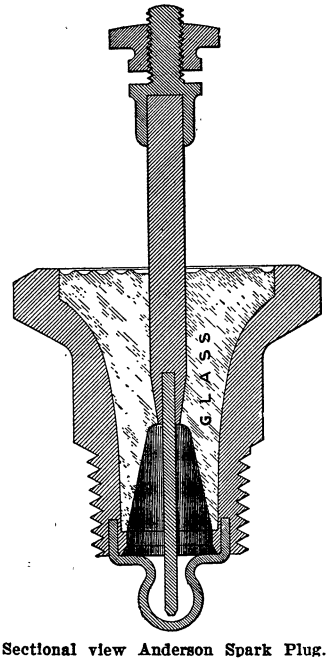
The "Anderson" Spark Plug

The unique feature of this plug is its insulator which is made of glass. While it is generally supposed that, because of its frailty, glass would be most unsuitable for the purpose, the makers of the Anderson plug claim to have thoroly demonstrated the suitability of glass as an insulator of a spark plug. In the Anderson plug the glass is, by a special process, welded with the steel shell and becomes integral with it.



Sectional view Anderson Spark Plug.

Being perfectly non-absorbent and a non-conductor of electricity, the glass makes an ideal insulator and the special process of welding the glass and steel provides the necessary strength it is claimed. The perfectly gas tight joint thus produced is another advantageous feature of the Anderson plug, and the glass insulator also provides a means of observing the sparking while the motor is in actual operation.

This plug is made by Anderson Spark Plug Co., and W. E. H. Hutton of 348-352 Fulton Street, Brooklyn, is the sole distributor.

The Park Drop Forgings Co.

The Park Drop Forgings Co., has recently established itself in a large, new and well equipt plant at East 79th Street and Gordon Park, Cleveland, Ohio, for the purpose of producing drop forgings. The treasurer, Dwight Goddard, and the superintendent, T. B. Smith are experienced drop forge men from the best shops. The purpose of the management is to do only the highest grade of special drop forging, paying especial attention to forging, and treating alloy steels.

Facilities are provided for making one piece automobile axles, and multiple throw cranks, steering knuckles, gear blanks, and transmission parts. The company has a paid up capital of $100,000.00 and starts out with one of the best plants in the country. It is of steel construction 200 feet long, and 65 feet wide, with an ell 60 ft. x 60 ft. The building has a noticeably high monitor roof for ventilation and the whole lower part can be opened up during the summer by lift doors. One end of the building is made two stories to accommodate the machine shop which is fully equipt with the best modern tools.

The forge shop has 15-ton over head cranes over the hammers, furnaces, machine shop and railroad tracks. The hammer equipment consists of nine Chambersburg steam and Waterbury board drop hammers running from 1000 to 3000 pounds, with the latest oil furnaces arranged to preheat blast and oil. The blast is from a special Sturtevant fan directly connected to a motor.

Power is applied to the machinery thru individual motors placed overhead on the trusses and operating sections of shafting. Steam is supplied by an Erie City Tubular boiler thru main pipes overhead and exhaust underground to heaters and

Monopol Piston Rings

Theo. Boerner Mfg. Co., 26-28 Union Square, New York, is the sole U. S. agent for a new piston ring which is manufactured by the Monopol Piston Ring Co., of Berlin. These rings are not made of cast iron, as usual, but are made of the best grades of Swedish and Scottish cast iron which, because of its toughness, elasticity and low co-efficient of friction, is especially suitable to meet the requirements of the case. They are also made by a special method which is claimed to give them great elasticity so that they perfectly fit the cylinder bore and no further refacing or wearing is necessary. These rings are guaranteed to be perfect circles not varying one-tenth of a millimeter. They are made either eccentrically or concentrically, with or without overlapping joints.

Cleveland-Canton Spring Co., Canton, Ohio, has installed machinery for the testing of Vanadium steel springs in a new building recently added to its factory. A new rolling machine, used in the manufacture of springs, has also been added.

The Canton Drop Forging & Mfg. Co., Windsor Lane and Odd Row, Canton, O., manufacture special drop forgings in quantities to customers' specifications. They recently installed an up-to-date oil treating and annealing outfit to take care of specifications for high grade material as well as for heat treatments.

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the market by the Perkins & Campbell . Co., 620-624 Broadway, Cincinnati, O. s made of two thicknesses of heavy ome leather, lined with a lighter piece he same material. The tread is riveted n case-hardened metal rivets, which are to withstand a sharp steel file, so that

Perkins & Campbell Tire Protector.

y are practically proof against wear on nite blocks or rocks which may be met n on road surfaces. The sides are cov- d with three rows of discs to prevent r from cracked rock or road ruts. The tector is fastened to the rim by means hooks between the clinch and the rim, hat all the strain comes on the rim and on the tire.

he "Fairhurst" Rock Crusher Tire Cover

ne of the latest puncture-proof tire ers placed on the market is the Fair- st, illustrated herewith and manufac- ed by I. J. E. Fairhurst, Orfordville, . It is attached permanently to the casing and needs no removable at- hing devices. The construction of the er is as follows: The body of the er is made from the best cuts of ome leather, of which there are two knesses where the wear comes. This her covering is then completely cov- d with six-sided washers or burrs, le of steel, which form a complete cov- g where the cover comes in contact n the ground. In order to further pro-

is completely worn out, which is almo impossible on account of the latter bein case-hardened. The leather cover is mad endless and then slipped over old casing and riveted to the latter by means of tu ular rivets, which pass thru the old ca ings first and then thru the cover, als

The "Fairhurst" Protector.

thru two additional strips. The outer edg of the cover is pared down to a feath edge, which is tucked under the rim an on the inner side of the tire. The insid of the casing is lined with a layer canvas to protect the inner tube fro any possible friction or wear due to ru bing against protruding rivets. The ca ings are made for all sizes of tires fro 26x2 ins., listing at $9 each, up to 36x5 in listing at $27.00 each.

Mexican Graphite Lubrication

The United States Graphite Co., Sag naw, Mich., report great success in th automobile field with their Mexica Graphite as a lubricant. They furnis graphite in powdered form reduced to e treme fineness by an elaborate system air floating. It is high in graphitic carbo and when mixed with proper lubricati oils, and reduced to proper consistency makes an excellent automobile lubrican The U. S. Graphite Company obtains i graphite from its own mines in Mexi and combines it with pure mineral oi of proper gravity to obtain the necessar mixture. This combination is said to b of uniform consistency, gritless, non-dri ping and free from precipitation. It ca be used wherever oil is ordinarily used transmission and differential cases, wheel bearings, etc. It can be introduc

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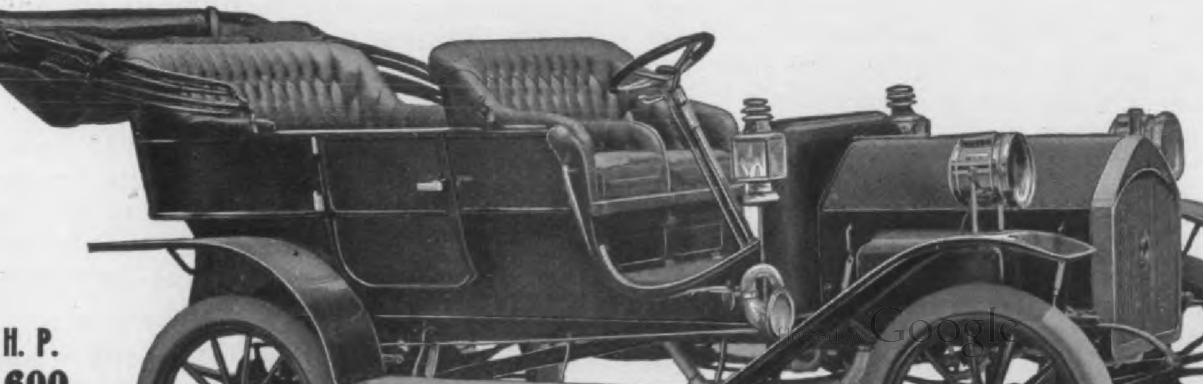

H. P.
600

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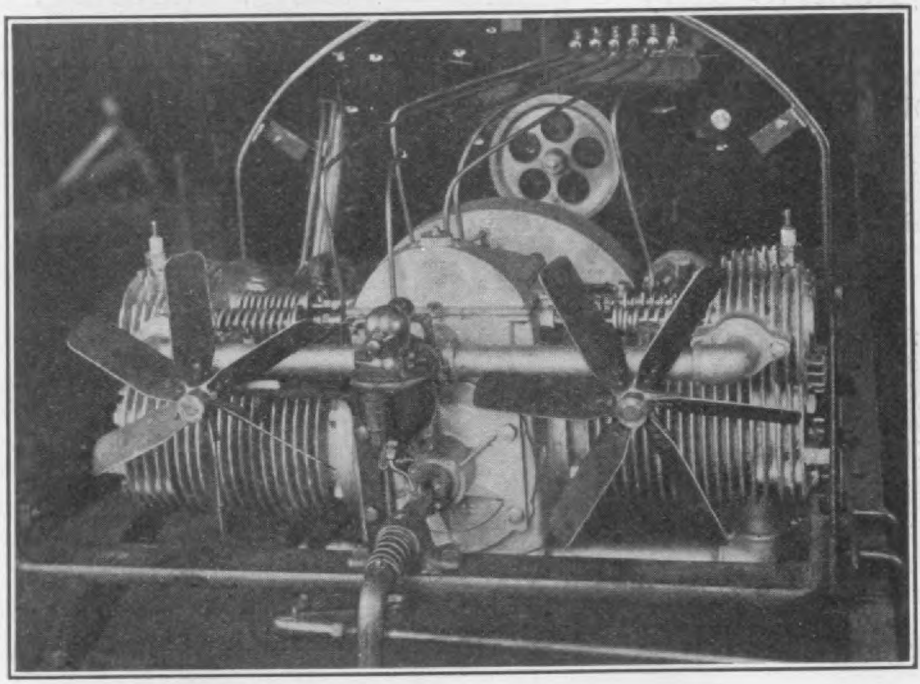
cars of the runabout and surrey type, Albany Automobile Co., of Albany, Ind., furnishing their air-cooled automobile r to the trade generally. This motor f the 2-cylinder, horizontal, opposed and develops 18 to 20 H. P., operat- n the 4-cycle principle. The cylinders of 5-inch bore and 4½-inch stroke. ing is assisted by two friction-driven Bearings are of bronze. The crank is 1⅝ in. at the crank end and 1¾ in. e fly-wheel end. The crank pins are n., all made of drop forged open hearth . Both sets of valves are mechanical- perated and both are placed on the r side of the cylinders, and air cir- ion is allowed between the valve s and the cylinders. The exhaust es are 2 in. in diameter and open 7-16 inch, which allows the complete ex-

Locust St., Columbus, Ohio, has for som time past been making a specialty of th manufacture of front and rear axles, mo tors, clutches, wheel hubs, flanges, hous ings, brackets of all kinds, etc., all of thi work being done to customers' specifica tions. Its factory equipment includes tw Schumaker and Boye engine lathes, on Fay and Scott turret lathe, one America Fox turret lathe, one 21-inch Gisholt turre lathe, six Lidge and Shipley high-spee patent head lathes, which can be used a turret lathes or as engine lathes, the tu rets being interchangeable with compoun rests, all fitted with tail stocks and tape attachments. They also have two 34-inc Colbourn vertical boring mills, four dri presses, and a Kempsmith universal mil ing machine; also large tool grinders, un versal grinders, buffing lathes and grindin



The Albany 4-cycle, 18-20 H. P. Air Cooled Car Motor.

on of the exhaust gases. The gears cams are enclosed in a dust-proof k case. The pistons have three com- sion rings and are fitted with large w piston pins. The cylinders are nd to a smooth bearing surface. The ng surface provided by the flanges s 2200 square inches, while the sur- exposed to the heat totals only 220 re inches, and the makers claim that motor will cool sufficiently even with- the fans. The cams and valve push are of tool steel, tempered. Oiling is neans of a six-feed mechanical oiler. er-covered asbestos gaskets are used

wheels for finishing work. Their tools ar all of the latest patterns and they conten plate increasing their facilities as the aut mobile business increases its demands fo their product.

The Auto Tire and Tube Co., 1657 Broad way, New York City, have recently brough out an inner tube which they claim will pre vent blowouts, punctures, etc. It is also sai to be strong enough to carry the car withou a casing. It is made in all sizes.

The Monash-Yoonker Co., 203 Cana

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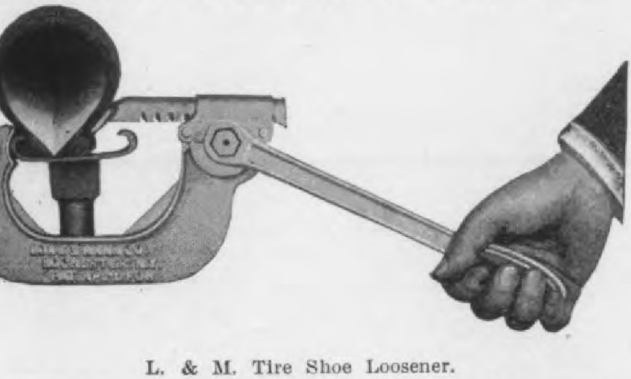
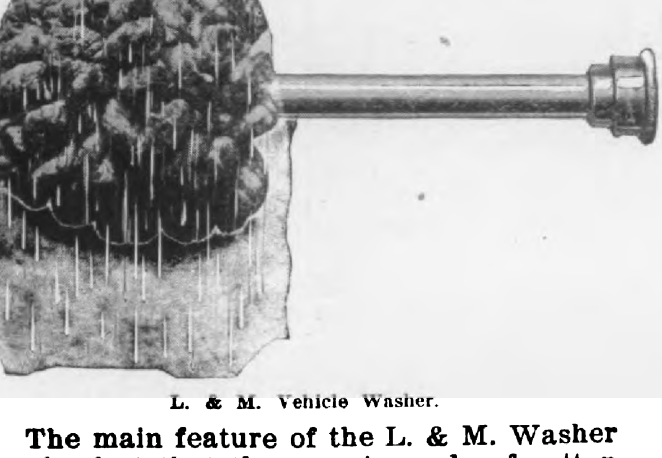
.., are including in their 1908 line two entirely new products, one the L. & M. Tire Shoe Loosener and the other the L. & M. Vehicle Washer. Besides these two entirely new accessories they have made some minor improvements on their Minute Tire Adjuster. They are also now putting up the Minute Adjuster in a bag for convenience in stowing away in the tool kit.



L. & M. Tire Shoe Loosener.

The L. & M. Tire Shoe Loosener is very convenient for loosening tires which have become rusted or frozen to the rim. It consists essentially of a wide jaw, the end of which rests against the rim of one side of the wheel and the other end of which contains a pinion and rack mechanism which forces the arm against the opposite side of the tire by the raising of a handle. The handle is detachable so that the tool can be taken apart and placed in small space in the tool box. The tool is made in one size only, but is adjustable to any size, style or make of tire. The price is $3.



L. & M. Vehicle Washer.

The main feature of the L. & M. Washer is the fact that the mop is made of cotton mop rope which, while serving the same purpose as an ordinary sponge, is much cheaper. The handle portion is of brass and, of course, lasts indefinitely, while the mops can be renewed at slight expense. This washer is so arranged that the water

is turned on full or only one-half. washer lists complete at $1.75 and mops can be had for 50 cents each.

Chicago Automobile Jacks

The Chicago Steel Foundry Co., 80 The Rookery, Chicago, Ill., manufactu number of styles of lifting jacks, in

The Chicago 3 Piece No. O Jack.

ing two models for automobile use. No. 0 Chicago automobile jack consis but three pieces and weighs less th lbs. This jack, it is claimed, will lif heaviest machines. It is 10½ in. high lifts 7½ in. It works up or down, ac in to the position of the lever whi easily shifted. The price is $1.50.

No. 1 Chicago jack is also notabl its extreme lightness and great stre It has a lifting capacity of two tons

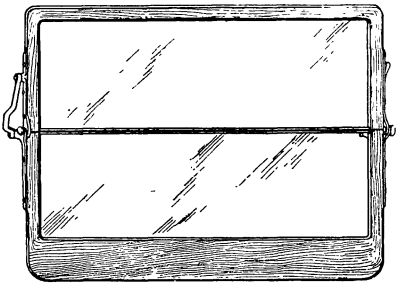
No. 1.

The Chicago No. 1 Jack.

weighs only eight lbs. It is 12 in. hig lifts 6 in. This jack consist of five and is very simple in operation. made of steel thruout and the re finish is in red enamel, altho any will be furnished on quantity orders. lifting low loads a detachable steel l foot is furnished, which hangs fron

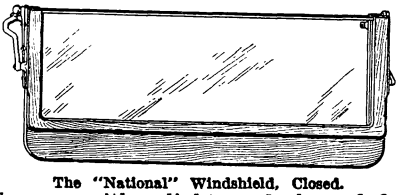
The "National" Windshield

The National Auto Top Co., Inc., 1904 Broadway, New York City, manufacturer and jobber of auto tops, folding glass fronts, wind shields, slip covers, etc., has recently placed on the market a new windshield called the National, which is illustrated herewith in open and closed positions.



The "National" Windshield, Opened.

The changing of this shield from one position to the other is accomplished by simply turning two small thumb screws, which release the upper section, which in turn can be folded back and locked by tightening the thumb screws. This front can be applied to any car without interfering with the lamps or steering wheel in any way. The frames are of genuine solid



The "National" Windshield, Closed.

mahogany, either light or dark, and finely finished. The attachments are of solid polished brass. The glass is selected polished plate, 3-16 in. thick. The edges inside the frame are bound with felt. The list price of the shield is $50.

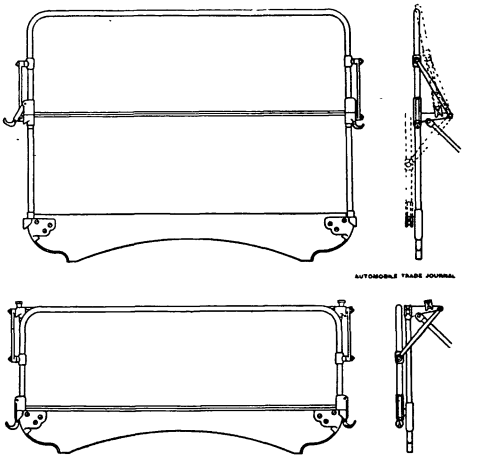
"Laman" Tops and "Stick Tite" Bow Separators

L. L. Laman Auto Top Co., Utica, N. Y., manufacture extension, coupe and runabout tops for motor cars, and, while offering nothing radical in this line, base its claims for business on the high grade work turned out. In these tops, it is claimed, the best grades of cover material are used, bows, sockets, linings, etc., and that the top joints break right so that whether extended or folded back and in the dust cover the tops are of proper shape. These tops are said to fit perfectly when applied to the car.

All Laman tops are fitted with "Stick Tite" bow separators without extra charge. This separator has previously been described and illustrated in these columns. One of its main features is the fact that no screws are used in attaching it. It bolts to the socket in a novel way, which gives it a vise-like grip and insures a firm hold.

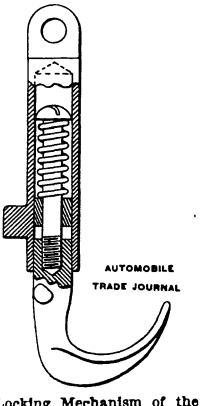
"Williams" Divided Wind Shield

We illustrate herewith the "Williams" divided wind shield in upright and folded positions, and also show a detail view of the locking device used on this wind shield. This wind shield is so constructed that the upper sash can be brought to any one of



The "Williams" Divided Wind Shield In Open and Closed Positions.

three positions without removing a nut or thumb screw. This is accomplished by means of a simple locking device at each end of the frame. The cross sectional



Details of the Locking Mechanism of the "Williams" Divided Wind Shield.

view of this device herewith plainly shows its constructive features. As can be seen, a small hook is provided which is easily grasped by the forefinger, and to change the position of the upper sash these two hooks are pulled downward and outward, allowing the sash to be moved to any position desired, after which they spring to locking position. These wind shields are made with both brass and wood frames, and all parts are interchangeable. This shield is the product of Twentieth Century Motor Car Co., South Bend, Ind.

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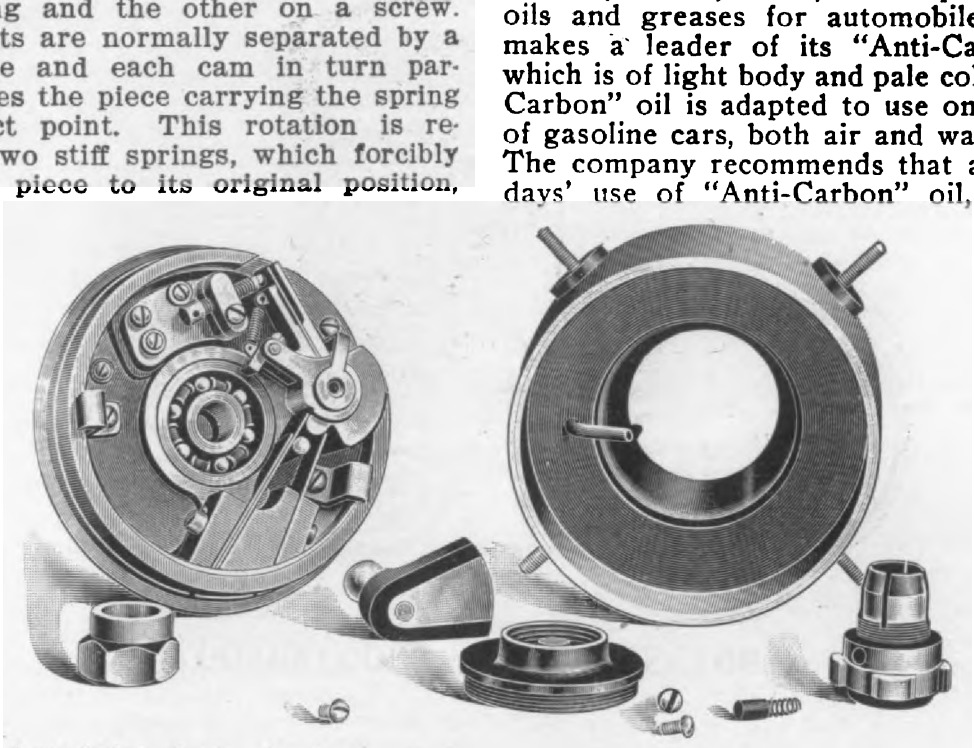
es, has now added to its product the e Igniter, herewith illustrated. The e is a combined timer and distributor, timer mechanism being the unique re. It is mounted on ball bearings will fit on the shaft in place of the timer. A single contact of extreme ity is made for each explosion, a sin- on-vibrating coil being used, thus sav- atteries and making it possible to ac- ely time the spark in the cylinders. small cam piece at the extreme right e cut has as many cams as there are ders, these cams in succession oper- he platinum contact points, one being spring and the other on a screw. e points are normally separated by a space and each cam in turn par- rotates the piece carrying the spring contact point. This rotation is re- l by two stiff springs, which forcibly n the piece to its original position,



he New Acme Igniter, showing the timer mechanism at the left and the distributor portion which fits over it e right.

nomentum being sufficient to slightly the spring and throw the contact s momentarily together, followed by instant separation due to the straight- of the spring carrying the movable ct point. This gives the smallest pos- time of contact and is very economi- current. The making of the contact tirely mechanical and can, therefore, finitely timed. Furthermore, one set- gives absolutely the same timing in number of cylinders, which is ex- ly important and is next to impossi- obtain with multiple vibrating coils. time during which the contact points is practically the same at all engine s and is as positive at slow as at speeds. The device is provided with

able distributor arm is shown at the cen- tre of the cut and the terminals for the secondaries are, as usual, on the outside of the ring. These are well protected by vulcanite caps.

The 4-cylinder ignition outfit complete sells for $60 and the 6-cylinder for $70 which, considering the fact that four or six vibrating coils are dispensed with, is very reasonable.

"Amoco" Automobile Oils

American Oil Co., 168-170 South Water street, Jackson, Mich., has a special line of oils and greases for automobile use, and makes a leader of its "Anti-Carbon" oil which is of light body and pale color. "Anti-Carbon" oil is adapted to use on all makes of gasoline cars, both air and water-cooled. The company recommends that after a few days' use of "Anti-Carbon" oil, while en-

gine is hot, a teacupful of wood alcohol be injected into each cylinder and allowed to stand over night. The next morning the engine should be speeded up for five or ten minutes, which will work out all carbon accumulations, after which, with continued use of "Anti-Carbon" oil it is claimed that further carbon troubles will not arise.

Four grades of "Amoco" oils are made for those who do not want a light oil like the "Anti-Carbon." The medium, heavy and extra heavy grades are for hot weather use and the light for cool or temperate weather. The "Amoco" line also includes oils for steam cars and for transmissions; also solid oil or cup grease, graphite grease and a soap for cleansing automobile bodies.

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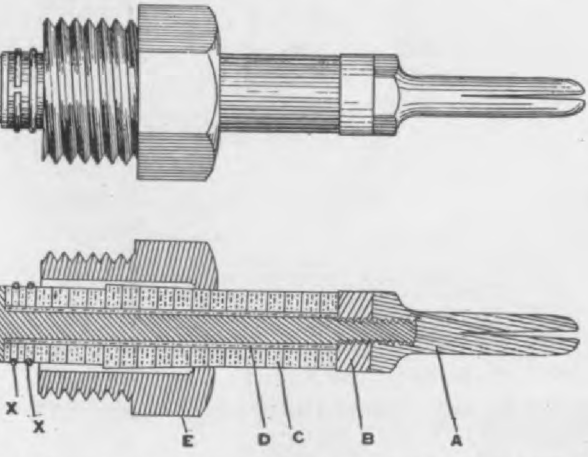
y, has recently placed on the market e "Multiple" spark plug, the main fea- e of which is that it gives several simul- neous sparks in the cylinder at each com- ession.

The several sparks are obtained by a ies of rings or electrodes which are so ced as to form a bridge for the current ich is forced to jump these gaps and erefore give a number of sparks. It is known fact that if an outside gap is ced in the plug wire, the spark is in- sified and in designing the "Multiple" g it has been assumed that a succes-



he "Multiple" spark plug, perspective and sectional s; A, special attachment for use on up-to-date cars; brass washer; C, mica washers; D, mica tube pro- ing rod; E, brass nut; F, steel rod; x, x, steel rings ctrodes).

n of gaps on the inner end of the plug ll intensify the spark in proportion to e number of gaps used; hence that the ength of the spark is very much in- eased by having to jump the gaps formed the rings referred to above.

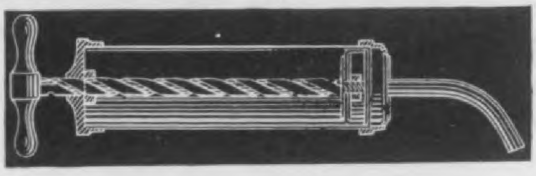
Another feature of the plug is the sim- city of its construction, the mica core ing easily detached from the nut by sim- knocking it upon its head; yet there is possibility of leaking, the core fitting one 1000th of an inch. The "Multiple" n be used with magnetos as well as with ls. The list price is $1.50.

e "Miller" Quick Action Grease Gun

The accompanying cut illustrates the ller quick action grease gun for use in ricating the transmission gears and arings of automobiles and motor boats. is the product of Miller & Starr, 250 eene St., Brooklyn, N. Y., and possesses umber of meritorious features which rec- mend it to the attention of those who

for advancing the plunger when the han is turned toward the right.

The plunger in the barrel of the gun advanced rapidly and with uniform mo ment by turning the handle shown, o four turns being necessary to empty t gun of the eight ounces of grease which will hold. The gun can be very quic



The "Miller" Grease Gun.

filled by unscrewing the cap. The lub cant can be ejected in just the quantity sired, as the plunger cannot be forc ahead, but only advances by turning t handle. It is also evident that it will spill the lubricant and may be carried all times without fear that the conte will be forced out by the jolting of t vehicle or its contact with other objects

"Cleanola"

The Cleanola Company, Fulton Bl Pittsburg, Pa., maker of "Cleanola," preparation for cleaning, polishing, prese ing and renewing highly finished surfac is offering to send free of charge a sam can of this preparation to any garage p prietor or car owner seriously interest The list prices are as follows: 1 gall $2.50; ½ gallon, $1.50; 1 quart, 90 cen 1 pint, 50 cents; 6 oz. can, 25 cents; 5 a 10-gallon cans, $2.25 per gallon; half b rels and barrels, $2 per gallon.

For the convenience of dealers the Cle ola Co. puts up its goods in assorted ca as well as in cases of each of the smal sized cans.

The Continental Motor Mfg. Company Muskegon, Michigan, well known auto a marine engine builder, is about to be the erection of a new machine shop, dim sions of which will be 100 ft. by 175 ft., fourth addition in two years to the n plant at Muskegon. This building will one story, absolutely fire proof with s tooth roof construction. In addition to present machine shop equipment, extens additions and increases comprising latest and most modern machinery for curate and precise work will be made. large motor testing house has been co

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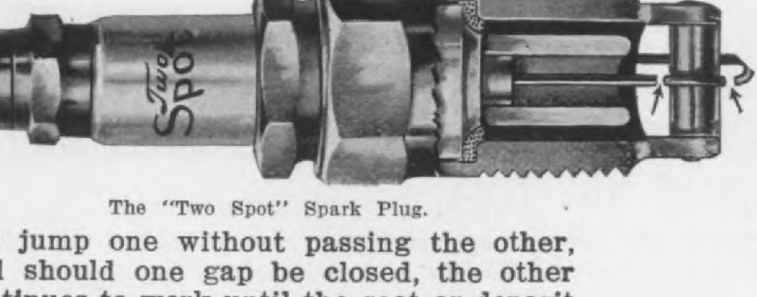
y call the "Two Spot." The special ture of this plug and from which it de- es its name is the fact that it produces sparks at two well separated points. s action is made possible by insulating se two places from each other within firing chamber so that the current can-



The "Two Spot" Spark Plug.

jump one without passing the other, should one gap be closed, the other tinues to work until the soot or deposit urned out.

n the ground that an exterior gap ced in the ignition circuit intensifies the rk at the plug the maker of the "Two t" holds that the extra gap at the firing is of great advantage in producing a ng spark without fail. It is claimed t on all tests made in actual service with plug it has shown a decided percentage increased power, due to a more perfect quicker ignition of the charge.

While plugs have been made with two s in which the spark jumped one or the er, in the "Two Spot" the spark is posed to jump both.

"Cox" Tire Cushions and Inner Tube Vulcanizers

avid H. Cox, Rahway, N. J., well known nufacturer of the Cox acid cure vul- izing outfit, has recently placed on the rket a tire cushion, the object of which o prevent punctures, blow-outs, etc.

listing at $10 for a set of four. Cott wadding, felt and similar substances a very different materials to cut or pier and this fabric and felt cushion would a pear to be an excellent puncture prevent

The "Cox" Inner Tube Vulcanizer.

In conjunction with the Cox vulcanizi outfit, above referred to, Mr. Cox is f nishing an inner tube vulcanizer, here lustrated, which is made with a felt cus ion that conforms to the shape of t patch being vulcanized, giving even pr sure at all points. No heat is employ in using this device, as the acid cure so tion furnished in the Cox outfit does n require heat to obtain vulcanization. T vulcanizer jaws are clamped by mea of thumb nuts. Price of the device is $1.5 The vulcanizing outfit lists at $1.00.

"Cincinnati" Gears

The Cincinnati Gear Works, 118-1 Opera Place, Cincinnati, Ohio, makes specialty of cutting bevel and mitre gea up to 24 inches diameter, and spur gea up to 36 inches diameter. Confining efforts to this range of work, it is believ a higher degree of accuracy is reach than would be obtainable if all classes work were handled. The spur gears a cut in the usual manner on Brown Sharpe and Gould & Eberhardt automa gear cutters. On bevel and mitre gea the use of cutters with fixt curve has be abandoned, retaining nothing but the B grain & Gleason automatic gear plane which are said to produce work with th retically correct planed teeth particula

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NOTICE

IT HAS BEEN BROUGHT TO OUR ATTENTION

That certain unscrupulous dealers and top makers have been offering to the trade and public Automobile tops made of cheap inferior leather substitutes, representing them as

Pantasote

The name PANTASOTE represents a particular composition, which is, and for years has been, manufactured exclusively by us. It is thoroughly protected by copyright. We do not desire to create trouble, but for the protection of our own business, as well as that of our customers, are forced to give notice that we will follow up and

Prosecute to the full extent of the law

all such cases as come to our notice.

TO DEALERS

We are prepared to furnish upon application, free of charge, small celluloid trade mark labels, one of which affixed to a Pantasote top stamps its genuineness.

THE PANTASOTE CO.

NEW YORK,
11 BROADWAY.

CHICAGO,
707 FISHER BLDG.

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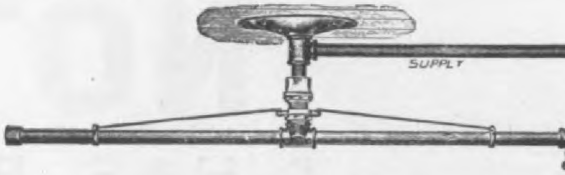
Canton, Ohio, recently added to its 08 line the No. 6 rear axle here shown, ich is suitable for use under 40 horse-wer cars weighing 2800 lbs., ready for ssengers, or when equipped with nickel el tubing and shafts, it is suitable for horse-power cars up to 3400 lbs., mak-; it then a companion to the 1⅝ in. I-sec-n front axle.

The No. 6-B axle is made with either sin- or double brakes on drums integral with e inner flange. When double brakes are ed, they act on separate drums with an space between to prevent overheating der severe service. Both brakes are of ge surface, the internal brake being mpletely housed in for protection against t. Easy adjustment is provided for th brakes. The axle tubing is 2½ in. meter by ¼ in. wall, and is keyed and eted into both the brake bracket and the ntre housing. The latter is a one-piece sting carrying all of the bearings for e pinion shaft and differential entirely dependent of the driving axle and ar-nged for ready adjustment through a ver, which, when removed, enables the

The "Timken" No. 6-B Rear Axle.

ire differential and gear to be bodily re-ved while the axle is still on the car. e gears are 4-pitch and of large diameter. The drive from the differential to the eel is by means of shafts squared on the ds telescoping freely into the differen-l gears and prest securely into six fin-driving dogs in the wheel hubs. These gs are forged steel and are held in place the hub caps which in turn are locked prevent their coming loose. The hubs ve 8 in. flanges and take 1⅝ and 1½ kes with liberal depth of spoke in hub. ar ratios can be given of approximately , 3, 3½ and 4 to 1. Spring seats are in e piece, free to oscillate on the axle, and vided with radius rod lugs, as required. e counter torque of the axle is taken a torque bar carried in a deep pocket rallel to the pinion shaft. The axle o can be furnished with the concentric m of torque tube.

special features is the self-grinding seat which it revolves. This is all brass, a if any wear occurs it amounts to a regri ing of the seat which therefore can leak. No leather washers are used, a as every part is of brass, nothing in device is perishable.



The "Star" Vehicle Washer.

Two 5-ft. lengths of extension pi flange for bolting to the ceiling and malleable iron tee for connecting to supply pipe are furnished. No supply p or hose is included. As the washer volves on the ceiling a vehicle can, course, be reached from all sides, and no hose has to be dragged around the flo the device makes for both economy a convenience. The price is $20.

"Cummer" Auto Top Gloss

The James W. Cummer Co., 29010 E 34th St., Cleveland, Ohio, is manufact ing an elastic preparation for preservi and restoring the natural lustre and fin of automobile and carriage tops, sea guards, straps and the like, whether ma of leather, Pantasote, rubber or similar m terial. It is guaranteed not to chip off break with the bending of the arti dressed. It is also water-proof and a m chine dressed with this dressing is rea for use in a half hour.

Chas. H. Smith & Co., jobbers of autom bile and marine supplies, have lat moved into their fine new building at North Broad street, Philadelphia, a mo made necessary by the rapid growth their business. Besides automobile a motor boat supplies they handle a co plete line of hardware. This firm call

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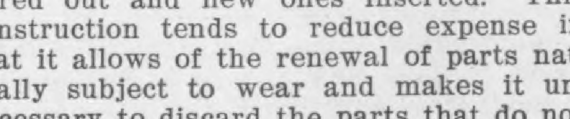
s recently placed on the market by io Mfg. Co., and is being marketed by otor & Specialty Mfg. Co., 1327-1329 oodward Ave., Detroit, Mich., sales ents. The "Trio" commutator is made both automobile and motor boat use, e marine type being fitted with a cir-it breaker for reversing two-cycle mo-rs.

The "Trio" Commutator Disassembled.

The contacts in the "Trio" commutator e made shorter than is usual for the rpose of economizing current. The ring that holds the roller against the re ring and contacts is very simply at-ched and should it get broken could, in emergency, be replaced by a rubber nd until a new spring could be obtained. The fibre ring, which is punched to re-ve the ⅝ x 5-16-inch contacts, is detach-



The "Trio" Commutator, and Attaching Outfit as Applied to the Ford Runabout.

le, and when the contacts become worn is ring can be removed, the contacts red out and new ones inserted. This nstruction tends to reduce expense in at it allows of the renewal of parts nat-ally subject to wear and makes it un-cessary to discard the parts that do not

is also advantageous for lubricating poses.

The attachments include two bevel gea a short piece of shafting, and two brack for attaching the commutator shaft to motor. The gears are cut out of spec

The "Trio" Marine Type Commutator with Circu Breaker for Reversing Two Cycle Motors.

bronze and the brackets, which act a bearing for the vertical shaft, are made the same material. Price of the outfit, cluding the timer, is $10; of the tir alone, $6.

West's Automobile Top Dressing

This dressing is made by a concern t has been making leather dressing for years, and its vast experience puts it an enviable position and adds weight its claims of merit for its product. T manufacturer is West Enamel Mfg. Co., 121 North Madison Street, Rockford, For many years West's enamel has b recognized as an article of high merit the carriage trade. West's automobile dressing is a similar preparation made stand the severity of the conditions in au mobile use. It is adapted to use on ena leather, rubber, Pantasote and all artifi leathers, light and dark. It is a little sl er in drying than West's enamel, but however, dry dust-proof over night. applied to an old top before the latter begun to absorb water, it fills the lit almost invisible cracks in the surface the material and is said to be sufficier antiseptic to kill decay germs alre there, so that decay is arrested and top also preserved from shrinking.

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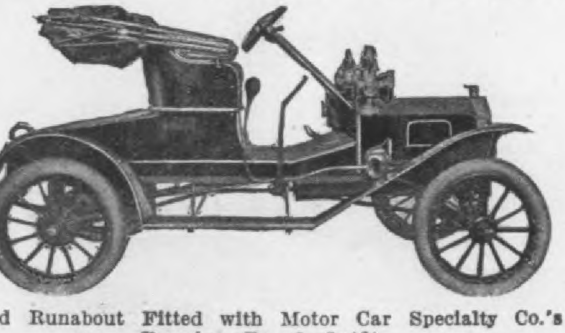
g out a running board outfit for Ford del N runabouts, the outfit including r fenders, two running boards and all essary fittings, listing at $30.

The fenders are made of very heavy ge sheet steel and the outside edges led over a large wire. They are highly shed in black enamel. The aprons on

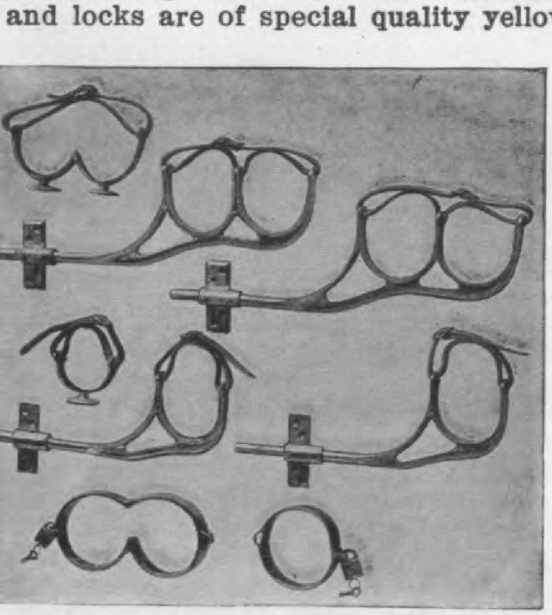


d Runabout Fitted with Motor Car Specialty Co.'s Running Board Outfit.

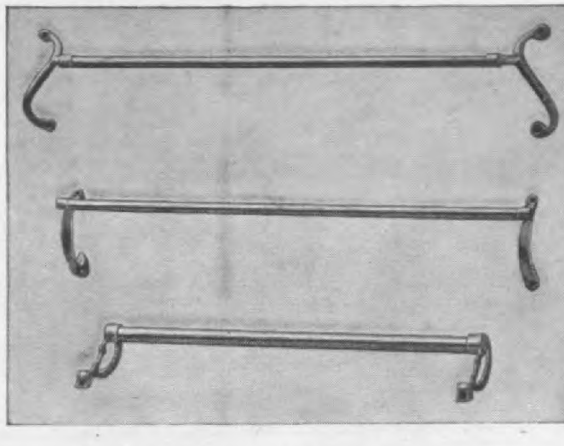
h front and rear fenders are also made steel and are very wide, coming down the frame of the car, absolutely prevent- any mud being thrown on the body of car. The running boards are made of and are covered with corrugated rub- matting, which is held in place by a der of brass. The running boards are ported by drop forgings and these are plemented by truss rods under the car.

iley" Brass Tire Holders, Tire Locks, Foot Rails, etc.

iley Brothers, of Bridgeton, N. J., are nufacturing a line of brass articles such tire holders, tire locks, etc., for which y find a big demand. Their tire hold- and locks are of special quality yellow



tire locks list at $4.00 for the double at $3.00 for the single lock. Their co robe and foot rails are of the same qual brass as their tire holders, brass tubi iron lined, being used, ⅝-inch in coat a



"Riley" Foot and Robe Rails.

robe rails, and 1 inch in foot rails. All t rails are made long with one end solder while the other end is fitted but not s dered, to enable purchasers to have t rails cut any desired length. The co and robe rails, either style, retail at $2 each, and the foot rails at $3.50.

"Permanit"

Permanit is the name of a punctu closing substance recently introduced in this country by Adolf Karl & Co., so American agents, 239 Washington St., Ne ark, N. J. Beside rendering tires punctu proof, it also preserves the life of the ru ber. It comes in the form of powder a is pumped into the tire. After the requir amount of powder has been pumped in the tire, depending, of course, on the si of the tire and its use, whether for car cycle, 2½ ounces of clear water is added each package of powder. Then the whe should be turned slowly 10 to 20 times so to have the contents scattered in the ti Permanit does not dissolve in water n does it become a paste, glue, or fluid; ther fore, it will not close the valve, but, the contrary, when a puncture occurs t powder comes in contact with the outer a and causes a chemical reaction, wherel the injured part is instantly healed. O treatment will last at least one year. T price per package is 75 cents.

The Buffalo Tube Company, 255 Ra Street, Buffalo, New York, make a full li of small sizes and thin gages of brass a

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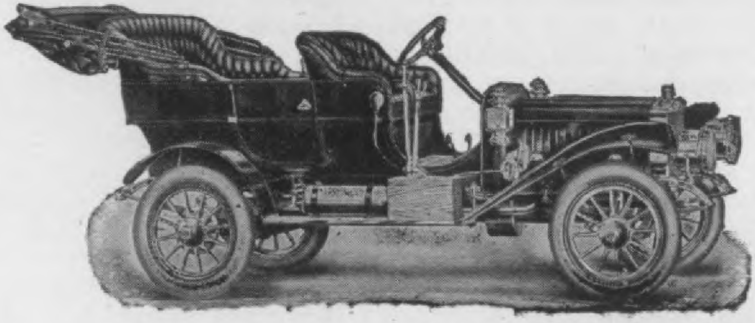

THE $2000

THE STANDARD OF AMERICAN AUTOMOBILE VALUE

Mitchell

Perhaps you've noticed that most cars cost more than the Mitchell. Did you ever notice that they were any better in finish or in material—or any better in **performance**—on the road? Ride in a $2000 Mitchell and **see.** Have any Mitchell agent "show you" a Mitchell.

Look it over—go out into the country and test it on the toughest hill you know of—through some particularly bad stretch of sandy or muddy road. Notice your power—notice speed—notice the sweet running motor—the tranquil action of all moving parts—ease of control—notice general efficiency, Mr. Prospective Owner.

Then if you can see how you'll get two or three thousand dollars more automobile value out of any other car—**buy** the other car, we won't say a word.

But you won't **find** more value in any other car.

Present day automobile value is **standardized in** the **Mitchell** at **$2000.**

A demonstration will prove this to **you.**

You are under no **obligation** to buy when you ask for a demonstration.

If you are considering the purchase of a car we want you to **know** the Mitchell, and we want **to show** you what you get in a Mitchell at $2000 and that you can't get any **more** in **any other** car, **regardless** of the price.

Call up the Mitchell agent.

The Right Price for the Right Car

$2000

WRITE US FOR CATALOGUE No. 18

MITCHELL MOTOR CAR CO.

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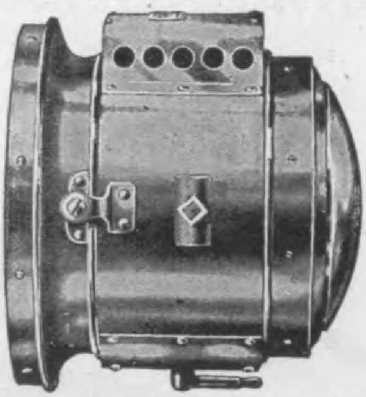
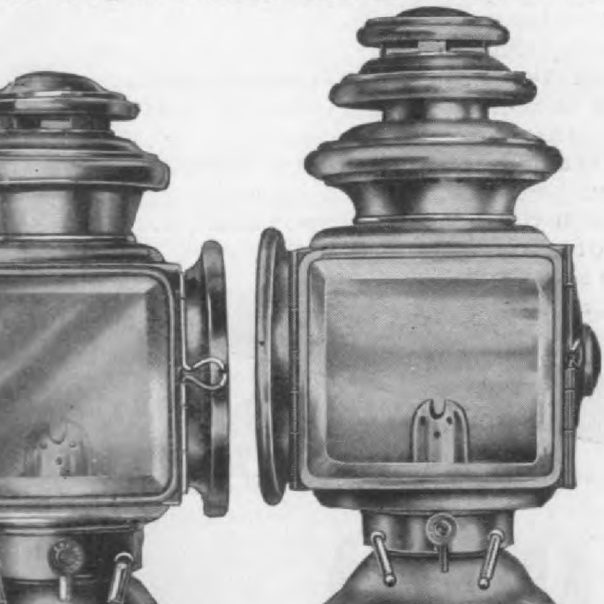
fg. Co., of Detroit, Mich., is their No. 166 adlight, here illustrated. This headlight 7½ in. across the flange, 7¼ in. long, ½ in. high and is fitted with a 6-inch mir-r. The price is $15. The same style mp is furnished in four other sizes with



1908 E. & J. Model 166 Headlight.

7, 8 and 9⅝-inch mirrors respectively, e prices being $17.50, $20, $25 and $30. hese headlights are furnished with sec-onal glasses so that in case of an acci-nt to the mirror lens or front glass it is sily removed. They also furnish this yle of headlight with one-piece plate ass at a lower price. In the line of side l lamps the Edmund & Jones Company e offering two new designs, one for me-um weight touring cars and limousines

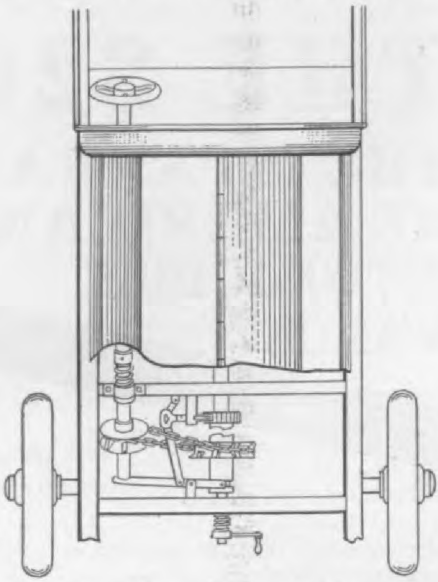


E. & J. No. 3 le Oil Lamp.

1908 E. & J. No. 4 Side Oil Lamp.

d the other for runabout and motor ggy cars. Model 4 side oil lamp is made one size only, 12 inches high, with a 4⅜

market by the Adams Motor Car Sta Co., 86 Bowen Ave., Chicago, Ill. T device is arranged so that the operato the car can start the engine from the s by turning a small hand wheel, which shown in the accompanying illustrat Before turning the wheel it is prest do ward and by a system of levers the st ing handle is thrown into connection that by turning the wheel a sprocket the other end of the column to which wheel is attached is revolved, in turn



The Adams Engine Starter.

volving another sprocket on a small sl which connects with the engine shaft a ratchet and dog arrangement. Sho the engine back-fire, the connection broken, and no harm can come to the p son operating the starter. The us starting handle can be used if desired the regular way, but cannot kick back thus do injury to the operator, as the c nection is broken as soon as the eng back-fires. The Adams starter has parts, and these are simple, and it is plicable in any make of car.

The Winton $2,500 contest for chauffe closes July 1. Sixteen-Six drivers n enter any time previous to that date, only requirement being a minimum 3,000 miles traveled prior to the close the competition.

A Franklin 28 H. P. motor car recen made a 440-hour non-stop run at Cin nati, which included road running ev day and idle running in the garage night. Daily runs were made of from to 300 miles each. On three success

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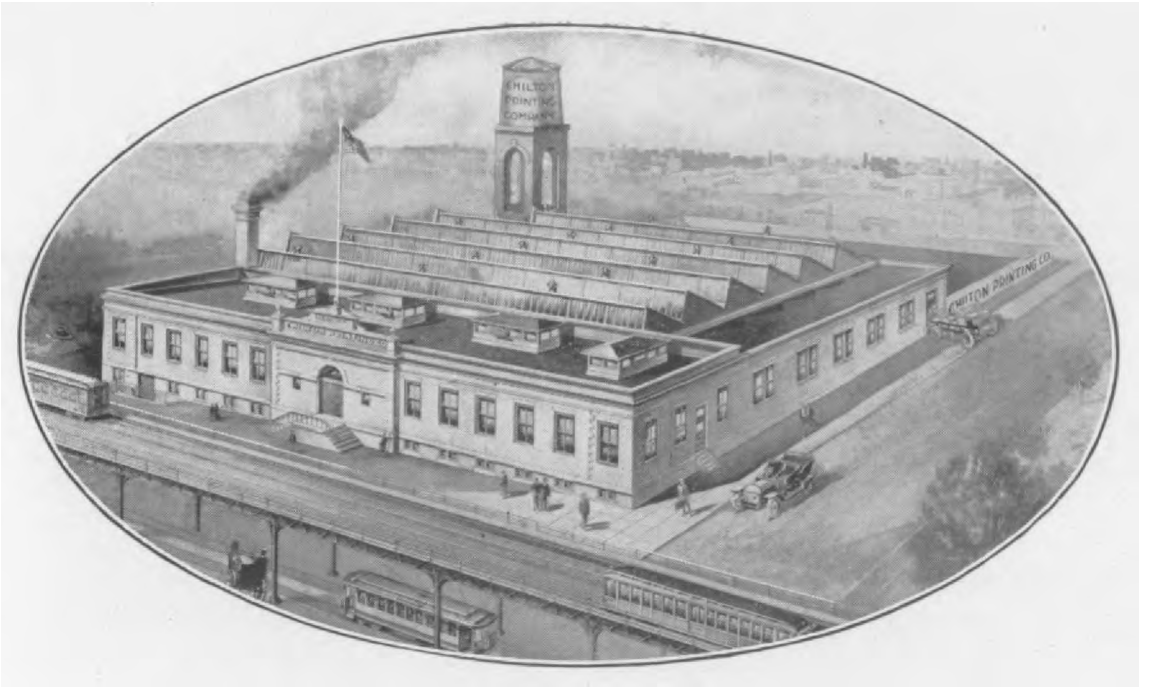

IN presenting to the buyer of printing this illustrated and descriptive review of our new plant, we desire to emphasize one fact, viz.: that it is strictly a Daylight Establishment. Every nook and corner is practically as bright as an open field, with the exception that there is no sunlight. Proof of the wonderful amount of daylight is given in the photographs used for illustrating this description. These were taken without the aid of artificial light, and as they were almost instantaneous, it will be evident to you that the "Daylight" Plant in reality is all that we claim for it.

Yours very truly,

CHILTON PRINTING COMPANY

Market and 49th Streets :: Philadelphia

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JAS. ARTMAN GEO. H. BUZBY C. A. MUSSELMAN

The Daylight Plant
OF THE
Chilton Printing Co.

THE HOME OF THE "CYCLE AND AUTOMOBILE TRADE JOURNAL" AND GOOD PRINTING

SINCE the time of Benjamin Franklin the art of printing has been so rapidly developed that to-day it is considered by many as having almost attained a state of perfection.

During the many years in which hundreds of thousands of men have struggled to make printing one of the fine arts of the civilized world, the greatest natural aid given to man has been overlooked, viz.: daylight. Is there a painter or photographer who would think it possible to obtain artistic results in a dark, gloomy establishment? And yet printers, with few or no exceptions, have struggled against the greatest handicap to their trade, the lack of proper light. Even the plainest printing in black requires strong light to obtain uniformity, and when color work is to be art work, daylight is an absolute necessity.

The Chilton Printing Company early realized the necessity for a modern establishment, and in the design of their new building at the corner of Market and 49th Sts., Philadelphia, the architects were given instructions which specified that every nook and corner of the establishment would have to be brilliantly illuminated by daylight.

Sunlight produces many shadows and reflections, and therefore is not practical for the printing business, and to overcome this objection and yet have the full benefits of daylight, it was necessary to have a steady north light. To obtain this result, the building was constructed having the roof in the form of the teeth of a saw, with skylights facing the north, and the slanting roof to the south.

Thus the printers' principal handicap was avoided and a great asset added to the store of excellent facilities of the Chilton Printing Co., who next turned their attention to the mechanical equipment, always keeping in mind the object of the organization, to still further advance the art of printing.

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The machinery is all in one large room on the ground floor, and every inch of space is as bright as daylight can make it; so that the artisans are afforded the greatest aid—nature's light—in an abundance which has heretofore been denied practically all those who have sought to make printing a real fine art.

Knowledge is the next essential. The men in all departments must be experienced and competent. From the Superintendent to the Foremen; from the foremen to the most modest workers, we have selected as our assistants only those who have served their apprenticeship, have earned a reputation for being superior in their particular branch of trade, and who are known for the excellent work they have produced.

Next in importance is equipment, which means both the machinery and the methods of operating it. We think we are safe in stating that there is no other printing establishment in this country of an equal size, with as new and as good machines as are to be found in the plant of the Chilton Printing Co. All the Presses, Type-Making, Feeding, Folding, Gathering, Stitching, Covering, Binding and Cutting machines are the late models of the best makes, and are driven by individual electric motors, thus placing the speed control entirely in the hands of the operators of their respective machines.

To the three most important factors in the production of art in printing,—*daylight, knowledge* and *equipment,*—can be added *protection* against loss of time and money due to fires resulting from great or hazardous risks. The character of construction of the building, plus the automatic sprinklers and other safety devices, has so reduced the danger from fire that inspectors have rated it as one of the best risks in the State of Pennsylvania, and in consequence reduced the insurance cost to a minimum. For this reason, the Chilton Company will insure, free of charge, all the plates and other valuable property of its patrons. Two large vaults—one brick, the other concrete—have been provided as a still greater safeguard against loss by fire. Both these vaults have fire doors and are equipped with sprinklers, which additional protection practically guarantees that the contents cannot possibly be damaged by fire. The plant is located on the corner of two prominent and wide streets, and there are no adjacent, hazardous fire risks. To the North is Market St.; to the South is a large piece of ground belonging to the Chilton Printing Co.; to the West is 49th St. and to the East is an open lot. The plant is therefore practically isolated from danger of fire from any outside source, as well as from within. The building is but one story high, with a basement under a portion of

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the office section only. This basement is built of brick and concrete, including the ceiling, as an additional precaution against fire. Special stress is laid upon this feature, because insurance protection is only partial protection, as it is impossible to estimate the loss resulting from delays caused by fires, which, in many cases, are so great as to totally overshadow the value of the stock covered by the insurance policy.

The true art of printing necessitates an artist at the inception of the order, for in no other way is it possible to obtain absolutely artistic results. The artist should be the first to be brought in touch with the order, and for that reason the Chilton Company has connected with it men who are, in temperament and by training, printing artists—men who can design and execute attractive catalogs, booklets, mailing cards and calendars, or anything in the printing line; men who can originate as well as execute the sort of printing that commands respect. The Chilton Printing Co. is therefore prepared to plan, design and execute catalogs, booklets, etc., including the drawings, plates, compilation and printing. By having full charge of the work from beginning to end, it is possible to obtain artistic results. Where several different interests are at work, there is always a lack of harmony which is in evidence in the finished product. Without harmony a piece of printed matter may be ruined, because crude handling at the start may prevent an artistic finish. The facilities which the Chilton Printing Co. has to offer are of an unusual character and assure the buyer of good printing, good results.

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OFFICE OF THE PRESIDENT

MR. James Artman, Editor-in-Chief and founder of the Cycle and Automobile Trade Journal (which is one of the largest and most influential industrial publications printed in the world),

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OFFICE OF THE VICE-PRESIDENT

MR. George H. Buzby, Head of the Department of Solicitors and Special Traveling Representative for both the Cycle and Automobile Trade Journal and the Chilton Printing Co. Mr.

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OFFICE OF THE SECRETARY AND TREASURER

MR. C. A. Musselman has charge of the Financial, Advertising and Subscription Departments of the Cycle and Automobile Trade Journal

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GENERAL VIEW OF THE OFFICES

IN this picture are shown most of the departments of the Chilton Printing Co. All the modern appliances known to business systems can be found in the office equipment, which includes 14 Oliver Typewriters, Edison Business Phonographs, Electrical Envelope Sealing Machine, Multigraph Machine for producing imitation typewritten letters, Elliott Stencil-Cutting and Addressing Machines the latest Filing Cabinets for cards, records, correspondence, etc., individual steel lockers, inter-office and long-distance telephone service throughout. As thousands of pieces of mail matter are handled

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SUBSCRIPTION AND MAILING DEPARTMENTS

USUALLY this feature of a trade paper is not much in evidence, because circulation in many cases is more imaginary than tangible. In the case of the Cycle and Automobile Trade Journal, however, the Subscription Department is one of the principal features of the business; for to maintain 20,000 readers of the kind that are most desirable and to take care of the wants of subscribers is a task requiring a large office force

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THE EDITORIAL DEPARTMENT

IN addition to the regular staff of editors, the Cycle and Automobile Trade Journal has special contributors and traveling representatives. It is very probable that there is no other Journal in the same field having so large and complete an Editorial Staff. Although the publication is issued but once a month, it is deemed necessary to maintain this large force in order to obtain, regardless of cost, the best material possible for the Journal

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ADVERTISING DEPARTMENT

THIS special feature of the business is probably one of the most important, because advertising to-day is one of the greatest helps to modern business. Here are planned and executed the many campaigns which make known to buyers throughout the world the advantages of the Cycle and Automobile Trade Journal as a publication and the Chilton Printing Co. as a printing plant. This department, in addition to the usual clerical

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OFFICE OF THE PRINTING DEPARTMENT

HERE samples of all kinds of paper and printing are kept for ready reference. Estimates are made and type and press proofs are approved. As an accurate factory cost system is kept of every job, large or small, the clerical work required for records is quite extensive. A thorough system insures accurate and intelligent estimating and right prices to those who buy printing without estimates. The entrance shown to the enclosed office in the upper right-hand corner is that of the

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VIEW ILLUSTRATING THE DAYLIGHT FEATURE

IN the foreground of this picture is one of the Cutting Machines, but the view was reproduced so as to show the construction of the roof with the large number of skylights. This form of construction is practically the same as that employed by the modern photographer, who requires the strongest and steadiest light to obtain the best results. A comprehension of this feature will give you some idea of the special advantages

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GENERAL VIEW

THIS view was taken from one corner of the plant, and while it does not show the machines in detail, it gives a general idea of the proportions of the room, about one-half of which is

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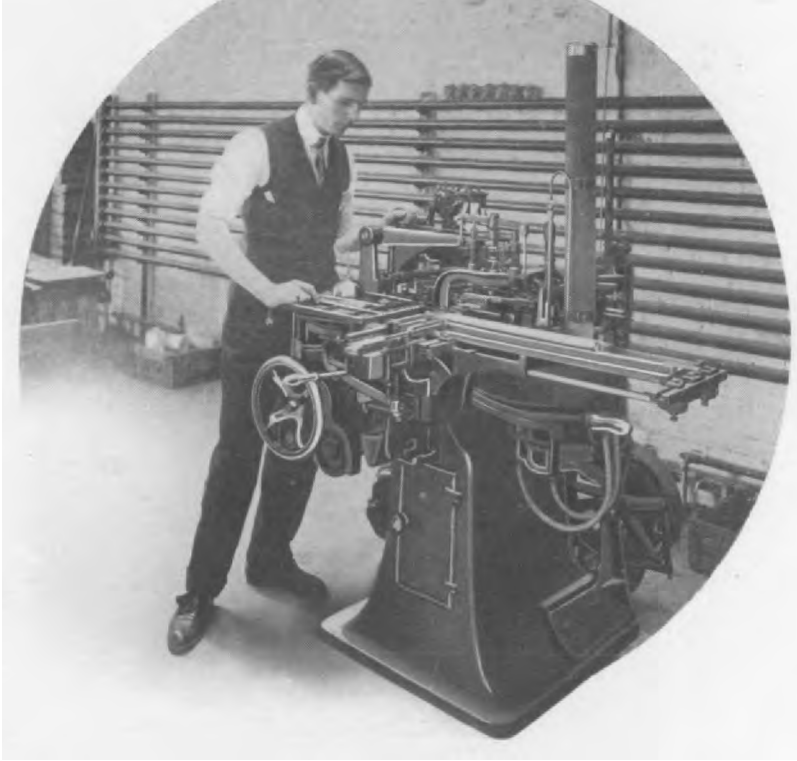

THE TWO VIEWS ARE OF ONE OF THE MONOTYPE MACHINES, KEYBOARDS AND OPERATORS

THIS machine will either cast type singly, up to 36 point, for distributing in cases for job or book work, or will compose and cast, up to 14 point, either plain or tabulated matter. By the use of the Monotype Machines it is possible to always print from new

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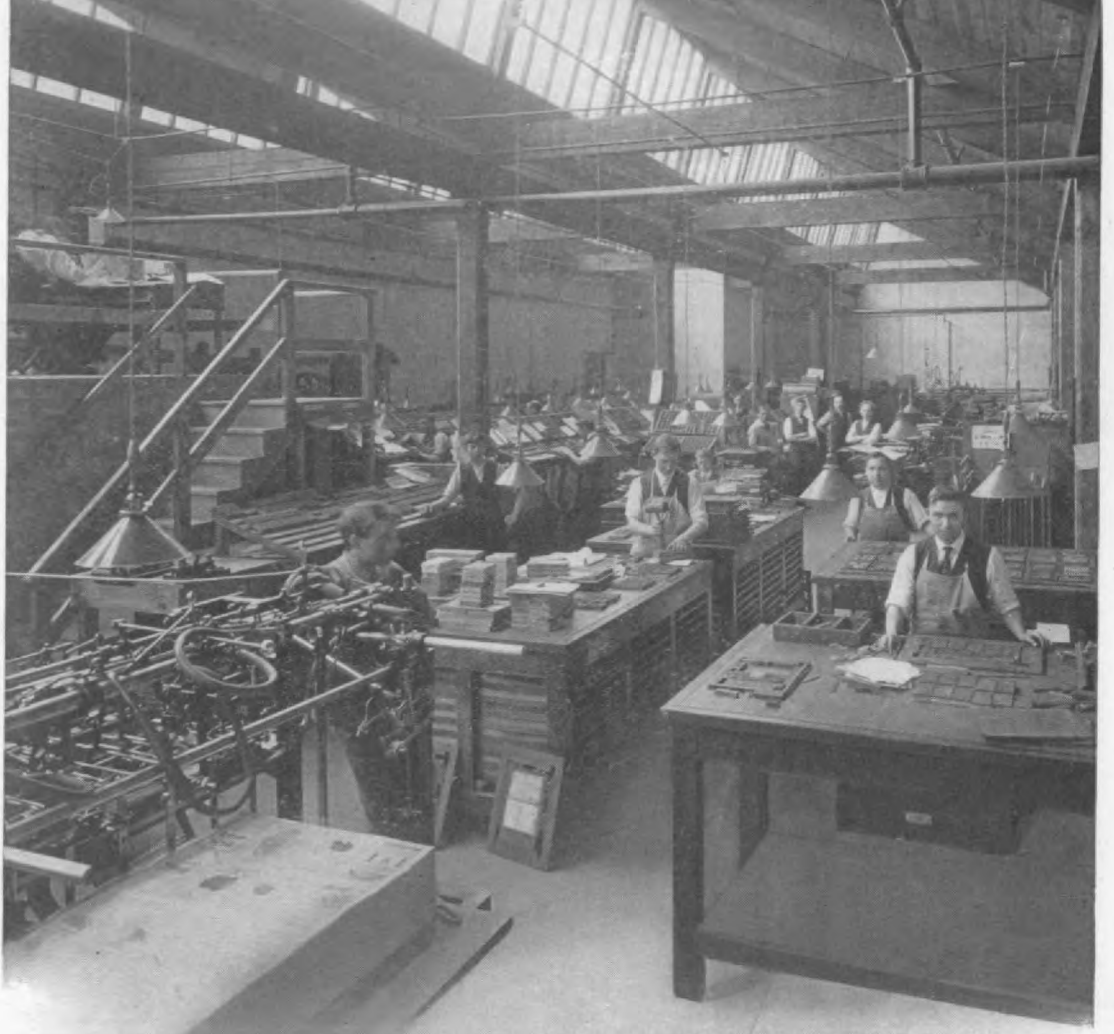

COMPOSING ROOM

GENERAL view, showing imposing stones in the foreground and the type-setting cases in the rear. To the left is the Superintendent's

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VIEW OF THE TYPE CASES

THIS picture shows the number of men employed to set job type for display advertising, catalogs, etc. This department contains thousands of dollars' worth of new type, as it is

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JOB PRESS ROOM

CONTAINING eight of the latest types of Job Presses. Although one of the smaller departments, it is one of the most important, because a large percentage of the covers for high-grade catalogs are printed here and embossed; fine stationery, calendars and small color work are handled in this department. Each Press has an individual motor drive and speed control, so that it is possible to run the various presses at dif-

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GENERAL VIEW OF THE CYLINDER PRESS ROOM

TO the left is shown a corner of the Superintendent's desk on the elevated platform, from which point is commanded a view of the entire plant, so that all operations are under the careful

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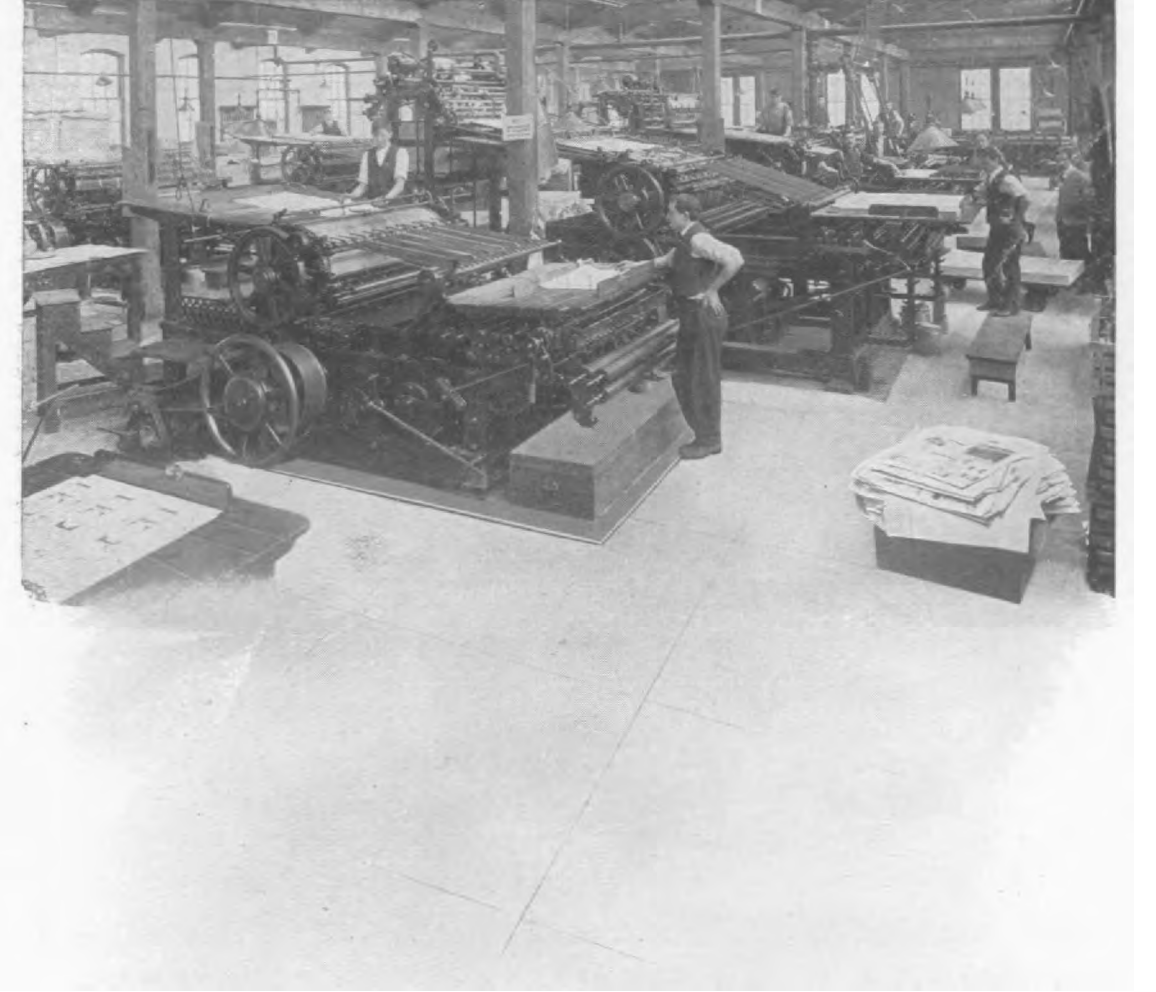

CYLINDER PRESS ROOM

THIS view shows but 6 of the Cylinder Presses. The one in the foreground is known as the "Pony," on which is printed a large amount of small color work. The Presses immediately beyond in the line are equipped with automatic feeders for fast and accurate work. As all the Presses are mounted on stone foundations, it is not necessary to have them bolted to the floor.

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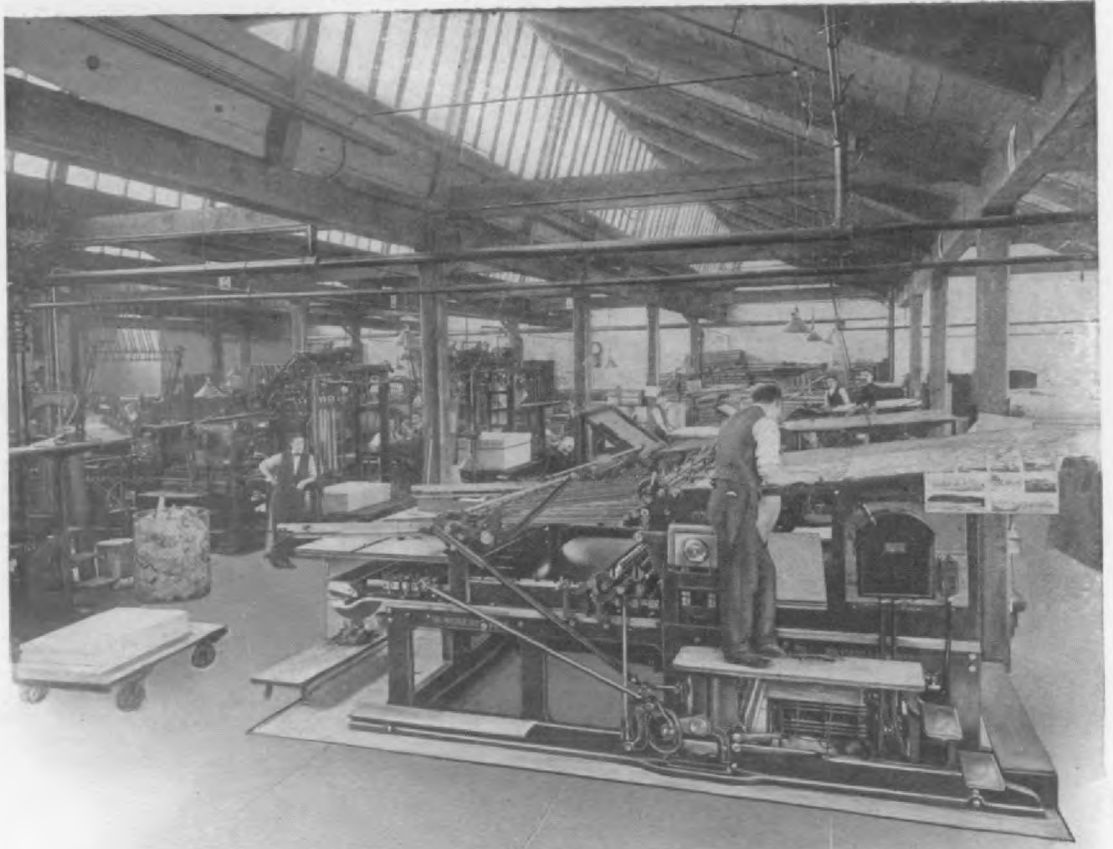

ONE OF THE LARGE CYLINDER PRESSES

THIS view makes evident the advantages of the special roof construction or "Daylight Feature." The pressman is examining the register of a sheet of three color calendars. In most print shops the pressman is compelled to walk to a window and then only a reflection or sunlight is obtained. This is an objection overcome by

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A GENERAL VIEW THROUGH THE CENTER AISLE

OWING to the immense size of this room it is difficult to do it justice on account of the foreshortening caused by a wide-angle lens. This view, however, will give a general idea of the breadth of the building. The picture was taken from that portion of the room containing the

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BINDERY

THIS is the part of the Bindery devoted principally to hand folding and such classes of work which it is either impractical or impossible to fold on the machines.

A large amount of high-grade catalog work requires tipping in or pasting, which must also be

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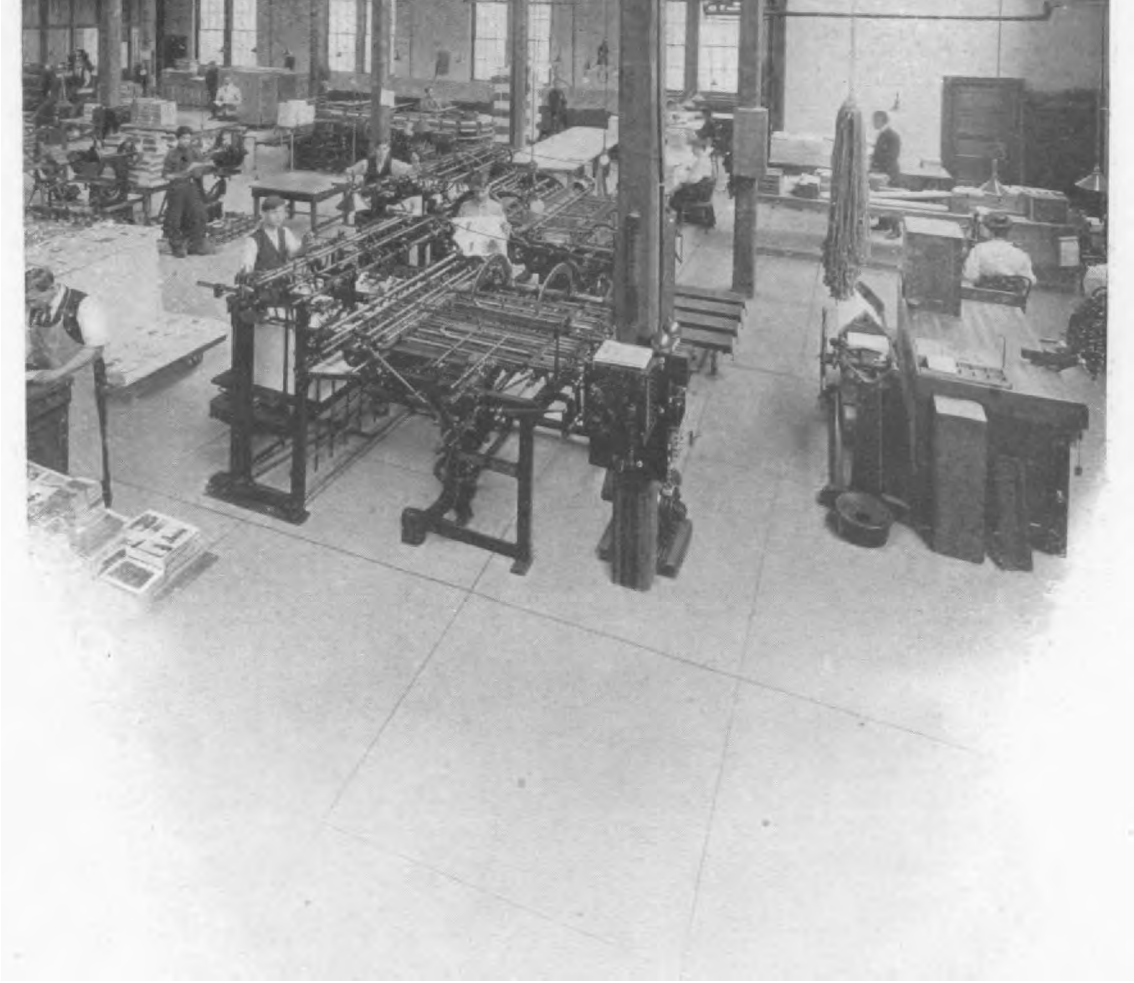

FOLDING MACHINES

IN the center of the picture are shown the larger Folding Machines, equipped with automatic feeders. These are used for catalog and book work. The Folders, like other machines in the plant, are run by individual motors with separate

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STITCHING MACHINES

THESE are of various sizes and kinds for different classes of work; the larger machines being capable of driving a heavy wire staple through an inch and a quarter book of coated paper, which is one of the most difficult stitching

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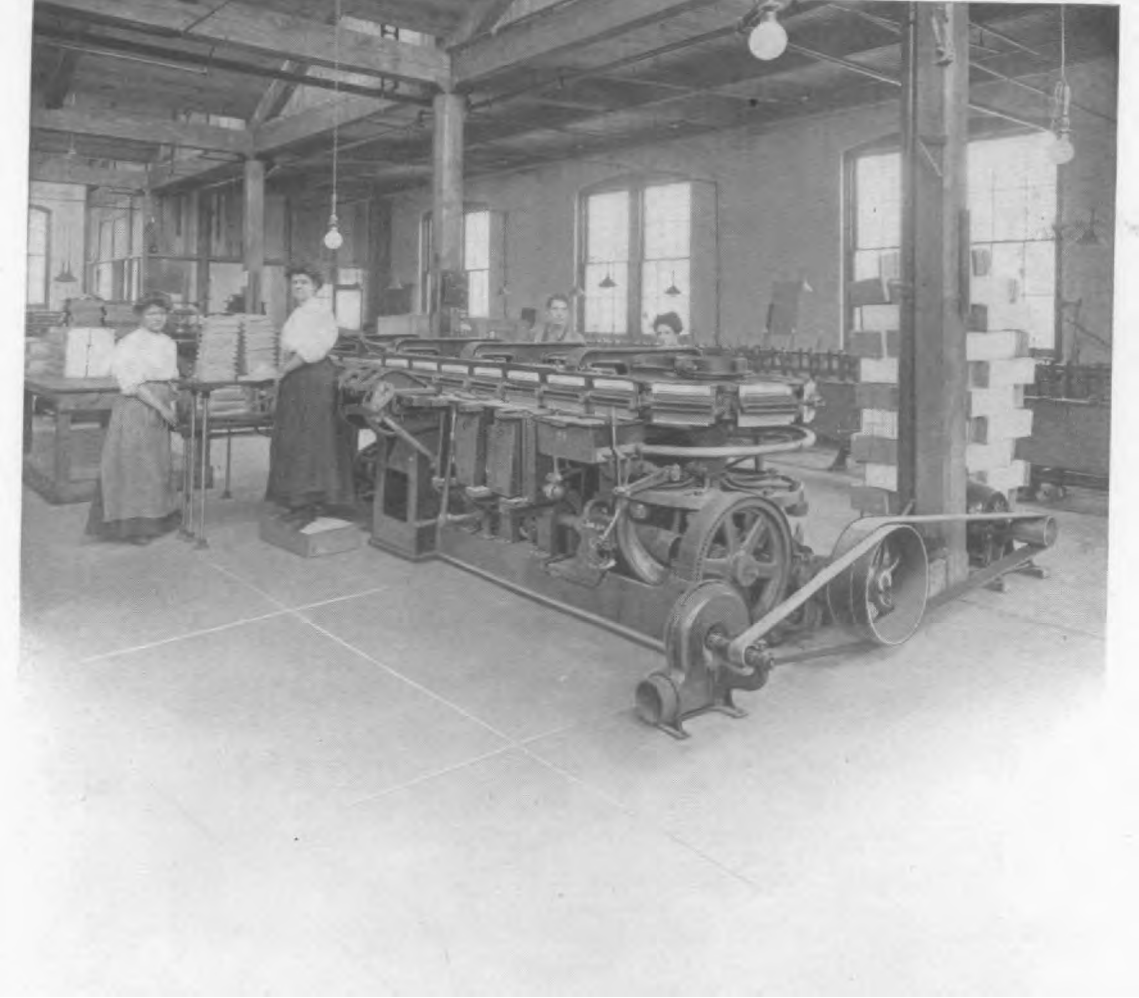

BINDING MACHINES

THIS is one of the latest types of machines manufactured for the binding and covering of magazines and paper-bound books. After the signatures are gathered into books on the Collating Machine, they are placed in the grippers of the Binding Machine. The first operation is to cut off the backs of the signatures; second, to rough them; third, to dust them; fourth, to blow off lint; fifth, to put on glue, which is melted by electric heat; sixth, to pick up cover; seventh, to clamp it fast; eighth, to deliver completely bound books

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GATHERING MACHINE

THIS Gatherer is technically termed a Collating Machine and gathers signatures or forms of catalogs, books or magazines which are placed in hoppers on one side. This machine is capable of gathering 30 signatures at one time. Moving arms pull the under sheets to a traveling chain, to the delivery board shown in the foreground, and here the completely gathered books, ready for pasting or stitching, are turned out at the rate of

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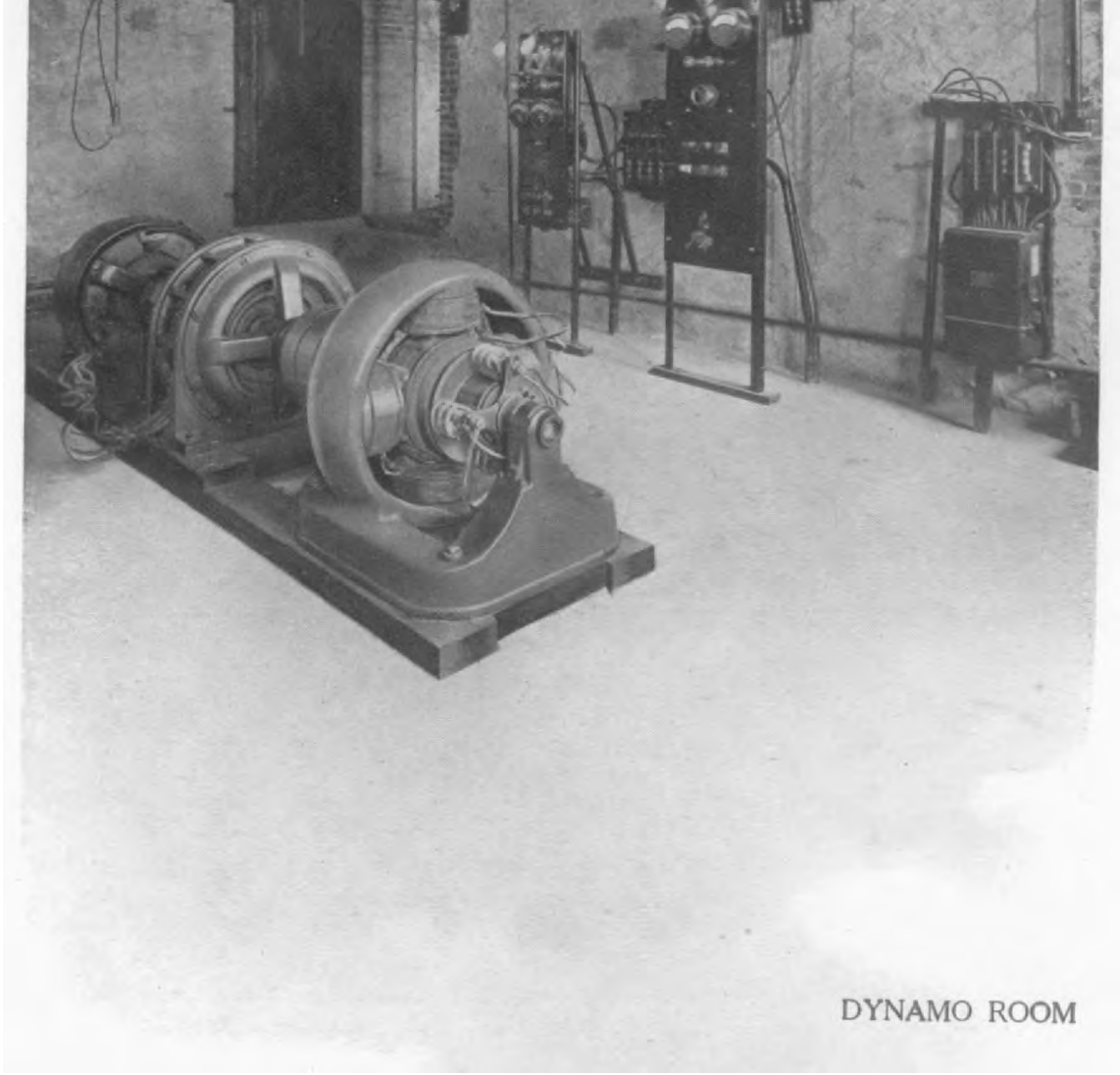

DYNAMO ROOM

HERE is generated the electric power which is used for operating all the machines in the Plant. Although there is no danger from fire, this Dynamo Room, nevertheless, is built entirely of stone and concrete and it is isolated in one corner of the building. Electric equipment is known to be one of the most reliable forms, and for that reason there are very few interruptions

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RECEIVING AND SHIPPING DEPARTMENT

FOR heavy work, double teams are used. For small packages to be delivered quickly is used the modern conveyance, the Motorcycle Deliv-

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CHILTON
PRINTING CO
PHILADELPHIA

CATALOGS

¶ Under this heading are issued all kinds and characters of booklets and books. Thousands of dollars are spent judiciously, thousands of dollars are wasted. If a catalog does not have individuality or if it is not attractive in appearance or well printed, it is often an expense which does not bring adequate returns. If the catalog is unnecessarily expensive in make-up, paper, etc., it sometimes becomes a piece of extravagance and therefore cannot prove profitable to the advertiser.

¶ The right kind of a catalog at the right price is always a "money-maker." We have made a careful study of the catalog question and are prepared to go into this matter in detail with you. Our experience plus our facilities are sure to produce for you catalogs that are "money makers." Inquiries solicited.

Chilton Printing Company

Market and 49th Streets
PHILADELPHIA

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IT WILL PAY YOU TO USE
POST CARDS

For Advertising Purposes

WILKESBARRE HILL CLIMB. The Great Chadwick Six (Winner) at the Finish

Subjects Similar to the Above are One Color Photographic Post Cards

For this style card you furnish photograph, we furnish engraving; one or two lines of description included.

1 subject, 1st thousand	$5.90	Each additional thousand, each	$1.75
2 subjects ordered at one time, 1st thousand, each	5.50	" " " "	1.75
4 " " " " " " " "	5.00	" " " "	1.25
8 " " " " " " " "	4.65	" " " "	1.10
16 " " " " " " " "	4.50	" " " "	1.10
32 " " " " " " " "	4.20	" " " "	.97

Special prices on quantities of over 5,000 of a subject.

If you would prefer to have the cards roughed or pebbled, the additional charge will be $1.00 per thousand in lots of one subject.

2 subjects at one time, per thousand	$0.75
4 " " " " " "	.50
8 " " " " " "	.30

Send for samples and tell us what quantities you can use.

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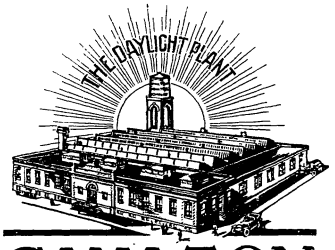

CHILTON
PRINTING CO
PHILADELPHIA

THIS trade mark or the name "Chilton Printing Co." on a piece of printing, indicates that the buyer appreciates the advantages which are offered by the "Daylight" Plant, viz.: Good printing at reasonable prices.

With our large office facilities, we are able to offer services to our patrons which cannot be had from other printers. We have a complete department for illustrating, catalog compilation, "ad" writing, which, together with original ideas, guarantee the best services which it is possible for any printer to render any patron.

We earnestly solicit your inquiries.

Yours very truly,

CHILTON PRINTING COMPANY

MARKET AND 49th STREETS :: PHILADELPHIA

President JAS. ARTMAN — Vice-President GEO. H. BUZBY — Sec. and Treas. C. A. MUSSELMAN

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Model B Touring Car
Price, $1350

Full equipment including two gas lamps, two side oil lamps, one tail light, generator, horn, tools, jack, pump and batteries. Top, $75.00 extra.

"Making Good"

It isn't a joke for a new automobile to appear on the scene just now, when there are already upwards of fifty-seven varieties bidding for the public eye.

We know very well that for the Oakland car to succeed just at this stage of the "game," it must have **mighty good reasons** for existing—that's just the point we want to impress upon **you.**

The reasons are very plain—so simple in fact, that if you will only weigh them carefully one by one, you can see for yourself, without any argument on our part, that the Oakland is going to be **the** big medium-priced car on the market this season, because it has definite well-defined advantages to offer the prospective purchaser.

Why the Oakland Takes the Lead

Let's throw out of consideration for a moment the low-priced runabout, and the high-priced touring car—the market for both of these types of car is held by three or four leading manufacturers.

The demand for a moderate-priced light family car is the demand that is most heard today, and the Oakland fills the demand logically, because—

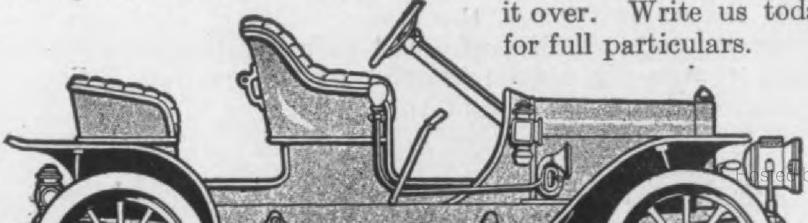
The Oakland is the lowest-priced car of its power with direct shaft drive. The Oakland is the lightest car of its power and capacity. Run it on the scales and prove it.

The Oakland is the cheapest car to **own** and **maintain,** because of this lightness and weight, because of its care in construction, and because it has less moving parts and adjustment **by over 50 per cent.** than any other car of equal power and capacity.

The Oakland is beautiful in the simplicity and taste of its body lines and finish.

The Oakland motor is original in design—two vertical cylinders, perfectly balanced and **free from vibration,** and gives 20 horse power **at the wheels.** Designed by Alanson P. Brush. Do you know of anything like it?

We believe that agents who take up our proposition now are in to make a lot of money. You will be **as** enthusiastic as we are over the Oakland after you have looked it over. Write us today for full particulars.



Oakland Motor Car Co.

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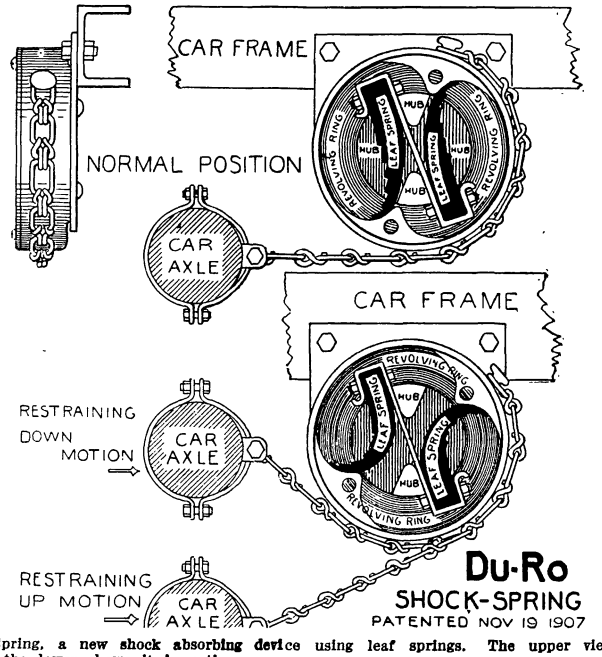
The Du-Ro Shock-Spring

One of the latest shock-relieving devices is the Du-Ro Shock-Spring, a device for eliminating shocks by using the leaf spring principle. It is the work of Duncan Robinson, sales office, 89 State Street, Boston, Mass. The inventor, taking his cue from the fact that the leaf spring is acknowledged to be the most superior method of supporting an automobile body, has utilized this form of spring to advantage in the Du-Ro, two views of which are herewith shown. The upper illustrates the relative position of the device which is attached to the car frame, and the end of the operating chain which is connected to the axle. Any motion of the axle except toward the device tends to pull on the chain and rotate the revolving ring, which motion is resisted with ever increasing force by the two bunches of small graded-in-length leaf springs, which are held by an S-shaped cross piece abutting against the rigid hub. Any desired tension may be had originally by varying the number and thickness of the individual leaves and afterward by hooking up the chain shorter or putting an initial tension on it with car body in normal position.

As stated by the inventor, automobile springs must be strong enough to carry the weight under all conditions, and for this reason cannot be made so that they will properly resist their own recoil. Therefore, an extra device must be used, working along the same lines and having the same "give and take," but carrying none of the weight. To carry no weight it must have no resistance at normal, but must have a "give and take" resistance, which, starting at nothing, will increase progressively in strength, to a point far beyond any possible demand. This the Du-Ro accomplishes, as any movement of the car body except in the direction from the axle toward the device, is subject to the same progressive restraint as are the up and down movements. Now, as the front pair are in front of the front axle, and the rear pair are back of the rear axle, the front pair restrain the forward motion and the rear pair restrain the backward motion of the car body relative to the axle. Therefore, the Du-Ro shock-spring restrains four motions—the up and down, but the forward and backward as well.

As every movement away from the device pulls on the chain, and as no movement can be away from both pairs at the same time, it will be seen that this device is continually using its power to "centre" or bring the car body back to the normal position from any direction.

The set of four sell for $60, f. o. b. Boston, the maker stating that the price will be refunded to any dissatisfied purchaser upon receipt of the springs within thirty days of their purchase.



The Du-Ro Shock Spring, a new shock absorbing device using leaf springs. The upper view shows it under normal conditions and the lower shows it in action.

In the first automobile races ever held in Havana, a Winton Six-Teen-Six won for runabouts having between 25 and 50 horsepower, defeating one American and four foreign entries. The time was 2.11 3-5 over a 1.7 mile course, distinguished by one sharp and very dangerous turn.

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nio, having been manufacturing lubrica-
rs to meet various requirements for some
ears past, are in position to furnish any
pe desired, and while the accompanying
ustrations are suggestive of the stock
signs they offer for 1908, this company is
ady to submit drawings prepared to
ecifications and is prepared to furnish

unkenheimer Type B, Single Compartment, 6-Feed, Mechanical Lubricator.

y size of lubricator with any number of
tomatic feeds, with or without hand
mp.

The Lunkenheimer Type B, here shown
th six automatic feeds, is a single com-
rtment oiler. Type A is of the same de-
gn, but has two compartments, so that
o grades of can be carried, a heavy
ade for the splash pool in the crank case
d a lighter one for the cylinders. The
avier oil is forced to the crank case by
eans of a hand-operated push pump, while
e cylinder oil is forced out by means
the mechanical feeds. The single com-
rtment oiler, Type B, is, of course, fitted
th but one filler plug and gauge, while
ype A has two of each. Oil is drawn from
ype B by both the hand pump and the
tomatic feeds.

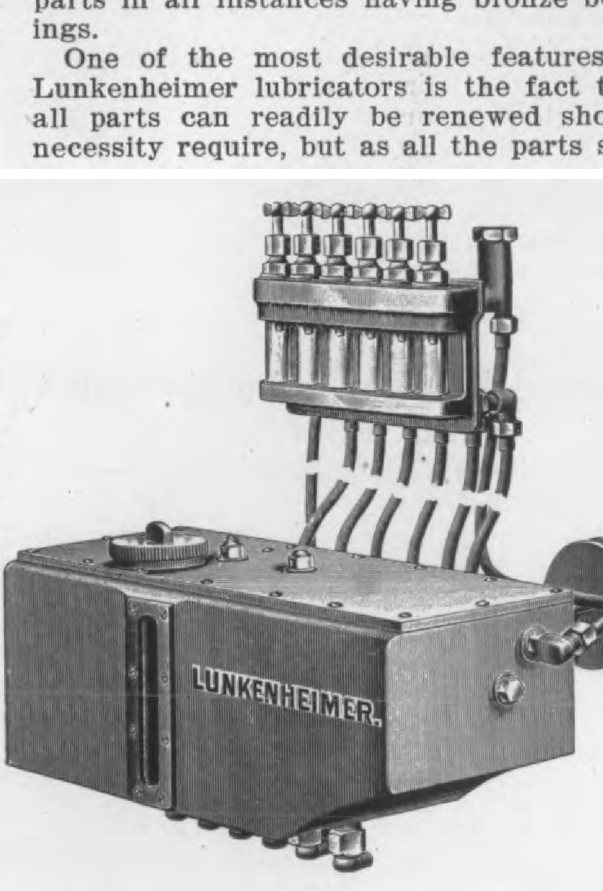
To supply the demand for a lubricator
th one compartment, no hand pump and
y number of automatic feeds, the Lun-
nheimer Type C has been designed
hich is otherwise similar to Types A and
The capacity of Type C is 5 pints.
ype A holds four pints of cylinder oil and
pint of heavier for crank case and bear-
gs.

The Lunkenheimer Company have had

mechanism in these is the same as
Types A and B. The form of Type
reservoir has been designed to suit
particular make of car for which it
originally intended, but the same style
lubricator, Type H, is also furnished w
plain oblong reservoir or with other fo
to suit any requirements. Type I, for
ample, has one of the upper corners sla
ing, corresponding with the slant of
worm shaft which in this type is placed
an angle to suit certain conditions. T
J lubricator is driven from the rear
of the cam shaft by means of a pair
enclosed bevel gears. Type J, on the ot
hand, has an extension housing which
been added to enclose the bevel ge
thru which drive is taken from the c
shaft.

The bodies and lids of these oilers
made of aluminum and the working pa
are made of either hardened tool steel
hard bronze compositions, the moving s
parts in all instances having bronze b
ings.

One of the most desirable features
Lunkenheimer lubricators is the fact t
all parts can readily be renewed sho
necessity require, but as all the parts s



Lunkenheimer Type F. Mechanical Lubricator.

ject to wear operate in oil, they will st
long and severe usage with but very li
deteriorating effect.

Another commendable feature is

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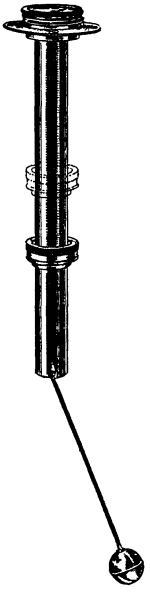
The Webster Extension Gauge

The Webster Mfg. Co., 248 Jefferson avenue, Chicago, Ill., have brought out a new type of their Webster tank gauge, the new type being called the Webster Extension Gauge, so named from then fact that the tube carryig the gauge can be adjusted to any desired length, the purpose of this new gauge being to allow of its being placed at the middle of the front seat against the divided arm in the usual type of individual seat now used. The adjustable feature consists of a cone-shaped band cut on one side like a piston ring, a flanged, exteriorly threaded collar and an interiorly threaded collar with a knurled edge to enable the user to screw it down to the other collar. When these three members are separated, they slide freely on the tube, and when the desired length is obtained the flanged lower collar and the interiorly threaded upper collar are screwed together, forcing the cone-shaped ring between them, producing a wedge effect, which locks the tube at the length desired.



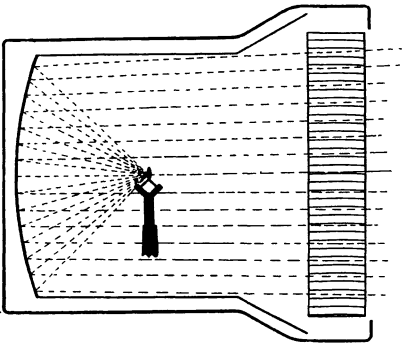
The Webster Extension Gauge.

Improved Idler Attachment for 1903-4 White Steam Cars

This device is manufactured by the Auto Trading and Repair Company, 2167-69 E. 9th Street, New York, and can be used only for the 1903-4 White steam cars. The object of this idler is to provide means whereby the engine can be run idle for any length of time desired allowing the engine to attain its normal beat and to expel all water in its cylinders due to condensation or other causes, thus preserving the packing and increasing the life and efficiency of the engine. It also eliminates hand pumping, should the car steam pressure get low. The idler is furnished complete ready to connect to the machine, and can be fitted with little or no trouble. It consists mainly of a jaw clutch keyed to the drive shaft and normally held in engagement by means of a helical spring encircling the drive shaft and interposed between a collar on the shaft and a flange on the short sliding sleeve which carries one portion of the jaw clutch. A pedal is provided to disengage the clutch. The other member of the clutch has a squared end which is inserted in the universal joint of the engine. Price of the complete outfit is $45.

The Wridgway Automatic Headlight Shade

Charles G. Wridgway, manager of the Peerless Motor Car Co., of New York, 220-224 W. 41st St., N. Y. City, has placed on the market a shade for acetylene headlights, designed to soften the glare of these lights at a short distance from the car without interfering with their brilliancy at long distances so that the purpose of the headlight is not destroyed and yet dangers from the blinding glare at close range is entirely eliminated. This screen consists of a series of thin horizontal plates extending across the face of the lamp behind the front glass. These plates are dull black on the top, so that upward-



Diagrammatic illustration of the effect of Wridgway Shade.

cast rays of light are absorbed. The lower side of each plate is silver-plated, thus intensifying the light rays which are thrown below the level of the eye. At a distance of 200 yards from the lamp it is impossible to see any effect of the shade, the same not being visible at this distance. As the distance is decreased, however, the screen comes more and more into effect, so that at close range the blinding glare is entirely eliminated, and the light appears dull. These shades can be fitted to any of the automobile headlights on the market.

The royal patent has just been granted by His Majesty, King Edward Seventh of England, to the Michelin Tire Co., making them official purveyors of tires to the throne and incidentally to the royal motor cars. This is a much coveted privilege, as it almost invariably results in the adoption of the article so favored by all the members of the court, the nobility, the near-nobility or aristocracy, and so percolates down through the various social strata until its use has become universal among every class whose pocketbooks will stand the strain.

The 1908 Year Book of the A. C. A. will be distributed free of cost to all members of the Club, and to the Subscribers to the Bureau of Tours, the new class of Associates just authorized by the Board of Governors; it is expected this class will run up in the thousands.

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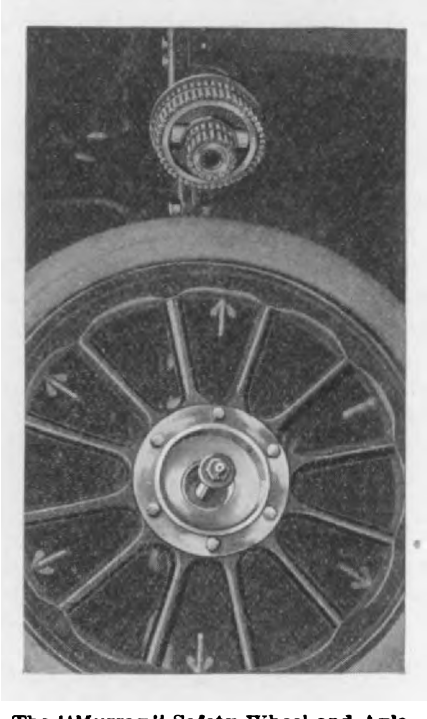
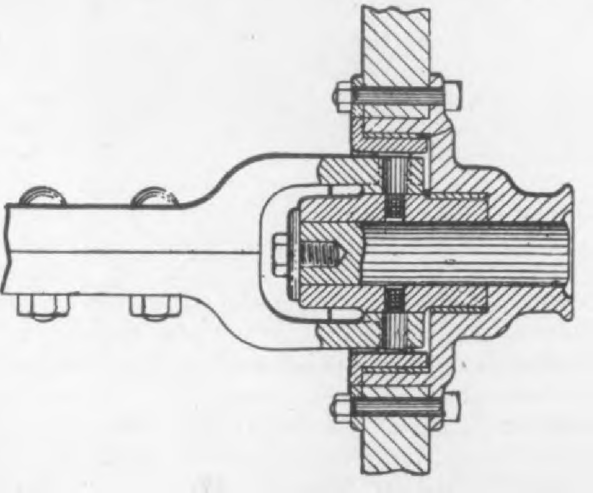
nd axle manufactured by James E. Murray, 42 Atlantic ave., McKeesport, Pa., lies in he fact that the entire weight on each steering heel rests positively in the plane of the spokes nd tire. There is no lateral strain, but a irect vertical load, which gets the full support



The "Murray" Safety Wheel and Axle.

the wheel at its point of maximum strength. is claimed that with this device all danger gainst sudden change of direction of the heel in meeting an obstruction is avoided, ecause there is no leverage sideways, but a raight lift thru the wheel. The mechanism as two sets of roller bearings, placed in dif-



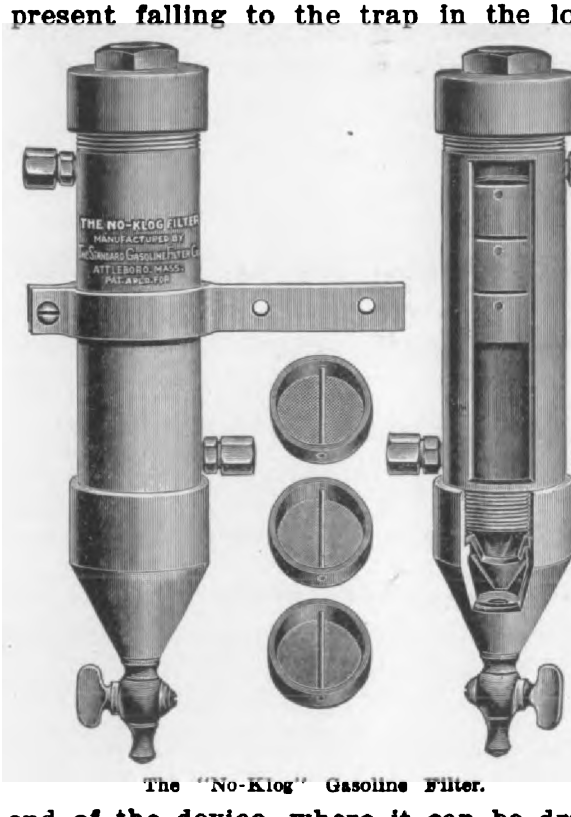
Sectional View of the Murray Hub and Axle End.

rent vertical planes, providing ample surface r wear without increasing the weight or dis-

kept in position by a suitable tapbolt. wheel proper has a large recess to admit larger diameter of the journal with its r bearings, and a smaller recess for the c set of bearings. Connected up to the jou bearings is an arm which engages the re rod of the steering system, and by which wheels are directed. The weight of the will principally fall on the larger bearings as these are reinforced by another set of b ings in a different plane, all bending ten cies are provided for adequately, and sh ing accidents are impossible.

The No-Klog Gasoline Filter

The Standard No-Klog Filter Mfg. Attleboro, Mass., has placed on the r ket a new gasoline filter called the Klog, which we illustrate herewith, gi two views of the device. This No-l gasoline filter is made entirely of b and consists essentially of a cylindr column fitted with a series of three di ent sizes of screens thru which the g line flows. The screens or cup strai catch all sediment, any water that ma present falling to the trap in the lo



The "No-Klog" Gasoline Filter.

end of the device, where it can be dr off by means of a pet-cock shown. cup strainers can be removed while engine is running if necessary by ren ing the screw cap on top of the filter lifting them out by means of a little c

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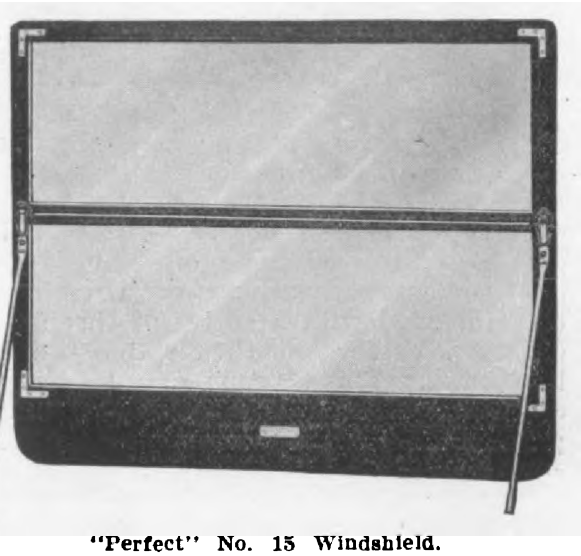
'he Fellwock Automobile & Manufac-ing Co., Evansville, Ind., have lately ed to their line of "Perfect" wind-elds a folding style known as No. 15, ch is here illustrated. This No. 15 eld is similar in construction to the rfect" solid windshield described in July, 1907, number, page 156, but dif-s from it in being divided horizontally oss the middle so that the top half be folded down if desired. The "Per-t" solid wind shield has not been ma-



"Perfect" No. 15 Windshield.

ially changed for 1908. The "Perfect" ndshields have 24 by 36 inch double ength glasses and hard maple frames shed in mahogany. The frames are bed and polished. Brass rods and nmings are used. These shields are nished complete to fit almost any shape dash and are suitable for both run-outs and touring cars. Price of the w folding windshield is $15, or $19.50 h French plate glass. A liberal dis-nt is given the trade.

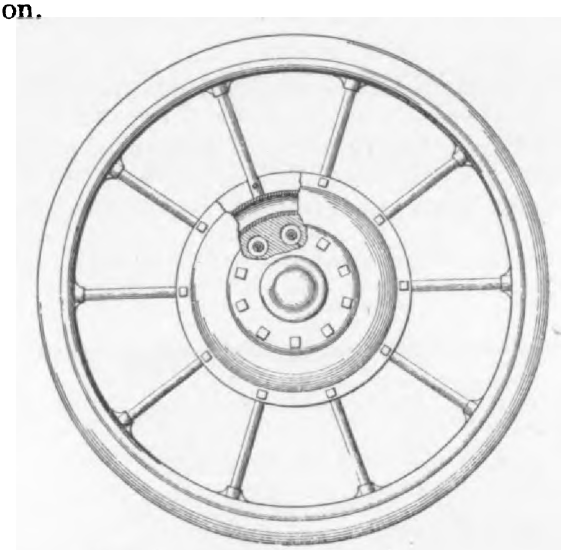
Michigan" Turnbuckles, Forgings, etc.

Michigan Nut & Bolt Wks., foot of Mel-m avenue, Detroit, Mich., manufacture s, bolts, washers, axle clips, drop forg-s, etc., and are making a special line of nbuckles. All their turnbuckles are made h special hexagon ends so that they can turned up by wrenches if desired. All 1-h or smaller are drop forged; larger sizes also forged, but not drop forged. The ger sizes can be furnished in any length ired at an advance of 5 per cent. per inch stock size prices. The turnbuckles are

The American Pneumatic Hub Whe Co., with offices in the National Metr politan Bank Building, Washington, D. C is equipping a factory for the purpose manufacturing Pneumatic Hub Wheels f automobile use.

This wheel is designed to overcon punctures, blow outs, and tire troubles general, and at the same time furni the resilience necessary to protect t motor.

In general appearance the wheel is n unlike the regular wheel, with the exce tion that a cushion tire is used on t rim. The hub of the wheel is made of two parts, the external consisting two circular halves of bronze or steel th form a chamber in which is fitted a mo able disc attached to the axle of the ca Around this movable disc is a three-in pneumatic tube that furnishes the great part of the resilience of the wheel. T pneumatic tube is not exposed in any ma ner, so that it cannot be injured purpose or accidentally, and is fully protect from mud and water. We are advised the inventor, A. H. Collins, that a tu used for test purposes in a wheel th was used one year and driven over 5,0 miles showed no deflation nor deterio tion.



The "Collins-Akehurst" Pneumatic Hub Whee

The movable disc is held in place roller bearings that act as the point contact in transmitting the propelli power from the axle to the wheel. Th also take up any shock that is not sorbed by the cushion tire on the ri and the pneumatic tube in the hub.

Wheels may be built any size witho affecting the efficiency or strength in t

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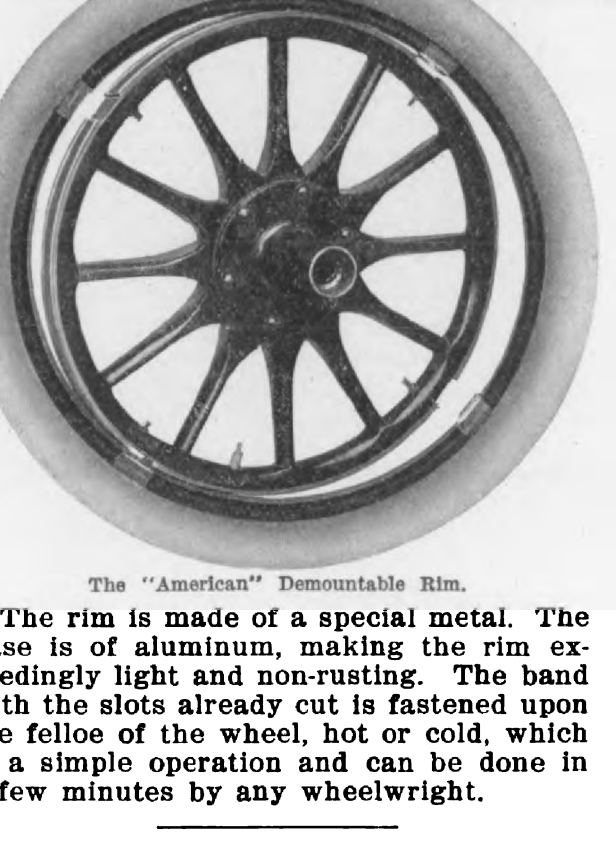
fering to the trade a new demountable m called the "American," which it claims n be placed on and taken off of the heels in 45 seconds. Standard clincher ms already in use on any car can be ted with this device, lugs being riveted the clincher rims and so placed that ey slide into slots in a band that is fastned to the wheel felloe. No clamps or olts are used, the rim being held by means an eccentric cam.

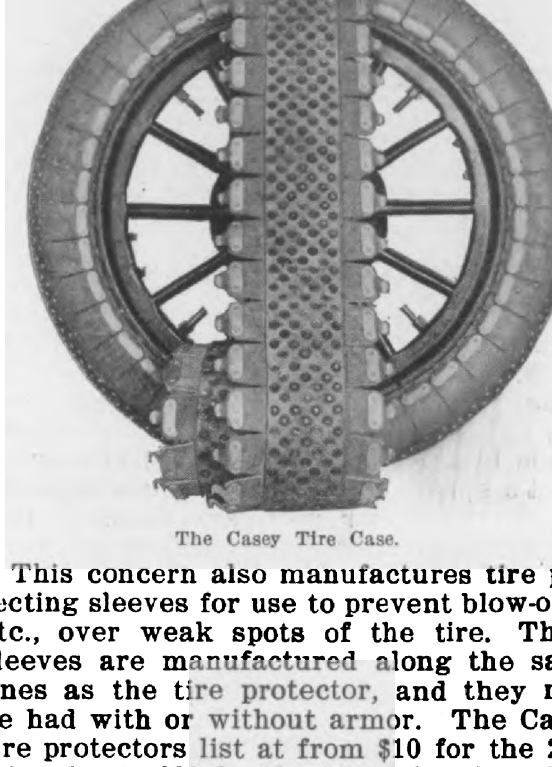


The "American" Demountable Rim.

The rim is made of a special metal. The se is of aluminum, making the rim exedingly light and non-rusting. The band th the slots already cut is fastened upon e felloe of the wheel, hot or cold, which a simple operation and can be done in few minutes by any wheelwright.

The Casey Tire Case

The Casey tire case is a tire protector anufactured by the Case Tire Casing Co., Mt. Pleasant, Ia., the main body of hich is made of chrome leather subjected a special mineral tanning process which ves it toughness and elasticity. This ather is entirely free from oil and will erefore not injure the rubber tire. It is so claimed to be as nearly water and at-proof as it is possible to make it. This sing completely covers the tire and bears ainst each part with equal firmness. hese protectors are made to fit any rim the Clincher type. The tread is reforced by one ply of special oil tanned ather, which is made fast by rivets and rrs for obtaining traction on the road the leather fibre to work freely under burr without being pinched, thus addin the life of the tread. All the rivets heavily coppered to prevent rusting injury to the leather. The clamps hoo the rim and are cut from tough steel heavily aluminized to prevent rust They are very securely attached to leather casing.



The Casey Tire Case.

This concern also manufactures tire tecting sleeves for use to prevent blow-o etc., over weak spots of the tire. Th sleeves are manufactured along the sa lines as the tire protector, and they be had with or without armor. The Ca tire protectors list at from $10 for the 2 in. size to $30 for the 30 x 5 in. size. tire sleeves list at $2 and $2.50 respect ly for the two sizes, one of which is the 3½-inch tires and under, and the ot for 4-inch tires and over.

A new preparation for cleaning car b ies, known as Linosoap, has recently b placed on the market by the Linosoap 942-944 West Fifth St., Cincinnati, O Linosoap, of which the basic ingredien linseed oil, is mixed in the proportion one tablespoonful of Linosoap to quarts of water.

The Spear-Martin Fur Garment Co., B lington, Vt., manufacture fur hats, ca gloves, robes and garments for automo ists, making a specialty of coon skin, wh is collected in Northern New York, Ca da, Vermont and New Hampshire. T fur, while heavy and thick, is very fine. C the Spear-Martin Company make coats men and women, elegant lap robes and

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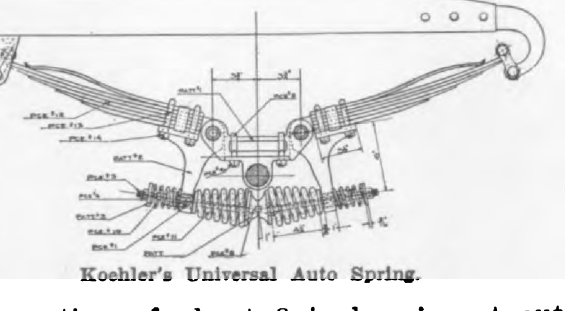
ordinary elliptic spring and the shock orber, has recently been placed on the ket by the Universal Motor Car Spring Broadway and Branch St., St. Louis, The main feature of the "Universal" omobile spring is a helical spring of ole cone shape, which is interposed be- en two portions of the ordinary semi- tic or full elliptic spring as shown in illustration.



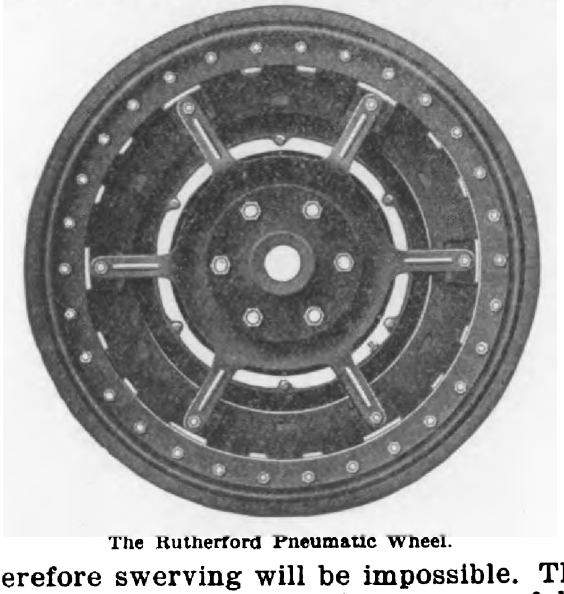
Koehler's Universal Auto Spring.

section of about 8 inches is cut out the centre of the lower half elliptic ng. A fulcrum bracket is then placed he same relative position to the spriug , directly over the axle and fulcrumed his bracket is a drop forged steel arm ed a spring equalizer. To these equaliz- on the upper part, are fastened the s of the quarter elliptic springs, and the lower ends between the two equal- s is placed a compression spring, bar- shaped, and also two coil springs of ller dimensions on the opposite side n the compression springs.

he compression spring may be adjusted seen fit to suit the height of the car y by arrangement of an adjuster thru equalizer member.

he Rutherford Pneumatic Wheel

he Rutherford Auto Wheel Mfg. Co., of nford, Conn., are offering a new type pneumatic wheel, consisting briefly of heel within a wheel. The outer wheel, ch comes in contact with the road sur- e, is flexibly connected with the inner el with a pneumatic tube interposing ween the two parts, so that as the el travels over road obstructions the er portion is allowed some amount of and shocks are taken up by the pneu- ic tube. The tube, however, does not e in contact with the road surface and efore puncture is impossible. The ufacturers call attention to the fact the weight of the vehicle is not car- upon the small portion of the tube, as he case where a pneumatic tire is used, according to the requirements of the ca Should by any accident the tube becom deflated while the vehicle is in motion, th wheel will not swerve, as it could not dro suddenly as in a case of collapse of pneumatic tire. The outer tread bein solid, its circumference cannot change, an



The Rutherford Pneumatic Wheel.

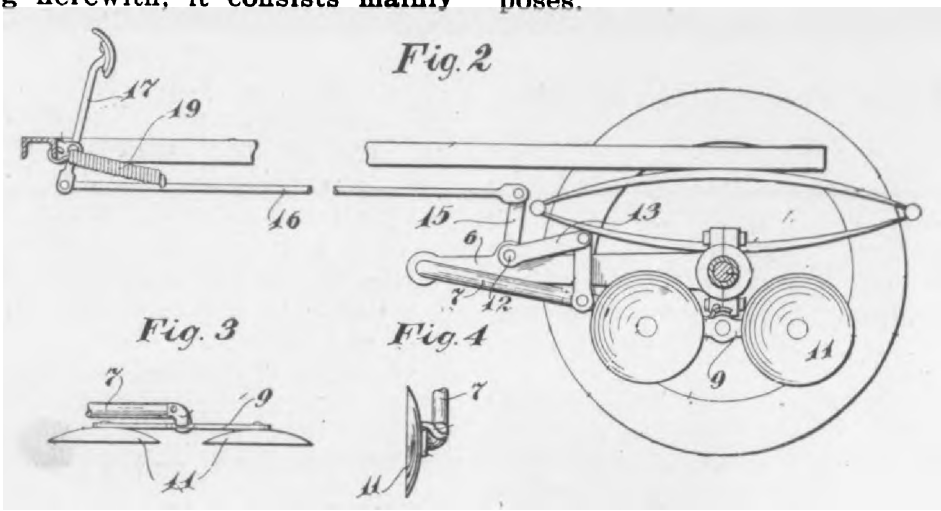
therefore swerving will be impossible. Th makers claim that they have successful operated a 7-ton vehicle with less than pounds air pressure in the pneumatic tub For touring cars they furnish wheels of in. diameter and for heavy cars 36 in. diameter. The wheel for touring ca weighs about 75 pounds and for hea vehicles 200 pounds.

"Franklin" Lubricants

The Franklin Oil Refining Co., of 306-3 North Commercial St., St. Louis, M manufacture a line of high grade lubrica ing oils and greases and are catering esp cially to the automobile trade with sever grades of lubricants especially adapted its uses. One of the features of Frankl oils is the thoro filtering to which they a subjected, which results in the producti of almost white oils, free from carbo The A-C special brand is for air-cooled m chines; nine different brands are offer for water-cooled machines. For steam m tors the E brand is offered, which has very high fire test, and for transmissi and differential gears special oils which not run are offered. Besides these oils full line of cup greases are carried a the company is prepared to meet any quirements in automobile lubrication.

The H. W. Johns-Manville Co., 100 W liam Street, N. Y. City, has recen

Baum's Brass & Pattern Works, 242-246 hird Ave., South, Minneapolis, Minn., have rought out an entirely new type of anti-kidding device, which unlike most anti-kids, is not attached to the tires, but is mechanical device entirely separate from e vehicle wheels. As will be seen in the ne drawing herewith, it consists mainly



The Perfection Anti-Skidding Device.

two pairs of metallic discs, one pair at-ched to each rear wheel, which are ought into contact with the road surface means of levers and arms worked by a dal. The arm (6) is rigidly attached to e axle casing and a lever (7) is pivoted to a sleeve in one end, the other end of e lever having pivoted to it a short bal-ced equalizing bar (9). Each end of is bar carries a revolving steel disc (11) ghtly concaved. Each disc engages with e roadbed when the lever (17) is de-est, this action transmitting motion to e rod (16), then to a rock shaft (15) and the above mentioned lever (7). Two of ese discs are placed on each side of the r and both pairs operate in unison so at depression of pedal (17) brings the hole four discs in contact with the road once. It will be observed, or course, at this device is only brought into play hen there is chance of skidding and is t continuously in use.

The Baum's Brass & Pattern Works are king care of the Western trade, but de-e to make connection with some concern manufacture for the Eastern trade. ey have obtained patents fully covering s device, and would like to find some ncern who will manufacture it in the st, paying them a royalty.

"Columbia" Metals and Solder

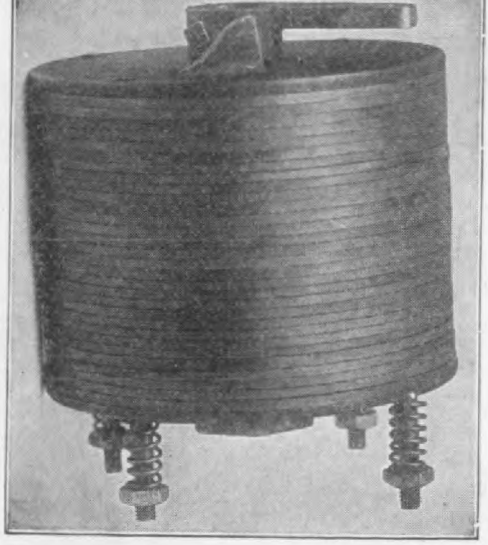
Columbia Smelting Works, 363-369 West

able prices.

Besides these bearing metals they m solder in both wire and bar which are furnishing the automobile trade. T also deal in ingot copper, spelter, pig and tin, make alloys of all kinds and nish aluminum in ingots for casting poses.

The Webster Muffler

The Webster Muffler Mfg. Co., of Ga burg, Ill., have just brought out a muffler for gasoline engines which is simple and compact, being about 6 in. l by 6 to 8 in. in diameter for cars, and 6 long by 2½ to 3 in. in diameter for mo cycles. This muffler is made of a num of flat-faced rings and has a closing h for each end. On the inside of the end



The Webster Muffler.

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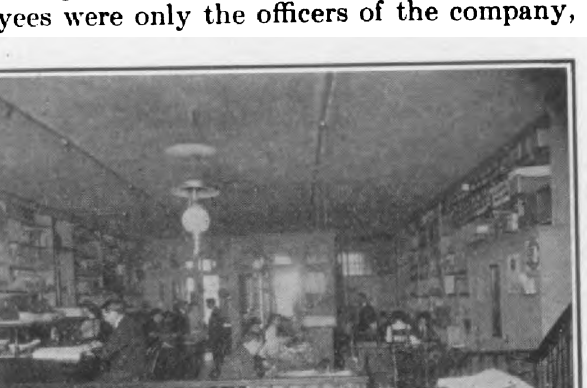
which it is attached to the cross pipe, th

low a Little Business Grew into a Big One

'he New York Sporting Goods Co., who occupy the entire building 17 Warren eet, New York, were incorporated in ruary 1897, and began business with a h capital of only $2,500. The first emyees were only the officers of the company,



1. General office of the New York Sporting Goods Co.

. P. R. Robinson, President, and Mr. J. Murray, Secretary Treasurer and a red aded Irish boy called "Mike." A small lf store at 61 Nassau St. was rented at a minal figure, and the first day receipts ounted to 2 cents, representing the sale a pair of trouser guards to a customer to ep the snow out of his shoe tops. Mike ade the sale and was proud of it. A good end lent the company a snug sum on their month note which was paid when due, d from that day to this the financing of e business has come easily.

Money was freely invested in advertising, d some days the little half store would be crowded, the customers could hardly move ound. A specialty was made during the st few years of Bicycle Supplies, at which ne the market was full of jobs and many good trick was turned by buying some

As year after year went by, the compa continued to grow and prosper, and to-d the capital fully paid up is $100,000. with a considerable surplus besides, prac cally all being "made money."

There is no jobbing house in the East th carries so complete a line of all kinds of Spo ing Goods as the New York Sporting Goo Co., and their trade mark is known in eve state and in all civilized foreign countries. T business is arranged in five different depa ments, Fire-Arms, Athletic Goods, Fish Tackle, Bicycles and Supplies, and Au mobile Accessories, each department be run as a separate store, and in charge o buyer or manager, who is expected to "ma good." Buyers and heads of stocks required not only to familiarize themsel with the method of manufacture and va of the goods they buy, but to actually pa cipate in the games or sports for which th goods are used, and in this way to find what the public wants and why. Mr. Rob son, whom the boys call the "Head Gazab

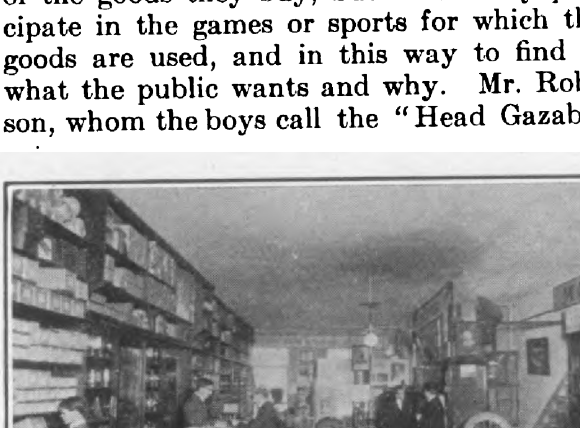


Fig. 2. Automobile Supply Department of the New Sporting Goods Company.

when he is not around, dips into practic all sports. His name often appears a winner of a trophy at a trap shoot, or if

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of Canada or Maine with rod or gun. With all this, he finds plenty of time to throw energy into the business, and he is posting himself all the while as to what the Sportsman or Athlete wants. Mr. Murray keeps his weather eye on the automobile department, and is responsible for the excellent system of circularizing and "follow-ups" and the financial management of the company. He can tell any bookkeeper or clerk how to do his work or can do it himself if the worst comes to the worst.

There are now between 50 and 60 employees, and most of the business is done with the dealer by mail. A few salesmen are kept on the road more with a view of making the acquaintance of the customers and to encourage them to send in their orders by mail rather than to solicit immediate business. Formerly no traveling salesmen of any kind were employed, but now that the business is such a large one, three men are traveling most of the time.

Real success has been won by judicious advertising, by never exaggerating a statement, and by refunding money without talk to any dissatisfied customer. Three separate catalogues are issued describing Gun and Athletic Goods, Automoblie Accessories and Bicycles and Supplies, and these are distributed yearly to dealers upon the company's mailing list. These lists are made up from replies to advertisements, asking for catalogues, and great care is taken to keep the names up to date and to keep off the name of any person who is not regularly engaged in the buying and selling of Sporting Goods, Automobile or Bicycle Supplies. Every two months, or sometimes oftener, these lists are addressed, and a dealer's bargain book forwarded, and customers are posted promptly about changes in prices or advised of new goods which have been added since the catalogues were issued.

EXPORT TRADE.

A specialty is made of the export trade, and correspondence is carried on in practically all foreign languages. This department, which is in charge of Mr. J. D. Koebler, not only handles the goods regularly carried by the company, but does considerable business in other lines on a commission basis, shipments being made of anything from sewing machine needles to ice cream freezers. The export trade is slow to come but very faithful when once secured, and if it is slighted in the least, trouble is sure to follow. How the company began to make a special play for this trade came about in this way: In 1898 an illustrated catalogue was issued, which by comparison with the present catalogues was not a particularly creditable product, and a copy was mailed to a South American firm in answer to a postal card request. No real business was expected, but to the surprise of the officer who opened the mail, a letter came postmarked "British Guiana" and upon being opened a $200.00 Post Office order fell out. From that day to this one of the company's slogans has been "Export Trade A Special Feature."

A particularly desirable feature in connection with the management of the business is the system of bi-monthly "inspection." Two officers of the company accompanied by a stenographer start in at the top floor or sub-cellar of the building and look into every nook and corner. Drawers in desks are pulled out, order files looked over, goods removed from shelves, and notes are made by the stenographer which are afterwards incorporated into a report, a copy of which is handed to each department manager. This inspection is complete even to calling attention to a gas tip being out of order or a little dust on the top of a clock. The plan has a wonderful effect in keeping the store and stock in shape, and department managers take pride in getting a report with complimentary remarks in place of justified complaints.

All the latest labor saving devices are used in the office such as adding and billing machines loose-leaf charge books and ledgers, triplicating receiving and shipping blanks, vertical filing cabinets and card indexes. While the detail, no doubt, seems considerable to an outsider, the business is handled easily and orders are filled with much more promptness than by smaller houses who do not have their system so well worked out.

The Weber Implement Company, of 415 Main St., St. Louis, Mo., has taken the agency for the Glide car.

B. F. Everett, of the Wayne Automobile Co., is a strong advocate of "making good" on guarantees, and recently went so far as to send a man from the factory at Detroit to Pittsburg with a new rear axle to replace a defective one on the car of a customer. His instructions to the man were: "See that you make a good job of it. Ship the defective axle back, pay all expenses and thank the customer for telling us about it instead of knocking the car." The complaint had been received on a Saturday afternoon and the man was rushed to Pittsburg that night so that the customer would not miss his Sunday ride.

A novel contest was recently conducted by the H. H. Franklin Mfg. Co., among its dealers. A solid gold 21 jewel watch was offered as a prize to the dealer who would send in the best ten reasons why an automobile buyer should select the Franklin.

The contest lasted for four weeks, fifty-seven contestants taking part. All were carefully examined by a committee consisting of H. H. Franklin, president of the company; John Wilkinson, chief engineer; and F. R. Bump, sales manager.

The prize was awarded to Irving R. Gardinier, superintendent of the automobile department of C. H. Childs & Co., Utica, N. Y.

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Safeguarding the Garage Against Fire

Fire insurance companies are naturally interested in seeing that the buildings they insure are made as proof against fire as is possible and while their desire in this direction arises from a mercenary motive, the general safety of the public and the safety and welfare of the "assured" are both safeguarded by the seemingly extreme precautions taken by the fire insurance companies. It does not pay any man who is in business to stay to have a fire and this applies as well to garage owners as to other lines. Live automobile men will therefore be interested in an article by Alfred G. Patton which appeared in the January number of "Insurance News" on the subject of garages as a fire risk.

The article is too lengthy for complete reproduction here but we give below sufficient extracts to cover the main features of the same.

After a few preliminary remarks relative to the subject in general the writer gives the following recommendations in regard to the proper construction of garage buildings, the handling of cars, oils, etc.:

BUILDINGS.

"Buildings of standard fire-proof construction, not over five stories in height with all floor openings protected, without turntables in floors, and with floor areas subdivided by fire walls, present the best type of structures for this class of occupancy. All boilers for power or heating should be in separate buildings not communicating with main structure. No dynamo or gas engine should be permitted in or under rooms where gasolene is stored or handled. No exposed artificial lights should be in the buildings.

"Heating should be permitted only by steam or hot water. Repair pits should be of fire-proof construction and drained and ventilated to outside of building. The outer building should be so constructed that all floors are freely ventilated so as to insure a continual change of air.

HANDLING CARS.

"As far as possible machines should not be run into the building under their own power, and in no case should a steamer or a steam-driven machine be propelled in the garage. While the securing of an honest observance of this requirement would perhaps be a difficult task, yet efforts in this direction should be determined and continuous.

"The cleaning of acetylene gas lamps and the removal and renewal of carbide should always be done outside the building and under no circumstance should the residue from an acetylene lamp be thrown on the floor of a garage.

REPAIRING.

"If repair work is done in the building, the repair shop should be so located that forges, etc., shall not expose any possible gasolene fumes. All machines before being taken to repair shop should have volatile oils removed from the tanks and no gasolene should be permitted in the room.

INSPECTION AND TESTING.

"The use of extension electric wires in the repair room is to be condemned, as such a wire coming in contact with the sparking attachment of a machine may cause a flash and a fire. Where such extension lights are used only extra cable should be installed, and lamps should be should be installed, and lamps should be wire screen over the bulbs. No cut-out switches should be permitted in rooms where gasolene fumes are liable to accumulate. Testing of motors should always be carried on outside of the garage, as the sparks of the machine may ignite gasolene fumes.

CLEANING.

"The almost universal practice of cleaning or washing automobile parts inside of garage with gasolene cannot be too strongly condemned. There are perhaps but few garages and repair shops where this is not done, even in close proximity to exposed flame; and while explosion and fire consequent on this cause may by a fortuitous chain of circumstances be delayed yet it is inevitable. Should it become absolutely necessary to so clean certain parts of the machine, the automobile should be removed from the building far enough away in the open air as to warrant that no fumes shall find their way into the garage. This work should not be done on the roof of the garage, owing to the well known fact that the fumes of gasolene are heavier than the atmosphere and therefore in all likelihood would find their way from the roof into the building.

(*To be continued.*)

Retail Notes

The Babcock Electric Carriage Co. has recently opened a branch in Chicago at Nos. 1328-30 Michigan Ave., right in the heart of the automobile trade district.

W. M. Ball, a liveryman at Devil's Lake, N. D., and C. A. Stottler, of Grand Forks, have formed a partnership and will conduct a garage at the former place.

B. I. Blanchard, of San Diego, Cal., will erect an automobile and bicycle shop in State Street.

The Brown Auto Top Company, of Philadelphia, has established a general automobile repair shop at the Belmont Avenue entrance to Fairmount Park, and which will be run in connection with the Belmont garage.

Harry J. Beebe and Chas. Haigh, of Alpena, Mich., have gone into partnership and will open a garage in that place. They will do a general repair business, carry a line of sundries and act as agents for several cars.

The Bergdoll Motor Car Co.'s new quarters at 249-251 N. Broad St., Philadelphia, were recently opened. This company holds the agency for the Benz, Berliet, Imperial and Welch cars.

The Columbus Auto Supply Co., 342 South High Street, Columbus, Ohio, has been formed by F. A. Cromley, E. P. Schopper, Jr., G. Schwendler and W. R. Clark. The business will be managed by Cromley.

The Connersville Automobile & Supply Co., Connersville, Ind., will erect a one-story 40x105 foot garage.

Coombs & Hagan, South Fourth Street, Salt Lake City,

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enth St., between 2nd and 3rd Aves. The structure will e 40x100 ft. and will consist of a large basement and main oor. The building will cost $5,000.

Elmore Motor Car Co. will open a garage on Euclid ve., Cleveland, Ohio.

The Fawkes Auto Co., at 113 Sixth St., Minneapolis, linn., has acquired the store adjoining for the purpose of sing it as a display room.

Carl Fisher, of Indianapolis, Ind., will erect a large arage at Capitol Ave. and North St. It will be a building 2x135 ft. in dimensions, with 3800 ft. of floor space, and ost from $25,000 to $30,000. It will be three stories igh, steel and concrete construction, and fireproof thruout.

C. W. Henzler will carry on an automobile livery and arage business in the Philbrick Building on Broadway, ismark, N. D.

S. B. Hoelsey, of Leigh, Neb., is remodeling the build- ng adjoining the post office for the purpose of opening garage.

The Indiana Auto Co. expects to erect a new garage be- ore the end of the year. At present it is handling the eerless, Autocar, Thomas and Franklin cars.

Webb Jay has moved into his new quarters in the Har- ester Bldg., Michigan Ave. and Harrison St., Chicago, here he will handle in addition to the Webb Jay steamer e Stanley steamer and the Kisselcar, also the Acme.

The Johnson Automobile Co. has taken a five-year lease n the Binford & Snelling storeroom at 122 East Main t., Marshalltown, Iowa, where it will conduct a garage nd repair shop.

George P. Jones, South Main St., Findlay, Ohio, is hav- ng a 30x40 ft. addition built to his garage.

W. L. Hibbard, formerly president of the Hibbard Auto- nobile Co., has formed the W. L. Hibbard Motor Car Co. nd secured the agency for the Thomas-Detroit 40. Mr. Iibbard is located at 448 Milwaukee St.

The Kansas City Automobile Dealers' Association, Kansas ity, Kan., at its annual meeting elected H. E. Roodledge s president to fill the vacancy made by resignation of . B. Doddridge.

H. J. Kohler Co., of 845 Broad St., Newark, N. J., has rected an up-to-date garage, 50x100 ft. The building of reinforced concrete and all the most modern appli- nces are fitted.

H. J. Kellman, of Litchfield, Minn., will establish a arage and auto livery in connection with his machine hop, to be known as the Litchfield Garage and Machine hop.

J. W. Mason, Newark, N. J., will erect a new two-story arage at 350-352 Halsey St., which will be ready for ccupancy by April 1st.

The Motor Specialty Co. announces that it has moved nto new quarters on Automobile Row, 239 Jefferson Ave., etroit, Mich., where it will handle a complete line of uto and marine engines, launches, etc., etc.

Johnson & Cickey, of Cherokee, Iowa, are building a arage to be known as the Northwest. They will act as gents for the Franklin.

Alfred W. Norris recently resigned as manager of the Norris Auto Co., and has become identified with the sales epartment of the Buick Motor Co., of Flint, Mich., where e will take charge of an important department.

The Pope-Hartford agency in Buffalo has been trans- erred from the Imperial Motor Car Co. to Mr. John J. Gibson, of the Buffalo Auto Exchange. Owners of Pope- Hartfords will be taken care of in the way of repairs and arts at his garage, 401 Franklin St.

Prothero, R. W. & Brother, will open a garage in the ear of Moeller & Sons' Wagon works, Baraboo, Wis., until new building can be erected for them.

Work on the garage of R. G. Running, on East Oak St., etween 2nd and 3rd Sts., Portland, Ore., is progressing apidly. The garage is being built of brick and will be 5x100 ft. in dimensions and cost $3,000.

The Salem Auto Garage Co., of Salem, Ohio, will make dditions to its present quarters in the shape of a repair hop and display room. The addition will be made to the ear of the building now occupied on Ellsworth St.

The Santa Rosa Cycle Co., Santa Rosa, Cal., on B Street, re erecting a 46x150 ft. garage. The frame of the building will be of steel, with a galvanized iron roof and sides f stone-faced prest steel.

A one-story brick garage is being constructed for the Sears-Nattinger Automobile Co. at 10th and Locust Sts., Des Moines, Iowa. It will be 132 ft. square, of brick con- truction and will be the largest garage in that city.

The St. Paul Motor Vehicle Co., of St. Paul, Mich., has ecently completed its 78x169 ft. concrete garage. The tructure and ground is estimated to cost $110,000.

J. B. Terry & Co., Cedar Rapids, Iowa, engaged for a umber of years in the electrical business, are enlarging

rights for Ramsey, Dakota, Washington, Onoka and pin counties with the Lambert machine.

The Akron-Williams Tire Vulcaniz

We show herewith two types of canizers manufactured by the Akron P matic Tire Co., of Akron, Ohio, one vulcanizing outer shoes and the other inner tubes. The tire vulcanizer wil commodate all sizes and styles of t Each compartment consists of three arate and distinct steam chambers for purpose of vulcanizing any part of the desired, thereby eliminating the possib

The Akron-Williams Three Cavity Repair Vulcaniz

of overcuring other parts. For insta if the tread is to be vulcanized, stea turned on in chambers supplying hea tread, and if the beads are to be vu ized, steam is turned on the chambers plying heat to beads, thus only app heat to the part to be repaired. The canizer, complete in every detail, havi capacity of vulcanizing three tires a same time, including clamps, steam g and three pairs of bead molds, list $95.00.

The Akron-Williams Inner Tube Repair Vulcan

The inner tube vulcanizer is so des that the pressure is effected by a lev tached to a steel spring which can adjusted that any pressure desired ca

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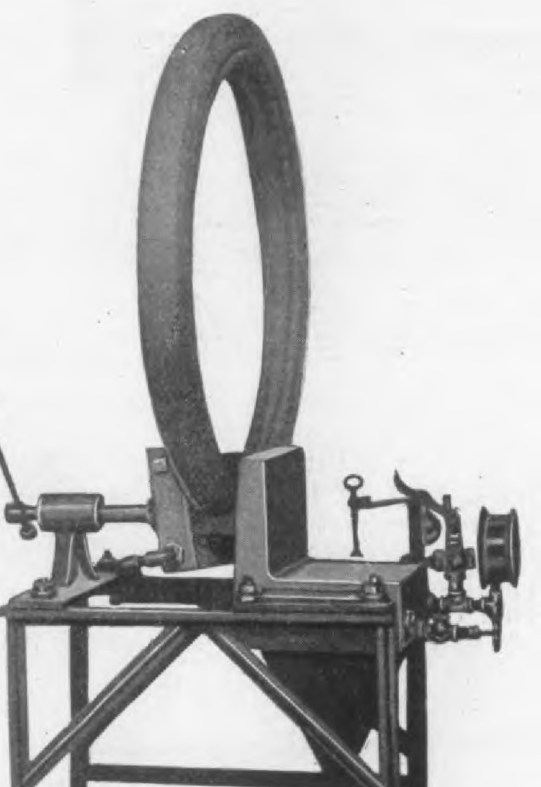
ed a vulcanizer for its own use, pat-
ed to meet requirements as found in
experience. This vulcanizer attracted
ntion and a number of orders for simi-
vulcanizers were obtained and the com-
y went into the business on a larger
e, and is now offering its machines to
trade generally. The main feature of
vulcanizer is the adjustability of the
s. The fact that new tires vary in size
that tires get stretched in use make
adjustable feature of this vulcanizer
y important. It is very simple in con-
ction, as will be seen by reference to
accompanying cut, consisting mainly
pair of hollow jaws, which are filled
steam from a conical boiler, the latter

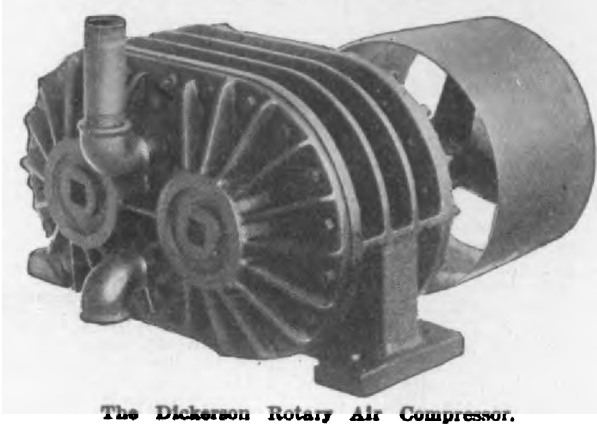


The Corp Adjustable Vulcanizer.

g a part of the stationary jaw. The
able jaw is connected by a flexible steel
to the boiler. A gas or gasoline burn-
used with the steam generator, and
ough not shown in this cut, it is in-
ed with the vulcanizer. A steam gage
safety valve also go with the outfit.
es can be vulcanized on the top of the
r which is planed off smooth, and
ble clamps are furnished for this pur-
Tubes can be vulcanized at the same

on, 116-120 Market street, Newark, N.
who claims for it not so much the embo
ment of many good features as the absen
of bad ones, his aim apparently being
produce a simple and efficient device calc
lated to give long-continued, satisfacto
service without requiring much attention.

The gear teeth are cut involute and a
said to be free from back lash.



The Dickerson Rotary Air Compressor.

A free running fit is provided in the tw
cylinder and heads. The packing is
liquid of good lubricating quality, havin
high and low temperature values. Th
packing is admitted continuously in sma
quantities, and is sufficient at all times
cover the working parts with a thin fil
serving the dual purpose of lubricant an
packing.

A receiver tank is provided for the pu
pose of holding the air and collecting th
oil that is carried out of the compresso
with the air; this oil gravitates to the bo
tom of the tank and is carried back to th
compressor under air pressure, through
small pipe from the bottom of the tan
A continuous circulation of the packin
lubricant is thereby automatically mai
tained. As considerable oil may be place
in the tank, it becomes at once the rese
voir for both air and oil.

High grade ball-bearings are used, co
sequently no wear can take place betwee
the revolving gear and the cylinder su
faces. The ends of the gear and head
having slight clearness, the end pressure
are balanced and kept tight with oil unde
pressure, and it is therefore evident tha
little wear can occur.

The recent inaugural dinner of the Berg
doll Motor Car Company, Philadelphia, hel
in its new building at Wood and Nort
Broad streets, brought together about 20
prominent automobilists.

Automobile dealers who participated i

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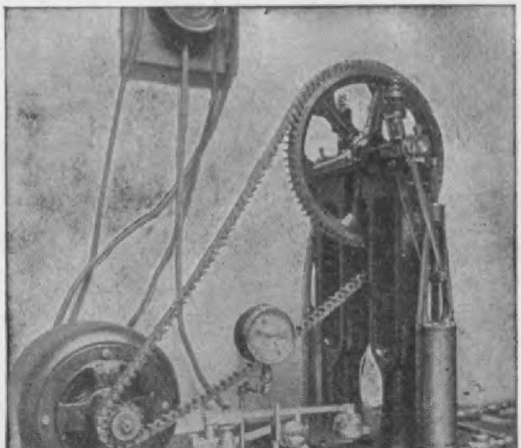
cently placed on the market by E. G. rown Beer Pump Co., 9-13 Chardon street, oston, Mass., a special feature of which a controlling attachment for automatilly maintaining a pre-determined preire on the comprest air tank.



The "Brown" Air Compressor for garages. It is ted with a device for automatically maintaining a e-determined pressure on the comprest air tank.

The controlling device is shown in the lustration setting on the base between e motor and the cylinders. In this deice the air pressure acting upon a diahragm operates a switch directly, makg the electrical parts very simple indeed. The cylinders of the compressor are iron nd the valves are all standard netal inuring its durability and long ife. The ylinders are air cooled. The compressor s driven by an electric motor mounted n the same base. The automatic preure regulating device is of great value s the pump is started as soon as the ressure in the tank is reduced below the esired point and stopt again as soon as e desired pressure is again obtained. It us requires no attention except an ocassional oiling. It maintains pressure up o 150 lbs.

Archer, Combs & Winters Co. is the ame of a new corporation at Portland, Oregon, who are jobbers of automobile acessories, fishing tackle and sporting

dle the Rambler cars.

The Chadwick "Great Six" will be han in Pittsburg by A. G. Summerville with age and show rooms at 4514 Henry street.

A. G. Southworth of New York, agent the Pope-Hartford car has taken in addi the agency of the Matheson.

The Logan commercial cars and semi-r runabout will be represented in Rochester Y., by Mr. A. Vernon Hart, one of the known dealers of that city.

Walter J. Durant has opened an up-to-garage and supply house on Railroad Ave Iberian, Louisiana.

The new garage of O. G. Roberts, betw Seventeenth and Miami Avenues, on Street, Columbus, Ohio, has just been c pleted. It is of cement block and occu nearly the whole of a lot 102 x 150 feet is fireproof and has a double entrance.

The Bruns Automobile Company of Bed Avenue, Brooklyn, have taken the agency the Reliable Dayton.

The following are new agencies for J automobiles: Jewel Automobile Company, Temple Court, Denver, Colo.; J. A. Lorry, I Rapids, Iowa; Wm. Tobiason, Decorah, I L. N. Simon, Goff, Kansas; Harry Humfre Waterville, Kansas; Edward C. Hubert, Orleans, La.; L. E. Gordon,, Deer Lo Mont.; M. J. Cook, Holland, Mich.; Boyce riage Co., 324 Ross Ave., Winnipeg, Man. ada; O. C. Sagmoen, Crary, N. Dakota; M Grant, 1016 Prairie Ave., Houston, Te Herman F. Gerhard, Austin, Texas; C. Dean, 226 S. Flores St., San Antonio, Te Ray-Wortham Co., 609 Throckmorton St., Worth, Texas; Auto Service & Motor Co., St., Cheyenne, Wyo.; Coatesville Carriage Coatesville, Pa.

The Auburn will be represented in Eas Pennsylvania and Delaware during the se of 1908 by Howard W. Trump who will a garage on Broad Street, Philadelphia. has just received first carload of Auburns.

The Hamilton-Hull Co., 1667 Broadway Y., has just taken the agency for the Ae Motor Co.

The Consolidated Motor Car Company, 406 Golden Gate Avenue, San Francisco, has taken on the Franklin line and wil an exclusive Franklin dealer.

The Brown Brokerage Company of Co ville, Kans., has taken on the Franklin It will also handle the Buick, and has a sp did new modern salesroom and garage of crete and brick—60 x 175 ft. The machine is well equipped.

W. B. Jernigan of Pine Barren, Fla., open a garage and salesroom at Pensacola will handle the Franklin line exclusively.

Mr. Boyer, formerly of the Boyer M Car Co., is identified with its successor Consolidated Motor Car Company, Francisco, and will continue as heret a leading factor in the selling end.

Elkhart Garage Co., 200-202 Main St Elkhart, Ind., recently equipt club r for the Elkhart Auto Club which formally opened on Wednesday eve February 5, and the celebration bro together a large number of prominen tomobile and good roads men of Elk

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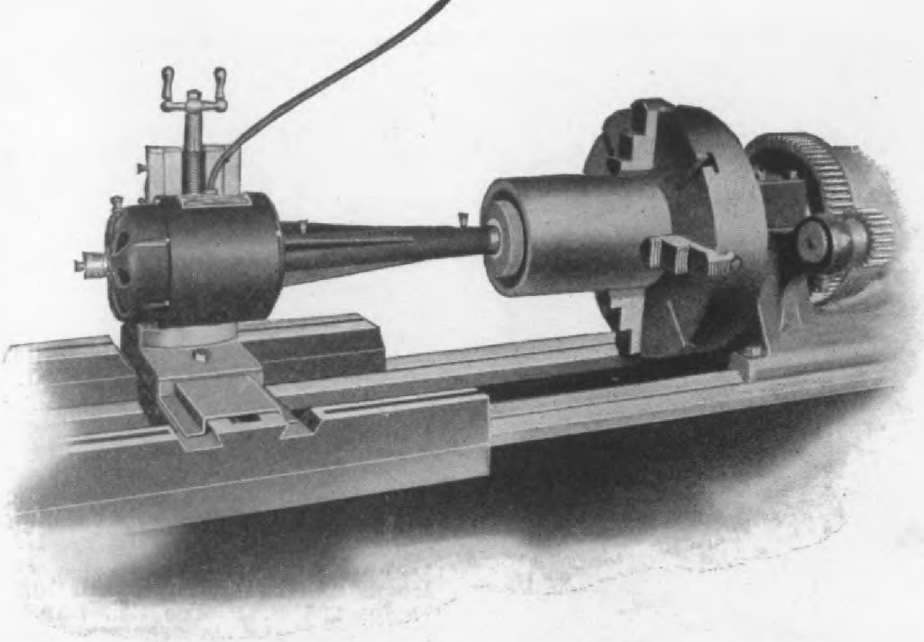
The cylinder grinder here shown is eting with great success in the automo- e field, being used in many large fac- ies and garages. It is the product of be made with a combination grinder ordering an extra motor head and an ex armature so that the grinder can be us for surface grinding of all kinds; or as

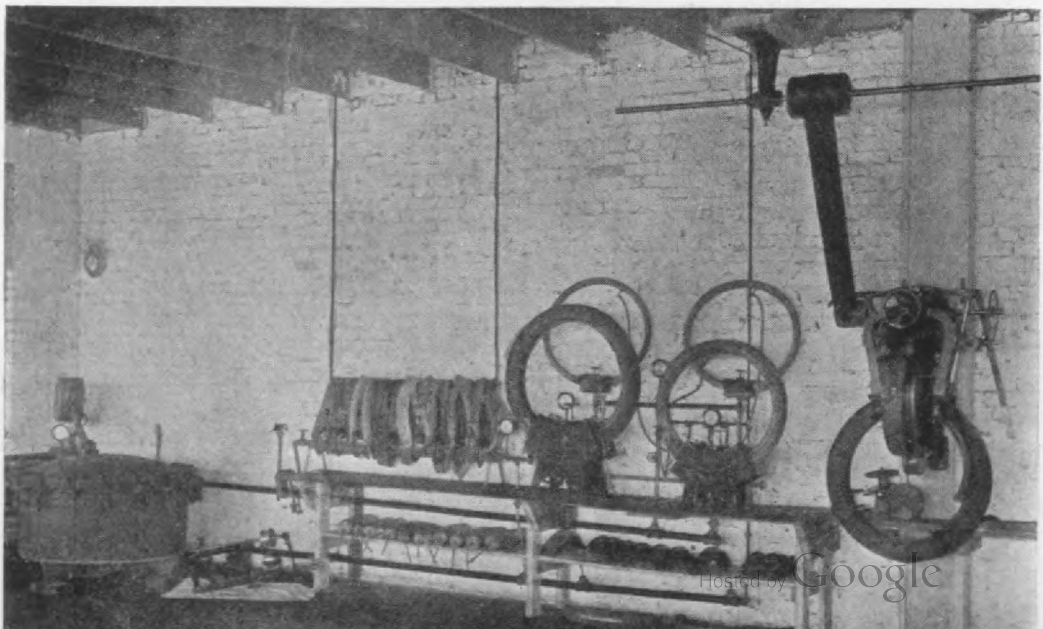


The "United States" Type L Cylinder Grinder for Factory and Garage Use.

e United States Electric Tool Co., 1938- 6 W. Eighth street, Cincinnati, Ohio, l, like all their drills and grinders, is ctrically operated.

This cylinder grinder can be bolted on tool-rest of an engine lathe, or on the n of a boring-mill. The bearings of centre-grinder; or it can also be used grinding up cutters, reamers, mandrels a dies.

The motor dimensions are 6x12 in. a the over-all length of the whole device 25½ in. It grinds bores as small as 3½ in diameter.



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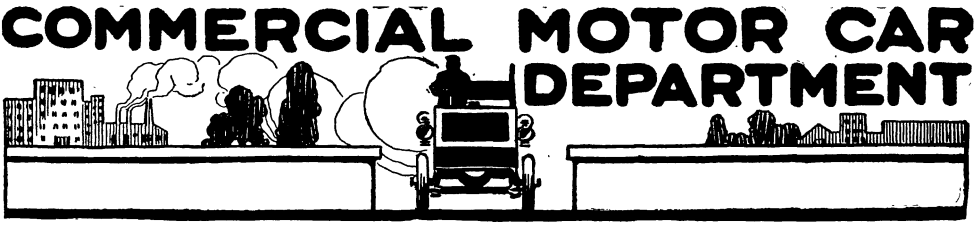

A Phase of Motor Delivery Service

By E. S. FOLJAMBE

It is very evident to those intimately connected with the manufacture, sale and use of commercial vehicles, that the vast majority of merchants who have equipped their establishments with a motor delivery service, or even with an individual machine are entirely ignorant of the fundamental facts, a knowledge of which is necessary in order that the service shall be conducted on anything like an economical basis or compete with that of horse drawn delivery.

Fortunately for the future of the commercial vehicle this state of affairs naturally improves with time, but any system which will relieve the timid and uninitiated merchant from the responsibility of inaugurating and caring for a motor delivery service, will materially aid the rapid introduction of power delivery vehicles. A system which fulfills these conditions has been organized in Philadelphia by Mr. P. Prouty of The Motor Commercial Delivery Co., 1518 Appletree street.

Briefly, this system makes it possible for the merchant or tradesman who desires to use motor cars for delivery work but realizes his shortcomings in regard to the best methods of purchasing, maintaining and operating such machines, to have all the benefits of such delivery without any of its disadvantages. In other words, it takes from him the entire responsibility of the cars and the uncertainty of the cost of their maintenance and in its stead, sets a fixed and definite amount as the cost per year.

The merchant simply signs a contract in which it is agreed that for certain considerations cars will be supplied him, properly maintained by a competent corp of mechanics, and even the chauffeurs engaged and paid by the company furnishing the cars. It is believed that this system will bring about in the near future, a much larger use of commercial vehicles, as it guarantees to the merchant 50 miles per day of actual delivery service for each machine, entirely relieving him of the uncertainty attendant upon such an enterprise. The contract also contains a clause by which the user is required to pay a certain amount per mile for each mile over 50 per day made by the vehicles, the same being determined by odometer readings. The user has no interest whatever in the chassis but is allowed to furnish various types of bodies according to the service. These may be appropriately painted with the advertisements of the merchant's goods, but beyond this the merchants' interest in the vehicle ceases. Everything devolves upon the operating company so that if a machine fails at any time, means are taken to see that the goods reach their destination in the quickest possible space of time, regardless of the number of vehicles it may be necessary to use in order to accomplish this end. Of course, it is seldom necessary to send an auxiliary vehicle and transfer a load to it for delivery, from a stalled machine. This does not happen nearly as often as with the cars of many merchants who are using a large number of machines and caring for them themselves simply because these machines are always kept in condition.

The following are some of the methods employed by commercial vehicle users, which sooner or later cause them trouble and largely increase the operating cost of their delivery service. In the first place, the manufacturers of the trucks themselves are partly to blame as they usually hold out the inducement to a possible merchant purchaser, that each and every one of their machines will step in and do the work of three horse drawn vehicles, and this irrespective of whether one, two or a dozen machines are used for delivery purposes. Now, it is well known that where only one or two machines are used, that for 365 days in the year they will not average the work of six teams, altho better methods are gradually bringing a nearer approximation to this desired result. The merchant, however, believing he is going to obtain this kind of service, disposes of his horses and wagons, takes his handy man from about the store who is somewhat mechanically inclined, and puts him in charge of the new installation, altho he has probably never had any experience whatever of this nature.

An attempt is made at once to make each machine cover as large a territory as possible with just as big a load as can be placed upon the platform. Both machines

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are usually run continuously without any relay system or periodical overhauling. This, of course, sooner or later results in an unfortunate breakdown, which very often lays up both machines at about the same time, and if the merchant has discarded his horses entirely, as is often the case, the situation is anything but advantageous for the motor delivery business. The excessive speed at which the machines are operated, as previously pointed out in these columns, is another feature which very often leads to trouble and is partly the fault of the makers, not only because the trucks are geared too high, but because the factory demonstrators are very apt to endeavor to show off the new vehicle by covering just as large a territory at as high speed as possible. Another feature which makes it difficult to successfully install a new service is the fact that the shipping department must in reality be entirely reorganized to fit the new conditions, and unless a man is placed in charge of this reorganization work, who is thoroly familiar with motor delivery service, the process usually results in a total demoralization of the previous shipping system without its place being filled by a systematic method suitable for use with the new type of delivery.

DRIVERS.

The drivers are one of the most vital elements in connection with the success or vehicles are placed at their disposal under failure of such a service. If they have no responsibility in the matter and are simply paid a salary, in nine cases out of ten trouble will surely follow. One of two extremes is usually followed,—either the very cheap, incompetent man is employed or else a high priced mechanic. In the first case, the truck usually suffers from abuse and neglect the result of which more than offset the low wages of the driver. In the second case it very often happens that the driver considers himself above the menial work attendant upon a servant's position and will not load and unload and attend to other as necessary duties, and a high priced helper is necessary which runs the expense beyond what can reasonably be borne. All of these details must be learned from experience by the user and are a few of the most prominent factors which deter the universal adoption of motor driven delivery vehicles.

A NEW SYSTEM.

The system which forms the basis of this article does away entirely with all of these disadvantages. In the first place vehicles were put into service in as many and varied lines of work as possible in order that the shortcomings and peculiar requirements of different classes of delivery might be ascertained. Various types of vehicles were also employed, each being as far as possible suited to the work in hand, and a large amount of useful data has thus been accumulated.

In this new system of handling the delivery problem some of the methods employed are unique and deserve special mention. The drivers are made responsible for everything that happens to the car under their control and are required to pay a certain amount for each breakdown and even 20 cents for each puncture sustained. This amount is deducted from their weekly wages, which would amount to $18 per week being $3.00 per day provided they have no breakdowns. At first sight, it would appear that in some cases injustice might be done the individual driver, but this matter has been so nicely adjusted and other facts which will be brought out later are so brought to bear on it, that in the long run it results in a permanent position for a careful man, and the company states that they have no difficulty whatever in securing operators. Each driver, during a period of a certain number of weeks must average $17 a week as his salary, or he is discharged as being too careless and this has resulted in the elimination of all undesirable help.

These men are not mechanics, nor is any attempt made to make them such. They are usually recruited from the farming districts and are trained to become nothing more than careful drivers. They never repair the cars further than making slight adjustments upon the road, all repair work being systematically performed by a corp of competent mechanics under the supervision of an experienced foreman. Each car, after a certain distance has been traveled, is retired from service, whether its driver thinks it needs it or not, and is thoroly overhauled and put into as perfect condition as possible. Thus no machine is called upon to do extra work and periodically passes thru the shop. In this way many incipient defects which might otherwise result in future breaks are noticed and corrected. Thus it will be seen that the breaking of a part, the average life of which is well known in other rigs of the same make and doing the same service, unless flaws or other defects are shown, is pretty conclusive proof that the machine has been subjected to unnecessary strains, such as produced by excessive driving over rough pavements or butting curb stones or exposed car tracks, so that no injustice in the long run occurs to an individual driver. Even the matter of punctures, which is shown to result in preventing drivers who have wasted time at saloons or other places from taking short cuts across lots or thru alleys where broken crockery or other things might be encountered which would damage the tires.

AVERAGE WORK OF EACH CAR.

Each machine is made to cover much more than 50 miles per day and will average for a 1½ ton vehicle upward of 700 stops. This large number of deliveries per day is made possible by a special system

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and carefully laying out the routes. For example, a boy is carried with each car and the routes are so thoroly known and so well planned that this helper with a certain number of parcels to be delivered within a short walking radius is dropped off while the truck goes on delivering to other places, the whole being so timed that less than five minutes on an average is lost on the return in picking up the helper. All of this planning is done by a person in the employ of the delivery company whose duty it is to gradually reconstruct the shipping department of the store using the trucks. This man is so thoroly acquainted with the capabilities of the machines, their individual drivers and the general needs of the service that he is able to divide the territory to be covered into such routes that the least possible time will be wasted and the smallest possible distance have to be traversed. Each machine on an average covers from 1500 to 1600 miles per month during the busy season. Two routes are sometimes combined in such a way that a single machine at times can cover both, thus saving time and expense.

DRIVERS' MOVEMENTS CHECKED.

An accurate record of the number of stops required on each trip is recorded and it has been found possible to very closely check the movements of an individual machine by means of the accuracy of this system. In addition, each driver is required to turn in a report on a printed blank, this having to check with the superintendent's report, this double check making it possible to detect irregularities in the service. Under these conditions it is impossible for drivers to attend baseball games or waste their time without being found out. The strictest of regulations in regard to appearing on time in the morning and having their trucks ready for loading are adhered to, a system of docking for laxness in this respect being used. However, at the end of each year of service a bonus, based upon the kind of work he has done for the company during that period is given to each driver. No arbitration is used with the chauffeurs, everything being settled indisputably by the office, and this regulation, which is agreed to by each employee, has saved much trouble.

STOPPING THE LEAKS.

The repair work is systematized to the same extent as the delivery system. A blacksmith shop, machine shop and a general overhauling room constitute the repair department and it has been found that very few parts have to be machined. To reduce to a minimum the cost of operation certain devices originated by Mr. Prouty, which have been found to be more economical, have been installed, such as a simple form of timer, which, instead of having the large number of points of resistance for the current usually found in devices of this nature, has cut this down to about one half, thus saving current. This may appear to some to be a very minor detail, yet with a large number of machines operating the year round, these are exactly the kind of leaks which must be controlled in order to make the service pay. Furthermore, it is just such small details which are entirely ignored by the average commercial truck user. Gasoline, oil, batteries, etc., are carefully watched and checked and no waste allowed. Drivers are not allowed to drive in the car tracks except when absolutely necessary. Long overhanging rear bodies on machines with comparatively short wheel base are believed to be bad, resulting in an uneven distribution of the load and extreme wear on the tires. More work can be done with the same machine with the wheel base lengthened and the load more equally divided on the front and rear wheels and the tire expense is much less. Large trucks of three tons or over are not believed to be as efficient as a larger number of smaller machines whose total carrying capacity is the same, but this, of course, varies with the type of work.

EDUCATIONAL NATURE OF THE WORK.

The entire system is educational in that merchants are instructed in the best manner of using commercial vehicles. The dle to be placed in any position over the the best of conditions for obtaining the maximum amount of return and the users are gradually educated to the point where they realize the value of such a service and also see what changes are necessary in the shipping and other departments for successfully using this means of delivery. Thus it is possible for a merchant to gain all of these advantages without personally going to the expense of owning the trucks and spending money unnecessarily gaining experience. Merchants are educated to purchase suitable types of machines for their particular class of work and not to choose from external appearances or pick out what might be termed dainty delivery wagons, but to choose vehicles the chasses of which are adapted for the purposes intended.

A combination of interests or a sort of co-operative employment of commercial vehicles is the ultimate end in view, there being a central garage in an accessible location at which the different merchants' cars are maintained, this system, of course, making it possible to cut down appreciably the maintenance budget and more firmly establish the use of motor driven vehicles for delivery purposes.

The Elmore Mfg. Co., Clyde, Ohio is said to be making a lot of 50 two-cycle gasoline cabs for use in Chicago.

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ck to Practical Designs and Eliminate Mere Talking Points

According to the report of Mr. W. F. ong, proprietor of the Death Valley to Co., Greenwater, Cal., he can do more rk with one automobile than three ms. He has been in the commercial toring field for the past five years both himself and others, and declares that chief trouble is in the operator and in the car itself. Mr. Brong has some ical opinions regarding the vogue in building and after buying a car he alys overhauls it and throws away at st one-third of its parts, which he ims are useless and only put on to get xing points for salesmen.

Brong is a reliable ignition system at minimum cost. Mr. Brong states that wi the car he can do as much work in one d as the team in five. In other words, says he can haul 120,000 lbs. per month a cost of $300 against 3-6 horse outfit co ing $900 per month; the auto clearing $9 as against $360 cleared by the horse o fit. Another item in favor of the car the maintenance expense which when t car is idle, does not amount to anythi According to Mr. Brong's idea a machi for his business should cost not more th $1000 and should not cost more than $3 per month for maintenance. In regards the construction of such a car, Mr. Bro says: "The trouble is no one makes su a car and the constructors have not had t

Mr. W. F. Brong in His Overhauled Car, Transporting Mail in California.

Mr. Brong's business includes everyng in the way of transportation, such forwarding mail, express, baggage, ight and passengers. For the past year has been using an old second-hand car t he bought for $500, the original cost which was $3500. This car is of the ylinder water-cooled vertical engine e, and rated at 30 H. P. The average d hauled weighs from 1800 to 3000 lbs. l 50 to 100 miles are covered daily. e average monthly cost of gasoline is and of lubricating oil $2.50. No exses are incurred for repairs, storage, pers or operators, as Mr. Brong runs l cares for the car himself. The car laced 6 horses and 3 vehicles, thus also ting out the expense of two drivers. out 15 miles per day were made by each m. The horses cost $150; harness $35

actual experience. If such a manuf turer should get the right idea and sti to it and turn out a low-priced car t Humane Society would be a thing of t past and all transportation would be se propelled. However, the present state affairs will continue as long as the man facturers look to their agents for adv on construction. The salesman deman that there shall be some change made eve year that he may have a talking poi For instance, there has been many chang in the clutch, but no improvement; the cone is still the best and most serviceal if used properly. I have started 10,0 lbs. with a 30 H. P. cone clutch."

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Grocery Concern Reduces Haulin

ence with commercial cars, have given us some very interesting information on the subject, at the same time stating that they are entirely satisfied with their machines which have innumerable advantages over horse-drawn vehicles.

They have in use two trucks, one of which has been in continuous service since September 1st, 1906, and the other since September 1st, 1907. Both trucks are of the Four-Wheel Drive Wagon Company's make and cost $4000 each. The motors are of the 4-cylinder vertical type and set under the driver's seat. As no odometers are fitted to the machines, no data re-are fitted to the machines, no data regarding the mileage can be given, but only the tonnage, which it is claimed from September 1st, 1907, to January 1st, 1908, amounted to 5480 tons of freight hauled for the two machines. If hauled by horses this would have cost $1918, the rate being 35 cents per ton. The expense of operating the trucks is as follows: Two drivers at $50 per month, $400; 2075 gallons gasoline at 12½ cents per gallon, $259.37; 55 gallons of lubricating oil at 56 cents, $30.80, and expense for heavy oils and grease, approximately $10.00; or a total of $700.11, which deducted from $1918, the possible cost by teams, leaves a net balance for four months of $1217.89 in favor of motor hauling. At another time this concern states it has pulled in one day 120,000 lbs. with one truck, which if figured, at 35 cents per ton, for cartage expenses, would have cost them with horses $21.00. Fuel consumption has never exceeded 10 gallons per day and their daily expense for lubricating oil never exceeds 25 cents.

As to depreciation and wear on the machine, the Allen Company has made no deduction for this item, stating that upon careful examination of the vehicles no material wear has been noticed other than the tires. These are of the wood type, and are conservatively estimated to last for 12 months of continuous service. They operate their trucks every day in the year and do not keep them under cover at all, but leave them standing in front of their store every night. They figure that each truck takes the place of from three to four teams. Altho the trucks are nominally rated at 7 tons capacity, the company claims to have put on 14 or 15 tons load without distressing them in the slightest. The company states that on small loads and outgoing freight, the showing is not nearly so good—in fact, there is no money in them at all. They must be loaded heavy to make them pay, as they are slow-speed machines, intended for heavy work. They employ a competent mechanic who makes all repairs and adjustments that are necessary. This concern thinks that the only way the automobile truck can ever successfully displace horses in a commercial way is for any firm using them to have one machine in excess of their actual requirements so that they will never be delayed in case they have to lay up their truck for repairs.

(We cannot vouch for the figures contained in this article further than that they were returned to us as correct after having been sent back to the company in question for verification.—Ed.)

A Case of Operator's Carelessness

That it is not always the car to blame but sometimes the fault of the operator is well illustrated by the experience of the Auto Transportation & Sightseeing Company, Savannah, Georgia. This concern employs three cars, for sightseeing and pleasure riding purposes, two of which are 16-18 horse-power Packard cars, with 2 cylinder vertical motors under front seat and costing $3200 each, while the third is a 4-cylinder Ford touring car.

The Packard cars have been in use for 18 months. One trip per day is made with about 5 calls per trip covering an average of about 20 miles. About 8 miles are figured to a gallon of gasoline and about 75 miles to a gallon of lubricating oil. $60 to $75 are paid per month for operators' wages and $30 to $45 per month for helpers. This concern does its own storing. The cars are figured to depreciate one-third in value each year, or in other words are expected to last about three years.

In regards to improvements needed in motor cars, this company states they are two numerous to mention. It seems this company is having all kinds of trouble in securing competent drivers, its usual luck being to get persons who are careless, indifferent, and lacking in sufficient moral principle to properly care for a car. This concern considers the horse more reliable than the motor car, and the help more efficient and careful, perhaps on account of caring more for actual life, but thinks the car better for distance and speed. The 4-cylinder Ford touring car is rented out at $4 to $5 per hour, but in the past 6 months not a cent of profit could be figured all due it is said to the driver's indifference, carelessness and to tire expenses.

Motor 'busses now run through the night in Paris, as all night street car service has been suspended. The machines do considerable business.

Max Gabrowsky has resigned his position as manager and designer of the Rapid Motor Vehicle Co. and has organized the Gabrowsky Power Wagon Co., at Detroit, Mich., with which he holds a similar position. His first model will be ready May 10 and will be described in an early issue of the Journal.

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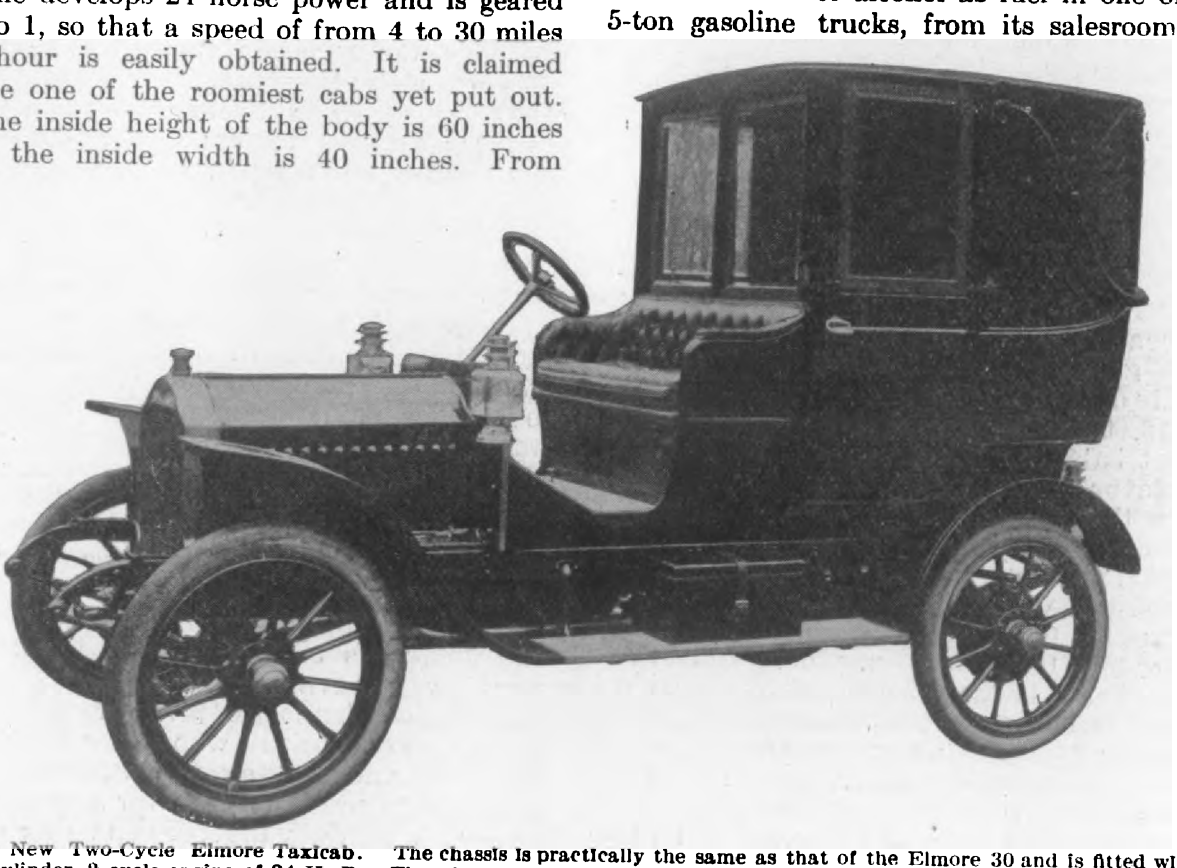
be assembled. For the present the entire out is being sent to Chicago, where Mr. n H. Fay intends to install the first icab service to be put in operation in the ly city.

hese Taxicabs are built over the same truction used in the Elmore Thirty, h is the three cylinder, two cycle valve- car built by the Elmore Manufacturing pany. The cab is an exceedingly light weighing less than 2,300 pounds. The ne develops 24 horse power and is geared o 1, so that a speed of from 4 to 30 miles hour is easily obtained. It is claimed e one of the roomiest cabs yet put out. ne inside height of the body is 60 inches the inside width is 40 inches. From



New Two-Cycle Elmore Taxicab. The chassis is practically the same as that of the Elmore 30 and is fitted with ylinder, 2 cycle engine of 24 H. P. The wheel base is 102 inches. The front and door windows are of drop patter e finish is in dark green. Either leather or cloth upholstery is applied. The top, of laudaulet pattern lets dow an open body.

ront seat to the back cushion is 45 inches. loor is 22 inches wide and 54 inches high. distance between the back of the front nd the front of the rear seat is 27 inches he extreme height of the body from the d is 90 inches. Three people can be conveniently seated in the cab, while eople have plenty of room and to spare. top, of landaulet pattern, lets down, g an open car.

e upholstering is furnished either plain biscuit pattern, in either cloth or leather. quality of both covering material and l hair is used. The cushions are all length and are built on the best quality

Taxicab and the regular stock chassis is fact that the wheel base has been shorten slightly, it being but 102 inches. This mak the car very easy to handle as it can be turn around in the average street without havi to back.

Demonstration of Alcohol as Fuel f Heavy Trucks

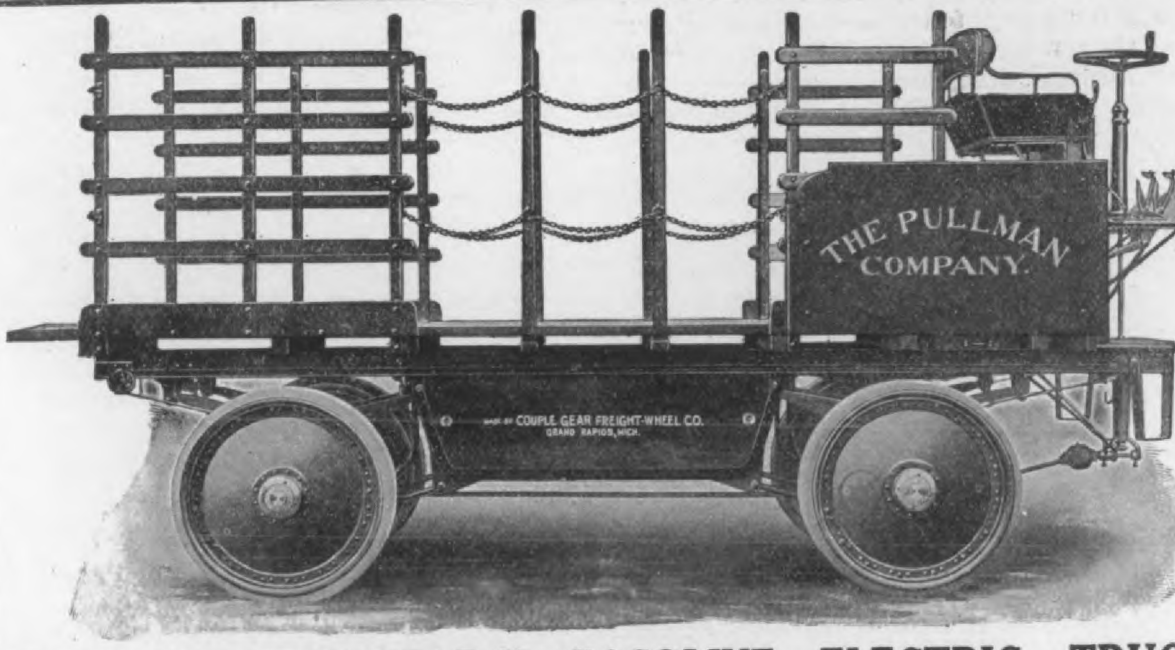
The Hewitt Motor Co., recently made demonstration of alcohol as fuel in one of 5-ton gasoline trucks, from its salesrooms East Thirty-first St., New York City. N changes were made to the vehicle with th exception of placing a hot water jacket aroun the intake manifold, and raising the com pression of the motor from 78 to 112 pound by using longer pistons with dome shape heads. The motor is rated at 32 H. P. an has four cylinders $4\frac{1}{4} \times 5\frac{1}{2}$ inches. The firs day's run with a 1000 lb. load demonstrate the flexibility of the motor, which could b run fast or slow with as much ease as if gaso line were used. Other runs made later with full 5-ton loads showed that the change o fuel did not lessen the capacity of the truck

5 TON HEWITT TRUCK

CUSTOMERS ALL SATISFIED

1000-Pound Light Delivery. Simplest car Made. Best Recor

HEWITT MOTOR CO., 10 E. 31st St., New York Cit



THE "COUPLE-GEAR" GASOLINE - ELECTRIC TRUC

Motors Contained in the wheels. Power applied at both sides of the wheel directly to the wheel rim. Single reduction of 25 to 1. Transmission losses practically eliminated. Equipped with "Storage Battery" or with engine and generator.

FRONT-WHEEL DRIVE AND FRONT-WHEEL STEER.

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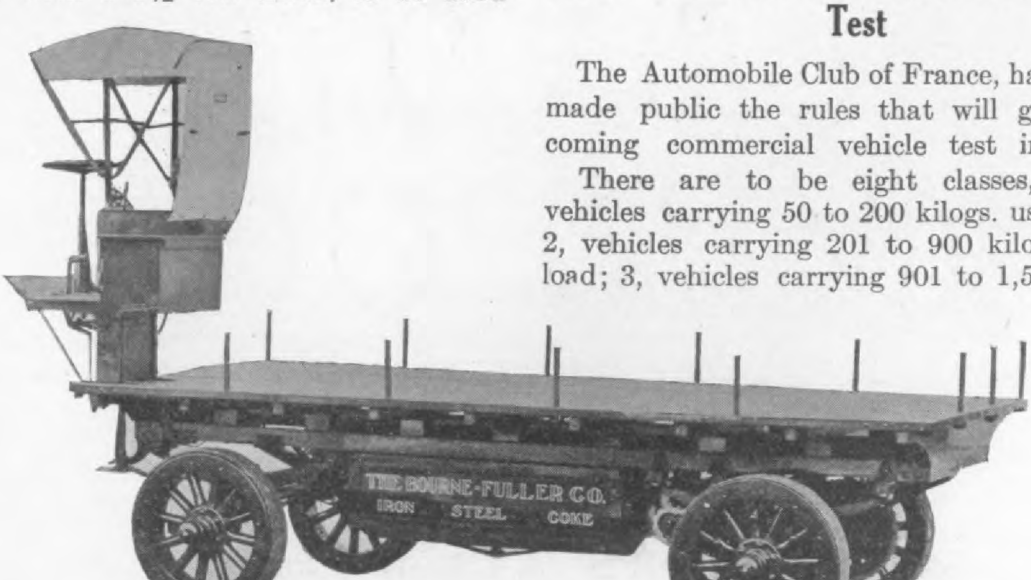
ıobile Company of South Bend, Indiana. e truck has been delivered to the ırne-Fuller Company, of Cleveland, Ohio, ether with a 3½ ton truck, to be used



Studebaker 5-ton Electric Truck recently delivered to the Bourne-Fuller Company of Cleveland, Ohio.

the transportation of iron and steel ı trucks although of different capacity of exactly the same design and em- the chassis specifications of regular lebaker electric 3½ and 5 ton trucks. ıe interesting feature of these trucks ıat they were probably the first electric ks built with special reference to the enient handling of steel and iron bars, ts, and strips. The driver's seat is ed to the extreme left of the vehicle

baker Electric Ambulance used by the Medical nent of the U. S. Navy at Washington, D. C.

ı this way extra provision is made for verhanging in front of extra lengths ɔn or steel, and this construction al-

radius of 40 miles on one battery charge

Rules for French Commercial Vehic Test

The Automobile Club of France, has recent made public the rules that will govern t coming commercial vehicle test in Franc

There are to be eight classes, viz: vehicles carrying 50 to 200 kilogs. useful loa 2, vehicles carrying 201 to 900 kilogs. usef load; 3, vehicles carrying 901 to 1,500 kilog useful load; 4, vehicles carrying 1,501 to 2,00 kilogs. useful load; 5, vehicles carrying 2,00 to 3,000 kilogs. useful load; 6, vehicles carry ing over 3,000 kilogs. useful load; 7, publi service vehicles, 6 to 10 passengers; 8, publi service c les overveh10 passengers. N vehicle must weigh more, fully laden, than tons per axle, the weight being arrived at b dividing the total weight by the number c axles.

The trial will comprise about 25 stages Each stage will be divided into a number o sections. The average maximum speed, whic must not under any conditions be exceede in any single section, is fixed at 25 k.p.h. fo all classes.

The final standing will be determined b the formula: T x C — P x D; in which T represents time in hours; C the fuel con sumption through the trial in francs; P the useful load carried, to which will be adde the weight of the vehicle body in kilogs. D the distance covered in kiloms.

Jerome J. Pattens, the well-known pro moter of Butte, Mont., is a great believe in the automobile for desert and western country, and has placed an order with the Jackson Automobile Company for three special Jackson Tourabouts for use in and

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THE

ECONOMY-COPPOCK

A car without an equal for endurance, simplicity and economy. We sent one of our trucks overland from Decatur, Ind., to Cincinnati, Ohio, 156 miles in 18 hours, Feb. 5th, '08. Not a single part was broken and the roads were almost impassable on account of snow and ice.

Cost of operation—.022 cents per mile.

We have run our first truck 25,000 miles. Cost of repairs $45.00.

Guarantee covers every truck for LIFE against imperfection in workmanship and material.

Most Attractive Proposition on the Market

Write us for Catalog

Coppock Motor Car Company

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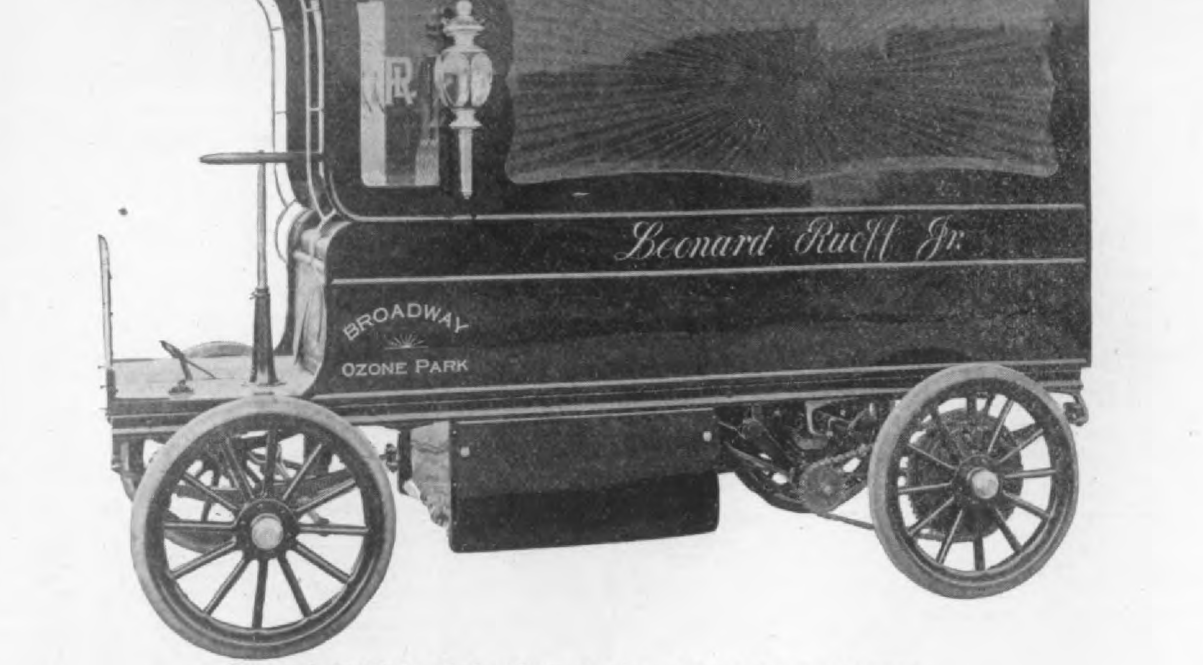


General Vehicle Co.'s New Design Undertaker's Wagon.

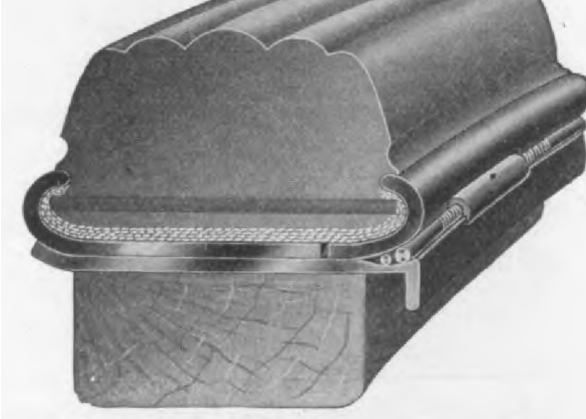
eneral Vehicle Co.'s Undertaker's Wagon

-eneral Vehicle Co., Broadway and Six-econd street, New York City, recently lt the undertaker's wagon here illus-téd. This wagon was built for Leonard iff and is capable of going 35 miles on charge of the battery at an average ed of 10 miles per hour. In this wagon General Vehicle Co., has employed 1908 type of construction, in which used a large single motor, driving a ntershaft with Morse silent chain and er chains to the rear wheels; internal ansion brake; continuous torque con-ler and solid tires thruout. This vehi-is arranged with double opening in rear and a removable shelf for carry-camp chairs and the box on the floor the vehicle.

e "Swinehart' Detachable Clincher Rim

he Swinehart Clincher Tire and Rub-Co., Akron, Ohio, have recently placed he market a new detachable rim, which sed as a retainer of different kinds of . It is suitable to hold a single-piece cher rim or dual tires already mounted rims, as well as the Swinehart detach-e clincher rim, and since the retainer djustable, it is particularly adapted to use of their detachable and adjustable

base, it is only necessary to tighten up t side flanges and follow up with the er less retaining wire which rests upon cone and can be moved inward ½ in. necessary. It is claimed that old tire c be removed and the rim applied with t tire already mounted, in less than twen minutes. Truck users greatly apprecia the advantages of this rim, as its use pr vents delay in their delivery service wh replacements are necessary. They fi it no longer necessary to remove whee from cars for the purpose of having tir



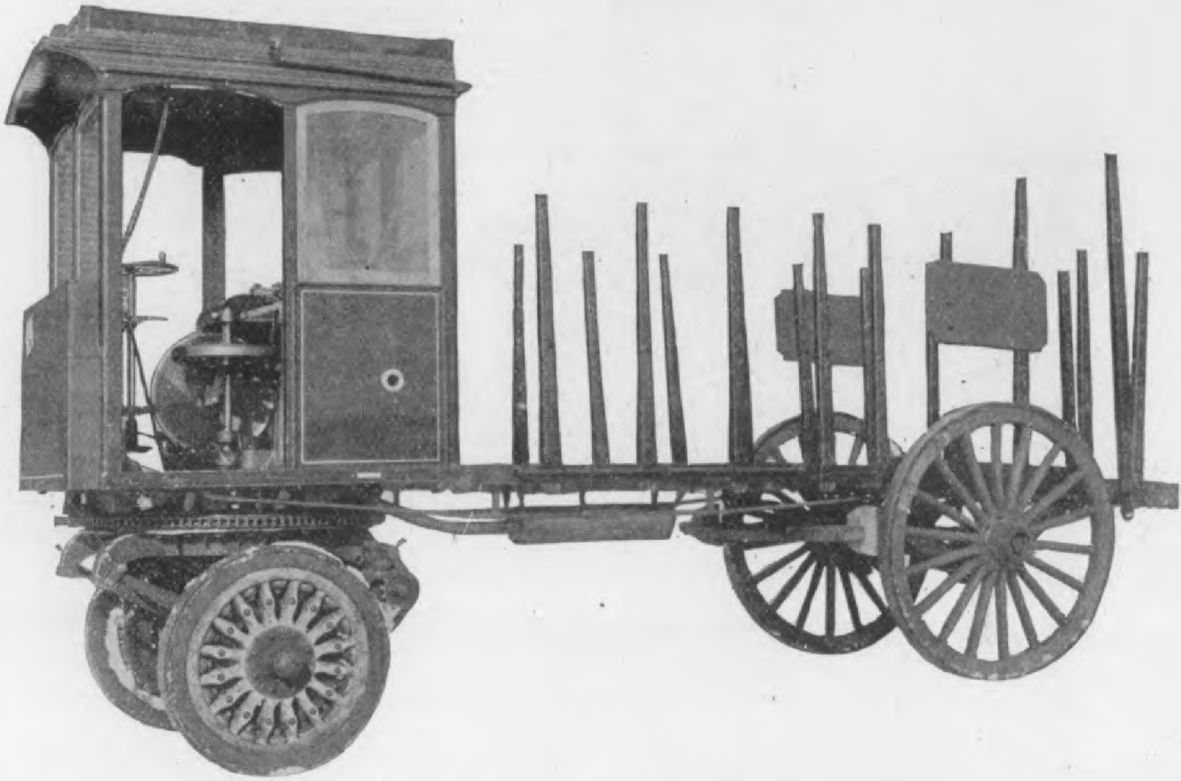
The "Swinehart" Detachable Clincher Rim.

applied, as they can receive the tires dire from the factory mounted on light clinch rims.

A new tire is also about to be placed the market by the Swinehart Co., the pri cipal feature of which is the mortising

The International

The Different Kind of Truck



3 and 5 Tons Capacity.

¶ **OUR CONSTRUCTION** overcomes high maintenance costs, and permits of predetermining a customer's costs by a guarantee allowing of the successful operation of heavy motor trucks under all conditions where speed, capacity and mileage are essential requisites.

¶ **THE ADVANTAGES CLAIMED** are that it overcomes the objectionable features of present power wagon construction, and admits of its successful competing with other methods of transportation when given proper conditions and facilities to demonstrate its advantages.

Specifications and prices upon application.

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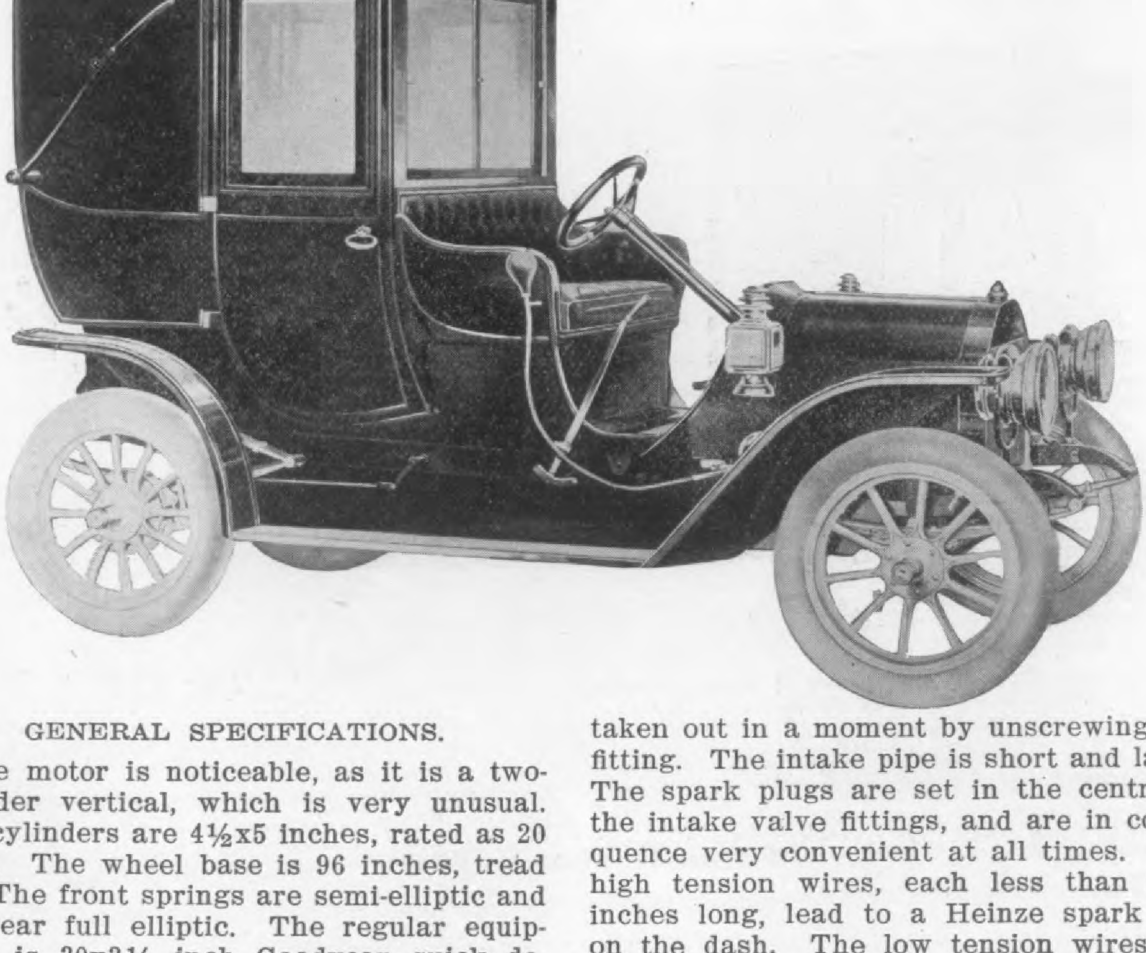
tiac, Mich., have entered the field with car herewith illustrated. It is light veight, staunch in construction, and pur-sable at a price consistent with a re-le, economical vehicle.

crank-shaft bearings are necessary. Bea ing alignment is thus reduced to its si plest form. The valves are large and co veniently placed, both inlet and exhau being on one side. Any valve may



GENERAL SPECIFICATIONS.

he motor is noticeable, as it is a two-nder vertical, which is very unusual. cylinders are 4½x5 inches, rated as 20 P. The wheel base is 96 inches, tread The front springs are semi-elliptic and rear full elliptic. The regular equip-t is 30x3½ inch Goodyear quick de-able tires. The seating capacity inside our, making the carrying capacity six ll. The car weighs 1800 lbs. and sells $1850, f. o. b. Pontiac, Mich.

WATER CIRCULATION.

ne Oakland motor is water-cooled, the er being circulated by a thermo-syphon em. The path of the circulation is t, and all pipe and hose connections very large, thereby insuring perfect at all times. The thermo-syphon sys-not only does away with all gears and ps, but insures even cylinder tempera-under all external conditions, as the of circulation depends not on engine d without consideration of engine tem-ture, but on the temperature itself. If pump on a force-feed system is prop-

taken out in a moment by unscrewing o fitting. The intake pipe is short and larg The spark plugs are set in the centre the intake valve fittings, and are in cons quence very convenient at all times. T high tension wires, each less than ni inches long, lead to a Heinze spark c on the dash. The low tension wires a of best quality and the remarkably simp but effective timer placed on the forwa end of the camshaft is also readily acces ble.

THE OILING SYSTEM.

The oiling arrangement is Oakland d sign and is very simple. The oiler is sig force feed with leads to two points onl the forward; main bearing and the tran mission. The former is flooded, the su plus oil flowing into the crank case. T design of the crank case causes positi splash oiling to all other bearings.

ACCESSIBILITY.

Embodied in this design are two co veniences which will be appreciated by a car owners. First, the extremely larg crank case hand hole, allows all the roo for inspection and work that could be d

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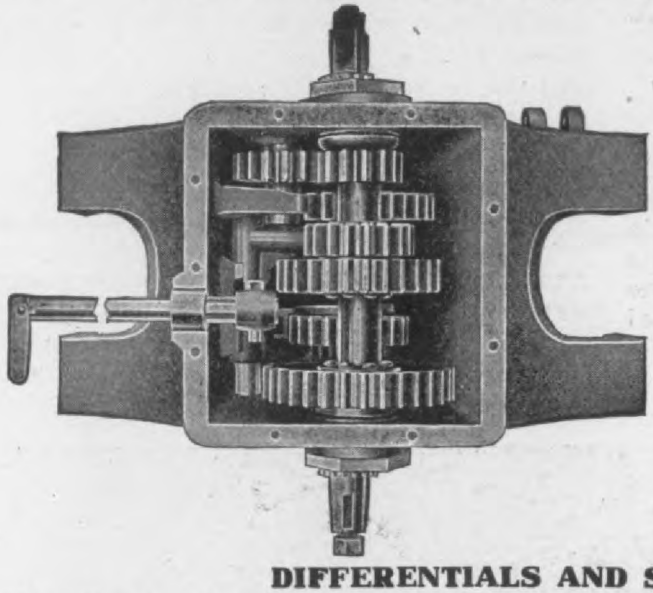
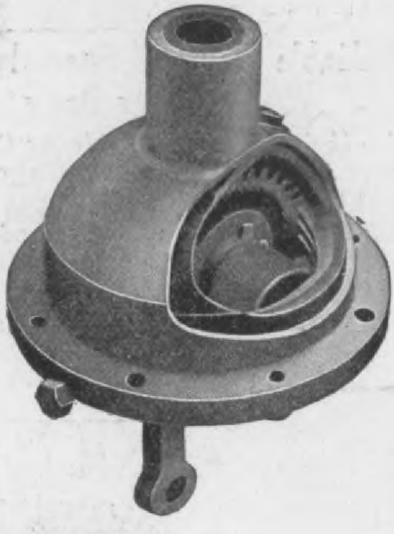
BROWN-LIPE GEARS

SELECTIVE AND PROGRESSIVE SLIDING GEAR TRANSMISSIONS





DIFFERENTIALS AND STEERING GEARS

Direct Factory Salesmen:—K. FRANKLIN PETERSON, 166 Lake St., Chicago. THOMAS J. WETZEL, 29 West 42nd St., New York City.
Sales Agent, Carrying Stock:—CHAS. E. MILLER, 97 Reade St., New York; 318-320 N. Broad St., Philadelphia; 202-4 Columbus Ave., Boston; 406 Erie St., Cleveland, Ohio.
Eastern Sales Agents:—POST & LESTER CO., Hartford, Conn.

BROWN-LIPE GEAR CO., 206 S. Geddes St., Syracuse, N. Y.

Commercial Vehicle Notes

ne George Abel Transfer Co., of New York City, ently bought ten motor trucks from the Knox omobile Co.

bey, C. A., of Chicago, is placing 50 Thomas taxi- in operation in Chicago.

r. Samuel Davis, of Lynn, Mass., is using an auto- bile in making his professional calls.

ay, Owen H., of Chicago, Ill., has ordered ten ore cabs built, and will place taximeters on eight tric cars, for the purpose of going into the taxi- business in Chicago.

ne B. B. Fowler Co., of Glens Falls, N. Y., is g a four-cylinder Logan delivery wagon.

law & Erlanger are having built large motor trucks the transportation of the scenic equipment that to make up their production, "Ben Hur;" they are constructing coaches, fitted up the same as ular passenger cars, for the movement of their panies.

r. C. D. S. Lovell, of Lynn, Mass., is using a or car in his profession.

ne Lynn Gas and Electric Co., Lynn, Mass., is g commercial cars, which they claim accom- h twice as much work as horse-drawn vehicles.

ne League Island Navy Yard, of Philadelphia, Pa., recently installed a 1908 Rambler touring car the quick dispatch of land messages.

r. Charles Meader, of Lynn, Mass., is using his omobiles for daily calls in his profession.

arker, Chester, an enterprising farmer, who has a produce farm at Cornish, Maine, goes to market Portland, nearly 35 miles, by automobile, carrying luce, thereby saving about 20 days in the year.

ne St. Louis Auto Exchange is the title of a new cern recently incorporated in St. Louis, Mo., with apital stock of $120,000, for the operation of an tric 'bus line running to all parts of the city, and necting the Art Museum with each car line which into Forrest Park. Forty-six cars are in opera-

River, to the mining camp of Parker, 60 miles down river, on the edge of the Colorado desert.

The Boston Taxicab Company has recently placed Taxicab in service in Boston, to which more will be ad if the project proves successful.

D. P. Plummer, manager of the Briarcliff Lodge, placed an order with the Lozier Motor Company for 40 H. P. Lozier cars, with 7-passenger limousine and t ing car bodies respectively, for the purpose of carr guests of the Manor to and from the station.

Como Park, of St. Paul, Minn., will have another si seeing automobile. The present one has practically for itself in two years, and has been unable to care for who wanted to ride.

The Hudson Automobile Company, Yreka, Cal., has ranged to establish an automobile line between Klam Falls and the terminus of the California North Eas Railroad. It is expected to have the line in opera in the early summer.

The Independent Auto Co., headquarters at the Hotel, Rawhide, Nev., has been organized to do an a mobile livery business. Seven cars are in commission.

A contract has been awarded by the Board of Pu Safety to the Marion Motor Car Co. for a runabout, t used by Fire Chief Coots, of Indianapolis, Ind.

An automobile line has been established between L mont and Estes Park, Colorado, by O. P. Lowe and L Larsten.

A number of grocerymen of Lansing, Mich., are plan to use motor wagons for delivering groceries thruout city.

A stock company has been organized with $10,000 c tal, at Melrose, Wis., for the purpose of running a fre and passenger automobile transfer line between that and West Salem, via Burr Oak and Mindoro.

At Norwalk, Ohio, a company has been formed for purpose of operating an automobile line between that and New London, 20 miles distant. In the same s another line is being organized between Cortland Warren.

The Pacific Coast Taximeter Cab Co., San Francisco, C

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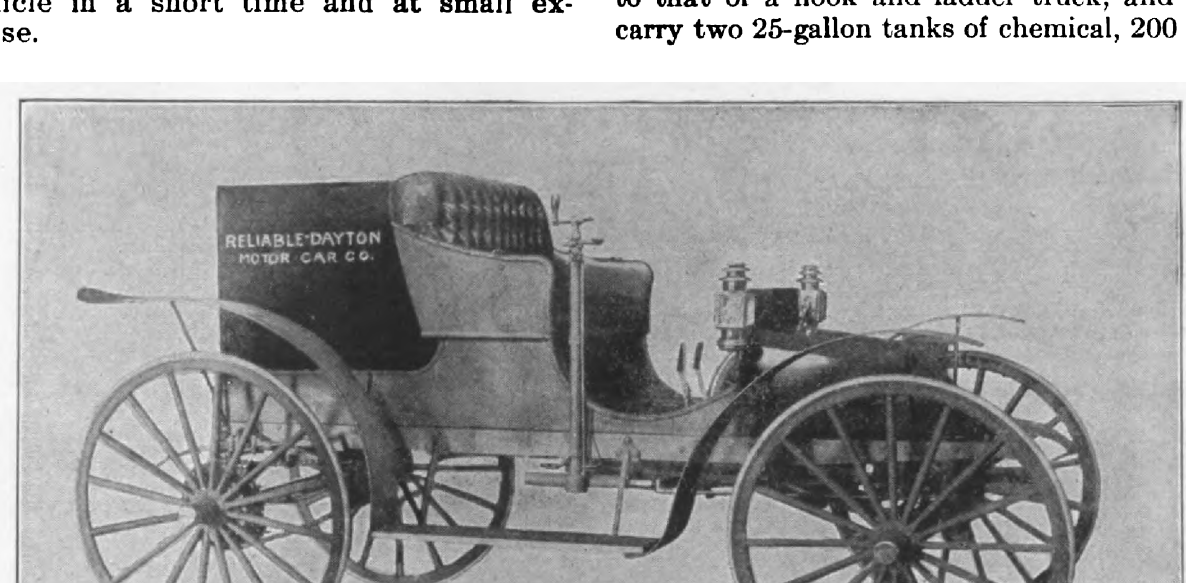
ings and from 1.30 o'clock until 2.30 for the matinees.
M. Roscoe, a grocer of Southport, Conn., has been g a two-cylinder car for delivering groceries on long-ance trips.
r. P. Elwood Stigers, Hancock, Md., is using a Ford linder runabout for making professional calls.
he U. S. Navy Department recently purchased two mobile ambulances from the White Company, of Cleve-, Ohio. One of these is for use at the Naval Hos-l at Philadelphia, and the other at the Tuberculosis pital at Los Animas, Col.

'Reliable Dayton" Special Auxiliary Delivery Body

The Reliable Dayton Motor Car Co., 15-21 rth May Street, Chicago, Ill., has ought out this attachment to provide ans whereby an owner of one of its e F high-wheeled cars can transform the ter from a pleasure to a commercial hicle in a short time and at small ex-nse.

Willimansett, Mass. will soon be the poss sor of a motor fire engine which will cost $6,5 and will be furnished by Knox Automob Co. of Springfield, Mass. It will be p pelled by a four-cylinder, 40 H. P., air-cool motor, while the transmission will be of t selective type, giving three speeds forwa and one reverse, direct on high. The car w be fitted with Timken roller bearings thruo The wheel base will be 124 inches, and t wheels will be 34 inches in diameter and fitt with solid tires. There will be seats for t men, one of whom will be the driver, in fro and a running board at the rear will accomm date several more. The body will be simi to that of a hook and ladder truck, and w carry two 25-gallon tanks of chemical, 200 f



The Reliable Dayton Type "F" car fitted with Special Auxiliary Delivery Body.

The delivery body which is here shown ached to the car is 33 inches long, 42½ hes high and 47 inches wide. It is sup-ed at the rear with double doors, which ord an entrance from the rear of 42 hes wide and 29 inches high. Best pop-is used, furnished in black and striped blue, same as the regular type F finish. slat shelf is fitted 23 inches above the or of the car. The carrying capacity is lbs. Type F car has been described our November 1908 issue, page 67. The ce of the car with rear seat is $925, and hout rear seat and equipped with auxil-y delivery body $935. Price of the auxil-

of chemical hose, 500 feet of fire hose, two foot extension ladders, two hand extinguishe a crowbar, axes, etc. The car will have t brass gas lamps on the dash and also a swi ing searchlight, so that it will not be hampe by darkness.

The New York branch of The White Co pany recently sold an ambulance to t Kings County Hospital of Brooklyn. T ambulance consists of a standard 30 hor power chassis with a body similar to th of the ambulances furnished by The Wh Company to the United States War a

get by you without adopting our **Pressed Steel Ste**
Hangers. Now used by over twenty of the most prominen
makers. Write for Samples or Prints.

The Crosby Company

BUFFALO, - - - - NEW YOR

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THE COMMERCIAL MOTORCAR CO.

INCORPORATED 1905

TIMES BUILDING - NEW YORK, N. Y.

We furnish Business Automobiles of all types and makes—machines exactly suited to any class of service.

We especially call attention to the SAFIR Motor Truck manufactured in Zurich, Switzerland. Descriptive circular and record of past performances mailed on request.

The Richest Field For The Agent

Rapid Commercial Cars

I wish every man who sells automobiles knew as I know the splendid opportunity just now for selling commercial motor cars.

The entire country seems to be waking up to the fact that money can be made, both in the carrying of passengers as a business, and in the delivery of merchandise by motor wagons

The man who handles the Rapid motor wagons can get the cream of the business. We have specialized in this field, and our success has built up the largest business in commercial motor cars in the United States.

We make passenger cars, delivery wagons, trucks, busses, fire hose wagons, hospital ambulances, and anything special desired If you have a garage and are able to represent us properly, write me to-day; I have something of interest to tell you.

B. M. HENRY, Sales Manager

RAPID MOTOR VEHICLE CO., 125 Rapid St., Pontiac, Mich.

assengers, $2500

One Ton Delivery,

THE MEISELBACH TRUCKS

One, Two and Three Tons

Friction Drive, Perfectly Supported. All Wheels on Timken Rollers. Powerful Brakes. The Simplest and Easiest Controlled Trucks yet shown. Thirty Horse Power.

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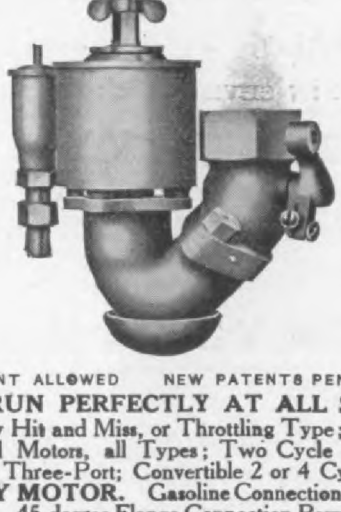
Carburetor

1908 MODEL



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WILL RUN PERFECTLY AT ALL SPEEDS

Stationary Hit and Miss, or Throttling Type; Four Cycle High Speed Motors, all Types; Two Cycle Two-Port; Two Cycle Three-Port; Convertible 2 or 4 Cycle.

FIT ANY MOTOR. Gasoline Connection Changeable for 3 Points. 45 degree Flange Connection Permits of Top or Side Outlet.

The North Chicago Machine Co.

North Chicago, Ill.

We Solicit a Trial and Guarantee Our Claims

Indestructible Steel Wheels

are never out of true cannot collapse

INDESTRUCTIBLE STEEL WHEEL CO.

1221 Michigan Ave., Chicago

SOME LIVELY SUBSCRIPTION AGENTS WANTED

LOGAN 1908

Model T One Ton Truck

A truck equipped with a four cylinder air cooled 20 H. P. Motor, built for service and fitted to carry its load day in and day out under all conditions. For detailed description address

THE LOGAN CONSTRUCTION CO.

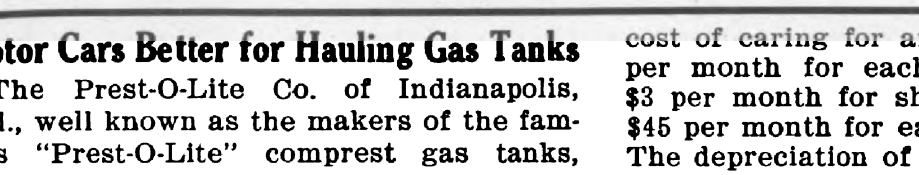
CHILLICOTHE, OHIO

PEUGEOT FRANCE

Peugeot Chains—"Strongest in the World."

296 BROADWAY, NEW YORK

CRAMP



Parsons' Manganese Bronze Axles

Stronger than steel. Thousands in use. None have ever broken.

The Wm. Cramp & Sons Ship and Engine Building Company

Philadelphia, Pa.

Motor Cars Better for Hauling Gas Tanks

The Prest-O-Lite Co. of Indianapolis, Ind., well known as the makers of the famous "Prest-O-Lite" comprest gas tanks, find it advantageous to use motor cars in place of horse drawn vehicles and they now have one Premier, 4-cylinder, gasoline car doing the work of four horses and two wagons previously used. The car has a carrying capacity of 1,500 pounds and makes a daily average mileage of 45 which includes about 25 short trips within a radius of four miles. They care for the car in their own garage and they pay the operator $80 per month. No separate account of lubricating oil and gasoline has been kept, hence no definite figures covering these items are available. Repairs

cost of caring for and feeding, $12 to $ per month for each of the four hors $3 per month for shoeing each horse a $45 per month for each of the two drive The depreciation of horse value was re oned at 20 per cent per year and of vehicles at 10 per cent per year.

"That there are not yet enough types cars, particularly commercial vehicles, the market, is every day more evide said Mr. Harry Levey, a young busin man of large interests, who has beco identified with motor racing. "I am in market for thirty-two light, gasoline de ery cars, capable of a carrying capacity fifty-four cubic feet, but of not necessa more than 200 pounds, besides the driv The ideal car for my purpose would h

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MOTOR CYCLE DEPARTMENT

No "Exhibition" Motorcycle Races

The Federation of American Motocyclists thru the chairman of its Competition Committee, Roland Douglas, has very clearly expressed itself in the matter of so-called "exhibition races," such as the "contest" perpetrated at Kansas City at the close of the recent six-day bicycle racing.

"There is no such race as an 'exhibition race,' " says Mr. Douglas. "In such events the results are fixed and prearranged, and are therefore dishonest. Such a race is a fraud on the public. As an 'exhibition race' is a fixed race, that form of sport must be stopped, and we mean that it shall be stopped, whether the men involved are amateur riders, professional pace-makers, or plain, ordinary, every day fakers."

New York and the F. A. M. Meet

It seems a foregone conclusion that the 1908 annual meet of the Federation of American Motorcyclists will be held in New York, during a week to be determined later, but which will doubtless either be the week of July 4th or the final week in July.

No other competitor for this honor has made an earnest effort for recognition, so New York is likely to get the sanction by default. The metropolis, in the persons of its motorcyclist enthusiasts, is preparing to make the meet the greatest in the history of the new sport.

Motorcycles and the Post Office

While many motorcycles are used by the carriers on Rural Free routes the post office department requires each carrier to apply for permission before buying or using a machine. It seems that the department regards a carrier's time schedule as something that is almost sacred. A man may jog over his route in five hours with a horse, and cover the same distance in two with a motorcycle. But the department wants to be certain that the schedule, whichever it is, will be religiously maintained. For that reason, the use of motorcycles is ordinarily permitted only when they can be in operation at least eight months in the year.

Motorcycles for Fire Chiefs?

Judging from the letters of inquiry received by an eastern manufacturer of motorcycles, at least one fire department in the United States is seriously considering the purchase of one or more machines. It is believed that for the use of a chief, or assistant chief, much better time can be made in getting a commanding officer on the scene of a fire than is now possible with a swift steed and chief's buggy. Experience with motorcycles and automobiles for fire service has proved a complete success in several foreign cities.

Motor Cycles for War Purposes

A most unique bequest is reported from Denmark, to the effect that a wealthy citizen has left his entire fortune to the government, for the purpose of forming a motor cycle corps, which shall be an adjunct to the Danish Army. It is proposed to equip the new contingent with one hundred motor cycles, each of which will carry a light machine gun capable of firing 500 shots per minute. This will be the first regular army motor cycle corps in the world.

Irvington Race to be Again Run

According to the announcement made by the Bay View wheelmen, the historic Irvington-Milburn 25-mile bicycle road race will be held on Decoration day, May 30. Wm Rouff is chairman of the race committee. The race will be started at 11 o'clock in the morning as usual.

1908 F. A. M. Meet

At the first meeting of New York motor cyclists in Parlor A of the Grand Union Hotel, New York City, held for the purpose of bringing the Federation of American Motor Cyclists' national meet to the metropolis, great enthusiasm was shown, workers were chosen, officers elected, and money subscribed. Nearly $1,000 was raised before the meeting adjourned. The officers of the F. A. M. meet club are as follows: President, R. G. Betts, of the New York, Brooklyn, Boston and Providence motorcycle clubs; vice-president, L. H. Guterman, Harlem Motorcycle Club; secretary, Henry J. Wehman, Brooklyn Motorcycle Club; treasurer, David Dessau, New York and F. N. Motorcycle Clubs.

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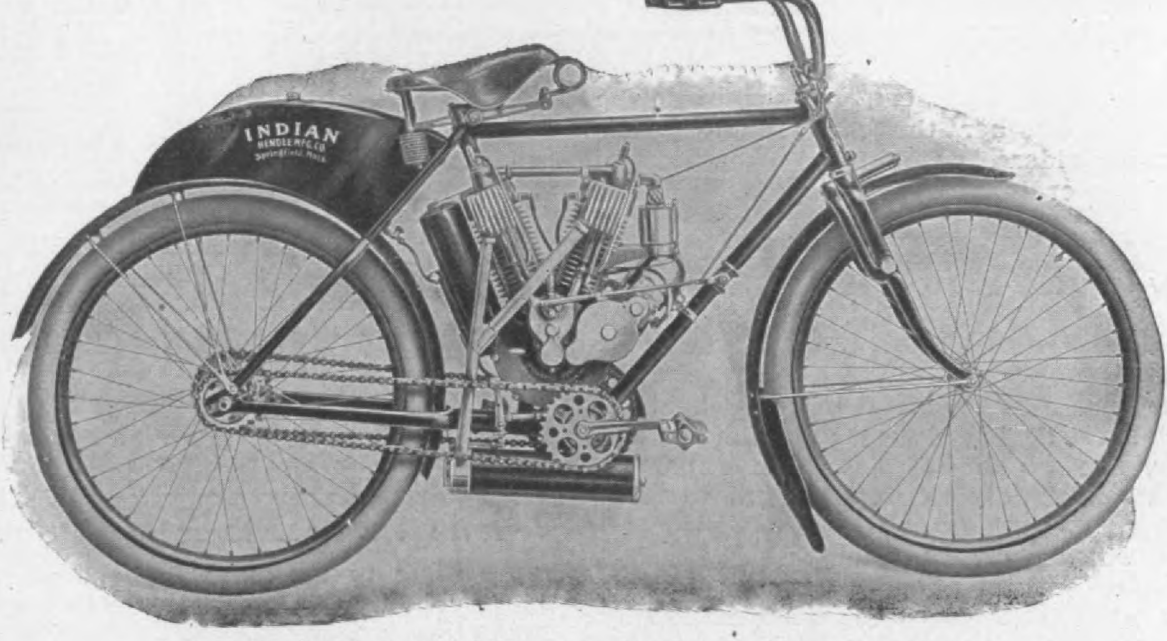
nticipating some time ago the proba-
y of a big demand for two-cylinder
orcycles, Hendee Mfg. Co., of Spring-
, Mass., makers of the well-known In-
machines, as early as 1904 began de-
ing and testing out twin-cylinder In-
s and are therefore well equipt to meet
big demand that has developed this
on. The Hendee Company have fac-
facilities for turning out 100 twin-
nder Indians per week and are offer-
two models of this type, one a 5 H. P.
hine listing at $250, here shown with
neto attached, and the other a 7 H. P.
r.

elieving the term horse-power, as com-
ly used in claiming engine ratings, to
deceptive, the Hendee Company has
ugurated the practice of rating its en-

be depended upon nor any varying sprin
to alter the proportion of the charge. Th
feature can readily be applied to all prev
ous Indian models, and at slight cost.

Another feature of the 1908 Indians
an oil gage in the motor base, enabling th
operator to know exactly how much oil
in the base and guarding against runnin
the engine dry.

In response to a popular demand f
magneto ignition, the Hendee Compan
gives an option on this form of ignitio
on all 1908 Indians. The extra cost f
magneto ignition is $40 and the Bos
magneto is used. It is placed on a sp
cially designed platform directly in fro
of the motor base, and connected to th
make and break shaft by three enclos
gears. The accompanying cut shows th



The Indian 5 H. P. Twin Cylinder Motor Cycle with Magneto Ignition.

es according to the cubic capacity of
ir cylinders, altho the horse-power rat-
is also given for convenience.

Iechanical inlet valves are used on all
the Indian models for 1908 excepting
7 H. P. racer.

'he new Indian mechanically operated
et valve is worked out so simply that
objections formerly raised are said to
e been overcome. One cam raises ex-
ust valve and operates intake valves
perly. The inlet valve still retains its
ition over the exhaust valve so that
ry charge is drawn in over that mem-
, aiding in the cooling immensely, and
ng away with any possibility of over-
ting. The whole construction is sim-

twin-cylinder, 5 H. P. Indian, with magne
attached.

The 1908 Indian line includes a new 3
H. P. model (26.96 cubic inches cylind
capacity). This machine resembles t
2¼ H. P. Indian in general appearan
but has a 3¼x3¼ motor, other dimensio
and specifications corresponding. Price
$300. It weighs 130 lbs. with full ro
equipment, 115 lbs. stript. The 5 gallo
of fuel carried will run the machine abo
100 miles, the one quart of oil, 350 miles

The main features of the 5 H. P., tw
cylinder road model Indian have alrea
been mentioned in these columns, b
slight changes can be made to make
more suitable for short men or those w
desire a low position, the saddle being

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One of the chief features of the latest "Erie" bicycle attachment is the fact that he motor is of the 2-cycle type, which, ecause of its lightness and simplicity, nakes it an ideal means for converting he ordinary bicycle into a power-driven nachine. This attachment is the product f the Motorcycle Equipment and Supply Company, 3 Lake St., Hammondsport, N. Y., nd is sold either separately, all ready for ttaching to the bicycle frame, or in the hape of a complete motorcycle. The atachment fits any size or make of frame nd is attached without a particle of alteraion to the bicycle frame, except slightly ending the narrow makes of cranks. The Erie attachment gives a speed of from 4 to 0 miles, and is controlled by means of one ever, the movement of which increases or ecreases the speed as desired. The tank s made of heavy tin and holds gasoline for 0 to 110 miles, and enough oil for 100 to 50 miles. The battery case is made to old three standard dry cells. The drive

The accompanying cut shows the Ec belt pulley idler for motorcycles, manu tured by the Eclipse Machine Comp Elmira, N. Y.

The "Eclipse" Motorcycle Belt Pulley Idler.

The manufacturers also furnish c motorcycle specialties, such as coa brakes, hubs, head sets, etc. The pu is also made with a V-shaped groove w desired for use with a V-shaped belt.

The "Erie" 2½ H. P. two-cycle bicycle power attachment.

Motor used in the new "Erie" 2-cycle motorcycle outf

s by the Erie flexible waterproof, gray, anned V belt, which is constructed on an ntirely new principle that makes it exremely tough. The attachment complete sts at $90, which includes motor, clamp nd pulley, coil, switch grip, muffler, caruretor, control lever, tank, battery box, elt, 3 batteries, oiling device, cocks, and, n fact, every part of the complete motorycle except the parts represented by a icycle. The motor alone, without accesories, lists at $55.

This concern, also furnishes complete

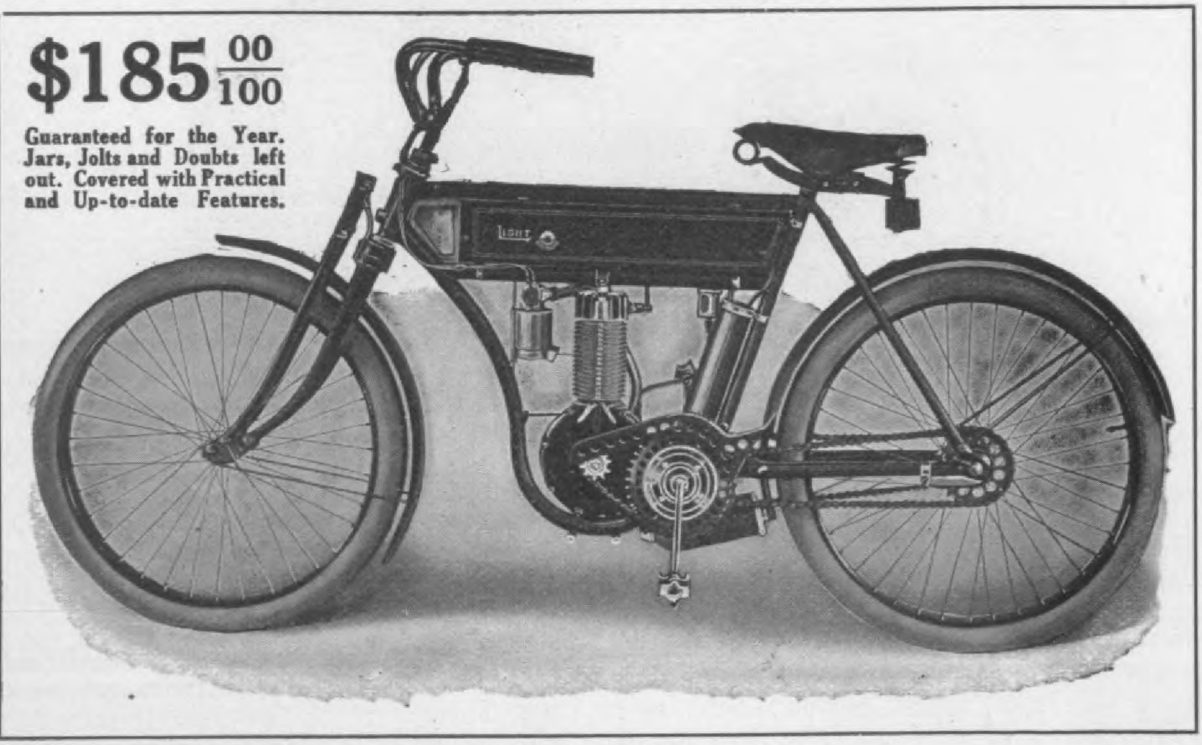
A 1902 Indian Motor Cycle made Hendee Mfg. Co. of Springfield, Mass. cently won the hill climbing champ ship, of New Zealand, Australia, at Ch church. This machine has won this test four years in succession against resentive motor cycles from all parts the world. At home the Indian is distinguishing itself being the winner the 104-mile endurance contest rece held in Alabama. This machine was den by Robert Stubbs of Birmingham

The Man Who Pays

wants the **BEST** his **MONEY** will buy. That's the reason so many purchase the Model A "Light" Motorcycle; it costs but **185\frac{00}{100}$**. Its value is 210\frac{00}{100}$. There is satisfaction in saving $25.00. There is greater satisfaction in knowing you have purchased a motorcycle of quality,—one that is positive in its action, simplicity in its arrangements and operating power, and speed that more than satisfies. Guaranteed for the year.

185\frac{00}{100}$

Guaranteed for the Year. Jars, Jolts and Doubts left out. Covered with Practical and Up-to-date Features.



MODEL "A"

AGENTS WANTED THROUGHOUT THE WORLD

CATALOGUE AND TERMS UPON REQUEST. Address Motorcycle Dept.

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CYCLE AND
AUTOMOBILE TRADE JOURNAL

Vol. XII, No. 12. PHILADELPHIA JUNE 1, 1908

May Edition 20,436

14,357	Copies mailed.
5,758	Copies delivered to News Company.
613	Copies to Philadelphia and foreign, etc., under stamps.
185	Copies to Y. M. C. A. Schools.
300	Copies held in reserve.
21,213	
777	Back numbers sent out.
20,436	Total copies April edition.
	Of these
12,002	Were paid subscriptions.
5,758	Delivered to News Company.
17,760	
868	Returned by News Company, to May 16th, 1908.
16,892	Net total paid.

We print on this page each month an exact statement of the number of copies printed and distributed of the preceding issue of "The Cycle and Automobile Trade Journal."

The bindery count of actual complete copies produced of the May issue was 20,436.

Of these, 21,536 pounds were mailed at pound rates, as shown by post office receipts. Each copy weighs 24 ounces, representing 14,357 copies, and 777 copies of back numbers and copies returned by news companies are accounted for, in addition to the total for the month.

We will be pleased to verify the above figures at any time to any one interested.

Forcing the officials to postpone the Algonquin Hill Climb three times on account of rain, the weather man finally won a victory over Chicago motorists and caused them to set the contest for August 14. The entry list will be kept closed and no other contestants will be allowed to enter other than those who had qualified for the original date, May 15.

Coming Events

American.

June 6—Second Annual Hill Climb, Williamsport, Pa., Williamsport Automobile Club.

June 6—Hill Climb on Dead Horse Hill, Worcester Automobile Club, Worcester, Mass.

June 13—Annual Hill Climb of the Cleveland Automobile Club, Cleveland, Ohio.

June 20-26—McClure Cup Contest in conjunction with annual run of the Albany, N Y., Automobile Club, John Randerson, chairman of committee in charge.

June 24-27—1200-Mile Reliability Run, Chicago to outlying points and return. Chicago Motor Club, C. P. Root, chairman contest committee.

June 25-27—Third Annual Summer Meeting of the Society of Automobile Engineers at Detroit, Mich.

June 27—Hill Climbing Contest on Skippack Hill, Norristown, Pa., Automobile Club.

June 29-30—New York City, Federation of American Motorcyclists' Annual Endurance Contest.

July 1-4—Federation of American Motorcyclists' Annual Meet, at New York City.

July 4—200 mile stock car race, in Lowell, Mass.

July 6-8—National Convention of the A. A A., at Buffalo, N. Y.

July 8—Start of Glidden Trophy Tour from Buffalo. N. Y. American Automobile Association, F. B. Hower, Buffalo, N. Y., manager.

September 5-9—San Francisco-Los Angeles Reliability Run, under auspices of the Automobile Dealers' Association

September 14—Annual Economy Run. Chicago Motor Club.

December 31-January 7—A. M. C. M. A. Annual Automobile Show at Grand Central Palace, New York City.

1909.

January 18-23—Annual Automobile Show in Madison Square Garden, under auspices of Association of Licensed Automobile Manufacturers, 7 E. 42d St., N. Y. City.

February 1-6—Chicago National Automobile Show; National Association Automobile Manufacturers, N. Y. City, S. A. Miles, manager.

Foreign.

June 1—Beginning of Alcohol Engine Competition, under auspices of Automobile Club of France.

June 1-8—Pleasure Car Reliability Trials. Automobile Club of Great Britain, London, England.

June 9-17—Touring Competition for Prince Henry of Prussia Cup, Germany, Imperial Automobile Club of Germany.

June 14—Mount Cenis Hill Climb, for Voiturettes.

June 15-19—Scottish Reliability Trials for Touring Cars.

June 18-21—Reliability run under direction of the Austrian Automobile Club.

July 7—Grand Prix Contest, Dieppe Circuit, France, A. C. of F.

July 13-17—International Race Meet, Ostend, Belgium, Automobile Club of Ostend.

July 20-30—Ardennes Circuit Races and Coup de Liederkirke, Automobile Club of Belgium.

August 29-30—Mont Ventoux Hill Climb, France, Vauclusien Automobile Club.

September 1-8—L'Auto's Contest for Voiturettes, Paris.

September 6—Bologne, Italy, Florio Cup Race, Automobile Club of Bologne.

October 2—Speed Trials of Royal Automobile Club, Isle of Man.

October 11—Third International Balloon Contest, to start from Berlin, Germany.

December ——Eleventh Annual Salon de l'Automobile Grand Palais, Automobile Club of France, Paris.

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Glidden Route Altered

Buffalo, Pittsburg, Philadelphia, Albany and Boston will be the four largest cities touched by the American Automobile Association's touring contest for the Glidden trophy this year and they will be reached in the order named. New York City will not be entered and New Jersey soil will not be touched during the tour. The route has been changed so as to include Philadelphia and avoid New Jersey. The reason for eliminating New Jersey from the route of this year's tour is the sand-bagging motor law of the state. It was originally planned to run from Philadelphia to Atlantic City and spend Sunday at that resort, but as it would have cost the contestants about $13 license fee for each car, for the two days the state was avoided altogether. From Philadelphia the route of the tour will be through the Delaware Water Gap and by way of Port Jervis into New York and up to Albany. Thence it will go thru the most interesting parts of New England.

The work of laying out the route of the A. A. A. touring contest is now more than half finished and the reports from Dai Lewis, secretary of the A. A. A. touring board, who is mapping out the route are to the effect that generally speaking, the roads are better, the scenery finer and the night accommodations more satisfactory than on former tours. The roads lead over more mountainous country, however, and the time schedule being planned will make the contest a closer one than ever before, which has been the chief aim of Chairman Hower, of the touring board.

The run for each day and the stopping places at night and Sunday, as thus far arranged, are: July 9, Buffalo, N. Y., to Cambridge Springs, Pa., 117.4 miles; July 10, Cambridge Springs to Pittsburg, Pa., 110.2 miles; July 11, Pittsburg to Bedford Springs, Pa., 106.4 miles; July 12, (Sunday) at Bedford Springs; July 13, Bedford Springs to Harrisburg, 107.3 miles; July 14, Harrisburg, Pa., to Philadelphia, 133.5 miles; July 15, Philadelphia to Milford, Pa.; July 16, Milford to Albany; July 17, Albany to Boston.

From Boston the tour will go up into Maine, back into the White mountains and probably disband at Saratoga on July 22 or 23. The details beyond Boston will not be settled until after the pathfinding trip is completed.

Entries for the A.A.A. reliability contest for the Glidden trophy can be made at any time now, giving only the fee, the name of the car and the entrant. It will not be necessary for entrants to give the names of drivers and observers until the entries close on July 3. Entries are made with Chairman F. B. Hower, 760 Main St., Buffalo. Blanks may be had from him, from Arthur Jervis, 29 West 42d St., N. Y., or from any of the principal dealers.

Buffalo Good Roads Convention

Buffalo will be "wide open" to automobilists during the good roads convention to be held there July 6, 7, 8, under the auspices of the American Automobile Association. Mayor J. N. Adam will formally hand over the key of the city. A lively interest is being taken in this convention all over the country and the attendance is expected to be well up in the thousands. The governors of New York, Pennsylvania and Ohio, the highway commissioners and state engineers of Pennsylvania, Massachusetts and New York, and a long list of other notables will participate in the doings, educational and social. Road runs, speech making, smokers, vaudeville entertainments and highway inspections will vary the program.

A delegation from each of the different state organizations of the American Automobile Association will be sent to attend the National Good Roads Convention, and as there are now twenty-four state divisions, the event will probably be the most truly national, as well as the biggest good roads convention ever held in this country.

Among the demonstrations, entertainments, banquets and oratorical sessions at Buffalo during the National Good Roads and Legislative Convention will be a series of experiments with various dust preventives, such as Westrumite, Tarvia, oil, etc. In these, a 3½ mile stretch of dusty road will be divided into seven sections, on each of which a different mixture will be applied. About two hundred automobiles will be used to test the efficacy of the various dust medicines. Governors, state engineers and various highway officials will be present to learn what they can of subjugating dusty roads.

Under the new rules a state organization of the American Automobile Association can be formed in any state, by 100 individual members of the national body. Applications for an individual membership should be made to Secretary F. H. Elliott, at the executive headquarters, 437 Fifth Ave., N. Y.

The location of the Vanderbilt Cup course is still an open question. Representatives of the Savannah Automobile Club gave it up after numerous conferences with members of the Cup Commission, which appears to be long on agnosticism. The Savannah enthusiasts have not despaired, but state that they are much overcome with A. A. A. red tape. Connecticut is said to be an impossibility, and St. Louis is said to be out of the running. The light upon which the Racing Board's eyes are fixed appears to be the Long Island will-o'-the-wisp.

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A. M. C. M. A. 1909 Show Date Set for New Year's Eve

After a careful consideration of the interests of the automobile and accessory manufacturers, dealers and the public who buy cars, the American Motor Car Manufacturers' Association has definitely decided upon the dates for its show next winter in Grand Central Palace, New York. The big exhibition will open on New Year's Eve, a gala occasion in New York. This will make the show dates December 31, 1908 to January 7, 1909.

The Importers Automobile Salon this coming December 31 to January 7 will exhibit with the A.M.C.M.A. in the Grand Central Palace, New York, instead of separately at the Madison Square Garden as they did last winter.

E. R. Hollander will represent the Importers' Association to serve on the A.M.C.M.A. Show Committee which consists of H. O. Smith, Chairman; S. H. Mora, R. M. Owen, Benjamin Briscoe, and Alfred Reeves, General Manager.

A. M. C. M. A. Chicago Show in February

At a recent meeting of the Committee of Management of the American Motor Car Manufacturers' Association, held at its headquarters in New York, the Show Committee was empowered to make arrangements for an automobile show under the auspices of the association, to be conducted in Chicago some time during February. This is in line with the policy of the association of promoting its own shows, as in the case of the Grand Central Palace show to be held in New York next winter.

According to present plans, the Chicago Automobile Club and the Chicago Motor Club will be associated with the A. M. C. M. A. in the western show.

Meeting of the Mechanical Branch in Cleveland

In accordance with the policy suggested at the meeting of the Mechanical Branch of the Association of Licensed Automobile Manufacturers, in Chicago, in December, to the effect that the Branch meetings be held at different points thruout the country, in order to give the engineers an opportunity to inspect and study the different factory methods of its members, a meeting of the Mechanical Branch was held at the Hollanden Hotel in Cleveland, Friday, May 22d.

The morning session was opened at nine o'clock, taking up the subjects of proposed standard brake and clutch levers which has been given a certain amount of attention by the engineers and especially the Test Committe for the past three or four months. A full and very interesting report of data gathered by the Test Committee relative to the dynamometer of the Automobile Club of America was given and discussed. There was a paper on the two-cycle motor by E. W. Roberts and A. W. Thompson of the Electric Welding Products Company gave an illustrated lecture on the advantages of combination valves, nickel steel heads and carbon steel ends.

Some of the local factories were visited by the engineers in a body, and factory and shop methods closely studied.

46 in Grand Prix

There are 46 cars in all entered in the Grand Prix, the classic French auto derby. Of these the Bayard-Clement, Brasier, Lorraine-Dietrich, Motobloc, Panhard, Renault represent France; the Fiat and Itala are the Italian entries; the Austin and Weigel are the English entries; the Germain, Ben, Mercedes, Opel and Porthos are the German entries, and the Thomas the American. It will be seen that the American car is to compete against 15 teams of three cars each, of which six are French, two Italian, two English and five German. Preparations are being made with the entrants of cars in the Grand Prix race to have the drivers of the machines familiarize themselves with the circuit at Dieppe to the greatest possible extent. Some of those who will drive in the race were competitors a year ago and this means that the knowledge gained by practice and through the 1907 race ought to make the cars these men will drive minutes faster. The Grand Prix race ought to be more prominent than ever this season. Strang sails from New York on May 10, and will arrive on the course about May 17, and will thus have about two months of practice work upon the course, which will give him a greater advantage than has been the lot of American drivers who have entered the foreign events in the past.

Boston 1909 Show to be in March

It has been decided by the directors of the Boston Automobile Dealers' Association to hold the 1909 show during the second week in March as on previous years. The Mechanics building will be leased as usual, altho there was some talk of another location.

The Fairmount Park Commission, Philadelphia, Pa., has directed Superintendent Vogdes to begin the regular use of terracolio over all the principal driveways in the park. This liquid, which is a composition of asphaltum oil and water, will be sprinkled liberally over the roads once every week or ten days throughout the summer. It is stated experiments have shown that the treatment which costs only a half cent per square yard will save the city money as well as add to the comfort of the public.

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Automobile Club of France Protests Vanderbilt Cup Race Rules

The Automobile Club of America received the following letter from Honorable Chv. Rene de Knyff, President of the Commission Sportive, Automobile Club of France, protesting against the proposed rules for the Vanderbilt Cup Race to be held in the year 1908.

AUTOMOBILE CLUB OF FRANCE,
8 Place de la Concorde, Paris, France.
April 18th, 1908.

President of The Automobile Club of America, New York.

Mr. President.

The Contest Committee at their meeting on the 17th instant took notice of the proposed rules for the Vanderbilt Cup Race for 1908, as same were published in the different journals. I believe it is proper to call your attention to the fact that the basis of these rules is in disaccord with those adopted at the meetings at Ostende on the 14th of July, 1907, at the reunion of the delegates to the International Association of Recognized Automobile Clubs, at which the following formula was unanimously adopted:

"All cars taking part in the 1908 Race should have a 4-cylinder motor, with a bore of 155 mm. 6.1 inches maximum, or its equivalent in effective surface, whatever number of cylinders it may have.

Cars ready to start, but without water, without gasoline, without tools, and without extra tires, should weigh a minimum of 1100 kgs. (2425.06 lbs.).

In this weight of 1100 kgs. should be included the oil for the motor and the transmission."

Consequently French car builders have this year built their types of racing cars according to the rules above given, and the rules for the Grand Prix of the Automobile Club of France have been worked out on this same basis.

If the rules for the Vanderbilt Cup Race are as printed in the journals the car builders find themselves in the position of not being able to take part in this race, or to construct new types, which would be in opposition to the decision taken at Ostende.

I would be very much obliged, Mr. President, if you would be good enough to lay this before the Contest Committee of your Club, in order that the rules for the Vanderbilt Cup Race, which have not yet been definitely adopted, should be reconstructed so as to allow vehicles built according to the rules adopted at Ostende, to participate in this contest.

Will you please accept, Mr. President, the assurances of my most distinguished consideration.

President of the Commission Sportive,
(Signed) Chev. Rene de Knyff.

This letter was forwarded at once to Jefferson De Mont Thompson, chairman of the Racing Board of the A. A. A. and of the Vanderbilt Cup Commission by Robert Lee Morrell, of the A. C. A., with the request that the matter be presented at once. In this letter Mr. Morrell says:

"As the sole representative of all the national European Automobile Clubs and as the ony American member of the International Association of Recognized Automobile Clubs, the Automobile Club of America feels itself bound by the rules adopted at the Ostend Congress on the 14th of July, 1907, as set forth in said protest, and further that these rules are binding for any international race to be held in America."

At the time of going to press it is reported the A. A. A. will not change the Vanderbilt Cup rules and that the A. C. A. has proposed to the directors of the Savannah Club to conduct an international race there under the Ostend conditions.

The New York-Paris Race

According to latest reports, the competing cars in the New York-Paris race have departed from Vladivostock according to their finish in San Francisco. At a meeting recently held in Paris it was decided to send the Thomas Flyer away fifteen days ahead of the De Dion and the Zust, and thirty days ahead of the Protos car of Germany. The action of the committee having the race in charge is fair to the American car and this action has been approved generally throughout this country. George Schuster, who has been on the Thomas car ever since it left New York, will drive the car from Vladivostock to Paris and will not be replaced, according to rumors, by Monty Roberts or any other driver. George Miller will be his mechanician.

To be sold at auction for $1,650 was the fate of the Moto-bloc, driven by Goddard, who was telegraphed to abandon the race, sell the car and come home. The car was valued at $10,000. While the sale was proceeding an attorney engaged by an Iowa farmer made his appearance with a bill of $600 for hauling the car thru the mud half way across the State of San Francisco, foundering several mules on the job. After the bill was paid Goddard took the remaining $1050. Last but not least the U. S. Customs officials demand payment of $4,500 duty, which will probably be collected from the bondsmen in New York.

The Baltimore News Sealed Bonnet contest came to a successful close with seventeen contestants making perfect scores. It was originally intended by the Baltimore News when the contest was planned to give three cups to the first three cars in best condition after the contest, but with so many perfect scores the judges were in a quandary as to selection of the best three, so that after leaving the affair in the hands of the committee it was decided in favor of giving a small silver cup to each of the successful contestants. The contest was a success in every way. The large number of successful entrants who piloted their cars over the worst roads in the State, crossing mountains of the Blue Ridge, demonstrated the strength and durability of the automobile. Not only the big cars came through successfully, but the little Ford roadster, a 15-horse power car, surmounted all the difficulties of the way, and ended the run with a perfect score.

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A. S. M. E. and S. A. E. to Meet

The Society of Automobile Engineers will hold their third annual summer meeting in connection with the semi-annual meeting of the American Society of Mechanical Engineers at Detroit, Mich., June 25-27. The meeting of the A. S. M. E. will open June 23d and close June 26th, the dates overlapping so that the members of both organizations may have the benefit of papers to be read at each.

Harrisburg Endurance Contest

Twenty-six cars were entered in the second annual endurance run of the Harrisburg Automobile Club over the route from Harrisburg to Philadelphia and back, a distance of 186 miles. All of the cars entered started except a Rambler entered by I. L. Brown. The Philadelphia control was at the White Garage, and the first competing car arrived there at 3.57 P. M., nearly an hour ahead of time. The cars came thru to Philadelphia in good shape, with the exception of two. A Stoddard-Dayton, driven by Howard Hodson, skidded and ran into a wall while turning a corner near Doylestown, throwing its occupants out, but without injuring anyone, and C. C. Cocklin lost twenty-five minutes thru a broken water connection. Another car is said to have broken a steering knuckle. The perfect score winners were as follows: Jackson (J. S. Trego); Pullman (E. G. Irvin); Pullman (J. S. Kline); Pullman (Stuart B. Lafean); Pierce Arrow (H. F. Rawle); Mitchell (W. M. Cram); Cadillac (S. Thorley); Ford (A. A. Jones); Rambler (A. H. Bitner); Pennsylvania (R. H. Croninger); White (Walter C. White).

At the regular monthly meeting of the Executive Committee of the A. A. A., New York, the Virginia State Automobile Association was elected to membership making the twenty-fourth affiliated State organization.

A resolution was adopted designating the second week in June next as the period during which the outings to the orphans by the A. A. A. clubs should be given and it is expected that a large majority of the automobile clubs thruout the country will conform to this action.

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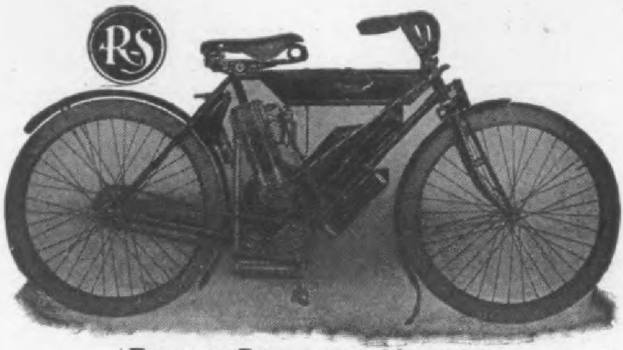

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Philadelphia, June 1st, 1908

An American Motordrome Needed

The automobile racing season is now well opened and plans for numerous economy tests, road and track events have been arranged in all parts of the country.

This publication has consistently advocated all such events as would tend either by their character or owing to the rules governing them to increase the fund of information so zealously guarded by the designer, or to promote in other ways the welfare of the industry. Stock touring car contests unquestionably are of material help not only to the makers of the cars entered, but as a means of enlightening the general public as to comparative car performance. Even highly specialized racing machines when entered for long distance competitions have added their quota to the general fund of useful motor car information.

That there is an element of danger in all such competitive events not only to those actually engaged in operating the cars but to the spectators we fully appreciate, and for that reason advocate as far as possible the use of such courses as can be adequately guarded. Racing over unnecessarily tortuous or difficult routes is certainly not to be encouraged nor is it necessary, and events held on short circular flat tracks, the curves of which are not banked, are also dangerous. There seems to be but one remedy, namely, to provide a properly protected and safe place for such contests.

Automobile races of one form or another will probably be held as long as the public has use for such a vehicle. If this view is correct there is unquestionably a growing need in this country for a specially constructed motordrome such as Brooklands in England. A course of this kind provides a suitable place for holding not only high speed tests but for carrying out under favorable conditions mechanical and special efficiency investigations, which are now attempted under extremely adverse conditions and usually without authoritative supervision. The results of these nondescript performances very seldom supply dependable data. The lesson of Brooklands has shown that even as an advertising medium such a track can be made extremely useful to manufacturers who take advantage of the facilities and supervision offered. If centrally located the grounds might also be made the site of an immense exhibition hall in which each year could be held a truly representative show, as the enclosure would provide ample facilities for parking visitors' cars and the track a place for gymkhanas and competitive events. Such a course, if located at a large automobile manufacturing center in our country could be largely used by manufacturers and would relieve the public roads in these districts of much of the testing car nuisance. At the same time much valuable and reliable information would result.

Taking everything into consideration it would seem wise to have such a track built in this country, as undoubtedly the American industry is now, and will continue to be sufficiently in need of a protected course of this kind, to make its construction advisable and its use profitable.

Demand for Convertible Bodies

As the mechanism of the automobile draws nearer and nearer to perfection and standardization of its parts progresses, the variation in the construction of the bodies becomes more evident. For some time past there has been evinced a growing tendency of the public for convertible bodies. This demand is being met by several of the best known makers by supplying two or even three bodies with a single chassis, the whole at a comparatively reasonable figure, and it is evident that this enlarging of the field of usefulness of the individual chassis is a feature which will play an important part in motor car sales in the next few years.

Cars are not as apt to be turned in at the end of each season as formerly and pur-

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chasers expect several years' uninterrupted service from their machines. The convertible body really supplies several cars in one and makes it possible and profitable to use a single car several years. The extremely heavy car is gradually giving way to lighter forms which are less expensive to maintain. This is shown in the demand for cars of runabout type, yet capable of carrying at least four, or even five passengers. The result has been the development of what is known as the tourabout, or a car having two individual removable seats at the rear or an open surrey seat capable of carrying three persons. Compare this modern vehicle with the previous heavy touring car capable of seating the same number of persons. It is lighter and much more graceful in appearance. Furthermore, in many instances the rear seat arrangements are of a convertible nature and can be folded up, making a sightly runabout for two, or the seats can be arranged to carry two or three persons at the rear or can be even completely removed, providing a rear deck for baggage. In other cases the entire body above the frame and to the rear of the dash can be removed and replaced by an enclosed body or bodies of landaulette type for winter use, but these changes very often necessitate considerable expenditure of time and strength and are not yet as thoroly perfected as could be desired.

We believe that a type of body would meet largely with public approval, in which the upper portion only need be converted instead of its being necessary to change the complete body. Such a convertible type could be arranged so that it would form a unit, which could be easily suspended in the garage and almost instantly lowered into position somewhat after the manner of the suspended harness for fire engine horses, thus materially reducing the labor of converting the car.

The convertible body certainly offers a ready solution of the problem which confronts the average purchaser. If a car is desired for business purposes, a seating capacity of two is ample, yet the purchaser also desires occasionally to take his family or friends for a drive, but he does not care to lug this extra seating capacity arrangement around in his business drives. Again, he may wish to make a tour, and, under these circumstances, it is extremely difficult to choose a car which can successfully supply these various needs. The convertible body, however, does fill these needs and makes it possible to rapidly change a single car into two or three different types, and all this can be done without having an excessively heavy chassis. Body building has reached such a state of perfection that substantial constructions are now made which are comparatively light, and these are nearly always so arranged that windows can be lowered, fronts lifted, etc., giving additional comfort to the occupant.

That the convertible body is now and will continue to be a live factor in connection with the sale of cars we are firmly convinced and therefore suggest improvement along the lines of lighter convertible types, particularly the design of such bodies that only the upper portion need be changed rather than the complete body.

Somewhat of a Nuisance

We have several times mentioned in these columns the need for two-speed and free engine devices on up-to-date motor cycles of American manufacture. The advantages of a machine fitted in this way are very numerous and can be appreciated by all riders. Many of these features have been pointed out, but recently we have had our attention called to still another matter connected with motor cycle use which would be greatly improved were free engine devices more generally used. We refer particularly to the disagreeable muffler explosions which are so apt to take place whenever the rider slows down by cutting off the spark. These explosions riders are accustomed to and they do not mind them, but how about the skittish horse or the unsophisticated pedestrian? The unfortunate part of this matter is the fact that nearly always these explosions occur just at the most inopportune time. For example, the motorcyclist, in threading his way thru traffic, notices a restive horse and naturally slows down somewhat as he approaches, very often cutting off his engine altogether just as he gets under the horse's head, and, of course, at this instant two or three terrific muffler explosions take place, and in some cases runaways have been caused in this manner. In one instance, the Court even censured the rider, which was manifestly unjust as he had done everything in his power to conform to traffic regulations, the entire fault lying with the mechanical arrangements of the machine.

Aside from the actual damage which may be caused by such unexpected explosions in the muffler there is also another phase of the question to be considered, that is, the effect upon the feelings of pedestrians in regard to motor cycles in general when machines make these disagreeable and startling reports. It is not uncommon to hear a person say after such an occurrence, "Well, I wouldn't ride one of those gattling guns if I had to walk the rest of my life," or some such equally uncomplimentary remark all of which goes to show the effect that such crudities, for they are crudities, have upon the portion of our community who are not users.

Running with the muffler open is another matter which can be classed as regards its

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effect in the same category, but is, of course, within the control of the operator, while the muffler explosion is not completely so.

If for no other reasons than those mentioned in the foregoing, it would be worth while for makers to supply some form of free engine device by means of which it would be possible to slow down without the engine continuing to run, ejecting charges of unburned gas into the heated muffler. The more refinements which can be incorporated in the design of these machines the more rapidly they will be taken up and used by the public. The same sequence of events can be traced in the history of the automobile, for in the early days nearly every auto sounded more or less like a threshing machine, particularly when on the intermediate or low gear, and this fact created considerable prejudice against them. However, as the cars were perfected and more efficient mufflers supplied, these defects gradually disappeared and to-day it is very unusual to hear a machine making such an uproar as was the common occurrence but a few years past.

We do not mean to say that the motor cycle is at present in such a bad state but there are still a number of improvements which can be made and none will insure their taking up and sanctioning by the public any more speedily than those which produce absolutely quiet running.

Plenty of Events for 1908

There is a seeming unanimity of opinion in regard to the advantages to be gained from competing in open events and all of the great contests, touring, hill climbing and racing, of 1908, will probably have record breaking entry lists. The season's prospects are therefore of the very best and the hill climbing events, the economy and endurance runs and track races of May with the events of similar nature in June and the A. A. A. tour of July will be well entered. The entry list for the A. A. A. tour is already open and entries are being received. The month of August will see a number of twenty-four hour races and some time in the Fall the first race for the J. De Mont Thomson trophy for stripped stock cars will be run. Then will come the elimination trials for the Vanderbilt Cup Race and then the Vanderbilt itself with hill climbs and touring contest until snow flies. Nor are these contests going to be easy going affairs when of the touring nature, for the promoters plan to bring forth winners this year by an increase in the stringency of the rules as was the case last Fall.

Suicide of R. Hale Smith

R. Hale Smith, president and treasurer of the R. H. Smith Manufacturing Company, Springfield, Mass., well known maker of the Springfield Motometer, shot himself while sitting at his office desk. Brooding over the fact that his speed indicating device had not been the financial success anticipated, is given as the reason for his action.

Before taking his life, he called up his brother and a doctor and requested them to come to the office as soon as possible. He also called up an intimate lady friend of his wife and told her to hasten to his home as she was needed. He then sent a messenger boy to his house with a note to his wife, saying that he contemplated suicide and another to her friend asking her to look after and console his wife. He lived but 55 minutes after the ball entered his temple.

Mr. R. H. Smith was one of the best known men of Springfield having been a member of the common council and board of public works on which his knowledge of engineering made him of much practical value to the city.

He leaves a son, Henry Pratt Smith, a successful business man of Guanajuato, Mex., a brother, Henry M., of Springfield, vice-president of the R. H. Smith Manufacturing Company, and two sisters, Mrs. Emily McCall of Lebanon, Conn., and Miss Ellen M. Smith of Springfield.

A New Route Between New York and Philadelphia

As many tourists have declared their intention of keeping out of New Jersey because of the drastic and unreasonable provisions of the new automobile law which goes into effect on June 1, the announcement of R. H. Johnston, Chairman of the Good Roads Committee of the New York State Automobile Association, that he has found a very desirable touring route between New York and Philadelphia which does not enter New Jersey, will be hailed with interest. The new route skirts the northern boundary line of New Jersey and then, crossing from Port Jervis, New York into Matamoras, Pa., follows almost a straight line down the Delaware valley to Philadelphia. The distance is about 225 miles only about 30 of which are not first class—and the scenery is said to be excellent.

In connection with the Subway celebrations at Jamaica, L. I. automobile time trials will be held on June 5, on Hillside Ave. They will be run in classes with an interesting free-for-all to top off the day's events. Three miles of splendid roadway will be fenced off and adequately guarded by the police. Hillside Avenue will be rolled and specially prepared for the events and there will be a thorough oiling of the course.

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Two-Cycle Engine Considerations

By E. S. FOLJAMBE

LACK OF FUEL ECONOMY.

With the recent revival of the 2-cycle engine and its growing use for automobile propulsion, the question of fuel losses or lack of economy in this type of motor is again brought up for careful consideration. That the small 2-cycle motor as ordinarily designed, or, more accurately speaking, as ordinarily built, for many specimens of this type seem never to have been designed, is wasteful of fuel is conceded. It will be understood that this discussion has no reference to the large and complicated stationary 2-cycle engines, the efficient performance of many of which is all that can be desired.

Much of the general impression in regard to the low fuel efficiency of small motors is doubtless due to the action of illy designed and crudely built marine engines of early type. Nevertheless, it may here be said that these same crude constructions were and even now are used, because they run and continue to run, with practically no care or attention, and this characteristic is a well-known asset of the simple 2-cycle engine. More modern 2-stroke motors are now being designed which approach much more closely the economy of the 4-cycle engine, and startling statements are occasionally heard from inventors that their engine is just as efficient as the 4-cycle, yet the writer has never had the pleasure of seeing any of these marvels under test.

There are many inherent reasons why the 2-cycle engine is somewhat wasteful of fuel, but much has been and can yet be done by careful designing to improve and possibly correct this principal defect without losing the simplicity of the type. In attempting to attain the goal of maximum fuel economy and consequent power production, many designers have been led unwittingly into the construction of motors fully as complicated and almost as heavy as the 4-cycle models, which naturally defeats the very end desired.

Losses are due to such causes as incomplete scavenging and consequent fouling of the working charge, direct losses to the exhaust, back firing, crank case losses. incorrect mixture, four cycling, etc., all these conditions being more or less intimately associated with 2-cycle action.

THE TIME ELEMENT.

Completely expelling the burned gases has been and is yet the greatest obstacle to be overcome. Time enters largely into this problem, for it must be remembered that actions which can be made to take place at moderate speeds cannot be carried out successfully at higher speeds. The almost infinitesimal port opening duration of the 2-cycle engine can be appreciated when it is stated that the entire sequence of exhaust, scavenging and intake in an engine of ordinary construction running at 1000 R. P. M. does not exceed 2-100 of a second and yet engines have been known to turn up light, between two and three thousand revolutions per minute. Experiments have shown that in the De Dion type 4-cycle engine it is impossible to get a charge of more than 60 per cent. of the actual piston displacement into the cylinder when the speed exceeds 1500 R. P. M. This same difficulty exists with the 2-cycle, only to a greater extent. The maximum working speed or that at which the engine will continuously carry a load is therefore much less than it can attain when running light. This working speed, of course, is determined by the balancing of two opposing factors, namely, decreased power at high speeds, due to insufficient charge, and increased power due to the larger number of impulses in a unit of time.

SCAVENGING.

Extreme and opposing views in regard to the scavenging of the combustion chamber are apparently held by designers. On one hand it is claimed that the residual gases must be forcibly driven out and on the other that as the exhaust port is uncovered while the gases are still under pressure, they rush out of their own accord without external assistance. Both of these assumptions are doubtless partially true, but the best action is obtained in a design based on a combination of these assumptions. If the stroke is too short or the exhaust port too high in the direction of the cylinder length, and the gases are liberated at considerable pressure, they will doubtless rush out of the exhaust, and at high motor speeds it is conceivable that due to inertia effects the resulting pressure in the cylinder might even be reduced to less than atmospheric. However, unless the new charge is forced into the cylinder or the exhaust otherwise assisted, high motor speeds cannot be obtained, and manograph records almost invariably show that when working under load the pressure in the cylinder never falls as low as the atmospheric line. Furthermore, exhausting at too great pressure is also wasteful of fuel. On the other hand, when the exhaust action is assisted by an inrush of either mixture or air, altho the scavenging is accomplished more rapidly, it will be seen from the foregoing that the action is not due entirely to the driving out of the old charge by the new, as sometimes stated.

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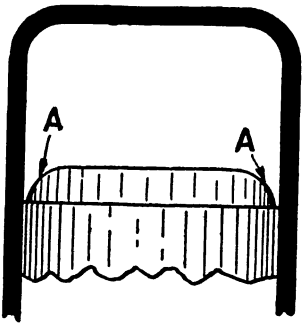
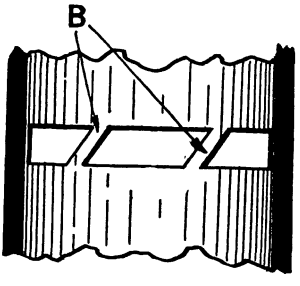
The greater the pressure of the new charge at the time of its expansion into the combustion space the more rapid will its transfer be, and, of course, this rapidity bears a direct functional relation to the amount which will enter the cylinder during the very limited time the intake port is open, and therefore to the resultant greatest speed and power obtainable from the motor. Again, however, opposing forces are at work limiting the advantages to be derived from highly compressing the charge before its transfer, for it must be understood that all the work done on the charge before it enters the cylinder, is negative. Furthermore, compressing it also heats the entering charge, which is not advantageous when carried beyond the temperature necessary to insure sufficient vaporization of the fuel to form a good mixture, and when a good mixture has been obtained the cooler it is when entering the cylinder the larger the quantity of fuel that can be made to enter and the great will be its useful rise in temperature when fired. The larger the volume of charge transferred, other features being similar, the more complete will be the scavenging, and it is even possible, by means of differential pistons and auxiliary pumps to more than fill the entire space swept by the piston and that represented by the clearance, in which case there is, of course, a direct loss to the exhaust port. But even under these conditions there is no certainty that all the exhaust has been expelled and the actual proportions of the mixture depend almost entirely upon the location, form and area of the port openings, the shape and size of the deflector or baffle plate and the form of the cylinder head.

THE PORTS.

Both the intake and exhaust ports of the ordinary 2-cycle type motor in which the piston acts as a valve should be made as large as possible in a circumferential direction rather than in height. This gives a larger port area close to the end of the stroke, where the motion of the piston is slowest, therefore this port area is open during a longer period than when the same area is obtained by making the ports taller. In no case, if 4-cycle engine performance is to be approximated, should the exhaust open earlier than it does in 4-cycle engines, the limit being about 45 deg. on the crank circle before the crank end dead point is reached. Opening earlier simply cuts down the actual length of the working stroke, wastes fuel and is not necessary if sufficient port area is gained circumferentially. In this direction the ports can be extended almost to touching, leaving simply sufficient wall space between to carry the piston ring openings, three fourths of an inch being about the minimum that can be allowed. There is one objection to this arrangement. In engines with high compression in which the available space above the piston is small, say less than 20 per cent of the total cylinder volume, and in which the cylinder head is considerably curved, the baffle plate must necessarily be rounded at each end, and if not very tall this may almost cut away the baffle plate at the cylinder walls as shown in the sketch at A, Fig. 1. Under these conditions, when the intake port is fully open a small amount of charge might pass over to the exhaust port. However, as 2-cycle motors do not ordinarily have high compressions and small clearance, the baffle plates are usually high enough to prevent this action. The end of the baffle plate should, of course, be as close a fit to the cylinder walls as possible, but this is a matter which will be considered in connection with different forms of baffle plates.





THE BRIDGES

The axial height of the intake is usually from half to two thirds that of the exhaust in order that the cylinder may be relieved of a considerable part of the waste products of combustion before the entry of the new charge and is made about 1-6 to ⅛ the stroke, depending on its circumferential dimension and the width of the bridges, two of which are ordinarily placed to prevent the rings catching in the ports. These bridges should be as narrow as possible in order not to interfere with the incoming gas, ¼ inch being about as narrow as practicable. They should be placed diagonally, that is, not parallel to the cylinder axis, as shown in Fig. 1 at B, in order to bear on a larger part of the circumference of the piston rings and thus

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prevent the wearing of a groove in the rings which, being pinned, always bear at the same place on the bridges. This arrangement of bridges also permits the entering charge to successively sweep every part of the cylinder.

On the down stroke this height arrangement of the ports can be made to give exactly the relative time of exhaust and intake port opening, but on the up stroke it gives just what is not desired. In other words, the intake is closed first while the exhaust still remains open allowing a loss. The best action would be had if these conditions were just reversed, allowing the intake to remain open slightly after the closing of the exhaust. Some designs obviate this difficulty by providing an intake valve, usually automatic, or by the use of an auxiliary sliding sleeve in the cylinder in which in turn the piston slides, the differential motion between the piston and sleeve being arranged to close the ports as desired, but these forms are apt to introduce complications.

It might appear that as the intake is open during the first part of the up stroke of the piston some of the charge might be forced back, but this does not take place, as the motion of the piston is so slow at this portion of the stroke and the gas is rushing in under pressure. Furthermore, the inertia of the gas would tend to keep up the flow into the cylinder and out of the exhaust, even if the pressure in the crank case or other charge compress chamber was down to atmospheric, and this can be taken advantage of as will be pointed out later. But during all this time the exhaust is still open and a continuous flow of either burned charge, fresh air, or, more likely, a mixture of both, has been passing out, thus wasting fuel. It is contended by some that it is impossible for any fuel to thus pass out, as it is assumed that the maximum amount entering the cylinder is only equal to the piston displacement and this volume would only be sufficient to fill the clearance space and the upper part of the cylinder down to the top of the exhaust port.

This view of the matter is evidently hypothetical, as it is certain the entire cylinder from the head to the top of the piston is filled with something and it is inconceivable that any clearly defined horizontal plane of demarkation should exist across the cylinder at the height of the exhaust port, with entirely fresh gas above and burned gas below. The fresh charge certainly mixes to a greater or less extent with the residual gas and largely reduces the resultant power of the explosion. Yet it must be borne in mind that even in the best 4-cycle motors the clearance space contains waste products of combustion which mix with the fresh charge. This being true, a 2-cycle engine in which there is a minimum amount of old gas diluting the new charge and in which sufficient charge can be introduced, to completely fill the cylinder, including the clearance space without complicated and power consuming mechanism, this engine should develop more than double the power of a four-cycle engine of equal dimensions at the same number of revolutions and is the ideal internal combustion engine for which designers are striving.

(To be continued).

Creditable Performances

A Woods electric car was recently driven up a steep hill on 21st Street, Kansas City, Missouri, said to have a grade of 22 per cent., the hill at the time being covered with a hard glaze of ice. This climb was made as a demonstration and three blocks including the hill were covered in 1 minute 10⅔ seconds.

H. E. Frederickson drove a Thomas Flyer from Cheyenne, Wyo. to Omaha, Neb., at an average speed of 17 miles per hour, breaking the record, it is said, for the run between these two cities. He left Cheyenne at 7 A. M. March 10 and arrived in Omaha Tuesday afternoon, having ridden night and day without stopping except for food and supplies. He slept four hours curled up on the rear seat while his mechanic drove, but drove the car all the rest of the time himself. Between Cheyenne and Sidney (Neb.) he averaged 30 miles per hour but after leaving Sidney struck softer roads.

A Reo 2-cylinder car recently made a new non-stop record of 4,992 miles, this distance having been covered in twelve days continuous running from 6 A. M., April 4, to 8.35 A. M. April 16, with representatives of the Los Angeles (Cal.) Times as observers. The average speed was 415 miles per day and the best day's running was 503 miles covered the first day. Only 4½ gallons of water were used in the cooling system and altho a full load of passengers was carried, the car averaged 17 miles on each gallon of gasoline.

Using a demonstrating car from stock, Mr. H. B. Odell, one of the salesmen of the Buffalo Mora Car Agency, had the power plant securely sealed by Dia. H. Lewis, Secretary of the Buffalo Automobile Club, and arranged for representatives of the press and club members to act as continuous observers in a 1,000-mile reliability test of a 6-cylinder Mora Racytype. The test was made on the streets of Buffalo and on roads 30 to 35 miles outside the city where actual road conditions were encountered at all times. The run was completed in 47½ hours actual running time, or an average of better than 21 miles an hour, allowance being made for tire repairs.

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FRANKLIN

Before you buy any automobile see it weighed and test its strength.

Look at the running-cost of a light-weight automobile compared with a heavy one.

You can carry seven passengers in the Franklin Type H automobile cheaper than you can run the ordinary 5-passenger machine. And Type H has six cylinders with all the smoothness and speed and perfect balance they give. Think of it!—a powerful roomy touring-car refined and strong and capable of 55 miles an hour; yet weighing only 2600 pounds, and actually costing less to own and run than the average 5-passenger 4-cylinder machine.

Other seven-passenger machines both 4 and 6 cylinders, weigh on the average, a thousand pounds more than type H, and cost over 40 per cent more to run besides depreciating faster.

All the Franklin models are on the same principle—high power with strength and light weight.

The Franklin doesn't bump itself to pieces nor jolt its passengers. The laminated wood-frame and four full-elliptic springs absorb road-shocks. There are no water-cooling troubles. What water-cooled motor could run a solid week with the automobile standing still in a warm salesroom, as the air-cooled Franklin did at Chicago? What heavy automobile could run from Chicago to New York in less than 40 hours?

You can't drive a heavy, steel-frame, hard-riding automobile at speed safely and comfortably on American roads.

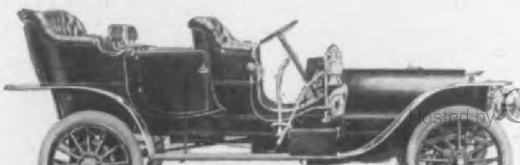
You're sure of comfort and safety in a light-weight Franklin.

16 h. p. 4-cylinder Runabout	$1750	28 h. p. 4-cylinder Touring-car or Runabout	$2850
16 h. p. 4-cylinder Touring-car	1850	42 h. p. 6-cylinder Touring-car or Runabout	4000

Prices f.o b. Syracuse

Write for catalogue describing the Franklin.

H H FRANKLIN MFG CO., Syracuse, N Y



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Fires, Failures, Judgments, etc.

A petition in involuntary bankruptcy has been filed against the American Gasoline Motor Company of Baldwinsville, N. Y.; liabilities $12,000, and assets $8,000.

The Detroit Trust Co., trustee in bankruptcy for the Aerocar Car Co., Detroit, Mich., is sending out checks to creditors to the amount of $22,000. This is the second dividend, which is 10 per cent. making with the first dividend a total of 22½ per cent.

The Brockton Motor Exchange, Brockton, Mass., has been bought by a new concern named the Gay Automobile Co. The new company has been incorporated with a capital of $10,000, and will continue the general automobile business at the same location, 351 Belmont avenue.

Fire in the basement of the Central Auto Garage, 67 Fountain street, Providence, R I., did very little damage, it being promptly discovered by Frank Reid who immediately turned in the alarm.

Schedules in bankruptcy of the Darracq Motor Car Company, No. 1,989 Broadway, show liabilities $61,219 and nominal assets $85,232, consisting of 12 automobiles, $44,867, covered by a bill of sale to the New Amsterdam National Bank as security for a debt of $11,500; one other automobile not in the bill of sale, parts and accessories, $16,-571; furniture and fixtures, $1,226; machinery, $1,421; accounts and notes, $20,762; cash $35; fire insurance $350.

The creditors of the Empire State Engineering Company, 149 Broadway, New York City, have filed a petition in bankruptcy against the concern.

James T. Graff, a garage owner of Spring Lake, N. J. has filed a petition in bankruptcy with assets of $315 and liabilities of $93,699.52.

The Kolb & Berger Mfg. Co., of 530 East Seventy-second street, New York City, filed petition in bankruptcy; liabilities $7,764 and nominal assets $4,825.

Eight separate suits to recover an aggregate amount of damages of $35,000 and to enjoin what is declared to be a wholesale fraud in the sale of automobile oils were filed by attorney Joseph R. Wilson, retained by Chas. F. Kellom, a pioneer manufacturer of lubricants in Philadelphia, Pa., against all garages and automobile supply people, who are and have been for several months, selling an alleged spurious concoction for the plaintiff's product, "Invader" oil.

The Manhattan Storage Battery Company of New York City, was fined $100, on May 13th for violating the injunction issued against it restraining it from selling imitations of the Rushmore lights.

A petition in bankruptcy has been filed against the Martini Import Company, dealer in automobiles, 239 West Fiftieth Street, by Epstein Brothers for these creditors: Frank Presbrey Company, $505 for advertising; Ernest Edwards, $371, advertising, and Pneu. L'Electric Company $226, merchandise.

In the case of F. S. Dickinson against the Matheson Motor Co. of Kingston, Judge R. W. Archbald recently decided for the defendant notwithstanding the verdict given the plaintiff for the amount of his claim $16,000, with $3000 interest, in the last session of the United States court in Scranton, Pa.

Schedules in bankruptcy of the Mercedes Import Company, wholesale dealers in automobiles, formerly 590 Fifth avenue, New York City, which was backed by Charles W. Morse, show liabilities $228,755 and nominal assets $261,514.

The National Cement and Rubber Co., of Toledo, Ohio, well known manufacturer of bicycle cement and rubber specialties, is in the receiver's hands.

Albert L. Perkins, a dealer at 1437 North Second street, St. Louis, has filed a petition in bankruptcy; liabilities are $29,525.73 and assets, $14,057.

The Prest-O-Lite Co., of Indianapolis, has filed a complaint against the Post & Lester Co., of Hartford, alleging infringement of its trade mark.

A dividend of 25 per cent. is soon to be paid creditors of the Pope Mfg. Co as soon as the court in New Jersey approves of the order to pay the dividend. Authority has also been granted by federal judge Robert W. Taylor to reduce the equipment of the company.

The schedules in bankruptcy in the case of Leon Rubay, 1697 Broadway, N. Y., show liabilities of $25,186 and assets of $19,562.

The Stepheny Spare Motor Wheel, Ltd and the Spare Motor Wheel of America, is bringing suit against the Black Mfg. Co., of Ft. Wayne, Ind., alleging infringement of patents and asking an injunction.

The Elkhart County Trust Company of Gohen, was recently named as trustee for the bankrupt Shoemaker Automobile Company of Elkhart, Ind.

Eugene Turton has been appointed receiver for the Star Motor Car Company, of 226 Halsey street, Newark, N. J. The liabilities of the company are estimated at $14,000 and the assets $3300.

The Winchester Speedometer Co., of New York City, was recently sold out at public auction.

In direct contradiction to all reports, Strang is still in the employ of Mr. John H. Tyson and is simply on a leave of absence while with the Thomas car at the Grand Prix.

Trade Changes

Mr. C. F. Green, formerly with the Automobile Equipment Company, has severed his connections with that concern, and purchased its top factory, and has combined his interests with the Motor Specialty Company, 239 Jefferson Ave., E Detroit, Mich.

The Auto Tire Company, agents for Morgan & Wright tires in Kansas City, have removed to 605-607 Fifteenth St.

Auto Supply and Storage Co. of Baltimore, Md. which had agencies for a number of popular cars, has changed its name to the Auto Accessories and Storage Mfg. Co. and has given up the car agencies and will devote its time to manufacturing specialties.

The Auto Parts Company of Chicago, Ill., dealer in engine parts has moved from 27 South Clinton Street to larger quarters at 99 West Monroe Street.

The R. F. Boda Co's. garage, located on East Rich street, Columbus, Ohio, will soon be removed to West Main street.

The Cleveland Cap Screw Company of Cleveland, Ohio, has changed its name to the Electric Welding Products Company

The Chicago Branch of the E. R. Thomas Detroit Company has been removed from the salesroom of C. A. Coey & Co. on Michigan Avenue to the salesroom of Levy & Fanning, 390-392 Wabash Avenue. Mr. Geo. W. Hipple will continue as manager.

The Commercial Motor Car Co. has moved its offices from Room 708 Times Building, New York City to Room 403.

The Empire Tire Repair Company of Chicago, has moved from 1301 Michigan avenue to 1615 Michigan avenue.

The Electric Garage Company, of Utica, New York, recently moved from 7 Court street to the building on Cornelia street known as "Dr. Watson's stables."

The Holmes-Booth Co's. establishment on Euclid avenue, Cleveland, has been bought out by M. E. and H. A. Steere, who were formerly employed by the Cleveland Elmore branch. They will conduct a garage and repair place.

The Hamilton Garage, of Allentown, Pa., will in the future be known as the New York Garage, with Mr. J. Harold Thomas as manager.

The Isotta Import Company, will move from its present quarters at 12 West Thirty-third street, New York City, and be established in the Palmer & Singer building, 1620 Broadway.

Will Johnson, of the Johnson Auto Company, of Boone, Iowa, has disposed of his interests in the business to G. D Johnson, the senior member.

Chas. Jobson's garage at Macon, Mo., was recently bought by Bert Allen and John Thomas, who will sell in addition to automobile extras a supply of electrical fixtures.

Marshfield Auto Garage, of Marshfield, Wisconsin, has been moved from the Adler Block to the Baumann Building.

The Milwaukee Automobile Livery Company, of Madison, Wisconsin, filed an amendment to its charter, changing its name to the Bland-Mueller Auto Co.

F. R. Parker, Boston agent for the Elmore, has moved into new quarters at 243 Columbus avenue.

S. S. Pierce, a young business man from Boston, has succeeded the Western Automobile and Supply Company, at Colorado Springs, Colorado.

A. J. Ray, one of the members of the firm of the Ray-Wortham Auto Garage Co., succeeded by the Hamilton Clough Auto Co. recently, will remain with the new concern and will have charge of the same branches of work formerly under his supervision.

The Swinehart Clincher Tire and Rubber Co's. New York office is being moved to 875 7th avenue, where a three story building has been leased and the Chicago branch will remove about July 1st to a new three story building at 1720 Michigan avenue.

The Triumph Gear Company, of Detroit, Michigan, moved from Sixth and Congress streets to Seventh and Abbott streets.

The Fraser Blowout Patch Company has moved to its new quarters in the Thoroughfare building, 1779 Broadway, New York City.

Tincher Motor Car Co., of South Bend, Ind., has removed its Chicago branch from the Chicago Automobile Club building to 1220 Michigan avenue.

Geo. H. Terry & Co., 92 Chambers Street, New York City has been succeeded by the Terry Engine Co., Bryant Park Bldg., 42nd and 6th avenue, New York City.

Chas. S. Taylor, Great Barrington, Mass., sold his garage to James Crotty and John P. Viola, owners of the building in which the garage is located. Ellis Holbrook will manage the business.

E. D. Verstraete, manufacturer of automobile parts, etc., has removed from 421 Clinton street, Milwaukee, to Burlington, Wis., where larger quarters have been secured.

The Weldon and Bauer Company, successors to the F. E. Boland Co., agents for the National and Correja cars, recently moved from 239 Halsey street to the new building at 200-202 Halsey street.

The Zacharias Garage Co., of Asbury Park, N. J., was recently incorporated by Chas. R. Zacharias, Leonard Hutis, and Frank C. Martin with $100,000 capital.

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Legislative and Legal

OHIO MOTOR VEHICLE BILL.

The motor vehicle bill which has interested automobilists of Ohio for some time was recently passed by the state legislature and will become a law thirty days after its signing by the governor. Speed traps are done away with but very fast driving is considered prima facie evidence of recklessness. All cars must be registered with the secretary of state in Columbus who in turn notifies every county clerk in the state.

The registration fee for gasoline and steam automobiles is $5 under the new law, while electric vehicles will be obliged to pay but $3. Commercial vehicles are not included in this bill and there will be no charge for them, they being classed as business and not pleasure vehicles. Dealers will be required to deposit $10 for each make of car handled and pay a fee of $2 for each license.

AUTO TAX MEASURE DEFECTIVE.

Senator Armstrong's automobile tax measure in New York has been found defective. Altho machines weighing 2500 pounds would be taxed $10 and those weighing 3000 pounds $15, machines of 2600, 2700 or 2800 pounds would not have to pay any tax at all. It may be remedied at the extra session.

Legal Notes

Charles F. Kellom, lubricant maker of Philadelphia and well known as the originator of 'Invader" oils, on April 30 brought suit against eight different concerns for fraudulent sale of oils under his trade name "Invader."

The New Jersey Automobile Trade Association and other New Jersey organizations are raising a fund to test the constitutionality of the new amendment to the New Jersey automobile law, under which high license fees are to be exacted for road improvement purposes.

Magistrate Butts, of New York, in the Yorkville Court recently decided that physicians may speed their cars in city streets in driving to emergency cases.

Probably the most important legislation recently enacted in New York in connection with roads is the joint highway commission bill, which virtually takes the control of the state highways from the State Engineer and vests it in a commission.

For the purpose of determining whether or not a speeding motor car could be stopped in time to avert an accident if certain large coal bins did not hide an approaching train from view, Coroner Southeimer of Atlantic City, N. J., recently made official tests at a railway crossing at May's Landing, where Samuel Bailey of Camden had been killed, and found that a car going at the rate of 25 miles per hour could be brought to a stand 12 feet from the crossing if the brakes were applied 60 feet from the same. The matter is of general interest as an authentic and unprejudiced test of stopping abilities of motor cars and as proof that such a speed is not necessarily dangerous.

Suit has been brought against the New York Taxicab Co. and the New York Motor Cab Co. by the Association of Licensed Automobile Manufacturers for the alleged infringement of the Selden patent.

Prince Henry Cup Race

The Prince Henry Cup Race will be run in six stages as follows: First, June 9, Berlin to Stettin; 2nd, June 10, Stettin to Kiel. On June 11 there will be a rest at Kiel. 3rd, June 12, Kiel to Hamburg. Speed contest on a level between Rendsburg and Itzchoe. June 13, rest at Hamburg and exhibition of the competing cars. 4th, June 14, Hamburg to Hanover. 5th, June 15, from Hanover to Cologne; 6th, June 16th, Cologne to Treves; 7th, June 17, Treves to Frankfort-on-the-Main. Mountain speed contest between Bacharach and Rheinboellen.

Trade and News Items

E. J. Bartlett, who was formerly connected with the engineering staff of the Electric Vehicle Company, has recently accepted the position of chief engineer of the Long Arm System Co., Cleveland, Ohio.

The Dayton Electrical Mfg. Co., of Dayton, Ohio, has elected Major R. L. Hubler as secretary and general manager of the company. W. D. Brown will continue to act as sales manager and R. F. Sutliffe as purchasing agent.

The Webster extension gauge described on page 168 of our May issue is made by Webster Mfg. Co., 251 Causeway street, Boston, Mass., and 149 Jefferson Ave., Detroit, Mich. There are a number of concerns with the same name and by mistake we gave the address of another Webster Mfg. Co. in our description of this new gauge.

The recent 123-mile endurance run made by the Norristown (Pa.) Automobile Club to Lancaster and Reading and return resulted in the finishing with perfect scores of sixteen cars. A rather novel disposition of the silver cup was made by the club. At a subsequent meeting of the sixteen winners it was decided not to run over again and instead of disposing of the silver cup by lot as was previously announced by the club, it was decided to melt it and make it into medals. These are to be given to the owners and drivers who made perfect scores.

Thirteen cars finished with perfect scores in the Detroit Automobile Dealers' Reliability Contest, which incidentally has stirred up more automobile interest than any event ever known in the State. The lucky thirteen cars and drivers are as follows: Franklin (Davis); Thomas (Grant); Peerless (Bemb); Northern (E. J. Chapin); Maxwell (Kelsey); Thomas (Mochesky); White (Sheridan); Northern (House); Pierce-Arrow (Day); Oldsmobile (Aubel); Stoddard-Dayton (Lane); Thomas (Lorimer), and Oldsmobile (F. E. Crum). The success of this contest will no doubt result in an annual repetition of the event, and even now there is talk of a non-stop run over the same course this summer.

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pular priced cars. Their strongest fea-
es are light weight, handsome appear-
ce and simplicity of control; this be-
made possible by the use of so few

The last model is "E," a landaulet of ol
1900 lbs., seats four inside and two o
side. This car sells for $2150.00 F. O.
Pontiac, Mich., including storm curtai

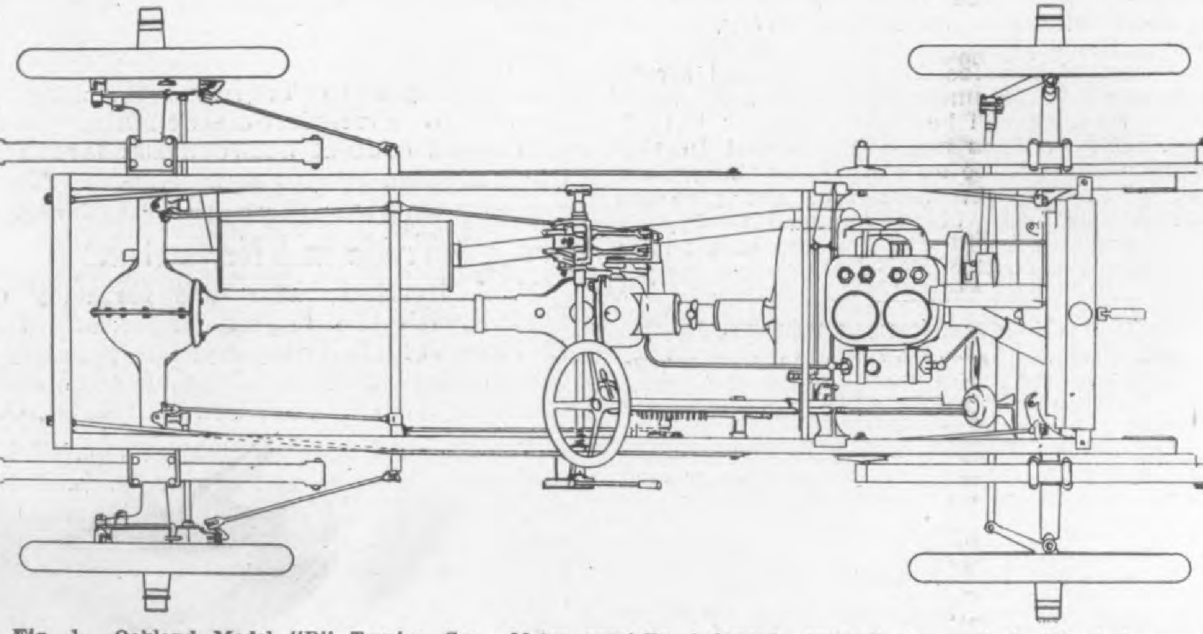

Fig. 1. Oakland Model "B" Touring Car. Motor specially balanced, two-cylinder vertical 4⅛ inches x
hes, rated as 20 H. P. A special planetary gear of extremely compact construction is used, the rear axle as
bly, and the housing of the driving shaft the forward end of which carries the change gear, forming a un
struction. The wheel base is 96 inches, tread standard. Tires 32x3½ inches, seating capacity five. Weigh
0 lbs. Price $1350.00

rts that all of them may be made of
eral size and still have the car much
nter than usual.

The Oakland cars are designed by Alan-
P. Brush, who is probably one of the
t known designers of popular priced

storage battery, dome electric light, spea
ing tube and card case, also a regul
equipment of three oil lamps, two g
lamps, generator, horn, tools and electric
outfit ready for the road.

The motor, steering gear, etc., are l

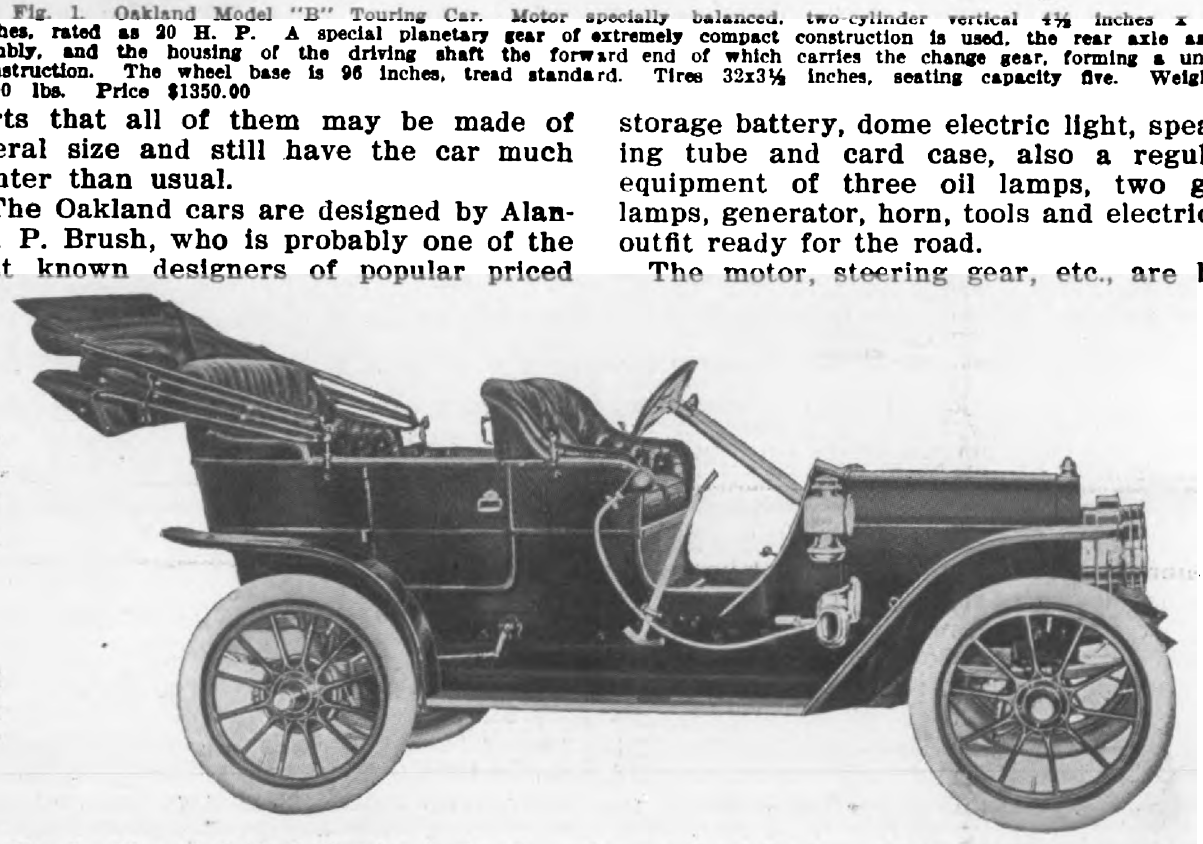

Fig. 2. Plan of Oakland Chassis, showing the springs outside of the frame, front semi-elliptic, rear full el
ic. The frame is a light rigid wood constructed with trusses under the sills. The two-cylinder vertica
cially balanced motor which is claimed to be practically without vibration is mounted on a three point suspen
n. The very compact planetary change gear is shown at the forward end of the rear axle and combined torsio
housing assembly. For other special features see text.

s in America. They are made in mod-
A, B, C, D and E, all having practi-

ing made under Brush patents. The mot
is a two-cylinder vertical, having a 4

ds. The upper end is bronze bushed d has a ⅞ x 2½-inch bearing on the two crank pits by an ingenious meth of interchange of oil.

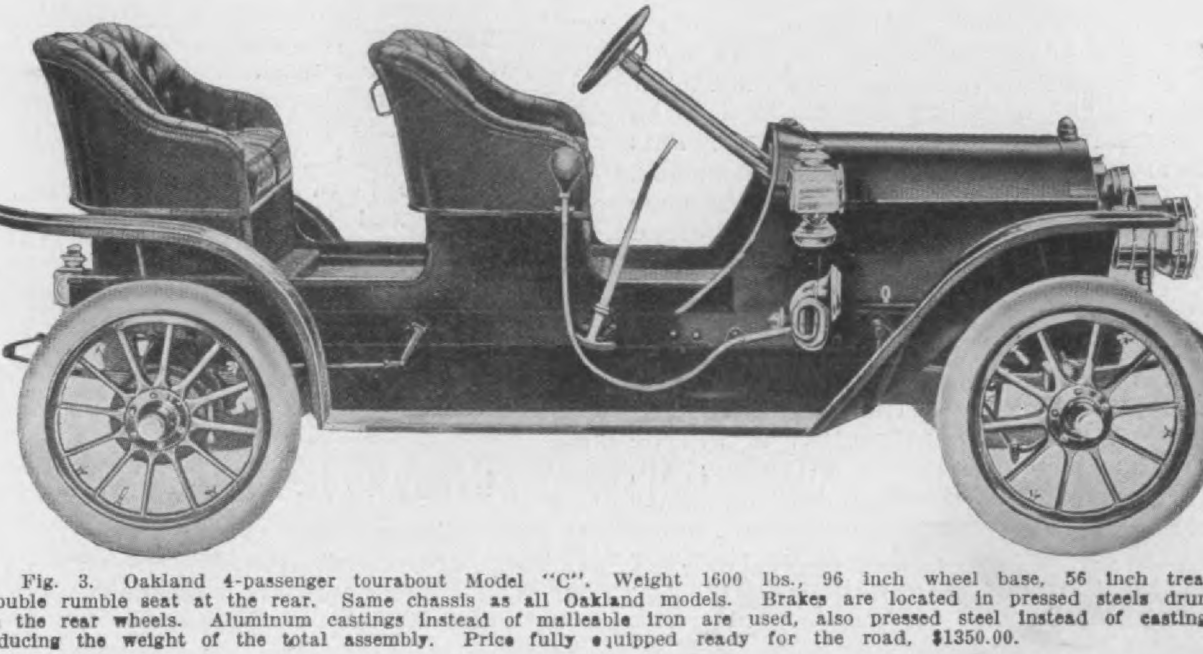

Fig. 3. Oakland 4-passenger tourabout Model "C". Weight 1600 lbs., 96 inch wheel base, 56 inch trea ouble rumble seat at the rear. Same chassis as all Oakland models. Brakes are located in pressed steels drum the rear wheels. Aluminum castings instead of malleable iron are used, also pressed steel instead of castin ducing the weight of the total assembly. Price fully equipped ready for the road, $1350.00.

rdened piston pin. The crank pin bear- gs are 1¾ x 3 inches, with bronze bush- gs, babbitt lined. The main bearings e unusually large, that in front being x 4½ inches, while the rear one is 1¾ 6 inches. They are not adjustable, and e made of bronze with babbitt lining.

Cooling is on the thermo-syphon syste a vertical tube radiator being used. T filling cap is acorn shaped, and the may be distinguished by this mark. strong air draft is induced by a sh metal fan secured to the three spoke wheel. Ignition is by jump spark, st

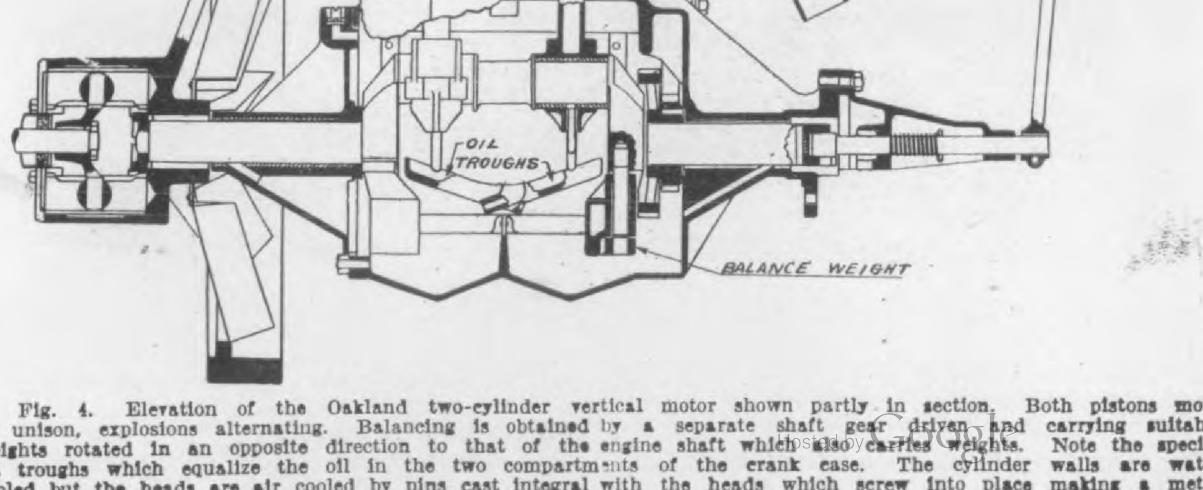

Fig. 4. Elevation of the Oakland two-cylinder vertical motor shown partly in section. Both pistons mo unison, explosions alternating. Balancing is obtained by a separate shaft gear driven and carrying suitab ights rotated in an opposite direction to that of the engine shaft which also carries weights. Note the speci troughs which equalize the oil in the two compartments of the crank case. The cylinder walls are wat led but the heads are air cooled by pins cast integral with the heads which screw into place making a met

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al vibration of the motor is claimed to somewhat less than that of a four cyl-ler of the same horse-power.

UNIT CONSTRUCTION.

The change speed gear is a very com-ct planetary, a refinement of an earlier sign, 15,000 of which are claimed to be successful use at the present time. This ar is said to be noiseless on all speeds. is enclosed and runs in oil, its case ming the forward part of the combined sion arm and driving shaft housing. e extreme forward end of this hous-; tube carries a Hyatt roller bearing d the end of the driving shaft runs in s and is fitted with especial sliding uni-rsal joint housed in the hub of the fly-eel. With this construction it will be en that the rear axle driving shaft, ange gear and the housing members m a unit, three point suspended. Since e entire gear mechanism is in the rear e unit, the clutch is eliminated from the wheel and the fan is substituted. doing ay with the usual fan support, bearing l belt.

ings. Both sets of brakes are came hair faced, and act on pressed steel dru attacht to the rear wheels.

To combine lightness and strength t propeller shaft is made from a 1½-in tube with ⅛-inch wall. For the same r son the tube which surrounds it and serv as torque rod and struts is 3 inches in ameter, with ⅛-inch wall.

The frame is of wood with metal c ner plates and a deep truss. All t springs are outside the frame, and inches wide. The front are semi-ellip and the rear full elliptic. Spark a throttle are controlled in the usual ma ner, through ball jointed connections fr finger levers under the steering wheel.

Sterling 40 H. P. Gasoline Car

The Elkhart Motor Car Co., Elkha Indiana, are offering for 1908 the "Sterlin 40 H. P. five or seven passenger touri car, with some exceedingly high cla features in motor car construction. T same chassis is also used for runabout,

The Sterling 4-cylinder, 40 H. P., 5 or 7 Passenger Touring Car with Top. Same chassis is used with run ut or roadster body.

AXLES.

The rear axle is made by the American

gentlemen's roadster.

The motor has 4¾x5 cylinders cast

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The Auto-Meter Is Believed

Talk about speed indicators that are believed—that have figured largely in famous events! Here are a few right off the reel—just jotted down from memory! The reviewing of big motor events is nothing more or less than a history of the successful career of the Auto-Meter.

Glidden Tour, 1906, 38 Warners used; All other makes, 23.

Memorial Day Races, Denver, 1906. Thomas "40" won 1st; Stevens-Duryea 2nd; both Warner-equipped.

Mudlark, 1906, from New York to Daytona, Warner-equipped; big tour afterward.

Memorial Day, 1906, non-stop run, New York-Boston-Springfield; Knox Waterless made record, Warner-equipped.

Franklin car, San Francisco-New York, 4,500 mile run, August, 1906; Warner-equipped.

Percy Megargle with Reo Mountaineer, across continent and back, 12,000 miles, 1906, Warner-equipped.

Military Message Run, Chicago-New York, June, 1906, Buick car, Warner Auto-Meter.

Military Run, New York-San Francisco, Aug., 1906, a Warner was used.

Red Cloud, Olds, trans-continental run, 1907, Warner-equipped.

Glidden Tour, 1907, 75 cars started, 53 used Warners; 21 used all other makes.

Detroit Reliability Run, 1907, winner used Warner.

New York-Chicago Sealed Bonnet Contest, winner Warner-equipped.

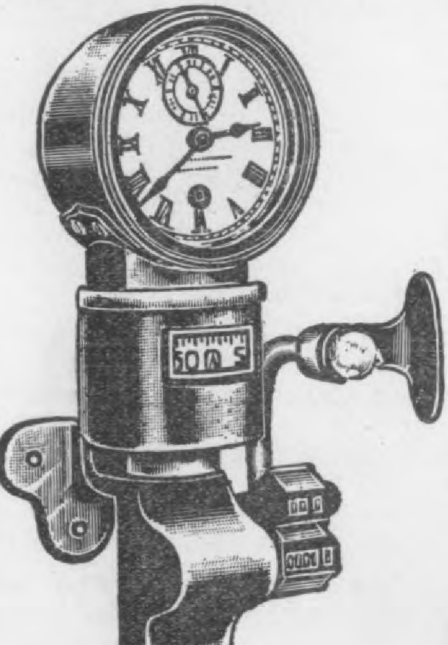
Long Island Economy Run, Frayer-Miller, winner, was Warner-equipped.

In New York-Paris Race only speed indicator in the run is a Warner Auto-Meter.

Ralph Owen, driver of Mudlark, 1908, bought a Warner for this car though offered another as a gift.

Winning Haynes car in Chicago Reliability Race, December, 1908, was Warner-equipped.

Charles J. Glidden has piled up 42,367 miles in 35 countries with a Warner Auto-Meter.



The fire departments of the following cities use the Auto-Meter: New York, Boston, Detroit, Chicago, Denver, Joplin, Mo., and Seattle, Wash.

All the reliable maps of the country have been laid out with Auto-Meters: The Blue Book, White's Route Books, all Canadian maps, Michael's Pictorial maps, all Glidden Tour courses, King's maps, Briarcliff Course, etc.

Nearly all the automobile makers of the country use the Auto-Meter to test their cars before leaving the factory.

The E. R. Thomas Motor Co. and the Olds Motor Car Co., furnish the Warner as part of the regular equipment.

Warner Instrument Co.

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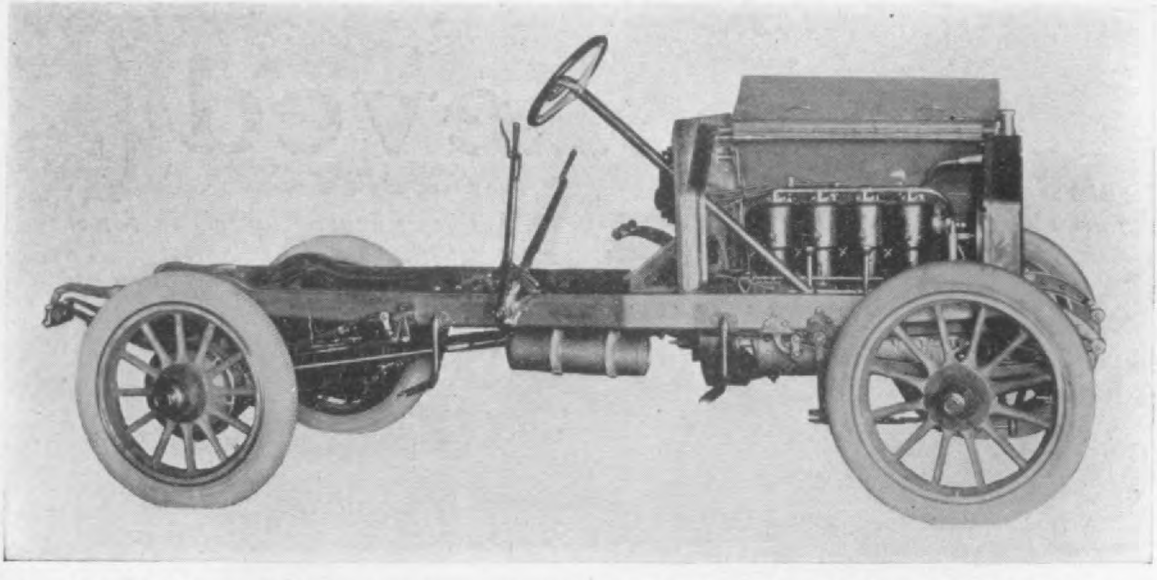
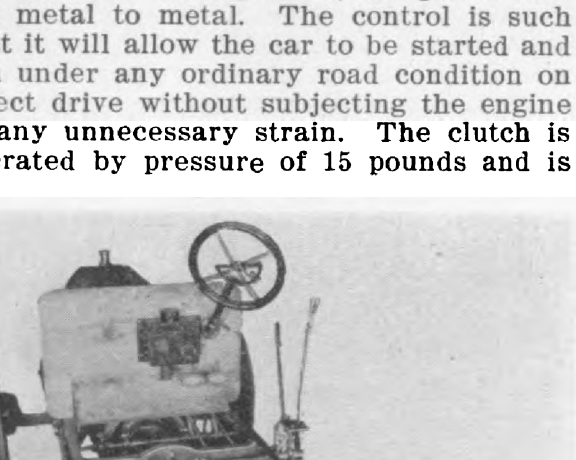
e and power is subjected.

semi-elliptic, shackled in the rear. Re



Side view of the Sterling 40 H. P. Chassis; is furnished with touring, runabout and roadster body.

'he clutch is a specially designed ltiple disc arrangement, the plates run- metal to metal. The control is such t it will allow the car to be started and under any ordinary road condition on ect drive without subjecting the engine any unnecessary strain. The clutch is rated by pressure of 15 pounds and is



Rear view of the Sterling 40 H. P. Chassis.

ased mechanically when applying emer- cy brake pedal. The entire clutch is sed in a steel casing 10 inches in diam- bolted to the fly wheel and runs in

springs are 56x1¾ inches and arranged pairs on each side of the frame, and sha kled at both ends, doing away with stre of driving thru the spring. All drive concentrated on a steel bracket at t center cross member, to which the slee of driving shaft is securely yoked. T twin spring construction and mode of dri ing is a very noticeable feature in t riding of the car. Wheels are 34 inche with 4-inch tires in front and 4½-inch rea

External contracting and internal e panding brakes are fitted to rear brak drums.

The car is furnished with full equipme —five lamps, electric horn, folding gla front, top and speedometer for $3,000 f. b. Elkhart.

In our description of an Idler for Whi Steam Cars made by the Auto Trading Repair Co., page 168 of the May numbe we gave the address of the concern as 216 2169 E. 9th street, New York City, instea of Cleveland, Ohio, which is the corre address of the concern.

We are informed by the Packard Mot Car Co., Detroit, Mich., and also by t Peerless Motor Car Company, Clevelan O., that their respective outputs for 19 are entirely sold and that orders are no being booked by agents for the 1909 mo els, some of which it is expected will b ready for delivery in a few more month

Edward Busby formerly with the M vale Steel Works of Philadelphia, is now the selling department of The Electr

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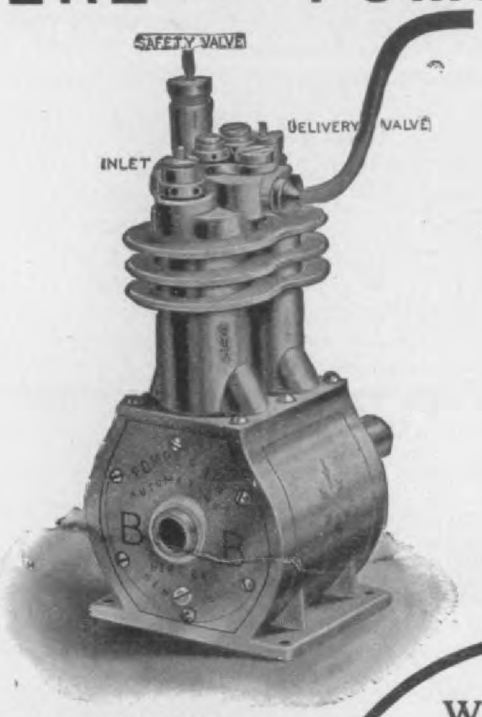
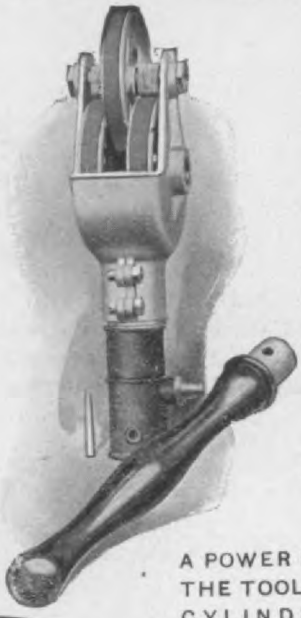


DOUBLE CYLINDER
PISTON RINGS
SAFETY VALVE
STEEL BALL COMPRESSION VALVES

WE ALSO MAKE TWO KINDS OF CLUTCHES FOR THE SAME.



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WE WILL BE GLAD TO MAIL YOU A COPY OF OUR

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IT'S A REFERENCE BOOK
WRITE FOR IT

HERZ'S PATENT

SHOCK ABSORBER

"PATER NOSTER"

1908 CONSTRUCTION WITH BALL JOINT.

SET OF FOUR, $75. SET OF TWO, $40.

HERZ'S PATENT

CABLE TERMINALS

AND

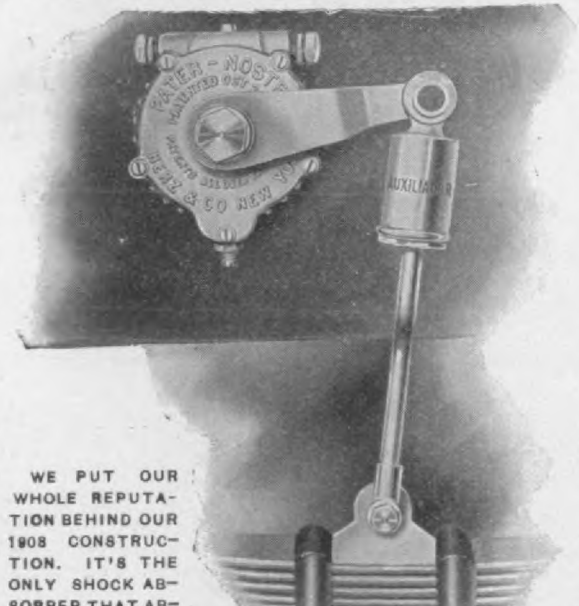
WIRE TERMINALS

With Groove

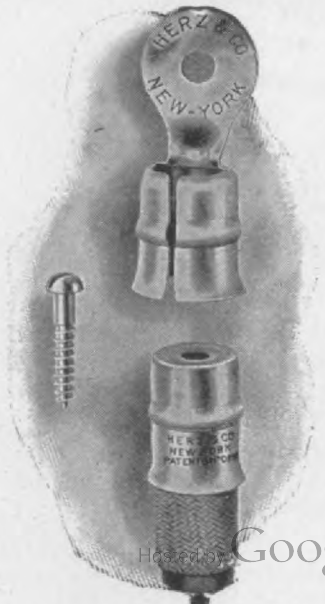
DETACHABLES.
3 SIZES:

3/8" 1/2" 5/8"

1.25 DOZ. 1.50 DOZ
1.75 DOZ.



WE PUT OUR WHOLE REPUTATION BEHIND OUR 1908 CONSTRUCTION. IT'S THE ONLY SHOCK ABSORBER THAT AB-



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THE LARGEST STOCK IN AMERICA.

SWITCHES,
CABLES,

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venteen years experience into a new de-
n, something out of the ordinary is to
expected. While Mr. Duryea has not
lt such large numbers of vehicles as
ve many makers, he has been constant-
at it for more years and has probably
ned out more special jobs than any other
signer and is therefore able to show sur-
sing results.

His latest production, which he calls a
uggyaut," is exceedingly simple as will
seen from the cut of the mechanism,
. 2. It makes use of a regular buggy
ly excepting the auto bonnet in front
l the turtle shell deck at the rear. This
ly is mounted on the side bars of the

Bowden wires, brought to the steering p
and one is connected with the steer
handle in a manner that permits throttl
with the steering hand while the spark
is easily reached. By the side of this p
is the speed lever which is thrown back
engage the reverse; and thrown forw
progressively for the high and low spee
The brake pedal is at the front center
the floor and a change pedal at the r
where it may be operated by the heel.

TWO-CYCLE MOTOR.

The motor is of the two-cycle type a
has two cylinders with the flywheel
tween them. They are air cooled and a
not only well separated, but the fly wh

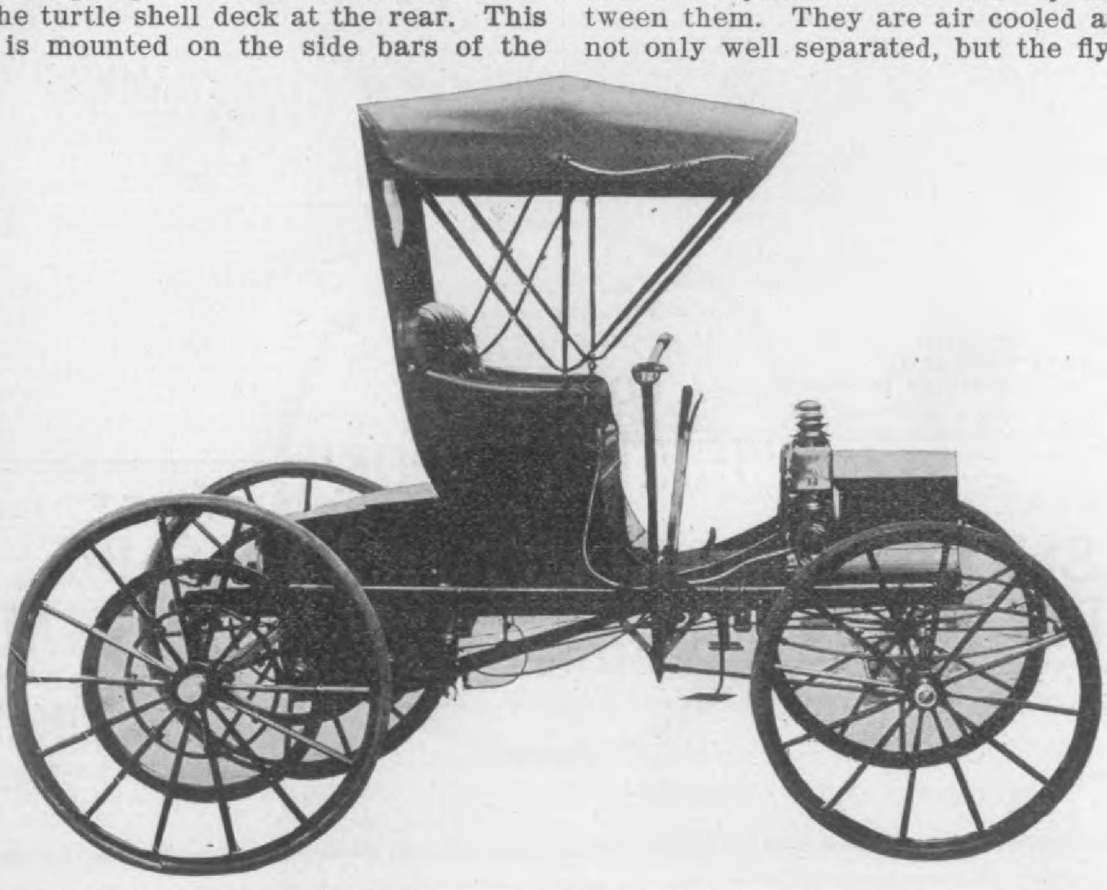

Fig. 1. The New Duryea Buggyaut. This vehicle h as many new features: 2-cycle air cooled motor, fan
flywheel only but a fan between cylinders can be supplied those still afraid of air cooling. Starts from th
t. No differential. Special friction drive with grooved pulleys. Grooved brake shoes act in the grooved driv
sheaves of the rear wheels. The body is of buggy type except for the hood. The rear deck is a folding sea
two giving the vehicle a carrying capacity of four persons. With one seat the price is $700.00, two seat
0.00. Tops are extra.

ssis in the usual buggy manner and is
h light and easy riding. The side bars
stiffened by steel backbones or rein-
cements and being quite deep carry their
l easily. They are mounted rigidly on
rear axle but are supported by ¾ el-
ic springs at the front thus giving a
ble elasticity at the front which permits
front wheels to rise easily over ob-
cles and not only secures easy riding
easy propulsion.

CONTROL

has fan vanes which keep the air movi
even if the rig is standing. In the flywhe
is the timer and distributor well protect
from water and mud. The motor cylinde
are inclined 15 degrees, which runs the
back toward the case and keeps it out
the cylinder heads.

The carburetor is just below and
tween the cylinder heads, where it ge
some of the heat therefrom, but if desir
it can be placed much higher for use
the South, where deep fords are frequent

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aving grooves on its outer circumference hile the larger is grooved interiorly.

In front of the ear axle hangs the otor with a long ank shaft, each end which telescopes to ermit either of two three grooved roll-s on the ends to be rought into line with e grooved rings by anipulating of the hange pedal. When ese rollers are in e desired alignment e whole power plant swung bodily for-ard or back to en-age them with the rooved rings and the ehicle is propelled by e friction of the rooved rollers in the rooved rings. It is vident that these rooves may wedge ghtly together with-ut undue pressure on e speed lever and so ive perfectly with-ut great strain on e bearings. The rol-r shafts are provid-d with roller bearings their outer ends nd so are able to ke any roller strain ithout undue fric-on.

The rings are so laced that the high peed forward and low peed reverse are in ignment at the same me, so the vehicle ay be driven for-ard or back at will by e simple movement of e speed lever in the sired direction just like ifting the current of an electric and without y shifting of the position of the rollers by e change pedal. This simplifies and sweetens e handling of the vehicle and adapts it to dies' use.

Powerful metal brake shoes rub in the rooves of the large rings and being rooved present large surface and great olding power. They hold even better

unless ordered wider are made the s dard gauge of 56 inches. The wheel b

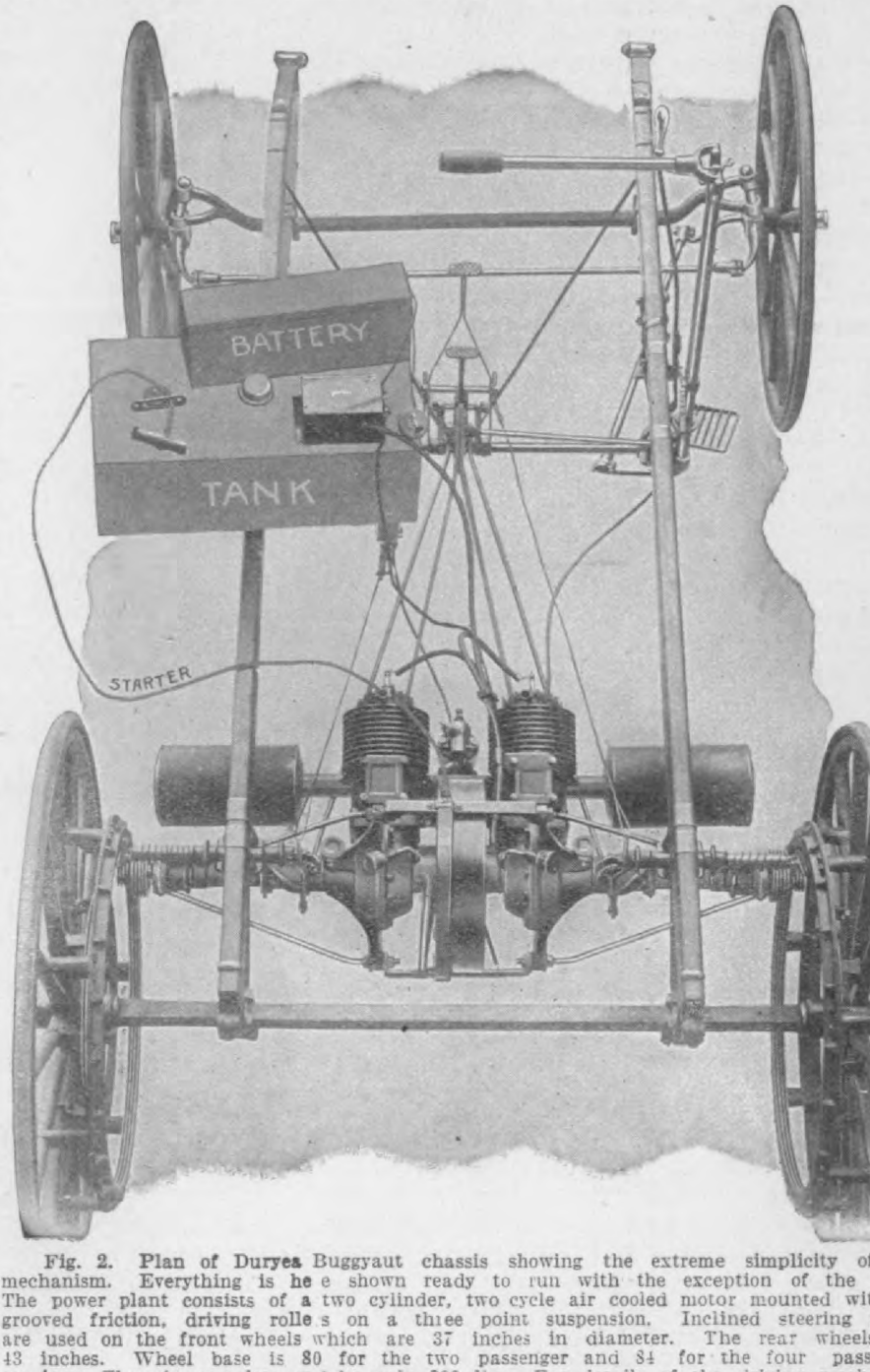

Fig. 2. Plan of Duryea Buggyaut chassis showing the extreme simplicity o mechanism. Everything is he e shown ready to run with the exception of the The power plant consists of a two cylinder, two cycle air cooled motor mounted wi grooved friction, driving rolle s on a three point suspension. Inclined steering are used on the front wheels which are 37 inches in diameter. The rear wheel 43 inches. Wheel base is 80 for the two passenger and 84 for the four pass carriage. The rig complete weighs only 800 lbs. For details of the driving mech see text.

is 80 to 84 inches, depending on the n ber of passengers carried. The gaso tank, the battery and coil are placed in body under the seat, leaving the w bonnet for an excellent parcel box.

The weight of the mechanism bein the rear permits the passengers to carried in the most comfortable posi which is between the wheels.

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chassis is sold separately for this purpose to those preferring a body different from the standard, or to the carriage trade who prefer to do the body fitting and finishing.

DIFFERENTIAL NOT NECESSARY.

Since there is no balance gear, some question its performance in turning corners, but Mr. Duryea calls attention to the common railway construction where the wheels must slip on the rails, and says that no balance gear is necessary because the driving rollers will slip as much as needed, but rather than expose the tires to any unnecessary friction he provides a method whereby the inner roller is releast in turning a corner and the outer wheel does all the driving. This device consists of an eccentric on the steering post and connection to the frame of the motor so that the front end of this frame is thrown toward the inner side of the turn. This is both simpler and superior to a balance gear.

Some have questioned the correctness of mounting the motor so rigidly, claiming that it will take damage from the road shocks to which the rear axle is exposed. However, according to Mr. Duryea's experience with motors, both spring mounted and otherwise, the simpler method is best. The motor and its shaft is so simple and so well trussed that it is practically a single piece, and far better able to resist shocks than are electric motors which are so mounted. Further it must be rigid enuf to take the explosion shocks and so is amply able to stand the road vibrations which are much less frequent and violent. While a starting crank may be applied to either end of the motor shaft, a ratchet starter is provided with cord to the floor of the vehicle, and thus the motor is easily started from the seat.

LUBRICATION.

There are but two bearings other than the wheel and motor bearings, and these being rollers need little oil other than what may reach them from the engine shaft. The wheels are ball-bearing and need oil but once per year. The engine shaft is lubricated by compression cups four in number, while the pistons and rods are oiled by a high test cylinder oil mixed with the fuel in the proportion of one gill of oil to a gallon of gasoline. This quantity is less than common to this method because of the superior lubricating qualities of the special oil used.

The entire absence of cams, gears, chains, gimbal joints, transmissions, clutches, pumps, fans and lubricating mechanism renders the vehicle quite free from noise and wear. The grooved rings wear faster than the hardened rollers, but being of large size are of long life and much cheaper to replace than a chain or pair of gears.

Mr. Duryea believes that this vehicle marks an era of simplicity of construction and it certainly seems to have taken a most advanced position in that direction.

A matter of interest to those living in the Far West is that the Buggyauts can be crated small enuf to ship at 2000 lbs. weight with corresponding reduction in the freight as compared with the usual vehicle which must pay on a minimum weight of 5000 to 8000 lbs.

Altho designed primarily for high wheels, smaller wheels and air tires can be used, making a natty little runabout. With a single seat for two passengers the buggyaut sells for $700. With folding rear seat, making the capacity four, the price is $750.

Former Sales Manager Ernest H. Brandt of the Corbin Motor Vehicle Corporation, has been appointed general eastern manager of the Cadillac Motor Car Co., with headquarters at 59th and Broadway, New York City.

Thomas H. McNevin, who has for seven months acted as Chicago representa tive of the Breeze Carburetor Company, Newark, N. J., was recently placed in full charge of the company's sales department and will remove to Newark. Fulton & Zinke, 1256 Michigan Ave., Chicago, will conduct the future business of the Breeze Carburetor Company in the west.

Hopewell Bros. of Cambridge, Mass., has opened in New York and will sell its tire cases and fabric line at 1900 Broadway, and has withdrawn its New York agency from the Allen Auto Specialty Co. and will maintain that territory through its own branch office, which is in charge at the present time of Mr. C. A. Russell, who formerly represented the company in the New England territory.

The Acme Spring Check Company, maker of the "Shocsorber," has recently been incorporated with a capital stock of $250,000. The company will have its headquarters in New York City, but will manufacture the Shocsorber in a Connecticut city.

Robert Burman, who for the past four years has been driving the Jackson racing machines for the Jackson Automobile Co., has joined the forces of the Geo. Jackson Motor Co., of 1720 Broadway, New York, local agents for the Jackson, and will drive for them in all the races in which the Jackson will be entered the coming season.

The Lockport Rubber Works, is the name of a new concern recently organized in Lockport, N. Y., under the New York State laws, with $300,000 capital. Chas. F. N. Kelley is President, J. Edwin Davis, Vice-President, and H. M. Wood, Secretary. This concern is at present building bicycle tires and sundries, but expects to build automobile and motorcycle tires, etc., later.

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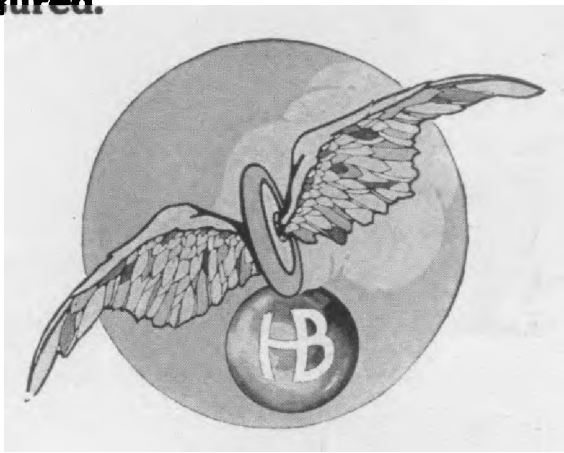
THE HESS-BRIGHT BEARINGS

Practically every automobile builder will admit that through the use of HB and DWF Bearings the running qualities of the car are brought to the highest possible standard, and perfect running is assured.



PROTECTION THROUGH HESS-BRIGHT GUARANTEE

Our guarantee to replace or repair, without cost, all damaged Bearings for one full year; to replace or repair, at pro rata cost for the second and third year, means that we assume all responsibility as regards the up-keep of HB and DWF Bearings for three full years. We supply the car builder with a printed Guarantee for each car—these to be distributed to Dealer or Owner. We supply brass Guarantee plates for attachment to each car.

To the Car Dealer our guarantee means *complete protection,* as he is relieved of all responsibility.

To the Car Owner our Guarantee means exemption from cost for repair, and protection for three full years against all bearing troubles.

Write for a copy of the Hess-Bright Journal.

The Hess-Bright Manufacturing Co.

2102 Fairmount Avenue, PHILADELPHIA, PA.

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Locomotive Automobile Company, of ch the first hundred are now being put service by the Waldorf-Astoria hotel New York, is found a new attitude to- d the economic aspect of the tariff cab city use. This attitude is the habitual of this company which believes that lding for long service is most economic the end, even at a slightly greater in- l cost.

Iaving decided to enter the field the erican Locomotive Automobile Company de an exhaustive investigation of the ious makes of cabs and the conditions

resistance to wear was the prime cons eration and the expense of material a construction secondary. Generally spea ing, the motor cab is built on the sa lines and of the same material and wi the same exacting methods as the Lo motive Company's touring car, the ch feature of difference being in the fi transmission of power from the gear ca to the rear wheels, which, in the case the cab, is not by chains, but by a sh drive. Imported materials are used in su important parts as cylinders, crank sha springs, frames, etc.

Fig. 1. The American Locomotive Co.'s Motor Cab. Motor 4-cylinder vertical 3 15-16 inches x 4¾ inches. 1 P. at 800 R. P. M., multiple disc clutch, low tension ignition Simms-Bosch magneto, no spark advance. En e speed controlled by governor. Wheel base 103 inches, tread 55 inches, weight complete 2600 lbs. Top conver le.

ler which they are operated, both here l abroad. The results of this indicated t the requirements of the service are ex- ing in such a way that a cheaply con- ucted vehicle is unlikely to be lucra- e. It was found to be the experience some companies that while the gross eipts were ample the net profit was nil, ing to the vehicles being in commission y about 50 per cent of the time, and that be finally profitable such vehicles should so constructed that they can be kept commission about 85 per cent of the

SPECIFICATIONS.

The general specifications of the cab a as follows. Wheel base 103 inches; tre 55 inches; height of frame from grou 24 inches; weight of cab complete 2,0 pounds; tires 32x4 inches all around; av able body space from dash to rear of fra 98 inches; width of frame 34 inches.

POWER PLANT.

The motor is of the four-cylinder ve cal type, placed forward of the dash un the usual form of bonnet, bore and str being 3 15-16-inch x 4¾-inch; nominal

peed of the motor is limited to 800 R. P. . This control it is claimed is extremely nsitive and absolutely reliable. It is beeved by the makers that it is desirable om the standpoint of maintenance and peration to not only limit the motor speed, ut the speed of the vehicle, as by so dog the life of the powerplant is increased nd the liability of accidents decreased.

The lubrication of the motor is effected ntirely by splash, oil being fed to the rank case by means of gravity thru a ight feed oiler. As a guarantee against ex-

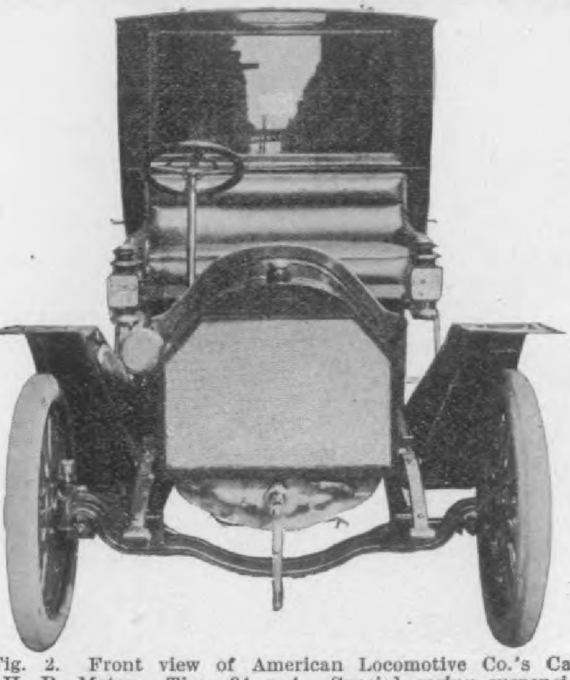

Fig. 2. Front view of American Locomotive Co.'s Cab. H. P. Motor. Tires 34 x 4. Special spring suspension l luxuriously appointed body. The frame is dropped at middle giving easy entrance or exit.

ss of oil and consequent smoky exhaust, ollow plugs are provided in the bottom of e crank case to maintain a constant oil vel, any excess of oil being carried off to overflow tank thru these plugs.

Cooling is effected by an extremely efcient honeycomb radiator, the water beg circulated by centrifugal type of pump, hich has ample capacity to cool under ost trying conditions.

The transmission is of the sliding gear pe "selective," providing three speeds nd reverse, the high gear being direct. he reduction on the high gear is 3.8 to giving a vehicle speed of 20 miles per our with the maximum motor speed as ove indicated.

SPECIAL REAR AXLE.

The rear axle, a new design, is, perhaps, e most novel feature of the cab. The le proper, or the load supporting mem-

therefore transmitting the braking tor thru springs to the frame. A forward ho ing registered within the central ring ries the rear end of the driving shaft the differential mechanism, and being unit within itself, permits a reliable and curate means of securing proper alignme This housing terminates in a torsion carried at its forward end in a fork tively mounted on the tube, the functio which is merely to counteract the dri torque from the motor, and to keep rear axle in proper alignment with transmission. It is assisted in this w by radius rods joining the forward sid the brake anchor with brackets on frame, the centers of which are in a lute alignment with the torsion-tube ends and the center of the universal j carried on the rear end of the main ing shaft of the transmission. A li cover on the rear of the axle comple encloses all the gearing, bearings, etc., protects them from foreign matter of kind. This axle is of the well-known f ing type in which the wheels are mou on the outer ends. The weight suppor portion of the axle and the driving sh from the differential transmit their po to the ends of the hubs by means of clutches, therefore imposing upon t none but torsion stresses.

BRAKES.

Two separate and distinct sets of bra are provided, both acting directly on rear wheels, the one set expanding wi a large drum, and the other contrac on the outside of the same drum, the o one being the service brake and oper by a pedal, while the internal brakes the emergency brakes and are operate hand lever.

Special attention has been given to spring suspension as that feature ma so much for the comfort of the pass gers, and in addition, affects to a grea or less extent the life of the power pl The front springs are semi-elliptic, and rear are semi-elliptic on the sides wit platform spring joining the rear ends placed directly under the rear cross m ber of the frame.

The frame itself is raised at the rea provide sufficient clearance over the axle, and at the same time bring the portion near the ground, making it tremely easy for passengers to enter alight.

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Hess-Bright, (D. W. F.) bearings

sible to replace any of the importan ments, such as front or rear axle, trans sion, motor, steering gear, etc., from ck without having to specially fit or up this part. Accessibility is an- er important feature in the design. It possible to examine practically all of working parts individually without dis- bing other adjacent parts. For example, clutch may be removed without disturb- either the motor or transmission; the nsmission may be removed as a unit in omparatively short time; and the same rue of the motor and rear axle.

LUXURIOUSLY EQUIPT.

Besides seeking to produce a cab to stand racking of tariff service in the city it been the aim to provide a vehicle which ll have the luxurious riding qualities of for the W. H. Seaich Company, which s plies the Waldorf-Astoria cab service, a not only handsome exteriorly, with th bodies finished in dark brown and the ru ning gear in yellow, but they are bu thruout of finest material and upholster and trimmed sumptuously. The wood wo is seasoned ash, with panels of sheet ste The door mouldings and glass frame fend are of metal, the door flappers being t Company's special pattern to hold t frames securely. The front, partition a the inside of the doors are lined with fancy wood veneer and the glass frames a of polished mahogany. The seat cushio etc., are upholstered in hand-buffed pebb leather, the floor is carpeted, the windo fitted with silk curtains and the door ha dles and other fixtures are of brass.

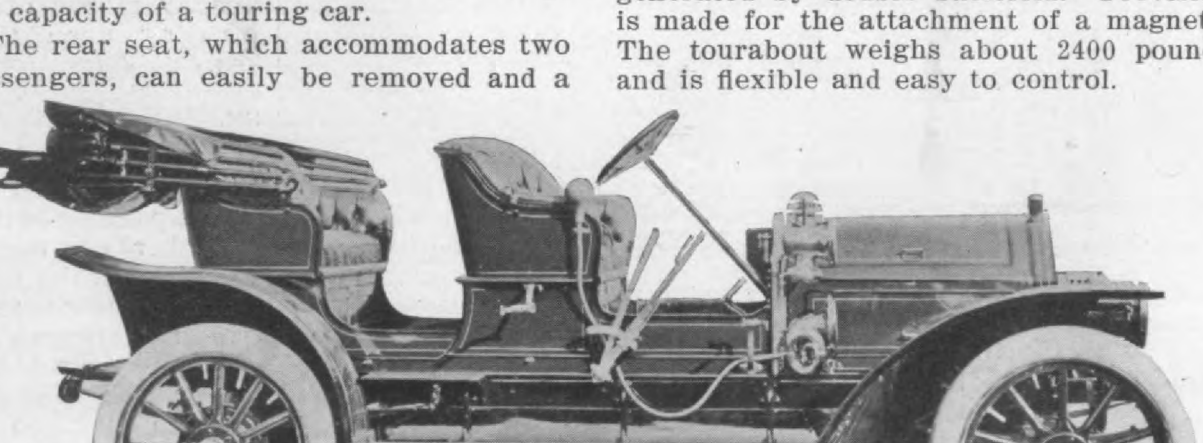
he 1908 Thomas Detroit Tourabout

The latest and one of the most attrac- e models turned out from the factory the E. R. Thomas Detroit Company is new tourabout. The car combines the ntness and speed of the Thomas-Detroit about with something near the carry- capacity of a touring car.

The rear seat, which accommodates two sengers, can easily be removed and a lected type equipt with Timken roll bearings and gives three speeds forwa and reverse.

The clutch is a leather-faced aluminu cone 16 inches in diameter with sen elliptic springs beneath the leather to sure easy engagement.

Ignition is by jump spark, current bei generated by double batteries. Provisi is made for the attachment of a magnet The tourabout weighs about 2400 poun and is flexible and easy to control.



The New Thomas Detroit Tourabout. Altho as light and speedy as a runabout, this car has almost th rying capacity of a touring car. Its motor is the standard 5x4¾ inch 40 H. P., as used in the other models e change speed gear is of the three-speed selective sliding type.

gle rumble seat with tool box or a trunk stituted.

The motor is a standard Thomas-Detroit ty with four cylinders 5 inches x 4¾ hes. Timken Roller and Hess-Bright l bearings are used throughout except the crank journals and on the connect- rods, where die pressed tin babbitt rings are used. Unusually long and

New Cameron Models

We show here a new model, which being put out by the Cameron Car C Beverly, Mass.

The season of 19 8 is opening with a unprecedented demand for a light, fo passenger car, the idea in the mind of t public evidently being to evade all t

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ANTICIPATE ALL DELIVERIE

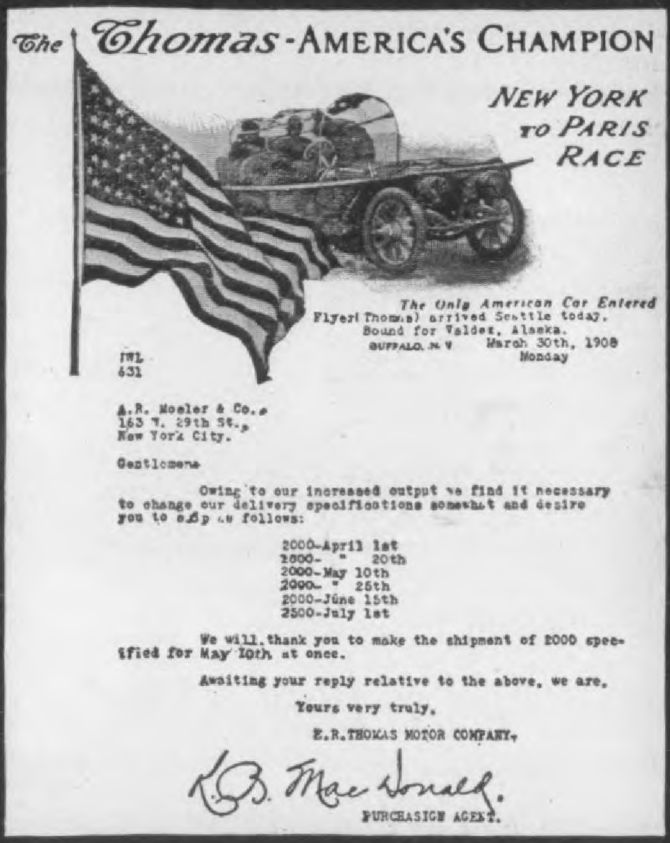
Rush Shipments for Thomas Flyer

Mosler Spit Fire PLUGS

LEAD THE WORLD

in the New York—Paris Race

08 THOMAS
EQUIPMENT



The *Thomas*-AMERICA'S CHAMPION

NEW YORK TO PARIS RACE

The Only American Car Entered

Flyer (Thomas) arrived Seattle today.
Bound for Valdez, Alaska.

BUFFALO, N. Y. March 30th, 1908
Monday

IWL
631

A.R. Mosler & Co.,
163 W. 29th St.,
New York City.

Gentlemen:

Owing to our increased output we find it necessary to change our delivery specifications somewhat and desire you to ship as follows:

2000-April 1st
2500- " 20th
2000-May 10th
2000- " 25th
2000-June 15th
2500-July 1st

We will thank you to make the shipment of 2000 specified for May 10th at once.

Awaiting your reply relative to the above, we are,

Yours very truly,

E.R.THOMAS MOTOR COMPANY,

K.B. MacDonald.
PURCHASING AGENT.

1908 THOM
EQUIPME

All Leading Manufacturers Use Them

A. R. MOSLER & Co., 163 W. 29th Street, New Yo

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th full elliptic springs, frame of reinced oak and the seating arrangement in rear of either a full Surrey seat without y division in the center, or a double inidual seat as shown.

The motor and transmission of the contain many interesting features; the m tor, especially to those who have follow the development of air-cooling system the transmission, which has been describ

A New Cameron Car Model 9. This machine is designed to meet the needs of purchasers of medium price rs. Its weight is but 1300 lbs., tires 32x3, tread standard, wheel base 98 inches, road clearance 12½ inche ecial change gear and shaft drive. Motor 4-cylinders air cooled 16 H. P. at 1000 R. P. M. The rear seats a mmodate two or an undivided surrey seat is supplied.

From the general appearance we believe s the first attempt in light, four-cylinder s to follow out the semi-touring car lines ich have been adopted by a large num- of builders of highpriced, high power- cars.

in these columns, is unique in its or inality and simplicity, being radically d ferent from anything yet produced.

Realizing the importance of a growi demand for cars in the Southern Stat the Cameron Co. has lately arranged

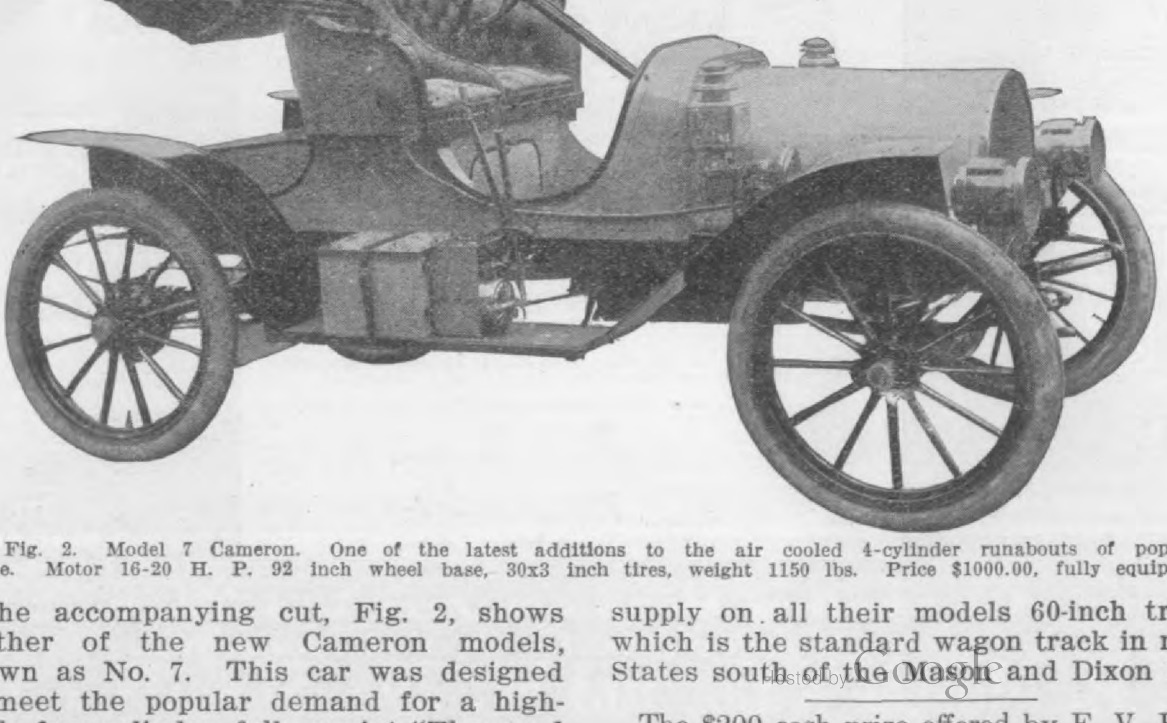

Fig. 2. Model 7 Cameron. One of the latest additions to the air cooled 4-cylinder runabouts of popul ice. Motor 16-20 H. P. 92 inch wheel base, 30x3 inch tires, weight 1150 lbs. Price $1000.00, fully equippe

The accompanying cut, Fig. 2, shows other of the new Cameron models, own as No. 7. This car was designed meet the popular demand for a high-

supply on all their models 60-inch tre which is the standard wagon track in m States south of the Mason and Dixon li

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The $200 cash prize offered by F. V. H

Look for the Solar Nameplate — only the best lamps have th

Exclusive Features of Solar Lamp

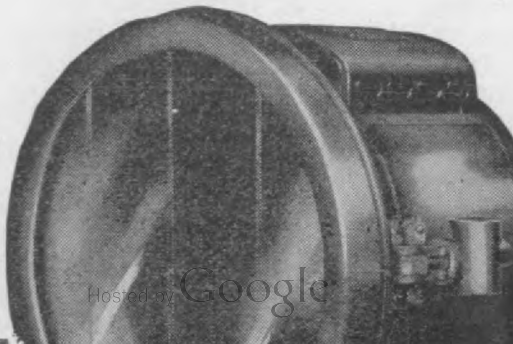
INTERCHANGEABLE PARTS

A most important point for the trade, wner or user to consider in purchasing a lotor Lamp is the matter of Interchange-ble Parts. The entire construction of olar Lamps by tools and jigs assures the ser of absolutely interchangeable parts. n the event of accident, delay is avoided, nd the matter of repair is greatly simpli-ed. Naturally this is less expensive than omplete replacement, which is often neces-ary when the lamp parts are not inter-hangeable.

This important detail and all others ex-ained fully in our new 1908 catalog. Write or copy.

adger Brass
lanufacturing Company

nosha, Wis. 434-11th Ave., New York



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A sample of the dreaded "American Invasion." Sir Herbert Greaves, Chief Justice of the British West Indies, a
idgeton, Barbadoes, W. I., in his Brush Runabout.

Vestinghouse Receivership Vacated

'he receivership for the Westinghouse chine Company, created last October, at beginning of the financial depression, was ated March 31 by Judge James S. Young he United States Circuit Court, Pittsburgh, petition of the company and the receivers. property was turned back to the stockders April 1, when the company began its al year free from debt, with cash in bank orders to justify operating the plant on ut 75 per cent. basis.

Opening of New Ajax-Grieb Plant

mid the applause of about 200 of those minent in the automobile industry vernor Fort pressed the button which rted the wheels of the new plant of the x-Grieb Rubber Company, Trenton, N. on May 11. The christening was sponed by Mayor Madden of Trenton and vernor Fort. There were speeches, a cheon, games, an interesting and inuctive trip thru the plant and a final deville entertainment in a gaily buntdecorated hall.

'he guests were conveyed to Trenton by special trains one from New York the other from Philadelphia. Presit DeLisser opened the ceremonies by velcome address followed by a humorous

The new plant consists of three bri buildings aggregating 53,800 square feet floor space while the grounds inclu about eight acres.

It looks as if there would be an Ame can invasion into Mexico some time in N vember, as Mexico City is to have a tw hundred thousand dollar race course. Th with the work that is now going on at t Guadalajara automobile course, puts th city in line after Savannah, as the Me can Auto Derby has been postponed un November.

Middletown Automobile Club, Midd town, Ohio, is about to issue a road gui covering territory 360 miles square in t southwestern portion of Ohio, and inclu ing such prominent cities as Cincinna Springfield; Richmond, Ind.; Hamilto Dayton, Xenia, Middletown, Lebanon, C ford, Eaton and Wilmington. This gui will include an index map of the whe section and 10 detail maps numbered correspond with numbers on the same s tions on the index map. All cross roa as well as main roads are shown so th tourists can know of interesting side tri from the main arteries of travel. The tail maps are each page size and on t page facing each map will be given f details covering the road conditions, hote garages, etc. From the preliminary pr

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tting out a new model styled No. 6, which ems to combine the essential and desirable atures of the buggy type automobile. Its lking points according to the makers are

4 1-16 in. bore and 4 in. stroke with cooling fins provided on cylinders and va cages to insure perfect cooling. The fa incorporated in the fly-wheel. The va

Fig 1. Snyder No. 6 Motor Buggy. The location of the 2-cylinder 4 1-16 x 4, 10-12 H. P. air-cooled motor is sh ve is by single Diamond chain to the jack shaft, which carries a spur gear.

nplicity, reliability, durability and "road-ility." It is built it is claimed of the best d strongest materials, and has sufficient wer to negotiate bad and hilly roads, and very compact and graceful in appearance.

are in cages in the sides of the cylinders. crank and cam shaft bearings are of bro The engine is oiled by a compression lub tor with sight feeds.

A Breeze automatic, float-feed carbur

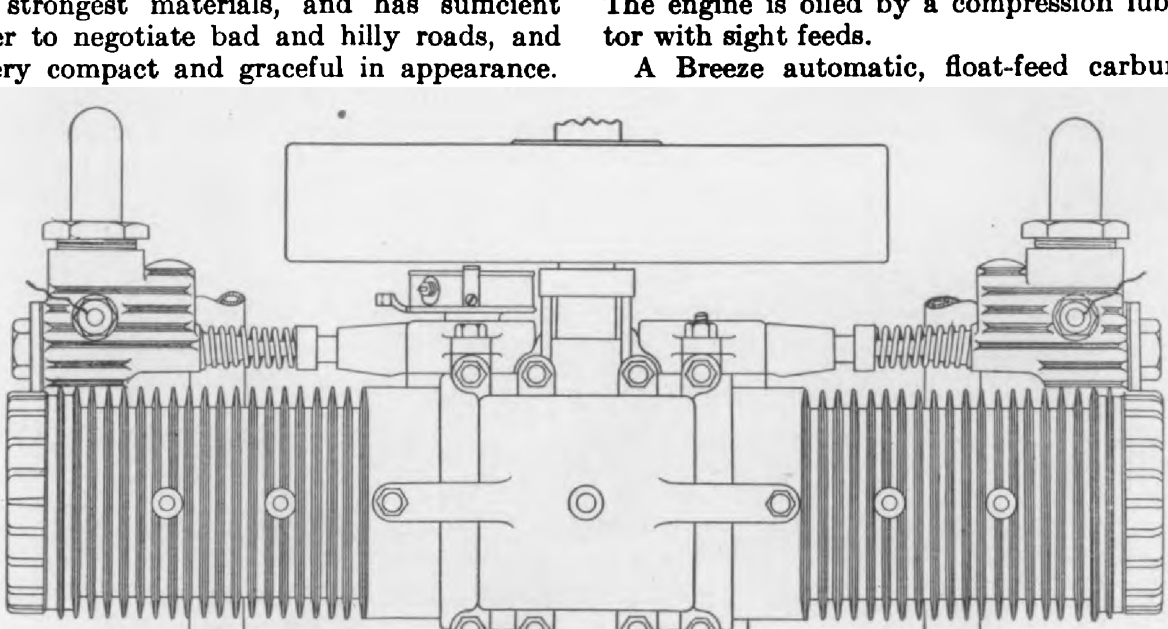

Fig. 2. Plan of Snyder Buggy Motor, showing cylinders and crank case cast integral and with coincident s, the connecting rods being offset. The cylinders have cooling fins and the fly-wheel has fan blade spokes. The b

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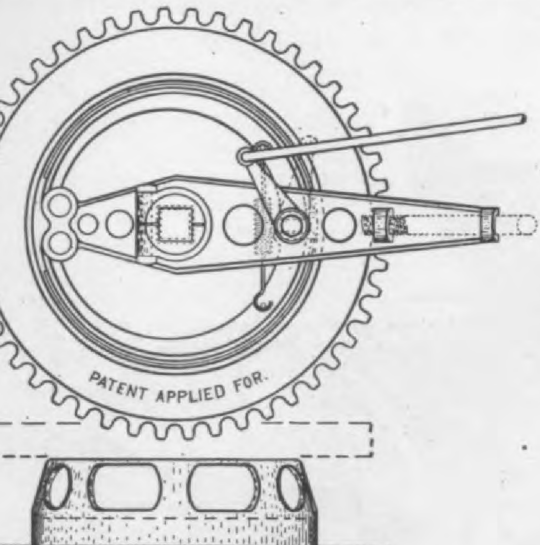
two speeds forward and one reverse and operated by pedals and lever. The final



3. Views of the internal expanding brakes of No. 6 r Motor Buggy. The brake drum and sprocket is egral piece. The distance rod is adjustable as shown, ar end being a casting which supports the brake shoe

is by Diamond roller chains of one inch

type. It is very strong and quick-actin Regular automobile steering knuckles ar yokes are used. Spark and throttle contr are situated on the steering post, just belo the wheel.

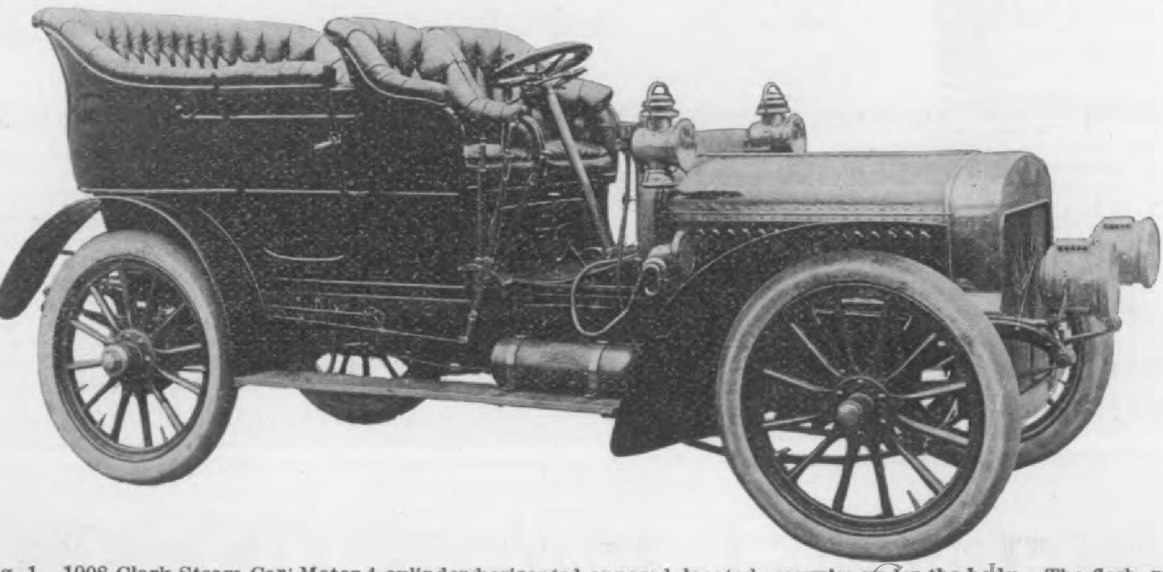
One of the special features of this car its brake equipment, which consists of o expanding brake on each rear wheel, th brake drum being integral with the sprocket as shown in the illustration. This is claime as a decided advance over motor buggi fitted with a single brake usually on the jac shaft.

Every working part of this car is easil accessible, the power plant being arrange so that the body need not be removed. Th crank case, transmission and differential a all oil-tight, so that all gears run in oil an are made very silent. There are really n especially new features to the car, most par being of a type that has long been in us and that has proven efficient. The car com plete weighs 800 lbs. and can be fitted als with surrey or delivery bodies. The vehic shown lists for $450.00 without top and guaranteed for one year. The surrey an delivery models sell for $500.00.

1908 Clark Steam Car

presenting his 1908 Model, Edward S. , Boston, Mass., manufacturer of the Steam Car has shown no radical changes esign from previous Model. Only such ovements have been added as the exnce of the past year has shown could be

and parts are accessible, no packing bein necessary. All the working parts of th engine are enclosed from the dust and di of the road. The lubrication is positive an plentiful insuring the motor against any undu wear, and with large bearing surfaces for a the moving parts. Under ordinary conditio



g. 1. 1908 Clark Steam Car; Motor 4-cylinder horizontal opposed, located crosswise under the body. The flash gener under the hood at the front. Price of passenger car, $3,500.00. A rumble seated roadster is also being supplied .00.

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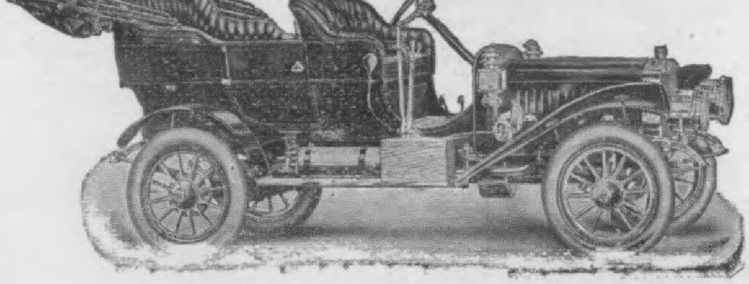

THE $2000

THE STANDARD OF AMERICAN AUTOMOBILE VALUE

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Perhaps you've noticed that most cars cost more than the Mitchell. Did you ever notice that they were any better in finish or in material—or any better in **performance**—on the road?

Ride in a $2000 Mitchell and **see.**

Have any Mitchell agent "show you" a Mitchell.

Look it over—go out into the country and test it on the toughest hill you know of—through some particularly bad stretch of sandy or muddy road. Notice your power—notice speed—notice the sweet running motor—the tranquil action of all moving parts—ease of control—notice general efficiency, Mr. Prospective Owner.

Then if you can see how you'll get two or three thousand dollars more automobile value out of any other car—**buy** the other car, we won't say a word.

But you won't **find** more value in any other car.

Present day automobile value is **standardized in** the **Mitchell** at **$2000.**

A demonstration will prove this to **you.**

You are under no **obligation** to buy when you ask for a demonstration.

If you are considering the purchase of a car we want you to **know** the Mitchell, and we want **to show** you what you get in a Mitchell at $2000 and that you can't get any **more** in **any other** car, **regardless** of the price.

Call up the Mitchell agent.

The Right Price for the Right Car

$2000

WRITE US FOR CATALOGUE No. 18

MITCHELL MOTOR CAR CO.

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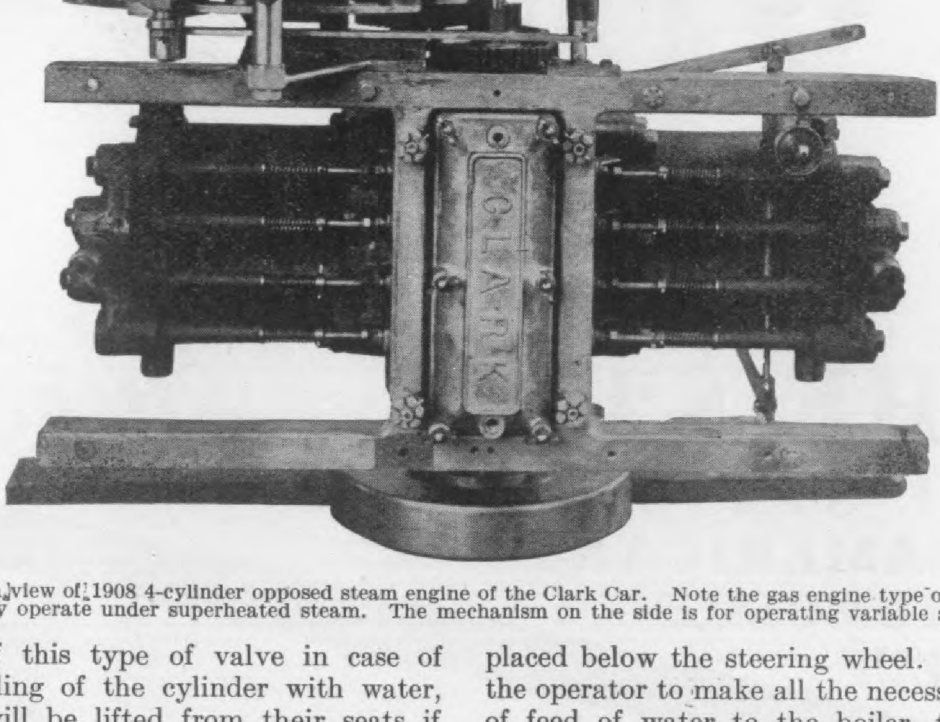
Racine, Wis



ig. 2. Plan view of 1908 4-cylinder opposed steam engine of the Clark Car. Note the gas engine type of poppet valve successfully operate under superheated steam. The mechanism on the side is for operating variable stroke pumps.

ntage of this type of valve in case of less flooding of the cylinder with water, valves will be lifted from their seats if ater hammer is formed, protecting the ing parts of the engine from breakage. valves are operated by cams on a cam , giving an instantaneous movement ar to that of the valves on gasoline nes and making all changes of cut-off and rse, insuring better economy of fuel than ssible with the ordinary slide valve.

FLASH BOILER.

e boiler is placed under the hood and is e flash type. This offers the great ad- age of simplicity and safety, also of ng the steam instantly, a greater saving me in firing up, as compared with other s of boilers. The steam is made as it ed by the engine, and having only a small nt of water in the coils no danger can bly exist by rupture, or over pressure. rush of steam through the coils is claimed e so rapid that no oil or foreign matter ollect or burn on the boiler. This method onstruction also makes it practical to ust the steam in the condenser, so that vater from the condensed steam can be over again, dispensing with the necessity large water tank and refilling while on road. By condensing the steam the ust is noiseless. By the peculiar con- tion of this boiler not only is a high ency obtained, but a long life is assured it can be easily and cheaply replaced. placing of a flash boiler at the front of utomobile under the hood is claimed to

placed below the steering wheel. This allow the operator to make all the necessary change of feed of water to the boiler, to meet th varying conditions of road and grades. Th adjustable water pump is placed beneat the foot board, where it can be easily ex amined and the valves can be quickly removed The pump plungers have a varying stroke from nothing to the full capacity of the pump At the same time, which is extremely im portant when working, the plungers displac

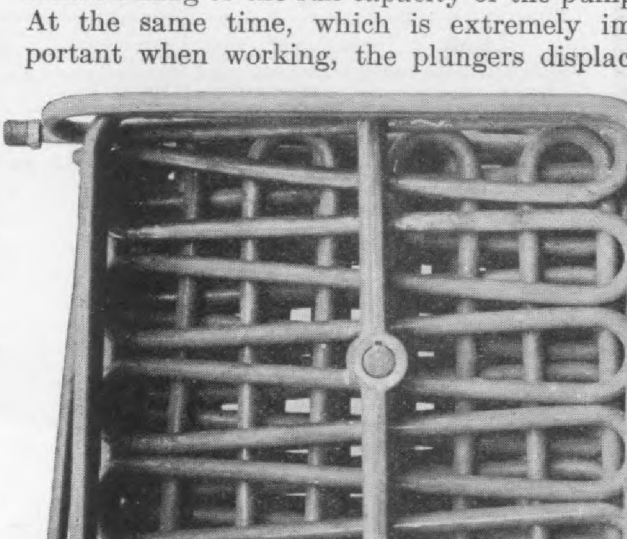


Fig 3. Plan of the flash boiler of Clark Steamer.

all the fuel and water from the body of th pump, preventing any air from accumulating which would destroy the action of the pump and prevent the proper feed of the fuel an water to the boiler and burner. The varyin

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GEARS
For 1909

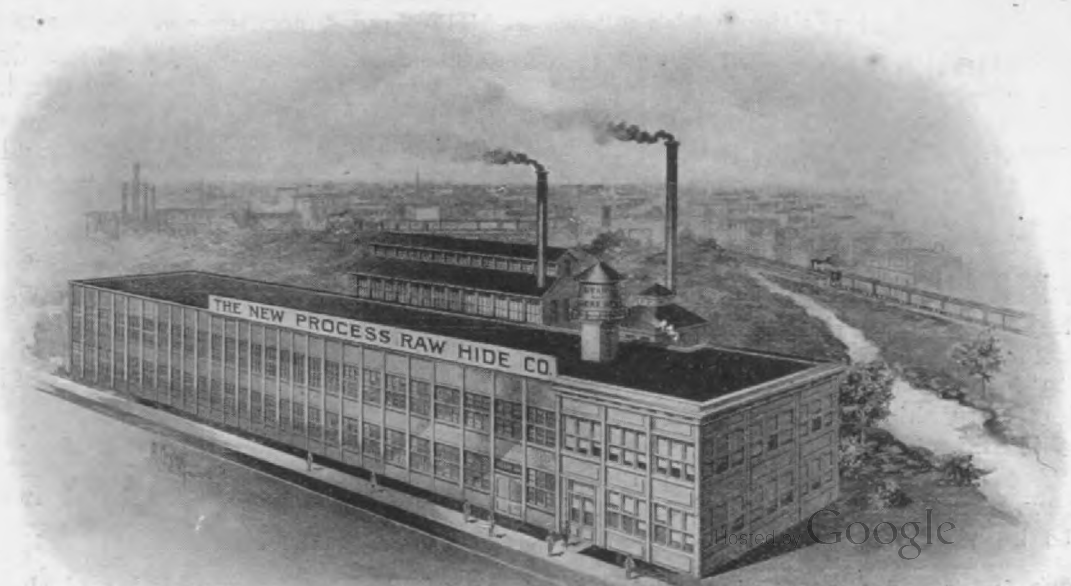
ACCURATE WORK GUARANTEED

WE have one of the largest and best equipped plants in the country for turning out accurately cut gears of any kind and material, and in any quantity. Have 36 gear cutting machines, including Fellows Gear Shapers, Brown & Sharpe and Gould & Eberhardt Rotary Cutters and 12 Gleason Generators for bevel work and a special hobbing machine for spirals, herringbone and helical gears. Our lathe equipment is in keeping and includes the best types of automatic screw machines and turret lathes taking stock through the spindle up to 4½" diameter. We have two large hardening furnaces fitted with a pyrometer system and are thoroughly familiar with the proper treatments of the special steels. And we have a reputation for the high quality of our work which is second to none.

SEND US YOUR BLUEPRINTS FOR ESTIMATES

THE NEW PROCESS RAW HIDE CO.

Syracuse, - - - - - - - New York



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Direct bevel gear drive is used between e engine and axle. The 1908 Model is ted with foot and emergency brakes acting the rear hubs. The car is fitted with a o speed change gear running on Hess-ight ball bearings, with sliding gears of improvements. All these devices are tected by a large number of patents, eit granted or now pending.

A novel feature of this car is a device watching the conditions of the fuel regul and coils. Directly in front of the oper

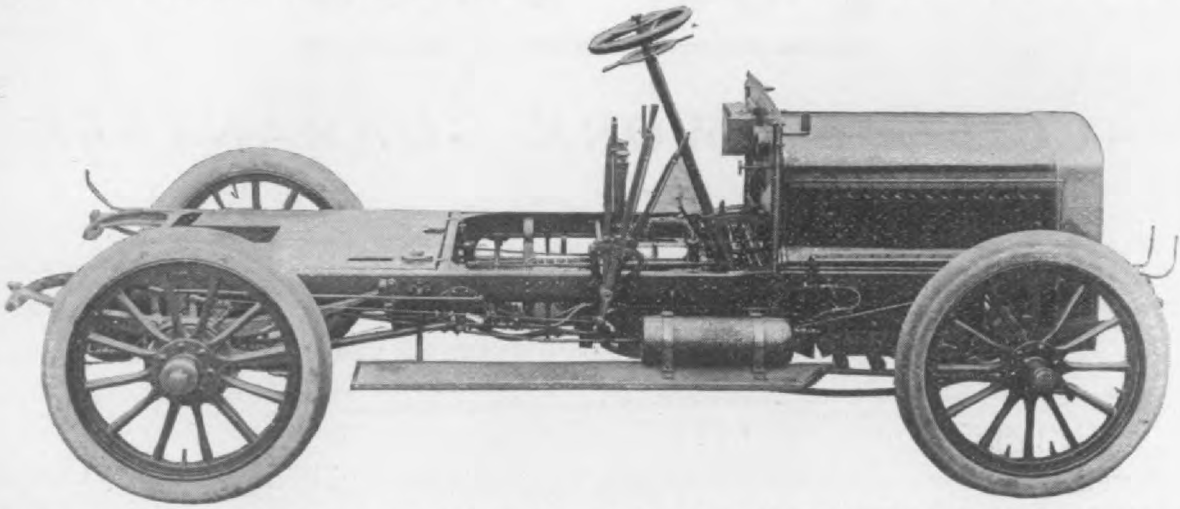

Fig. 4. Chassis of 1908 Clark Steam Car. This car is fitted with a flash boiler under the hood and a four-cylinder tal opposed engine under the body using superheated steam. A two speed change gear is also fitted with a neutral s gine and pumps can be operated with the car stationary.

rome Nickel steel. The dash is made of e piece of aluminum 5-16 in. thick, making free from the cracks and blemishes that e often found in a wooden dash. The ndenser plates are made of aluminum with rtical copper tubes. The frame of the ndenser is covered with a polished brass sing. The hood is of the regular three nged type having brass hinges.

CONTROL LEVERS

There are three levers; one shifting the ms operating the cut-off and reverse; one r the change gears which gives two speeds rward and a neutral position which allows e engine to run free for operating the pumps, c. while the car is still, and one for the nergency column, throttle wheel and ad-ster wheel. The controlling devices for e water and fuel, the steering wheel with and running through the dasher is a $1\frac{3}{8}$ brass pipe which extends through to boiler casing. Fitted to the lower end this pipe is a piece of heavy plate glass w enables the operator to see the conditio the fuel regulator and coils. The bod made of aluminum and the trimming upholstery is of the highest grade. The w base is 110 in. and the tread is 56 in. car is fitted with 36 in. x 4 in. tires. tonneau is roomy and made to carry folding seats making it a seven seated The price is $3,500.00.

The manufacturer of this car is building a Gentleman's Roadster, a descrip of which will be published a little later.

This roadster is furnished with one ru seat or as a four seated runabout and is n to sell for $2,500.00.

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ackard Has Not Taken Columbia Plant

We have been unable to verify the ru-or that negotiations were practically omplete for the transfer of the plant of e Electric Vehicle Company, of Hart-rd, to the Packard Motor Co., as noted the April issue, page 49. All indica-ons now show that no such transfer is kely to be made.

With the advent of "good going" Automobile Club of Bridgeport, Conn exhibiting an enthusiastic activity. A recent annual meeting of the club the lowing officers were named for the e ing year: President, Frank T. Stap vice-president, F. A. Strong; secretary W. Bolande; treasurer, L. B. Powe. E blanks have already been issued for Sport Hill and Redding Ridge Decora

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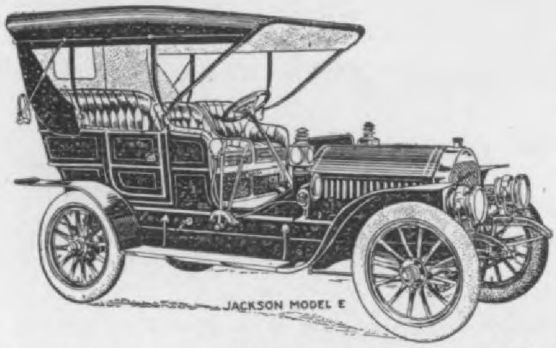
JACKSON

As Usual A Winner



MODEL E, JACKSON, $2000. 4-Cylinder, 35 H. P.
111-inch Wheel Base

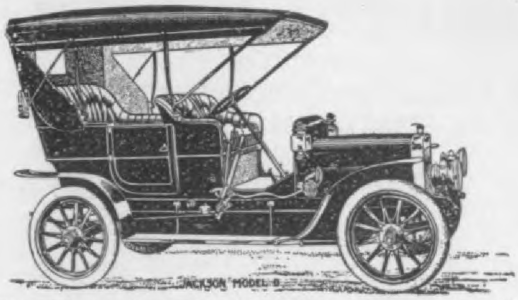
In the Fort George Hill Climb, held at New York City, April 9th, a regular stock MODEL E, JACKSON selling for $2000 defeated all competitors easily and made faster time than any Touring Car, regardless of price.

Other Models

MODEL C, JACKSON, $1250, 2 Cylinders, 24 H. P.

MODEL F, JACKSON, $850, 2 Cylinders, 18 H. P.

Engine under hood, Shaft Drive.



MODEL D, JACKSON, $1500. 2-Cylinder, 24 H. P., Engine under hood, Shaft Drive, Selective Type Transmission

JACKSON AUTOMOBILE CO.

Jackson, Michigan

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nio, commissioned Messrs. L. A. Frayer d C. O. Howard, of Columbus, Ohio, to velop for him a gasoline engine suitable r various portable work such as tractors, avy trucks, road rollers, etc. The en-ne was to be air-cooled and reversing if ssible, and above everything else sim-e and efficient.

used to seal the end leakage and the bearings shown are for the purpose carrying the valve concentric with cha ber and prevent body of valve from com in contact with surrounding walls. W this construction cylinder pressures create no friction and the total friction valves is what is due to sealing str

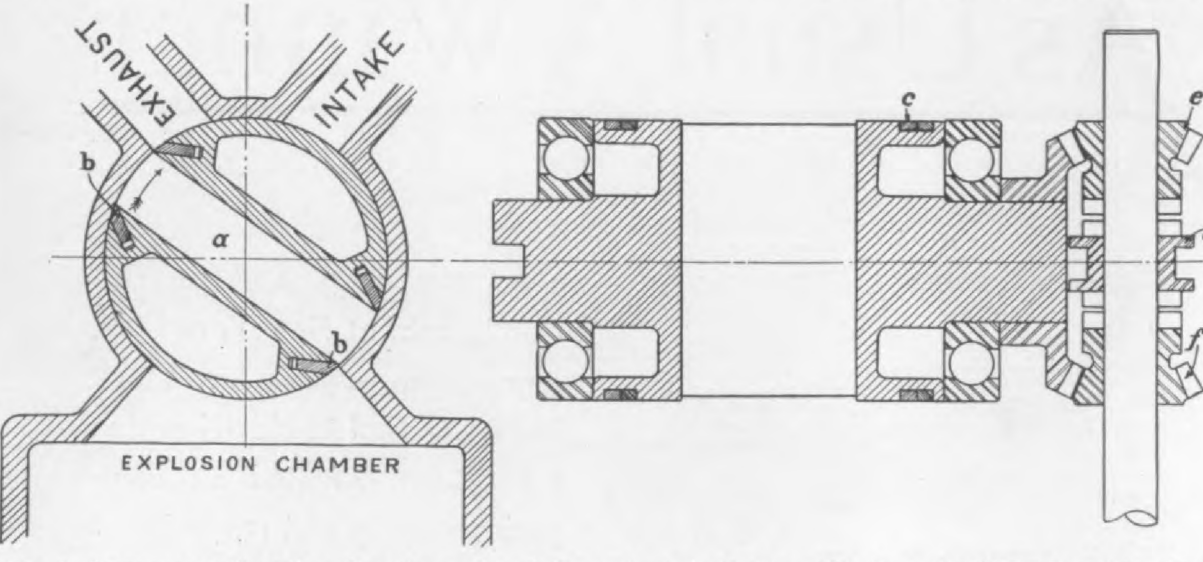

Fig. 1. Transverse section thru the rotary valve at the port, and at the right is a longitudinal section thru port as explained in the text.

After considerable thought on the sub-t Frayer and Howard decided that a ary valve, if practical, would not only ke the reversing means very simple, but eatly simplify the whole construction of engine, and perhaps obviate the diffi-ties experienced with exhaust valves in ge air-cooled engines. With these pos-le advantages in view they proceeded develop a rotary valve, and after a ies of tests under various conditions l covering a period of twelve months, orted that they had a rotary valve in ich they could find no defects.

CONSTRUCTION OF VALVE.

n describing the construction of valve, left of Fig. 1 is a transverse section ough the valve at port, a is the port l b represents strips which are backed by spring to seal the transverse or cumferential leakage. These strips bear inst the walls of the valve chamber l wear is compensated for by the ings, the body of the valve itself being ned approximately 1-32 smaller than the mber.

The valve rotates at one-quarter the eed of crank shaft and the diametrical t completes a cycle of engine every f revolution.

The exhaust is first discharged and as valve rotates it opens and takes in a

"b," which is extremely light.

The scheme for reversing the engine also shown here. The collar or dog clu D is feathered on the driving shaft the pinions E and F float. When clutch engaged with one pinion the valve rota

Fig. 2. View of air cooled cylinder of automobile en and its rotary ball bearing valve.

in one direction relative to the crank sh

e motor is unimportant in most uses, it a grêat advantage in such tractors as e required to work with equal efficiency either direction.

TESTS.

The first tests of the valve were made a 10 H. P. stationary engine. The old ad with poppet valves was taken off d replaced with a new head with rotary lve. A sprocket wheel was placed on e crank shaft and another (four to one) aced on valve stem. Motion was transtted from the crank shaft to valve by eans of a 3-16 in. ordinary bicycle chain. is engine was put in service and run r three months driving a water pump fore anything further was attempted.

abnormal compression high enough cause self-ignition after motor start The fan belt has been removed and engine run until pistons seized.

The valves have been run for th weeks without lubrication, three we with moderate lubrication and three we with copious lubrication. The valves h been run with an injection of lime a sandstone dust entering the suction p in such quantities that it was necess to remove the residue from the cylind and throughout the valves have maintai their efficiency and freedom.

An indicator was placed on the eng and motion taken from the vertical sh

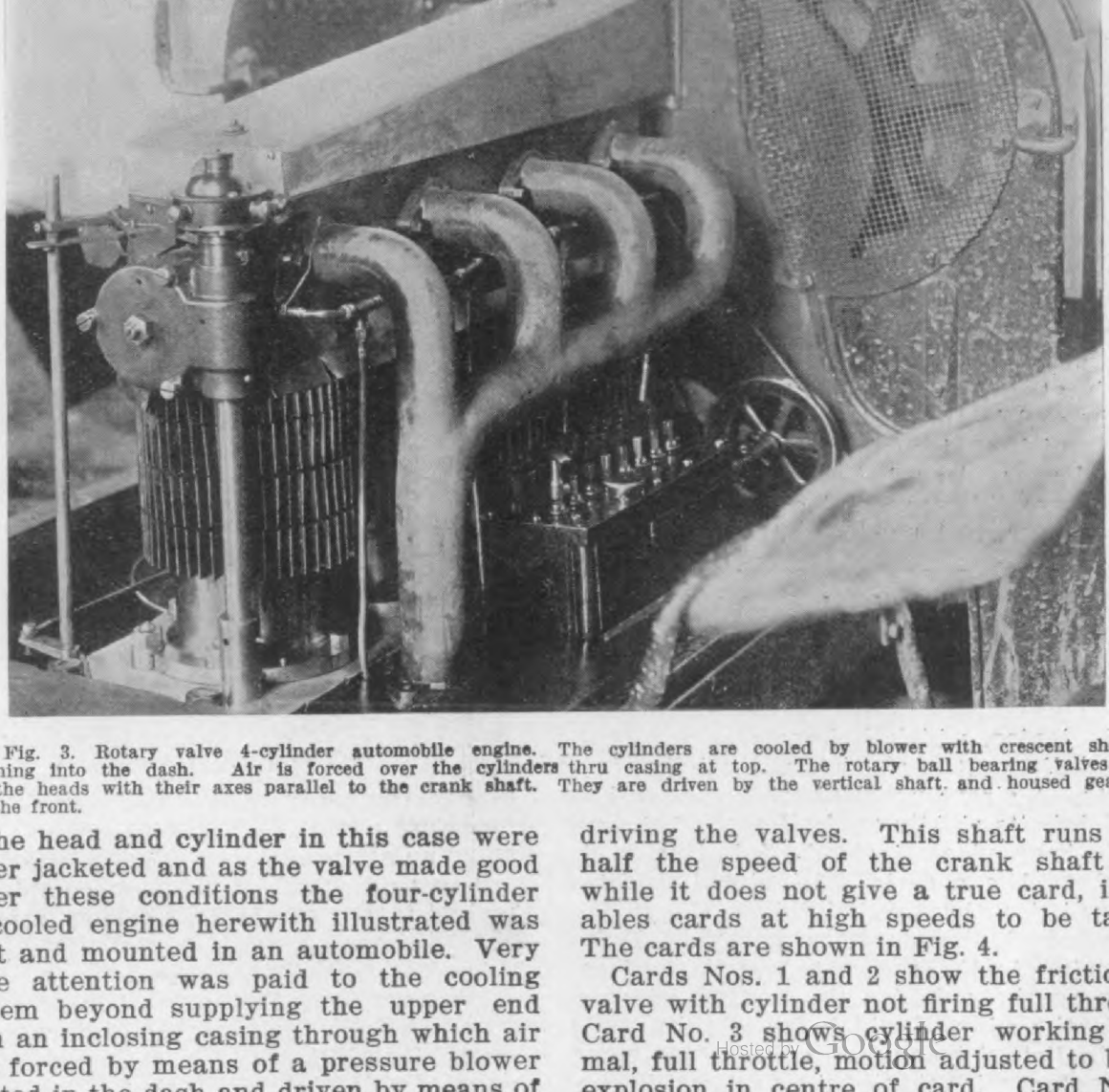

Fig. 3. Rotary valve 4-cylinder automobile engine. The cylinders are cooled by blower with crescent sha pening into the dash. Air is forced over the cylinders thru casing at top. The rotary ball bearing valves n the heads with their axes parallel to the crank shaft. They are driven by the vertical shaft and housed gear t the front.

The head and cylinder in this case were ater jacketed and as the valve made good ider these conditions the four-cylinder r-cooled engine herewith illustrated was ilt and mounted in an automobile. Very tle attention was paid to the cooling stem beyond supplying the upper end ith an inclosing casing through which air as forced by means of a pressure blower ated in the dash and driven by means of

driving the valves. This shaft runs half the speed of the crank shaft while it does not give a true card, it ables cards at high speeds to be tal The cards are shown in Fig. 4.

Cards Nos. 1 and 2 show the frictio valve with cylinder not firing full thro Card No. 3 shows cylinder working mal, full throttle, motion adjusted to b explosion in centre of card. Card N

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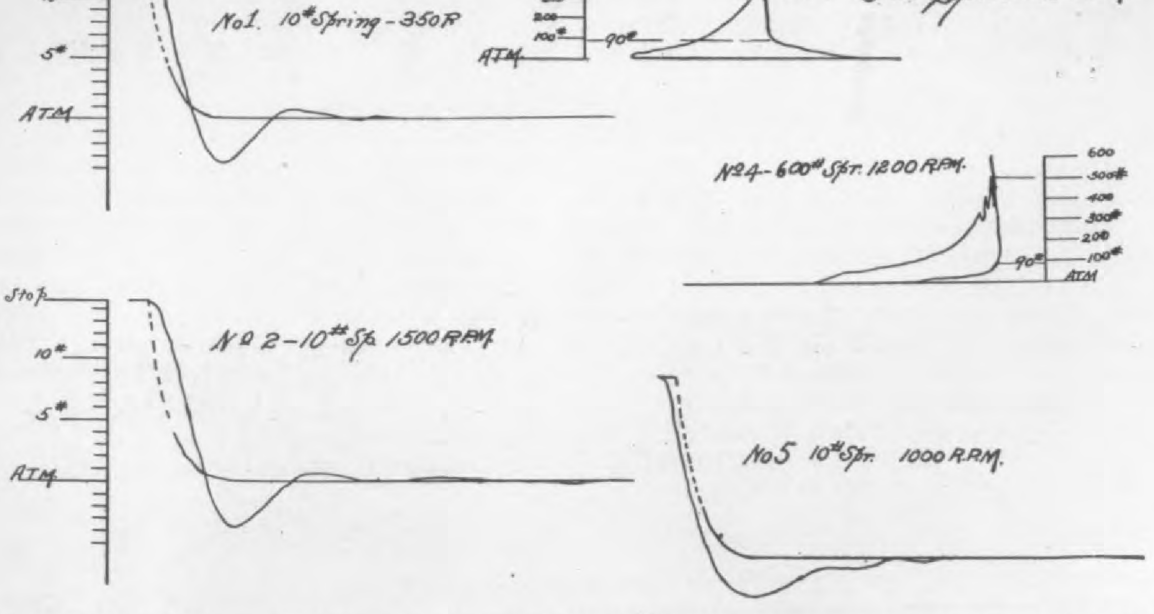


Fig. 4. Various indicator cards taken on gas engine with rotary valve, showing the very slight friction of lve, a card with a ⅛-inch pet cock open and a normal card at 1000 r. p. m. as described in the text.

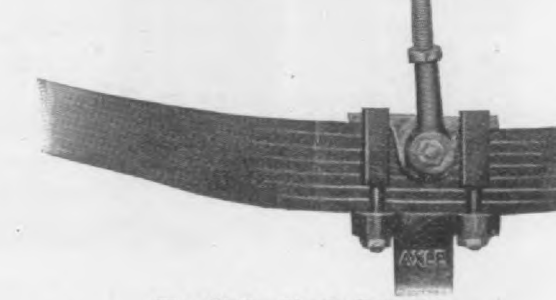
ght spring used. The reason the expan-ion line does not return on compression ne can best be explained by the heat enerated in compressing the charge. hould there be any perceptible leak to alve the line would return either on com-ression line or back of it, as in card No. 5, hich was taken with pet cock open, the et cock having an eighth-inch hole.

The Ohio Manufacturing Company is ow placing special machinery for the anufacture of this engine in its plants oth at Columbus and Upper Sandusky, hio, and in thirty days will be in position furnish engines from 12 up to 40 H. P., e larger sizes being air-cooled and of e reversible type and especially adapted r commercial trucks and tractors.

The Ciglia Shock Preventer

A new shock preventer has recently been laced on the market by the Ciglia Shock reventer Co., 176 W. 72d St., New York. his device, which is known as the Ciglia hock Preventer, consists essentially of two arts. A circular disk-shaped piece or base hich bolts rigidly to the frame of the car. his base piece, instead of having a flat rface, has a series of inclined surfaces, ere being three radial ridges, the surface etween sloping down to meet in a hollow ough. At the centre a bolt is fixed and ts as the axis for the second or cover sk, the edge of which forms a lip to ex-ude dirt. The surface of this disk comes contact with that of the first and is simi-

tion of the axle or body up or down rot the outer disc on the other and the w ing action of the surfaces tends to f the plates apart, this being resisted five-pointed star spring held by a nut. ordinary roads the action is so slight as to bring the star-shaped spring into ac These springs are cut from steel sheets



The Ciglia Shock Preventer.

highly tempered. The two rubbing faces are packed in graphite grease an quire no attention.

The price per set of four complete tached to the car is $100. They are g anteed for one year.

Western Drop Forge Co., 4 Railroad Marion, Ind., manufactures forgings every description and is doing a large ount of this class of work for the aut

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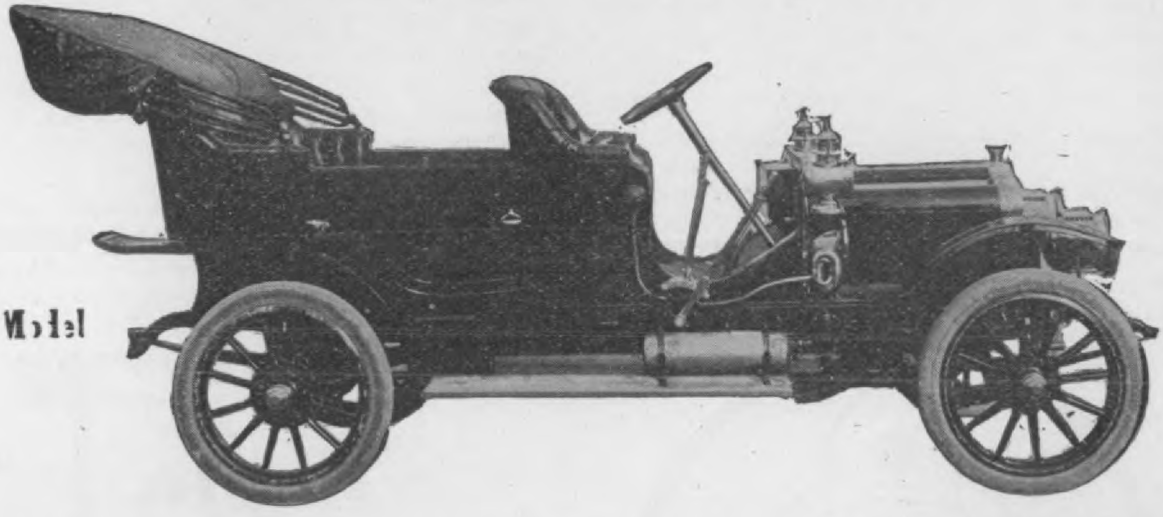
THE SELDEN CAR



Model

Five Passenger Touring Car, $2000
Three Passenger Runabout, $2000

AN ATTRACTIVE CAR
AT AN ATTRACTIVE PRICE

SPECIFICATIONS

Engine—4 cylinders $4\frac{1}{4} \times 4\frac{1}{2}$, 28-30 brake horse-power.

Transmission—3 speeds forward and reverse, selective, Timken bearings.

Wheel base—109 inches; tread, standard; clutch, cone leather.

Body—sheet metal, straight line type, roomy and comfortable.

Tires—$32 \times 3\frac{1}{2}$, quick detachable; make optional.

Frame—pressed steel, $4\frac{3}{4}$ inches deep.

Front axle—single I-beam drop forging, ball bearings.

Rear axle—Bevel gear drive, enclosed type, roller bearings.

Ignition—synchronized jump spark.

Weight—empty, 2,200 lbs. (actual not catalog.)

REPRESENTED IN GREATER NEW YORK BY
The Palmer & Singer Manufacturing Company, 1620 Broadway

SELDEN MOTOR VEHICLE CO.

ROCHESTER, N. Y.

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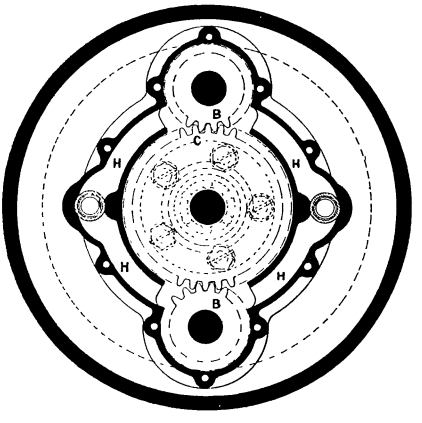
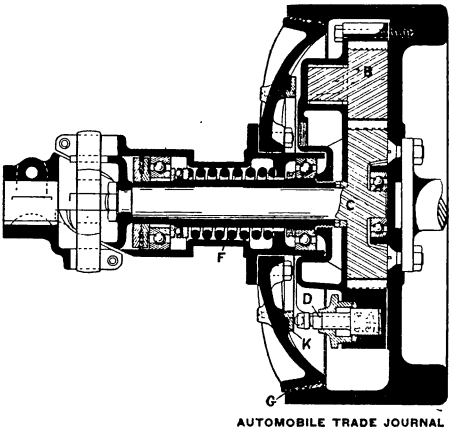
Stilson Hydraulic Clutch

The Stilson Motor Car Company, of Pittsfield, Mass., has brought out a clutch of the hydraulic type, of which the following is a brief description. The accompanying drawing shows an axial and transverse section of the new clutch. The Spider A is fast to the engine shaft and carries the two spur pinions B, B. These are in constant mesh with the spur gear C, which is fast to the driven shaft. The spaces H H H H are sections of a liquid casing, which is filled with oil. The arrangement is such that the gears and the oil spaces constitute a gear pump tending to circulate the surrounding oil. Several valves, one of which is shown at D, when opened, allow of the free circulation of the fluid through passages not shown, but when D is closed the oil is impounded and practically no relative motion is possible between the pump members. When the valves are opened and oil is by-passed freely the pinions B on the engine shaft simply run idly around the central gear C and no torque is transmitted to the driven shaft. When, however, the oil valves are partially closed the resistance between the pump members becomes considerable to the gear C and the pinions B drive the gear C and the driven shaft with only a slight amount of slip due to oil leakage.

The clutch is operated in the conventional manner by the release of a pedal. The spring F then acts and brings the ring K into contact with the ball bearing heads of the oil valves D, which have previously been held fully open by their springs. As the valves are more or less closed by the release of the pedals, the clutch torque increases, due to the pump work consequent upon the impounding of the oil, until they are entirely closed, when the clutch shaft revolves at about 90 per cent. of the engine speed. A still further motion of the clutch causes engagement of the leather-faced conical surface G and locks the clutch to the engine mechanically.





AUTOMOBILE TRADE JOURNAL

Stilson Hydraulic Clutch, operated in the usual manner by foot lever. This clutch is for use in starting and is not intended to do away with the change gears. It gives gradual starting at all engine speeds and is mechanically engaged when fully in.

Asbestos Wood

Professor Charles L. Norton, of the Massachusetts Institute of Technology, after several years of laborious research has succeeded in producing an asbestos wood which, while being fire proof, is harder than ordinary wood and takes a higher polish. In the motor car field this material will find many uses such as in the construction of garages, of compartments in factories, fire proof doors, etc.

Its uses in the electrical field are almost unlimited and for these purposes an ebony asbestos wood is furnishel which is of somewhat similar structure, but is saturated with a special insulating compound which causes it to take on the appearance of ebony. Ebony asbestos wood has a smooth, hard surface similar to hard rubber and takes a polish equal to hard rubber or marble. It is therefore well adapted to use in the manufacture of switch and panel boards, fuse bases, insulating barriers, duct linings, rheostat tops, etc. Both kinds can be worked with ordinary wood working tools. Prices on the plain asbestos wood range from 20 cents per square foot for the ¼-in. material to $1 per square foot for the 2-inch thick. The ebony wood lists at 40 cents to $1.60 per square foot according to thickness. This material is made by H. W. Johns-Manville Co., 100 William street, New York City.

The Dayton Electrical Mfg. Co. of Dayton, Ohio, the well known manufactures of Apple Ignition Apparatus and Storage Batteries, has found it necessary on account of the phenomenal growth of the lead burning and assembling departments of its Storage Battery equipment to enlarge and improve its old quarters.

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The "Cowles" Carbureter

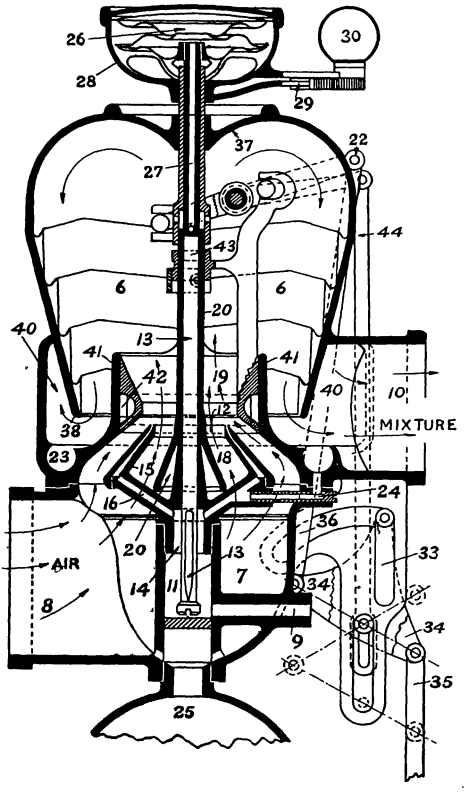
The Cowles carbureter, which is here shown in sectional view, is manufactured by E. P. H. Cowles, 131-135 Belmont street, Warren, Ohio. This carbureter is of the automatic type, and will be made in a number of sizes, determined by the maximum area of the air valve opening. At present only one size is being made, and that with a one square inch opening. This is known as No. 1 and lists at $25.

The carbureter consists of an improved nozzle, air valve, oil valve and combinations of the same. 6 is the mixing chamber and 7 the valve chamber or base. Air enters at 8, gasoline at 9, while the mixture is taken out at 10. The gasoline that enters at 9 passes into the vertical tubular chamber 11, where its passage to the nozzle 12 is gauged by the needle valve 13. This valve consists of a cylindrical stem sliding, oil tight, through a bushing, 14. A head on the lower end of the valve rod seats in the lower end of bushing 14, so that when it is drawn up it cuts off the flow of gasoline.

One or more V-shaped grooves, 13, are cut in the valve rod, their upper ends being ⅛ in. above the upper end of bushing 14, when the valve rod is down. Their lower ends are V-shaped, the point of the longest terminates just above the head on valve rod, the points of the others terminating successively where the straight part of next longer one begins, thus the flow of oil increases gradually as the valve rod moves down or decreases as it moves up, so that when the stream is fine its section is an equilateral triangle with outwardly curving sides, making practically a solid round stream. This admits of gauging the liquid with extreme accuracy, particularly when the quantity is small. The reason for more than one groove is to better balance the valve rod.

The nozzle consists of a cone-shaped annular chamber, 15, connected to the tubular chamber, 11, by radial arms, 16, conduits through these arms allowing the gasoline after passing through valve 13 to flow into annular chamber 15, where it is discharged in an annular film at the top of nozzle, 12.

The air after entering chamber 7 is divided into two blasts, an annular blast at 17 passing outside the chamber 15 and an inner blast passing thru 18. Their passage is controlled and regulated by a double valve, one annular, 19, sliding air-tight thru the base of mixing chamber 6, and seating on the upper outside part of chamber 15, the other cone-shaped, 20, seating in the upper inside part of 15. Its stem, 20, is bored out to admit valve stem, 13, by which it is operated, and both extend up thru the lid of mixing chamber 6. These two valves are operated by the arms of a rocker shaft, 21, one arm lowering 19 and the other raising 20, or vice versa, their lengths being inversely proportioned to the area of the valves so that they balance each other under any pressure. One end of rocker shaft, 21, passes outside of chamber 6, and has an arm, 22, to operate it. Valves 19 and 20 and chamber 15 are shaped to cause the two air blasts to converge and meet with great force, catching the gasoline between them directly over the nozzle, as shown by the arrows, forming a cyclone which effectually wipes up



Sectional view of the "Cowles" carbureter; numbers explained in text.

and atomizes the gasoline and thoroly mixing it with the air, after which the mixture is projected up in the centre against the lid, 37, where it is deflected down the sides of mixing chamber 6, passing under their lower edge at 38, all around into the annular passage, 40, and out at 10. Optional with the purchaser an auxiliary air valve 41 is provided, which when raised, admits air from chamber 7 thru passages 42, cut in the outside of main air valve, 19, into the mixture as it passes under the edge at 38. This valve is operated by links 43-44, connected to the arms of a rock shaft, 45, passing centrally thru 21. The lower end of outside link, 4, is connected to the pivot of plates 34 by a

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slot which permits these plates to move half way down before operating link 44 and valve 41. Thus valve 41 remains tightly closed and inoperative, except when main valve 19 is about half closed from excessive speed and light load, but when it closes from slow speed and heavy load valve 41 is inoperative.

The shelves along the inner edge of the chamber 6 are for the purpose of catching any unatomized globules of gasoline and conducting them down into the sump, 23, from which they are drawn back into the chamber 15 thru passage 24. Nozzle 12 extends beyond the air valves into chamber 6 and is consequently always fully exposed to the vacuum therein. The two converging blasts of air meeting with great force directly over nozzle 12, produces an induced suction on this line which causes the vacuum in chamber 15 to be greater than in chamber 6 or passage 10. This produces a current from sump 23 thru passage 24 into chamber 15, and carries any gasoline in 23 with it. The air drawn thru passage 24 only serves to assist in more perfectly atomizing the gasoline that passes thru nozzle 12. This feature, in connection with the vigorous and extended action of the double air blast makes it possible to use a much heavier gasoline with this carbureter. Nozzle 12 is practically 2½ in. long, with a thin air blast on each side which converge and meet directly over it, catching the gasoline between them.

To counteract the varying proportion between the air and oil drawn in by vacuums in chamber 6 of different degrees of intensity, a diaphragm, 26, is attached by its lower side to the end of valve rod 13. The upper side of the diaphragm is loosely held in a cage, 28, which is connected to the upper end of the tubular stem of air valve 20, by a quick motion screw secured by a jam nut, 29. A passage, 27, communicates between chamber 6 and diaphragm 26, so that it is always exposed to the same vacuum that exists in the former. Thus the relative positions of oil valve and air valve varies with the vacuum in chamber 6, keeping the proportions of oil and air correct at all times. By turning knob 30, the jam nut 29 is slacked and diaphragm cage, 28, can be turned to vary the richness of the mixture.

Preferably lever 22 would be operated by a centrifugal governor with a spring tension to regulate speed so arranged that normal speed would maintain it about half open, when the speed fell below this by reason of the motor being overloaded, or from any other cause, the air valve would remain wide open and the air blasts might become too weak to properly atomize the oil. To obviate this, a device shown on the lower right side is placed between the governor and arm 22. It consists of a plate, 31, permanently attached to any part having parallel slots, 32, 33, in which two plates, 34, on either side, slide parallel with the connecting rod by means of rollers running in said slots. Diametrically opposite the pivot roller two links are attached to plates 34; one, 35, leading to the governor; one, 36, leading to arm 22. When the speed is normal or above, plates 34 travel along slots 32 and 33, and with 35, 36 act as an unbroken rod, but when speed falls below the normal, the pivot roller abuts against the end of slot 32 and acts as a pivot about which plates 34 turn and reverses the motion of rod 36 and the valves, causing them to gradually choke the air blasts and maintain sufficient force to atomize the gasoline at all speeds. When the motor is stopped it automatically closes all valves tightly. Any surplus gasoline, as from leakages or other cause, fall to closed receptacle, 25, from which it can be removed as desired.

The entire assets of the bankrupt Shoemaker Automobile Co., of Elkhart, Ind., have been purchased by St. Joe Motor Car Co., which will continue the manufacture of Cars, both pleasure and commercial, at Elkhart, marketing its product under the name "St. Joe." The leading model will be a 40 H. P. car listing at $2,500, fully equipt. C. S. Conover is president of the St. Joe Company; O. G. Sellers, vice-president; M. L. Feckler, secretary and treasurer; Scott Van Ettan, superintendent.

In order to save American tourists the trouble of filing a bond and making a deposit of $25 on entering Canada, A. J. Chester of 110 Cromwell street, Sarnia, Ontario, Canada has made arrangements to relieve Americans of these details for the small fee of $3.50. He has filed a Surety Company's bond with the collector of customs at the port of Sarnia and a tourist can avail himself of the benefits of this bond by mailing Mr. Chester details regarding his car together with the required fee. A bond filed at Sarnia permits a car to enter any port in Canada.

Iver Johnson Sporting Goods Co., one of the largest jobbers and retail dealers of sporting goods and automobile supplies in New England and now located at 163 and 165 Washington street, Boston, has in course of erection an eight-story, fireproof building at Washington and Summer streets which it expects to occupy June 1. This company also markets a fuel strainer-funnel for automobilists and an anti-skid device of its own manufacture. The new building has foundations of sufficient strength to carry two additional floors, which will no doubt be needed in the near future. Besides the basement, there is a sub-basement, to be used for storage and the heating and ventilating apparatus.

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GOODRICH TIRES

will carry more cars in 1908 than they did in 1907—possibly more cars than any other make of tires in America. The fact is of no interest to the individual motorist except as an indication of the experience of a very large number of other motorists. No one sticks to a certain make of tire through sentiment;—no product receives such cold-blooded testing as the automobile tire. Hence, the fact that Goodrich Tires are being chosen by the majority simply means that their merit has been *proved* by experience.

The outcome of almost every important road test for 1907 is an invitation to specify Goodrich Tires.

THE B. F. GOODRICH COMPANY : AKRON, OHIO

BRANCHES IN THE PRINCIPAL CITIES

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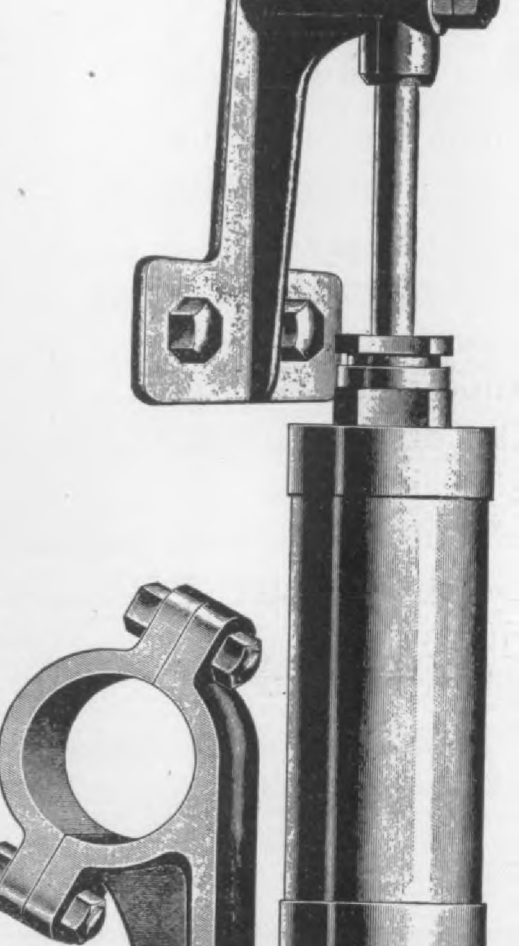
ly perfected and placed on the mar-
by Ernst Flentje, Cambridge and Trow-
ge streets, Cambridge, Mass. It repre-
s six years of making and trying dif-
nt devices. The preventer, as shown,
ists of a steel cylinder, the largest
being 9 inches long by 3¼ inches
eter, filled with about a quart of
erine and a piston and rod, and phos-



Flentje Preventer, showing the steel cylinder and
g fixtures.

bronze hangers for attaching it to the
The under side of the piston, the
eing pivotally attached to the frame,
ply grooved and has six holes bored
3 small and 3 large. All are open
e down stroke so that very little re-
ce is offered to this motion unless

1 to 2½ inches.

The device needs no adjusting and it i
claimed there is no chance for it to ge
out of order. The stuffing box for the pis
ton is all that must be kept tight, an
every 1500 or 2000 miles a tablespoonfu
of glycerine to keep the cylinder ful
should be injected with a force gun thr
a hole provided at the top. Better tractio
and longer life for tires and mechanism
are claimed.

A set of four with hangers are put o
for 60 days' trial without charge, and
guarantee of two years is given. Price pe
set is $100 for large cars and $90 for smal
ones.

Constable Quinn, of Leicester, Mass.
who took advantage of last year's Glidde
tourists by turning them at the bottom o
one hill and on the start for another, i
now out of his job, due, it is said, to the
Worcester automobilists.

"Steamtite Cement" for Cracks

"Steamtite cement" is a specially pre
pared compound made by the Clark Cast
Steel Cement Company of Shelton, Con
necticut, for the purpose of repairing
cracked cylinders, radiators, tanks, etc. It
consists of a fine metallic powder which
when mixed with a liquid chemical fur-
nished with the outfit forms a cement
which is absolutely unaffected by water,
steam or oil. In fact it is claimed it will
set hard in boiling water. In setting it
expands so much that it will stop a crack
or leak absolutely tight against a water
pressure of 3000 lbs. To apply the cement
some metallic powder is mixed with the
liquid chemical until the mixture is the
consistency of a very dry stiff putty or
dough. The cylinder is then heated to
about its temperature when the engine is
running, when the cement is forced very
tightly and carefully into the crack so that
if possible it will protrude on the inside
and when it expands in setting it forms a
shoulder on the inside to better resist the
pressure of the water from within. In the
New York to Paris race each car carries
a quantity of this cement, which has al-
ready proved its usefulness in one case.
It happened that during the first few days
of the race the Zust car cracked a cylinder,
which was promptly repaired by means of
this cement. The effectiveness of the
cement so impressed the owner of the car

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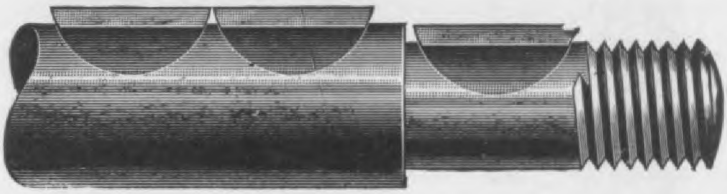
W H I T N E Y

We are now well settled in our new factory and READY TO SHOW RESULTS.

Prompt delivery and constant improvement in quality.

In our effort to possess the finest chain plant in existence and to maintain the highest degree of Accuracy, Efficiency and Finish, we are going to the very limit.

We will now make all sizes of Roller and Bushing Chains for which there is a reasonable demand.



If you are not taking advantage of The Woodruff Patent System of Keying, it is high time to investigate same. It has been adopted by most of the leading automobile manufacturers, who report better results and a great saving in cost.

THE WHITNEY MFG. CO., Hartford, Conn.

W H I T N E Y

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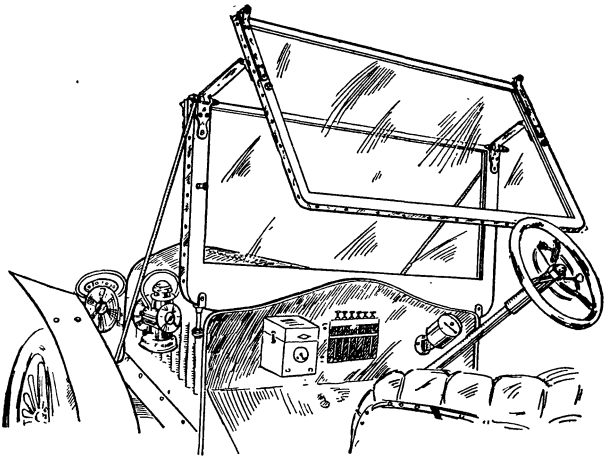
The 1908 "Ross" Windshield

The Ross windshield is designed to fold toward the wheel on any style car, and can be folded up or down from the seat. A special brass double hinge is provided for folding, which holds the frame rigid when up by means of angle brackets on opposite sides. These angle brackets being slightly tipped, allow the use of a knurled hand-wheel. By removing the two hand-wheels, the top section is folded toward the wheel operating at the two centre hinges the same as the single hinge type, but the auxiliary hinge above the centre allows top section to extend out over the lower section clearing the wheel, and then the top section is folded down and fastened to bottom section by the same two hand-wheels by the same method as used on the single hinge type. By this method the glass in upper section is supported when folded down by the wide part of the frame at the top. The corners of the top section are rounded to conform to the rounded corners of bottom section where it is fitted to dash. The hinges and brackets are bolted together through the frame by brass machine screws. Three-sixteenth selected polished plate glass is used exclusively. The glass is set in grooves and filled around with felt, making it impossible to crack it thru jarring. The windshield is manufactured by H. S. Ross, 5607 South Halsted street, Chicago, Ill.

The standard sizes are 42 in. wide by 32 in. high for the plain type front without filler board, and 42 in. wide by 36 in. high, using a 6 in. board at the bottom to be cut to fit the dash of car. On cars of round dash or other form requiring it, the frame is made with a filler board wide enough to fill in the corners of the dash. The frames are made in either quarter-sawed oak or mahogany finish. All trimmings are made of brass, highly polished. The price of the single hinge type without filler board is $35.00, and with filler board $37.00. The price of the double hinge type with filler board cut to fit the dash is $40.00.

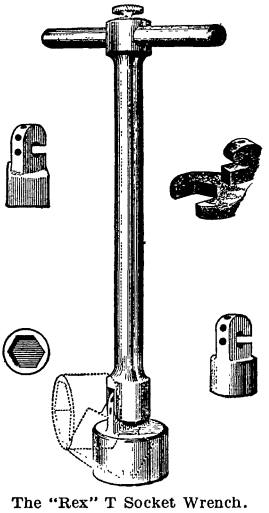


The 1908 "Ross" Windshield.

The "Rex" T Socket Wrench

The Rex wrench is made particularly for automobiles and launches, and has the particular advantage of allowing the user to tighten nuts in out-of-the-way places in which they could not be reached by the ordinary wrench. The outfit consists of a full set of interchangeable steel sockets of special form and a handle to which the sockets may be firmly and instantaneously locked at any desired angle. The sockets are in a series comprising the standard sizes of nuts. The cross-bar in the handle may be set firmly in any position that gives the best hold for getting into corners. A screw-driver and spanner wrench attachment is also furnished, the same being fastened to the handle in the same way.

The wrench is manufactured by the Rex Wrench Co., Boston, Mass., in blue mottled steel finish, listing at $5.00, and in nickel-plated finish at $6.00.



The "Rex" T Socket Wrench.

We are informed that eighteen out of the twenty-two cars entered in the recent Briarcliff Trophy Race, and the entire American crew used Bosch Magnetos and that in the race from New York to Paris, the Thomas, Zust and Protos cars are using the Bosch.

An addition will be made to the factory of Mason Motor Car Co. of Des Moines, Iowa, this summer, to consist of a 2-story structure measuring 44x150 feet. It will enable the company to increase its output from 10 to 16 machines per week. The assemblying, painting and upholstering departments will be installed in the addition and about 40 more employes added to the force.

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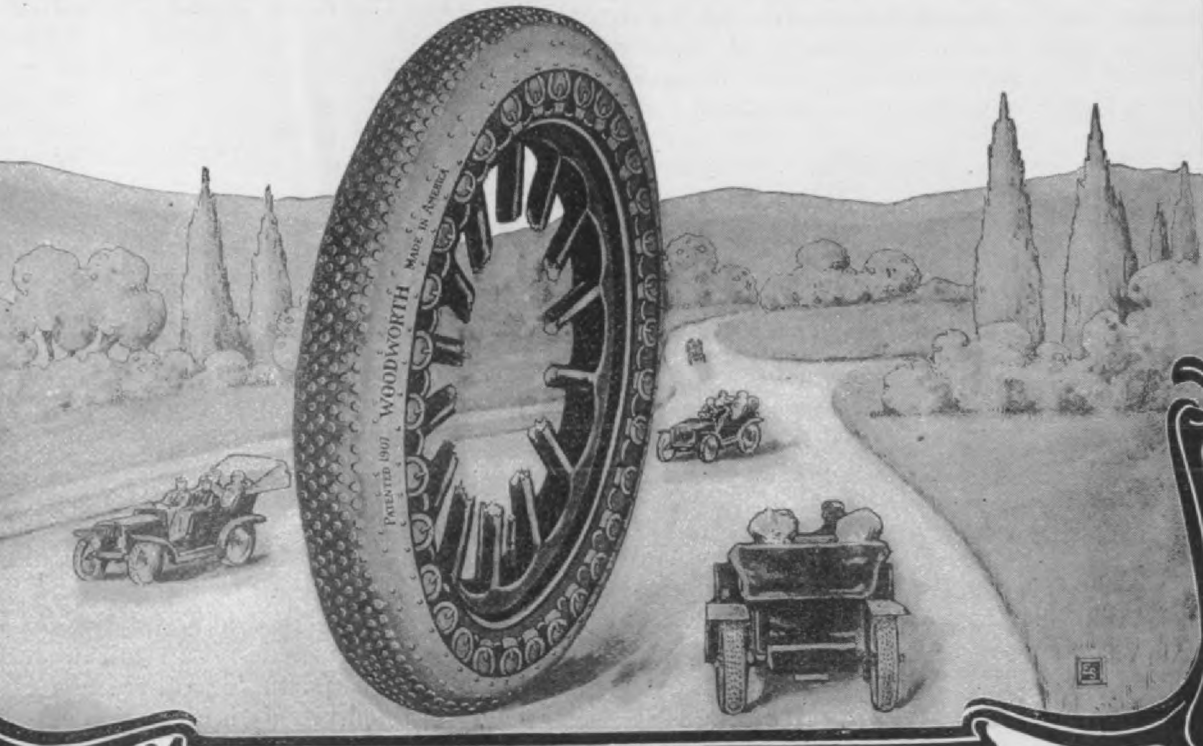
BIGGEST THING ON THE HIGHWAY



WOODWORTH

ADJUSTABLE **TREAD** DETACHABLE

The Woodworth Tread is not a new untried novelty or a mere theory, but a ensible practical useful tire protector that has been thoroughly tested for years on housands of cars running millions of miles on all kinds of roads in all parts of the ountry and under all possible conditions.

Woodworth Treads are made of three thicknesses of chrome leather that will not tretch or crack in any kind of weather or hard usage. They put an end to tire troubles nd save more than half the tire bill. Positively will not chafe or heat the tire.

Puncture-proof against nails, sharp stones or glass. With rational care make kidding practically impossible.

WOODWORTH SPECIAL TREAD. For rocky and rutty roads we make a pecial tread with oval-headed steel rivets set closely along the sides.

izes and rices as follows:	26x2½ $10.00	28x3 ..... $12 00	30x4 ..... $16.00	34x4 ..... $19.00	36x3½ $19.00
	26x3 ..... 11.00	28x3½ 14.00	32x3½ 16.00	34x4½ 20.00	36x4 ..... 20.00
	28x2 ..... 10.00	30x3 ..... 13 00	32x4 ..... 18.00	34x5 ..... 23.00	36x4½ 29.00
	28x2½ 11.00	30x3½ 15.00	34x3½ ... 18.00	36x3 ..... 18.00	36x5 ..... 25.00

Special Treads 20% additional.

Write for new catalogue.

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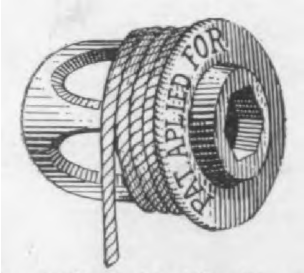
et a simple but efficient little tool in the hape of a wrench for the application and emoval of nuts of all kinds but especially ntended for manipulating tire lug nuts o as to facilitate the removal and replacenent of automobile tires. This ingenious ttle wrench consists of a hexagonal soc-

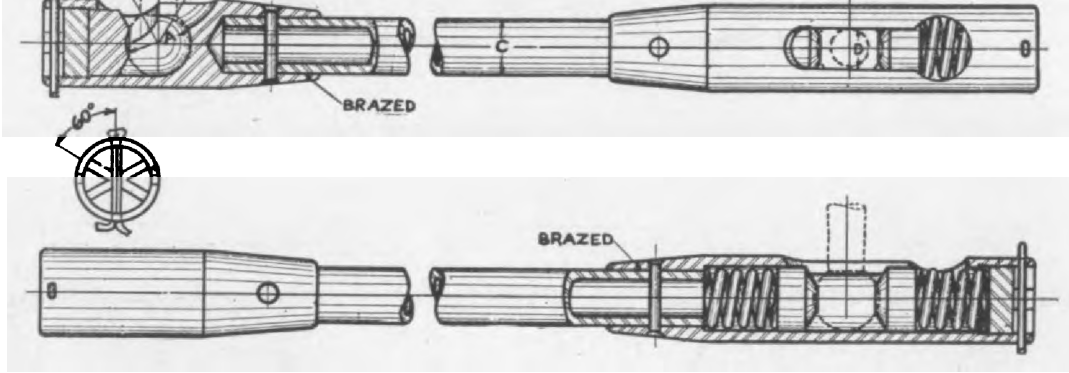


The Kelly Quick Tire Wrench.

et revolved in either direction by means of cord wound around it. The cord is wound p before placing it on the nut and after ne socket is fitted to the nut the cord is ulled, unscrewing the nut if the cord has een wound left handed and tightening it wound right handed. The socket is of rass.

"Long Arm" Steering Reaches

The Long Arm System Co. of Cleveland, hio, is placing on the market a new set f steering reaches of the ball socket and pring buffer type. These are furnished in hree sizes suitable for 1-inch, 1⅛-inch, and ¼-inch balls and are of interest chiefly



Long Arm System Co.'s New Steering Reaches.

or their simplicity and reliability. The ketches herewith illustrate the general onstruction.

The ball is securely held in the socket y a plug screwed in the end and its reaining cotter pin. To avoid the fine pitch hreads generally used for similar plugs, hich require a more or less secure clamp

wrought iron pipe pinned and brazed to ends is used for the center member. Th reaches are furnished in any desired len

The three sizes are listed as Types J and K. The distance B is varied to individual requirements, the maxim length in each type being 40, 45 and inches respectively. The diameter of tube (C) is ⅞-inch in types H and J a 1-16 inches in type K while the socket in the three respective types is ⅝-i 11-16-inch and ¾-inch.

The Penn Automobile Supply Co. of North Broad Street, Philadelphia, Pa. been reorganized, with Mr. John W. Lee as President and General Manager.

As there has been some doubt expresse certain quarters as to whether or not manufacture of Columbia cars would continued, readers may be interested to k that the Columbia small 4-cylinder model is being turned out in fair quant and that repair parts for other models also be obtained. This information has b obtained direct from the receivers of Electric Vehicle Company of Hartfrd, Co who say that they are devoting their w efforts to this one model as the demand i large they cannot accept all the orders are having offered them.

We are informed that in a recent dem stration of the properties of McAdam Metal, a special aluminum alloy, descr in our January, 1908, issue, page 128, following test was made. To show strength a ½-inch steel bolt was scre but three threads into a tapped hole bar of the McAdamite. Washers

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PITTSFIELD

IGNITION

IT WILL PAY YOU, IN THE END, TO GET PITTSFIELD IGNITION IN THE BEGINNING. You may have to pay a trifle more, but this will be made up to you many times over in the increased service and efficiency of your car. PITTSFIELD MAGNETOS, or PITTSFIELD SPARK COILS, PITTSFIELD TIMERS and JEWEL MICA SPARK PLUGS have won and retained a premier position solely through merit. They will never fail you.

Insist on having PITTSFIELD IGNITION on your 1908 car. Any manufacturer will supply it. Let us send you our printed matter.

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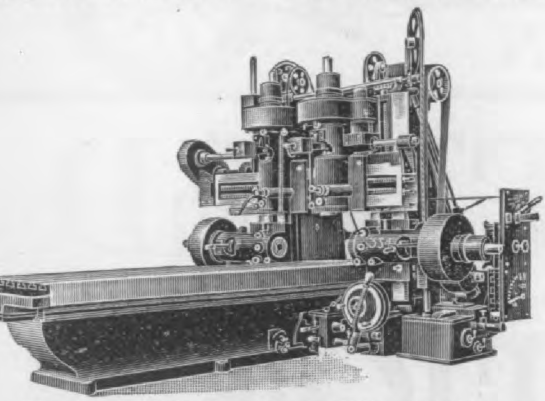
pany, Rockford, Ill, the cuts herewith ving two types this concern is furnish- to the automobile trade.

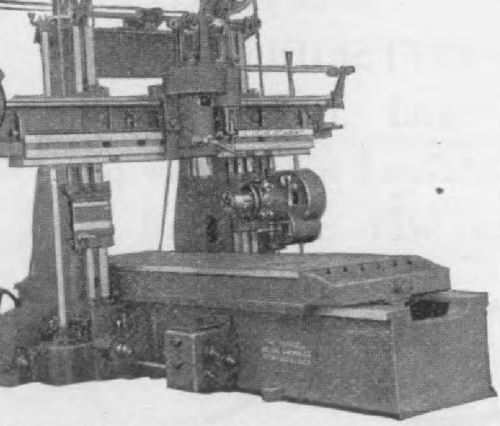
ne four-head machine is built in sizes 0 inches, 24x24 inches and 30x30 es, with any length of table. The e of this machine has automatic posi- feed in either direction with vertical dle feeds across the machine in either



The "Ingersoll" Four-Head Milling Machine.

ction, taking in the full sweep of the hine. The horizontal spindles can be ed and lowered independently or they be attached to the crossrail and raised lowered together with it by hand. An r support is furnished with this ma- e to be used on the crossrail in con- ion with right hand horizontal spindle driving an arbor.

he combined horizontal and vertical dle type is made in sizes of 24x24 es, 30x30 inches and 36x30 inches with



'Ingersoll" Combined Horizontal and Vertical Milling Machine.

length of table. The table feed on machine is automatic and reversible. vertical spindle has an automatic re- ible feed across the machine in either ction, taking in the full sweep of the hine. The arbor and arbor support

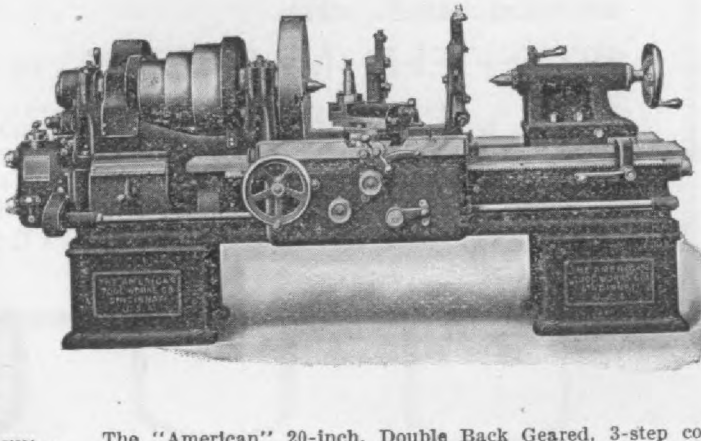
crank cases and cylinders.

The "American" 20-Inch Lathe

The 20-inch, 3-step cone lathe here i lustrated is the product of The America Tool Works Company of Cincinnati, Ohi who manufacture a number of machin tools that are particularly adapted to th requirements of automobile factories an repair shops. No one type of engine lath is of course adapted to all classes of wor and the automobile trade requires machine of great power and capable of rapid handling heavy cuts on nickel steel an other tough material as well as being a curate and productive of highly finishe machined parts. To meet these requir ments The American Tool Works Com pany has brought out a line of doub back geared lathes with 3-step cone pulle like the one here shown, these machine being made in 14, 16, 18, 20, 24, 27, 30 an 36-inch sizes.

This lathe is of very heavy constru tion, and is liberally supplied with ste gears. The double back gears are quick engaged or disengaged thru a convenien eccentric lever and with the three-ste cone pulley afford a nicely graded rang of spindle speeds, particularly valuable fo manufacturing purposes.

The three step cone pulley permits eac



The "American" 20-inch, Double Back Geared, 3-step co lathe.

step being of large diameter and wide fac thus providing great belt contact an abundance of power, a variation in ope belt speeds and great efficiency thruou

Rapid change gear mechanism provid a wide range of changes for feeding an

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The First American Car

to cross the winning line in the

Great Briarcliff Race

had as its

Regular Equipment a

CONNECTICUT

COIL.

60% of the American entries in this daring 260 mile speed contest, which was limited to stock cars, were equipped with Connecticut Coils.

AT THE Ft. George Hill Climb

CONNECTICUT COILS

were used on **68%** of the gasolene cars competing.

Connecticut Coils are always with the Winners.

Catalog No. 13 C yours for the asking.

CONNECTICUT Tel. and Electric COMPANY, Inc.

30 BRITANNIA ST., MERIDEN, CONN.

"Makers of the famous Connecticut Timers, Coil Current Indicators, Volt and Ammeters, Switches, Exploring Lamps, etc."

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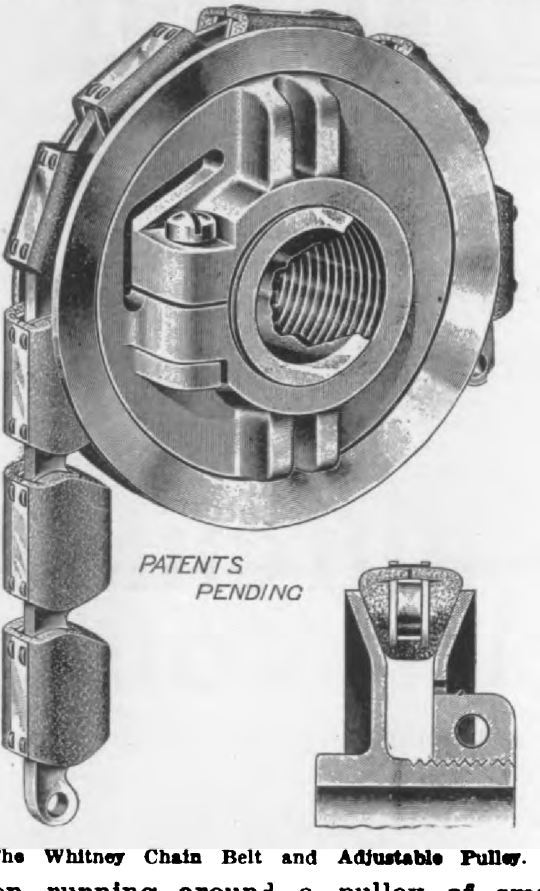
les, for fans, oiling devices, etc., on omobiles and for any similar work ere flexibility, silence, gripping qualities durability are desirable has been plac- on the market by the well known chain kers, Whitney Mfg. Co. of Hartford, n. It is in reality a combination of a in and a belt consisting of center cks, rivets, special side links and a piece leather of special shape which is wrap- closely around each pair of side links held firmly in place by means of a steel te on the top surface of the leather, the te being held in position by projections the side plates of the chain which pass u the locking plate and are headed over inst same. The locking plate has th on each side which are imbedded in leather in order to hold the ends se- ely together.

Nothing but the leather comes in contact h the grooved pulleys but the chain cen- makes the belt absolutely flexible even



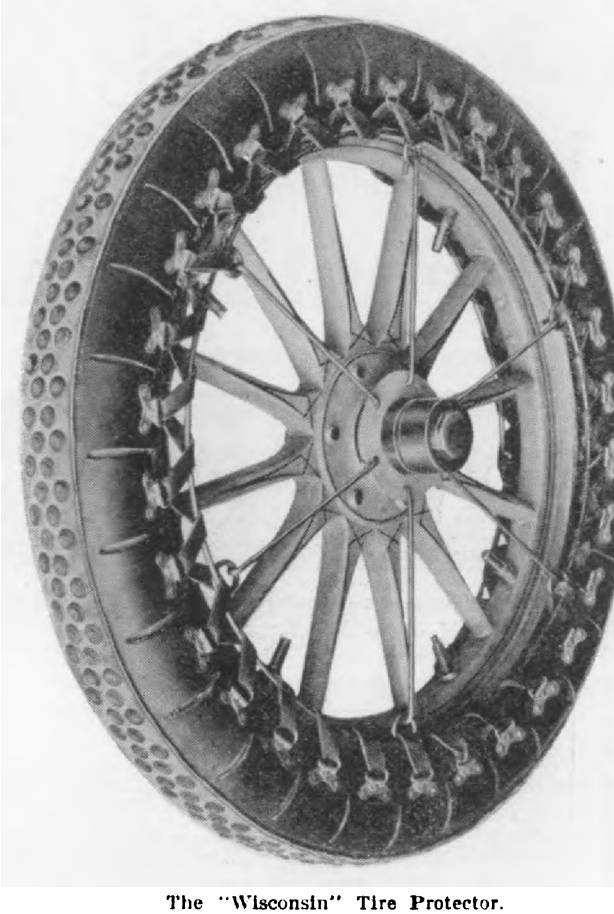
The Whitney Chain Belt and Adjustable Pulley.

en running around a pulley of small meter and it prevents the belt from etching.

he Company has also brought out an ustable pulley which is here illustrated connection with the chain belt.

y means of this pulley the chain belt

and bruises. It is made from a combin tion of specially woven heavy fabric co ered with a high grade rubber on bo sides of which is secured a layer of th very best chrome tanned leather—all which is securely riveted together wi steel rivets. The tread is fitted with



The "Wisconsin" Tire Protector.

layer of counter-sunk, case-hardened rivet The cover is held to the wheel by mea of a steel spring wire ring, securely lac to the cover, the ring being connected six hooks with a flange which encircles th hub, giving a strong tension on the cove ing all the way round. This protector made by the Wisconsin Tire Protect Company, 1229 Michigan avenue, Chicag Ill., in all sizes from 28x3 inches, listing $20.00 each, up to 36x5 inches, listing $47.00 each.

We are informed that the Overland factor Indianapolis, is now turning out five ca per day, and is employing very nearly 3 men. From the 1st of March to date, th Overland factory has produced nearly doub the number of cars it built in the previo five years, which speaks well for the ne management, which consists, since the co

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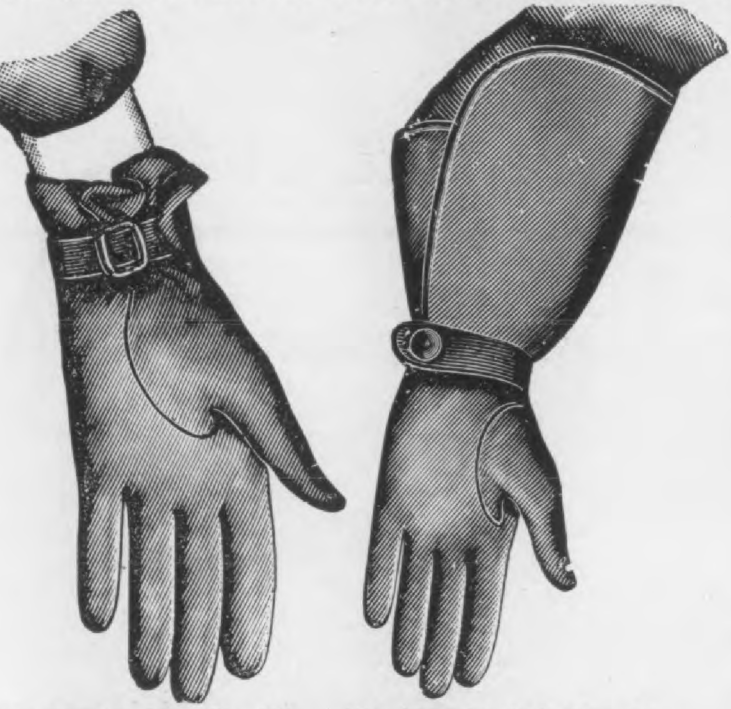
ohn D. Allen & Son Co., of Gloversville, Y., for automobilists' use, but their com-ete line is very extensive and includes oves ranging in price from $9 to $120 per ozen, unlined, wool lined and fur lined. llen gauntlets are all made from choice



len Gauntlet Style No. 280. Allen Gauntlet Style No. 480.

ock. No. 8405 is a style furnished in ack. It is a cape gauntlet with half out-am and is unlined. Price is $13.50 per ozen. No. 280 is another unlined cape

Allen Gauntlet Style No. 3345.

The "Automobile" Fire Extinguish

The accompanying cut shows the "A mobile" Fire Extinguisher, manufacture the Tea Tray Mfg. Co., of Mulberry

The "Automobile" Fire Extinguisher.

Murray Streets, Newark, N. J., wh manufactures a complete line of fire tinguishers, including everything from small automobile extinguisher to the l est city fire department apparatus.

The extinguisher here illustrated is m of heavy copper, and is operated by s ply turning the hand wheel on top of extinguisher, which releases an acid tle, causing the chemicals to mix and fo the stream heavily charged with carbo acid gas against the flames. It will th a stream 30 feet. This extinguisher furnished with a holder, consisting o metal cup to which straps are attached holding the extinguisher rigidly on the but allowing its instant removal when n ed. The price of the extinguisher c plete with holder is $20.

United Brass Mfg. Co., Cleveland, O is prepared to make any cast parts for motor trade from brass, special bron and aluminum. It furnishes castings the rough or finished and polished pa Its plant has been recently rebuilt new up-to-date metal-working machin installed which gives them ample facili

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nd Scraper & Tool Mfg. Co., of St. s, Mo., some of which are here shown. of their main specialties is a complete of tools, consisting of 2 cape chisels, ld chisels, 1 diamond point chisel, 1 d nose cape chisel, 1 half cape chisel, ribe, 1 bent grooving chisel, 1 oil

Case of Mound Improved Automobile Tools.

ve scraping tool, 1 square punch, 2 punches, 1 nail set, 1 prick punch, 1 re punch, 1 drift and 1 round point chisel. These are conveniently ar- ed in a finished oak case, and all are ned to be strictly high grade tools, y polished and guaranteed. They been constructed especially for auto- le repair work. The price is $4.50 et.

Mound Hollow Ground Scraping Tools.

ey are also offering a set of hollow nd scraping tools for scraping metal ings and oil grooves in automobiles. set consists of six tools of assorted from 6 to 10 in. in length. They are e of the best tool steel, carefully forged tempered. In making up this set, the ers have endeavored to ascertain just

der head. They are hand-forged from ¼ inch crucible steel and polished. The han dles are of applewood. The set is packe in a neat case and lists at $2.50. They ar

Mound Cotter Pin Extractor.

also offering a cotter pin extractor in tw sizes, 6 and 7 inches respectively, and list ing at $4.20 and $4.80 respectively pe dozen. These extractors are nickel-plated Their line includes also a set of offse

Mound Offset Screw Drivers.

screw-drivers, furnished in 5, 6 and 8-inc sizes. These screw-drivers are made o ¼-inch square tool steel, and list at $4 $4.20 and $4.80 per dozen respectively.

Almond Flexible Tubing

The T. L. Almond Mfg. Co., 1287 Wash ington St., Brooklyn, N. Y., manufacture a number of machinery attachments, als put out a line of flexible steel tubing, fo use on screw machines, milling machines turret lathes, bolt and nut machines, auto mobiles, etc., for conveying oil, air, gas water, or any liquid not of an acid nature This tubing is made of nothing but tem pered steel wire and Norway iron, no rub ber or packing of any sort being used. I is said to be so flexible that the larges size, which is ½-in. bore, may be ben around an 8-in. circle, while where shor lengths are used, it is sufficiently stiff t hold the ends from which the liquid flows It is also claimed to be perfectly leak proof, and is therefore especially suitabl for use on automobiles for conveying ga from generators or tanks to lamps, fo conveying oil from oilers to bearings, cylin ders, etc., and similar purposes.

This tubing is made in any length up t 10 ft., but is not furnished in long length to be cut up by the user. Prices rang from 40 cents per foot for the ⅛-inch siz

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SIMPLY PERFECT

is the ignition given by the

SPLITDORF

High Tension Magneto

IT STAYS "PUT"

With this Magneto on your car you can forget all about ignition apparatus.

So constructed that with four plugs in a four cylinder engine you have two distinct sets of ignition—an advantage sure to be appreciated by every motorist

This superb mechanism generates its own current by operating direct from the engine—requires no battery—**actually adds 30 to 50 per cent. to the efficiency of any engine**—and literally makes the motor run like velvet.

Absolutely reliable and guaranteed to give unqualified satisfaction.

Ask Dept. N for our new catalog.

C. F. SPLITDORF

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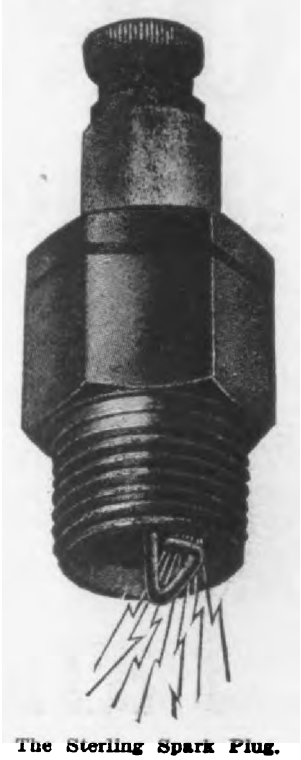
Worcester, Mass., who also make a t little vise designed especially for omobilists' use.

he Sterling plug is sold on a very ng guarantee, the makers offering to ace any Sterling plug that does not e satisfactory service during 5000



The Sterling Spark Plug.

es' running. The peculiar form of the tral electrode, plainly shown in the il- ration, has been adopted by the de- er of the plug for the purpose of hav- it vibrate with every motion of the or so that carbon deposits, etc., could lodge on it. This form, also, provides trap for lubricating oil which might on the electrode, and if held there, se difficulty in re-starting the motor. the end of this electrode is always the e distance from the shell regardless of shortening that may occur by burn- it is claimed that adjustment is never essary. The insulation in this plug is le from a special grade of vitrified celain and the inside wall is designed allow an even distribution of heat so to avoid cracking. All parts of the are interchangeable. Price is $1.00 either metric or ½-inch pipe thread es. Other sizes are furnished to order.

he Sterling vise is a handy device de- ed to meet a wide range of require- ts and yet sufficiently light and com- to be carried in the automobile tool partment. Being made of a special which nails, small tubes, etc., can be hel and below the regular jaw faces are pr vided secondary jaws with teeth hold pipes or other round pieces whic cannot be held in the regular jaws. Ov the body of the vise is a flat rectangul surface to be used as an anvil and ve convenient for straightening small piec or doing any hammering that is nece sary. The vise itself can be set at a

The Sterling Auto Vise.

position, as can also the jaws giving wide range of adjustment. The jaws a 2 inches wide and open 2¼ inches. Pri of the vise with polished base plate f the running board is $5 in black enam finish and $6 with nickel plate or oxidiz finish.

Shove and Gage Polishes

Shove & Gage Specialty Co., Misch Bld Providence, R. I., make both body and met polishes, their automobile body polish b ing known as "U-Auto" Polish. The latt dries quickly and will therefore not cau dust to adhere to the body after it polished. It is said to remove scratch and finger marks effectively and resto the original lustre to highly polished su faces. It is warranted not to gum.

This company's metal polish is call "Shinebright" and it contains no ammoni alkali or strong acids to work injury to t metal. The best oil stock is used in i manufacture.

Samples of either of these products w be sent by the manufacturers on receipt 10 cents to cover postage.

Ernest R. Benson on April 30th su ceeded Wm. E. Metzger as salesmanager the Cadillac Motor Car Company. He through his former connections, w

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our Customers?

If so, give him a little talk. He's doing a lot of work for 7c. When he doesn't happen to be near a garage, he'd give someone a dime without a murmur rather than be "The Man Behind the Pump." The

Prest-O-Tire Tank

Inflates the largest tire in less than a minute, for about 7c. Figure it up! Tank inflates 20 to 30 tires—depending on size of tires. Refilled tank costs $2.

The tank itself costs $18, but it never gets to be second-hand. The buyer's money is tied up, but not *spent*. He can always sell it for about what it cost him.

Explain the matter to your customers and you'll sell Prest-O-Tire Tanks.

Many of our dealers are making enough on Prest-O-Tire and Prest-O-Lite Refilled Tanks to pay a large slice of their total expenses.

The Prest-O-Lite Co.

Write The Nearest Main Station

New York, 1904 Broadway

Small enough to be carried in the car, or may be clamped on outside of car.

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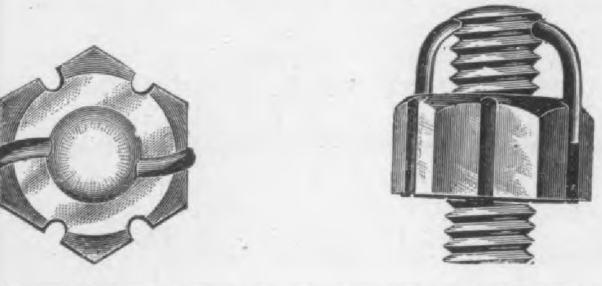
ose of keeping nuts from working loose nd dropping off of their bolts when the atter are used in connection with autonobiles or machinery subject to vibration r constant motion. It is manufactured by he Walker Manufacturing Company, 214-20 Walton Street, Syracuse, N. Y., and onsists briefly of a steel wire which asses directly through the bolt and is ent into grooves at the side of the nut, hereby allowing the nuts to be of ordinary hickness and yet providing all the necesary strength.

The "Victor" Lock Nut; the left hand view shows the eel locking pin in place, one of its ends being bent at right ngles before insertion in the bolt; the other view shows he job completed.

The accompanying cuts show clearly the nanner of locking a nut according to the ictor method. The nuts are furnished n all sizes, grooved and drilled, and with orresponding lengths of wire bent at one nd as shown, so that all that is required f the user is to screw the nut on the bolt ll it passes the hole in the bolt, then insert he steel wire in the hole and finish by urning down the free end. The advanages claimed for this device are that, hould the nut need tightening, this can



The "Victor" Lock Nut; the top view illustrates the anner in which the nut can be locked even tho the grooves nd hole are not in line with each other; the side view lustrates an important feature of the plug, namely, that he locking pin allows of an adjustment lengthwise of the olt, the thickness of the nut.

e done without in any way interfering ith its locking qualities from the fact that he steel wire allows of adjustment lengthise of the bolt, the thickness of the nut. nother feature is that the device permits he nut to be locked without having the rooves and hole in line with each other, hich feature is illustrated in the top

ton, Ohio, a concern recently forme Messrs. H. F. Apple, O. D. Apple an G. Apple, formerly with the Dayton trical Mfg. Co. of Dayton. The sto battery here shown is their first pro in addition to which they will shortly b out a new Dynamo-Floating Storage tery Ignition System.

This battery is specially constructe withstand the rough usage associated automobile and motor boat work. A ture of the battery is the entire absen any metal binding posts or metal mings which are subject to corroding. plates are made of alloy lead and mony and are joined by hard lead st which are burned together, thus over ing all open circuits. The unit syste heavy rubber jars is used, making it sible to replace any one of them separa These jars are all firmly sealed by a sp sealing compound into a finely finished case which is so constructed as to away with all screws and nails. The ners are all rounded; also the inside e at the top, thus making an excellent f

The "Apple" Storage Battery.

with the sealing compound. The re formed by the compound also serves to any acid solution that may be spilled in ing from running down the sides of case. The terminals consist of one inch hard lead threaded stems which

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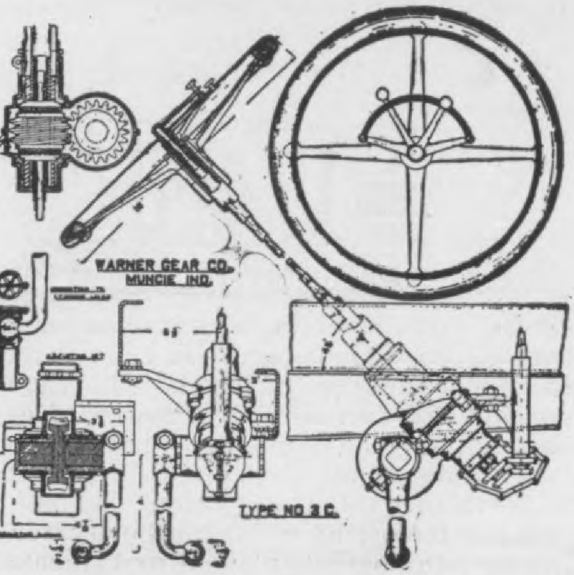
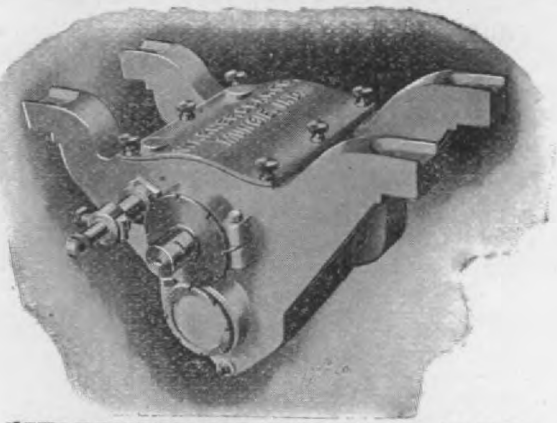
-1908 GEARS-



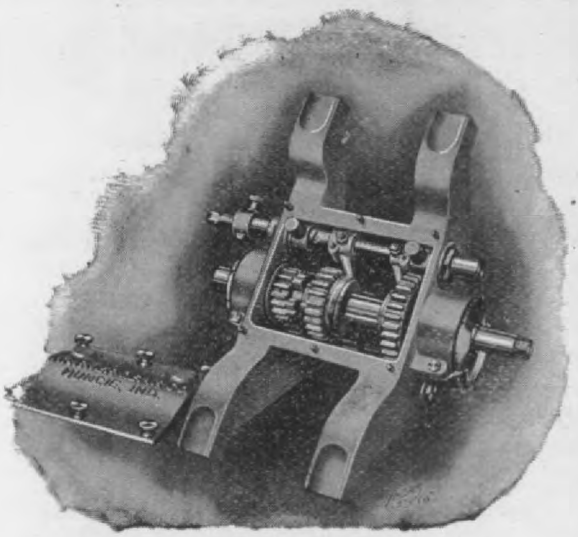
STEERING GEARS

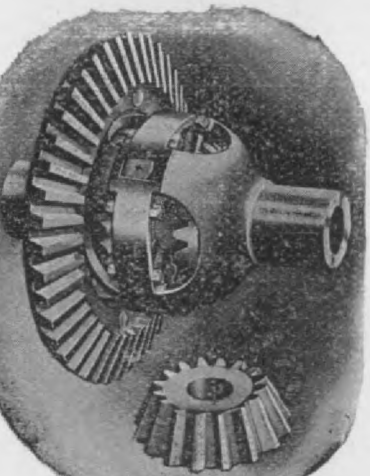
that are built to **"Stand Up."** Worm and sector adjustable, hardened and ground to size. Control levers mounted on top of 16 inch wheel, ribbed aluminum spider. Ball Bearings.

TRANSMISSIONS



"SELECTIVE" SLIDING—35 and 50 H. P.





For Timken Roller Bearings and Annular Ball Bearings.

GEARS are made from **SPECIAL GEAR** forgings, hardened, ground and "treated." We also furnish **"SELECTIVE"** control levers. We build both spur and bevel types of Differentials.

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ber covered webbing. This battery is made in nine sizes as follows: 4, 6, and 8 volts, 40 amperes; 4, 6 and 8 volts, 60 amperes; and 4, 6 and 8 volts, 90 amperes. The 6 volt, 40 ampere battery is particularly adapted for two cylinder engines. It is 7¼ inches long, 4¾ inches wide and 7⅜ inches high, weighs 19 lbs. and lists at $15.00. The 6 volt, 60 ampere cell is recommended for 4-cylinder motors. The size is 7¼ inches x 6⅝ by 7⅜ inches. The weight is 29 lbs. and the price $25.00.

"Perfection" and "Standard" License Number Indicators

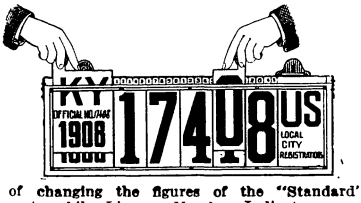
The accompanying cuts show two types of adjustable automobile license number indicators manufactured by the Automobile License Indicator Co., Lewisburg, Tennessee. The main feature of these indicators is that they can be used in any state and can be instantly changed to any number from 1 to 99,999.

The "Perfection" indicator consists of a metal casing, made of brass or aluminum. The front of the indicator is provided with a sight opening, which is covered against the access of dirt and water by a sheet of transparent celluloid or mica, held in

Method of operating the "Perfection" Automobile License Number Indicator.

place by a skeleton frame riveted to the casing. The casing is formed with tubes at each side in which are mounted on a shaft a series of telescoping tubes, to the outer ends of which are secured milled disks, and to the inner end of each tube is fitted a spool to which ribbons are fastened. On the first five ribbons are printed in type 4 in. high and 1½ in. face. the ten numerals, and on the sixth, or right hand, is printed the name or abbreviation of all the States of the Union. Under each name is printed "Official No. ——," in which can be inserted the license number of the State to facilitate the proper adjustment of the numbers before the sight opening. The indicator shaft is provided with a stationary disk at the central division, thus permitting a change of any of the characters displayed on either side of the division without disturbing the adjustment of the opposite side. The ribbons of the indicator are made from good, serviceable white opaque fabric, non-stretchable and waterproof. The size of the indicator is 16½ in. long by 5½ in. wide.

The "Standard" indicator is constructed similar to a card index file. The indicator consists of a removable cap cover made from brass or aluminum, with the front having a large opening cut therein and covered with a sheet of transparent celluloid, and with the cap fitting closely over the top the indicator is dust and waterproof. The back section of the casing is formed with inwardly extending folds dividing the case into seven divisions or pockets. Each of the five central pockets contain ten

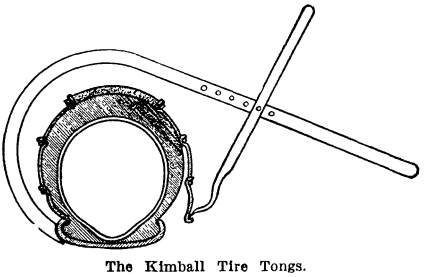


Method of changing the figures of the "Standard" Automobile License Number Indicator.

cards of celluloid or parafine-coated cardboard, properly indexed and showing on the face the ten numerals. In the end pockets are carried also a series of cards, showing on the front face names or abbreviations of all the states. A blank for a Certificate of Registration, which provides a means of citing authority for the license number displayed and means to distinguish numbers of one year from another, is also provided.

The Kimball Tire Tongs

Kimball Tire Case Co., 163 Broadway, Council Bluffs, Iowa, maker of the Kimball steel tire protector, is furnishing a pair of tongs for applying the Kimball tire clasps or armor on a tire. With these tongs the flat steel sections of which the Kimball protector consists, can be put on without deflating the tire. This tool is intended more especially for use where



The Kimball Tire Tongs.

only a few of these clasps are to be applied as in the case of a weak spot to be protected. Where more than four or five clasps are to be put on it is better to deflate the tire and press the clasps in place on the clinch by the use of a screw driver. The tongs list at $1. The latest Kimball tire case was described in our November, 1907, number, page 266.

Alexander Winton, President of the Winton Motor Carriage Co., announces that his company will continue the manufacture of six-cylinder cars exclusively in 1909.

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Oxy-Acetylene Welding by Philadelphia Company

Probably the most interesting department of the American Ferrofix Brazing Company, 2024 Cuthbert street, Philadelphia, where large numbers of broken automobile castings and parts are repaired, is that where the new Oxy-Acetylene welding work is done. This company, with the Davis-Bournonville Acetylene Development Company, had their representatives visit the various welding centers of England, France and Germany, and from the experience obtained designed an Oxy-Acetylene welding equipment, which, it is claimed, embodies all the advantages of the various systems without their defects. As this system is very little known in the United States, a brief description of the method is herewith given:

The acetylene is generated in a specially designed and patented pressure generator. The oxygen is generated from chemicals which may be bought in the open market, in an exceedingly simple manner, and is passed through washers to be purified, and then into a gas holder. From the gas holder it is compressed into steel cylinders, holding fifty or one hundred cubic feet. The complete oxygen generating apparatus and compressor can be installed in a room 6 ft. by 8 ft. by 8 ft. high.

The oxygen is taken from the tanks through a reducing valve to a blow-pipe, as is also the acetylene, and the two gases are thoroughly mixed in the nozzle, so that they do not come in contact with each other until almost at the point where the combustion takes place. After the acetylene is generated and the oxygen turned on at the proper pressure, a flame is obtained having a temperature of about 6300 degrees F.

When it is remembered that the melting point of steel is about 2570 degrees F., and that of copper 1929 degrees F., some idea of the welding possibilities of this flame may be obtained.

One of the greatest advantages of the flame is that it can be made oxidizing, carbonizing or neutral, as desired, and when set will remain unchanged. As the inner cone is protected by an outer envelope of hydrogen, the metal fused by this intense heat is protected from the atmosphere.

This method of welding will undoubtedly revolutionize automobile construction, for with it many parts heretofore riveted or brazed may be welded at not only less cost, but with greater strength. Auto frames may now be assembled without rivets. Tanks can be constructed at less cost than by riveting, and without the slightest danger of ever leaking along the seams.

While metals of practically any thickness may be welded by this flame, at the present cost of oxygen and acetylene, it is not found economical to weld thicker than three-fourths inch metal, but under three-fourth of an inch all of the commercial metals, it is said, can be united, not only neater and stronger, but in almost every instance cheaper than riveting.

Full particulars regarding this system of welding and cost of installation of plants may be obtained from The American Ferrofix Brazing Company, 1515 Sansom street, Philadelphia, Pa., or the Davis-Bournonville Acetylene Development Co., 90 West street, New York City.

"Godfrey" Camping Outfit for Tourists

Charles J. Godfrey Co., 10 Warren street, New York City, is marketing a camping outfit gotten up especially for the use of automobilists. The outfit is packed in a strong fiber case measuring 30 x 11 x 10 inches, which can be carried on the running board of the car without causing any inconvenience, as it can be used as a step, being practically indestructible. In the camp it can be used as seats for the tourists.

The camp outfit includes a tent, ground cloth, pole and stakes, pair of blankets, 2 steel folding stools with canvas seats, "Jewel" kerosene stove, water bottle, folding bucket and a complete aluminum cooking outfit. The cooking outfit comprises 7 and 10-pint cooking pots, 9-inch frying pan, 4-pint coffee pot, two 9-inch plates, two 1-pint soup bowls, 2 dessert spoons, 2 cups, 2 knives, 2 forks, 2 teaspoons and a waterproof bag to hold the set. Each utensil is formed of one piece of aluminum, and there are, therefore, no seams or joints. All the pieces nest snugly in the large cooking pot which is carried in the waterproof bag.

The tent is made of waterproof silk and the ground cloth of waterproof duck sewed to the tent. A single, jointed pole is used fitted with brass ferrules, which make it easy to put the pole parts together or take them apart. The blankets are of wool and measure 72 x 84 inches. The folding seats each measures 8 x 12 x 18 inches, open, and folds into a package 8 x 11 x 1½ inches. The stove can be "knocked down" for packing and when packed occupies a space 8½x8½x5½ inches. The burner can be unscrewed and a plug screwed into the tank. The water bottle and folding bucket are made of waterproof duck. The bucket holds 3 gallons and folds to less than ½ inch in thickness. Price of this outfit for two persons as described is $60. A larger outfit for 5 persons is furnished for $100. The tent is 6x7½ ft.

Willard R. Miller, President of the Miller Motor Company, Bridgeport, Conn., died suddenly with apoplexy at his home in Stratford.

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For Town Cars No Engine Can Ever Compare With The Valveless Two Cycle

Elmore
VALVELESS 2 CYCLE

The inherent faults of the four cycle car—intermittent application of power, valve trouble, complication and cost—are **emphasized** in the four cycle enclosed car.

They are likewise eliminated—entirely—in the Elmore two cycle, valveless Taxicabs and town cars.

In drastic street, park and hill emergency tests in New York, with the best other town cars built, the Elmore literally ran away from competition.

The same thing happened in Boston—the same thing will happen in every city in the country in which the valveless, two cycle engines of the Elmore Town Cars and Taxicabs come in active comparison with other types.

The valveless, two cycle Elmore has come into its own—in point of steady sales, success and owners' enthusiasm, it is the foremost car in America today.

A ten-minute talk with your agent and a twenty-minute demonstration will make you marvel that you have ever rested content with any car less perfect and more expensive to operate.

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EDITORS

Gasoline vehicles—Chas. E. Duryea, Reading, Pa., Consulting Engineer, A. M. C. M. A.
Steam vehicles—J. A. Kingman, Locomobile Co. of America, Bridgeport, Conn.

(We desire our readers to make full use of this department by asking our department editors advice on all subjects connected with motor cars. We will also grant full use of our columns to those who disagree with the views and opinions expressed in this department.)

NOTICE—Matter for the attention of the Editors of this department should be addressed to the particular editor it is intended for, care of the Cycle and Automobile Trade Journal, and must reach Philadelphia by the 5th of the month to insure insertion in the next number. (Special information on personal matters not for publication should not be expected without remuneration.)

Answers to Motor Cycle and Motor Boat inquiries will be found in those departments.

Gasoline Vehicles

CHAS. E. DURYEA

ENGINE PERFORMANCE AT 14,500 FEET ABOVE SEA LEVEL.

LA PAZ, BOLIVIA.

La Paz, Bolivia, is situated about 14,500 feet above sea level, and I calculate that at this altitude the average gasoline engine loses almost 50% of its efficiency, and that a steam engine loses almost as much.

At 14,500 feet the air is very rare and in consequence of the lack of oxygen in the atmosphere the mixture which enters the cylinders is naturally very heavy and the explosion, when it occurs, is very feeble as the component parts of the mixture are not proportionate. An automobile rated at 40 H. P. will not perform the functions claimed by the manufacturers and will not climb a hill having a gradient of 20% even when equipped with special gearing.

What formula could be used to compute the loss in efficiency on account of altitude? 2% for every thousand feet is all very well for altitudes as high as 8 or 10 thousand feet, but above that my calculations have "gang aglay." What formula could I use to calculate the loss in efficiency of steam-driven vehicles, and in fact all classes of steam engines? D. M.

You are mistaken in supposing that the composition of the air has changed at the height you mention. Many accurate analyses have been made of samples of air brought down from heights beyond those attained by living beings and they all show the same composition as pure air near the earth. You may be quite right that the mixture is not correct. It seems to be quite certain that a carburetor which has been developed to handle a dense atmosphere will not properly mix the same gasoline with a light atmosphere. It is probably true that the liquid while of the same weight will vaporize much more readily and that this further tends to throw the mixture out of proportion.

I have had no high altitude experience myself and writers seem to differ as to what happens and what is needed to get the power. There is air and fuel there and they can be made to do work properly and economically if the engine is right. The comparative pressures are best shown by a barometer and you can get at the air pressure in pounds per sq. in. by multiplying the barometric inches by .49. The power you ought to get out of a gas engine will be less than at the sea level as the air pressure is less. In fact it ought to vary just as does the barometric pressure. But since the engine has been built for one level and not changed for another, the power actually developt probably is less than proportional. It is well known that engines are slightly less efficient as the compression spaces are made larger. Reducing the density of the charge not only lessens the amount of working material but it decreases the compression and the working pressure and so reduces the economy of such charge as can be drawn in. It ought to be possible to increase the compression by filling the compression space about half full of iron and so avoid the loss of economy mentioned. Then the engine should give power compared with the sea level in proportion to the barometer. You are nearly 3 miles high and as the pressure decreases roughly ½ pound for each thousand feet, your barometer will indicate about 8 pounds. At 3½ miles the pressure is but half of the sea level pressure and an engine built for that level can only develop ½ as much power as the cubic contents would indicate. Your belief is therefore not far from right so far as it applies to the gas engine. To figure the loss, we must assume the engine to be built for the altitude and then the decrease will be 1-30 or 3⅓% per thousand feet.

But the steam engine is a different problem. Here you have to consider grate surface, flue sizes and stack capacity. These will handle less air as the pressure is less and the same percentage will apply. But if you get the steam in the boiler, the engine will do its duty better than at a lower level for it can exhaust into a partial vacuum without using a condenser. The remedy would seem to be the use of forced drafts and by faster speeds get the same quantity of air thru the fire.—C. E. D.

BACK FIRING INTO CARBURETOR.

PITTSBURG, PA.

Would be greatly obliged if you would explain, through the columns of your next issue, the cause of a gasoline engine firing back into the carburetor. WESLEY HOWELL.

The usual cause of backfiring is a mixture too lean. A proper mixture burns explosively and the fire goes out as soon as the gas is allowed to expand. If lean or over fat, it will burn very slowly and exhaust as flame and some of it will still be burning as the next charge enters. This fires the fresh mixture and it fires back toward the carburetor. Other things may cause this. If your spark occurs in one cylinder at the time the charge is passing in, it would backfire practically every time. A hot bit of carbon too small to hold heat enuf to cause what is called preignition may remain hot till the suction begins and do this mischief. If an inlet valve does not close, the charge will escape and the spark will fire what remains of it and communicate it to the pipe. But making the mixture richer is the first thing to try.—C. E. D.

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ON GRAPHITE LUBRICATION.

ELGIN ILL.

would greatly appreciate, a full expression of Mr. Duryea's ideas, in regard to graphite, as an aid to the lubrication of auto, gasoline engine cylinders. How should it be used with 4-cylinder vertical engine splash feed? Should it be mixed with oil put in crank case or passed through force feed oiler? What are graphite's greatest advantages and disadvantages as regards cylinders and valves? E. J. VAILL, M. D.

Graphite seems to me to be an ideal lubricant because it will not burn, smoke, carbonize or get gummy. Further it seems to fill up the pores of the iron and then the friction is that of graphite against graphite instead of metal against metal. Of course it is the intent to have always a film of oil between the two metal surfaces but oil in a hot engine gets very thin and either squeezes out or evaporates and leaves the walls dry. I have driven up to a stopping place with oil flowing freely and smoking a cloud but with the engine turning freely, only to be unable to start ten minutes later because the oil had all evaporated from the walls leaving them so dry and sticky the engine could not be cranked fast enuf to make a magneto spark. Graphite would not disappear like that. I have used graphite lined bushings for thousands of miles with no attention whatever and altho they did not run quite so freely as an oiled bearing, they more than made up by their freedom from attention and dirt. I have experimented with an engine having no oil about it and secured fairly good results. I am not sure but that some day we will have that kind. The fault I found was that with no oil on the rings, it would not hold compression so well as an oiled engine and this stopped the experiment for the present. So much for the advantages. The thorn of the rose lies in the fact that it is difficult to feed if mixt with oil. It settles to the bottom of the oil cups and clogs them. It goes to the bottom of the crank case along with the grit one prefers not to stir up. If fed thickly mixed with oil the oil disappears leaving the graphite as a paste which may be too thick to flow and one part of the bearing will get dry and cut while another will be all right. My experience indicates that you want an all graphite lubrication or else practically an all oil one but that a little graphite will greatly improve the latter. I like to squirt a little graphite into each bearing and cylinder every morning. Also a little into the crank case on top of the oil. In this way there is a little graphite each day hunting for a rough spot it may fill up. The Dixion Co. recommends dropping the oil into a cup containing graphite and letting it flow from the cup into the part to be lubricated. They claim this oil will stir up and carry with it a little graphite and that this little is all that is needed.

A new prophet in this field has lately arisen. The International Graphite Co. of Niagara Falls are putting out an artificial graphite so fine that it remains suspended in oil or even in water and so can be fed as is oil. I have not tried this but will do so in the near future. They say it is so fine that the best American filter paper will not clarify the water. It is claimed by some that the artificial and the natural amorphous graphites are not so slippery as the natural flakes.—C. E. D.

LONGER STROKE MORE POWER AT SAME NUMBER OF REVOLUTIONS.

INMAN, KAN.

How much power could we expect a 5 x 7 motor to develop at 1,000 R. P. M.? What advantage if any or what increase in power between 5 inch stroke and one of seven inches, bore being equal? O. W. S.

1000 R. P. M. is a pretty high piston speed. It is not common to run an engine of that size more than about ¾ this fast and in fact most of them run much slower. So long as there is not some limiting feature like the piston speed, the power will increase as the stroke is increased because the quantity of mixture taken in is increased in this same proportion and it is what makes the power.—C. E. D.

PROBABLY A SUPPOSITION CASE

CLEVELAND, O.

With a car standing on a hill steep enough to slide down, with the rear wheels locked tight, will it climb up with sufficient power to revolve the wheels forward on a dry road? H. KNUDSEN.

the hill is so steep that the car slides with locked wheels it is certain that applying the power will not make them stick and propel. Ordinarily applying power will start wheels to slipping if nearly at that point.—C. E. D.

PISTON SPEEDS LONG AND SHORT STROKE MOTORS.

FREDERIKA, IOWA.

I would be much pleased if you would enlighten me on the following:

In a catalog of a very popular motor car manufacturer, I find the following statement:

"A piston having a six (6) inch stroke travels only half as fast as one having a three (3) inch stroke on a shaft making the same number of revolutions."

On what principles is the theory based? C. E. CARR.

This statement as it stands is self evidently wrong. Probably what was intended to be stated was, that at the same R. P. M. a 6 in. stroke piston travels twice as fast as one having a 3 in. stroke, instead of half as fast.—C. E. D.

SHALL I CHANGE THE ARRANGEMENT.

I have a car with 4½x7 inch two cylinder opposed engine which should develop about 18 H. P. The engine seems to be in good condition, yet I cannot get enough power out of it. Could you tell me what might be the cause of it. The carburetor is about 18 inches above the intake and about two feet away. The oil feed is on top of the crank case and the exhaust from cylinder 2 comes straight into a tee. In your opinion would it benefit any to lower the carburetor and bring it closer to the intake, or would the changing of exhaust pipe at the tee help? How much H. P. do you figure this 4½x7 should give?—J. P. M.

It is a safe guess that the makers of the car had as good an arrangement as can be found and that if there is trouble it is not in the original arrangement. The best thing is always to bring the mechanism back into its original form and efficiency; and then, having it as good as it ever was, if you feel that it can be improved by making a change, try it but do not burn the bridge behind you. Leave it so you can put it back if it is not an improvement. I have seen so many cases where an owner at once went to "improving the rig" with the result that he never was happy and the maker got the blame. I do not favor a high carburetor but the only objection to it is the tendency for the liquid to flow into the cylinders. A small vent hole or cock in the pipe will fix this. The engine ought to give 15 H. P. Make sure the valves are timed right and that the compression is good. Try it with the muffler off. There is probably something not as the maker designed it and if you will find and fix that you will be all right.—C. E. D.

WANTS RIG FOR TRAVELING SANDY ROAD.

I have the contract for carrying the mail 24 miles and return daily on a route in Florida. The road is very sandy and during seven months of the year is quite bad on ordinary vehicles. The other five months it is wet and pulls much easier. I wish to know if it would be practical to handle this route with a light runabout or some kind of a gasoline vehicle. There are no automobiles here and I am advised by some that they would be entirely impractical on this road, and others say just the reverse. I would be pleased to have you set me right in this matter, either in the C. & A. Journal, or by private letter if you do not think the subject worth space in your paper.—T. P. GAY.

I feel sure a light but strong auto can traverse that sand better than a horse vehicle. It should be as light as possible in front. Try pushing a loaded wheelbarrow in sand if you wish proof of this. Just what tires should be used is a matter for experiment. I would suggest wide iron tires such as are used to fit single tube or hose pipe tires. These rims would not carry sand on their inner circumference and they would grip the sand and support the load rather than cut thru it. The wheels should be large so as to get a long support. Little wheels cut into the sand easily.—C. E. D.

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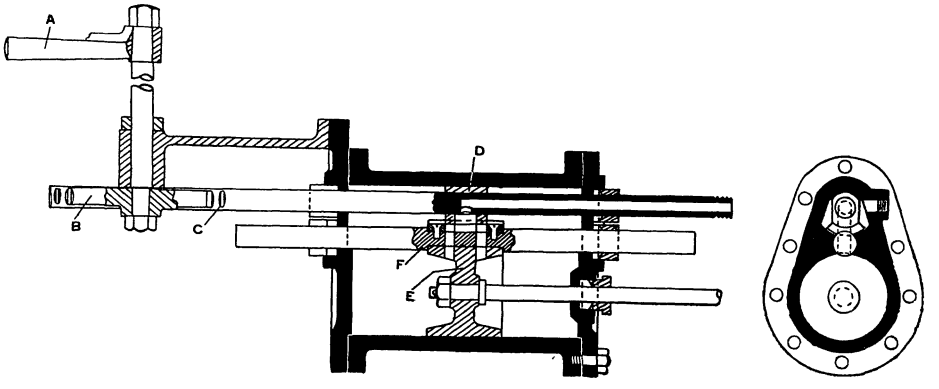
A HYDRAULIC STEERING DEVICE.

I have enclosed a blue print of a hydraulic controller with description which embodies some unique and valuable features for automobile steering. I send you this for your consideration and opinion as mechanical expert with the object of having the same published in the Auto Journal. The following is a description of this Hydraulic Controller: 1st. It steers the vehicle automatically in the direction the steering handle (1) points, and locks piston automatically and positively. 2nd. Its action in steering is quick depending only on the size of ports, and the pressure maintained from the pump. 3rd. The added weight of controller and the required quantity of water would not add materially to the weight of a machine. 4th. The principle of operation is this: The steering lever (A) operates through segment of pinion (B) to rack cut in valve rod (C) thereby moving valve (D) in either direction as is desired. The piston (E) being shouldered to port rod (F) whenever through movement of the valve the ports



are opened the piston and port rod immediately follow the direction of valve movement and centering with the valve closes ports automatically, retaining water on each side of piston, hence locking piston until valve is again moved through action of steering handle. When it is desired to change the course of the machine the steering handle is pointed in the direction it is desired to travel. The corresponding movement of the valve has opened the proper port for the inlet of water to one side of the piston, and causes the piston and port rod to move in the same direction that the valve itself is moving, meanwhile the water on the opposite side of the piston has been flowing through the other port into the valve chamber within the valve, and from there out through valve rod. As soon as piston and port rod have moved to a position directly beneath the valve all ports are closed by the valve and the piston will be locked in position. A pressure gauge is placed on the dash board showing operator the pressure in air chamber at all times. This is certainly a positive steering action not complicated, and suitable for heavy touring automobiles and commercial trucks, and for other purposes.—J. W. ANDERSON.

Your hydraulic controller or steering device is ingenious and as simple as any I remember seeing for the purpose. That there is need for a power device for steering the large vehicles does not need argument. Patents have been taken out on a number of power steering devices years ago but none seem to have come into common use. The commercial vehicle itself has been surprisingly slow coming into its field, but as autos are simplified and as drivers get acquainted with them, they will do their work better and be used more widely and then devices such as yours will find a market. The weak spot of your device is the need for a pump to maintain the pressure necessary to do the work. I look to see pumps abandoned before many years as an unnecessary nuisance and gravity circulation or air cooling used instead. —C. E. D.

H. P. OF FOUR 2⅜-INCH CYLINDERS.

North Tonawanda, N. Y.

Kindly answer through the Cycle & Auto. Trade Journal.

About what Brake horse power would a 4-cylinder, 4-cycle gasoline engine give with 2⅜-inch bore and 3¼-inch stroke, at 800 revolutions, also at 1200 revolutions per minute.—ROBERT STEINHAUS.

The power any engine will give depends much on the design. Good makers have mastered the art pretty fully so one will get out of a given size about as much power as another and the output of the factory will run pretty even; but an experimenter will fall down frequently and not get the power due him. To get at the power of an engine square the bore and divide by 2.5 for 1000 ft. piston speed per minute. If the piston speed is less take a correspondingly less amount of the quotient. Then multiply by the number of cylinders of course. Your engine ought to give about 5 H. P. at the highest speed and 3½ at the other.—C. E. D.

DESIRES CARBURETOR INFORMATION.

Please answer thru your Mechanical and Technical Department where I could get valuable printed information other than given in your Trade Journal about carburetors, their construction, advantages and defects. Also please state which in your estimation are the four most used float feed carburetors and the two most used valve carburetors.—F. E. D.

Most any book on gas engines devotes a number of pages to carburetors. Hiscox on Air, Oil and Gas Engines has twenty-two pages and describes about a dozen. Price, $2.50. This Journal has more than a score of carburetor advertisers and they will gladly send catalogs on receipt of a postal card request. If you had given your address, I would gladly have sent a paper on "Carburetors and their functions" prepared by me for reading at the last August meeting of the Society of Automobile Engineers. This free on receipt of postage. It is difficult to say which carburetors are most used. Many auto makers have their own while others have a special one built for them. Probably the older forms are most used because best known. Schebler, Kingston, Buffalo, Holley and others come in this list. Of the generator valves, Lunkenheimer is probably best known because sold by an old house. Many of these are in use on launches and I have no way to get at the number. The mere fact that a large number of any device are used does not prove that device superior to a later or more costly device.—C. E. D.

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SUGGESTIONS FOR CRANK CASE BREATHING.

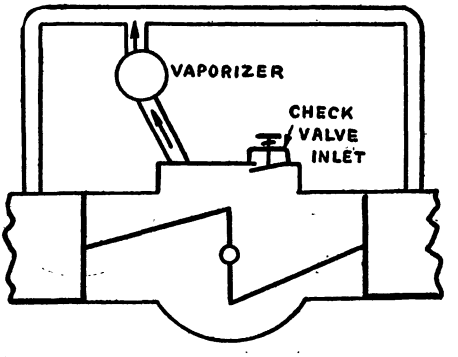
Philadelphia, Pa.

I am very much indebted to you for your opinion on the spring piston in the April issue.

It was simply a coincidence that I should hit on the same idea at about the same time as some one else. Your suggestion of using gases in place of springs is good in that instance.

Your reply to Fred. B. Fay, of Worcester, Mass., in regard to front wheel drive is also very much to the point and I don't see why the weight is not placed where it belongs as you suggest on the drivers.

I can imagine a car designed with the engine in the rear. Take a touring car for instance; place the engine over the driving wheels. Then instead of the usual rounded hood have a flat deck over the engine embellished with a railing. On top baggage, grips, extra shoes, etc., could be carried, as there is no place now to put anything on the touring cars of the present design, except passengers. The engine would be get-at-able through panel sides, and in case of serious trouble the whole rear deck could be hinged so as to raise and leave the engine and mechanism practically bare.



I will also ask you to kindly give your opinion on the enclosed sketch to help get over the trouble of my 2-cylinder opposed engine pumping all the oil out of the crank case around the various bearings. It is due to the pressure being greater in the crank case than outside. I presume that there is some leakage past the piston rings, although the compression seems O. K. The scheme as per sketch was submitted by a friend as being a satisfactory way out of the difficulty. There has been no breathing tubes on this engine. So I tried an ordinary swinging check valve on top of the crank case, so set as to let air out of the crank case when the pistons approached each other, and when the pistons reversed there would be a partial vacuum and drain the oil into the crank case again from around the bearings, which worked well, only I lost more oil out of the check than I ever did out of the bearings.

What's the answer?

I wiped the pistons and cylinder walls dry and tried the compression and with my weight they simply acted like cushions, so there is not much leak.—SYD. VERTS.

Simultaneous work on the same problem by different men far apart and with no knowledge of each other is not uncommon. It may be that recognized need explains it or it may be that brains telepathicly influence each other. I have seen instances that seemed to indicate the latter. Your suggestion for a body has some good points in my opinion. It does two valuable things. Gets the passengers between the wheels where the easiest riding is and the weight where the driving is to be done.

The breather problem worries many people. Ordinarily they make the bearings and case tight as possible and let it go at that. If you let air into the crank case you let in dirt and this is not good for the bearings, but it is done on most 2-cycle engines and no kicking.

The carburetor plan can be worked out all right and have some advantages. You can get larger charges this way, for the pressure in the case will insure a full cylinder no matter what the speed. In fact the charge could be under several pounds pressure. You could throttle at the inlet check and so not let in much air if little power was wanted. This would not be so positive a throttle as nearer the engine but if the case was tight there would be little trouble from this source. I would use a small out check and protect it from the oil as much as possible. This will cause a little more vacuum than pressure in the case and so tend to draw in the oil. Your check was likely too big. You let out the air too freely.—C. E. D.

ADVICE ABOUT PATENTS.

Cleveland, Ohio.

I have invented a simple mechanism for producing a make-and-break spark. The arrangement is operated from a cam on the camshaft, it is controllable and has very few bearings and parts to cause trouble. An engineer and inventor told me the device was practical but said that he was not in position to say how it would be received. Do you think the device is worth a patent and if I secured a patent do you think I could get a manufacturer to use it.—A SUBSCRIBER.

The contact spark is the simplest and finest kind but it requires some designing to get it onto an engine and makers usually prefer to buy all such parts and to make as few as possible. If your device is such that it can be applied to engines easily, there is a good chance for it; but if it has to be built into the engine then it will be of use only to the maker who decides to use it. In that case, better find your user before spending much money on it. I find that there is not much danger of a device being stolen. Get it made up and show it to friends and then you will have proof that you did invent it at such a date. Drawings dated and witnessed are splendid evidence. After you have those things you need not fear losing it and can hunt for a market even before you apply for a patent. If you wish you can have a patent attorney ready to take it up as soon as there is good reason to believe that you have a market. Many inventors think the only thing necessary is to get a patent. This is the least thing of all. Get the market and patents can usually be had. Submit the device to a few practical makers and they will tell you its faults and whether it has been used before and you will learn enuf about it to be able to get a good patent. I have used make-and-break sparks for years but am now using the jump and looking toward the time when I will be in position to again sup- [illegible] contact spark.—C. E. D.

HAVE REVOLVING CYLINDER DATA.

New York.

In the current issue of the C. & A. T. J. a Mr. Webster of Sparta, Ont., seeks information about "Revolving Cylinder Motors." As we have accumulated a large amount of data, about such motors, we would like to get in communication with him, with a view to helping him along. So if you can kindly furnish us his house and street number, we would deem it a great favor. We are the successors to the Balzer Motor Co., mentioned in your reply to Mr. Webster.—REV. CYL. MOTOR CO., THOS. O'BRIEN.

We have no address other than the one given, but think you can reach Mr. Webster by using this address as given. If you have data of interest I feel sure it would interest other readers and suggest that you furnish us with a copy.—C. E. D.

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HIGH WHEEL AUTO BUGGY DESIGN.

After carefully reading your valued journal for the last four or five years noting carefully what you have said in reference to air cooled, two-cycle engines and also what you have said in reference to high wheeled buggy type machines; the writer has designed the enclosed buggy type automobile.

We would thank you very much if you would criticise the enclosed blue print for us through the columns of your journal, and return blue print to us.

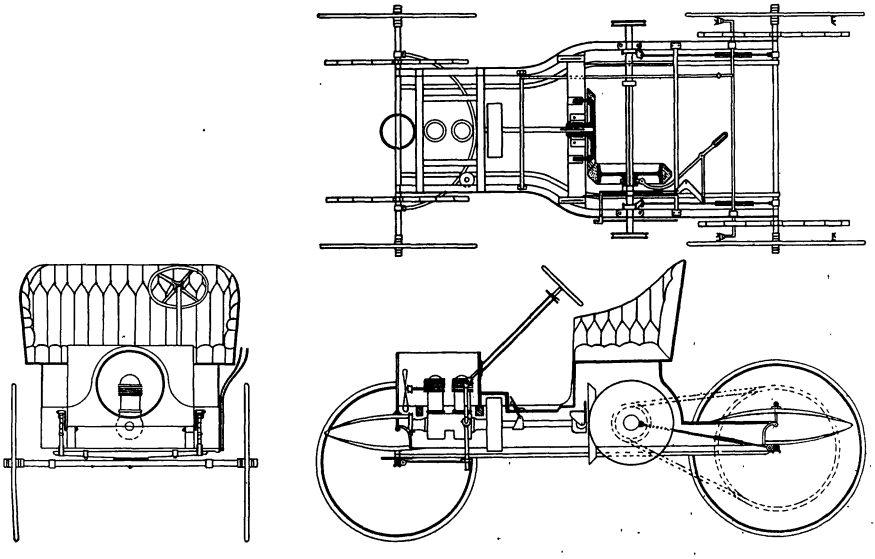
We would like to ask you the following questions: (1) Do you see any way that we could make this rig more simple? (2) Do you see any part of it that seems to be out of proportion or not strong enough or too strong? (3) Do you think we can get along without a differential by allowing the cables to slip a little, or would you recommend the more complicated drive of chain and differential? (4) Do you see any objection to the steering apparatus? This was adopted on account of its simplicity and cheapness. Also because you can take up lost motion. (5) What is your opinion on our friction drive scheme? (6) Do you agree with us as to the position of the brakes?

We expect to put these rigs on the market for about $400 to $450. Thanking you in advance for your criticisms, we remain.—H. A. B. CO.

Your plan in general is good. The cables will slip enough to permit getting along without a balance gear. This wears them out a little faster, but the American buyer likes new things and short life does not worry him. Low first cost is all important so leave out the balance gear. When you remember that all cars and locomotives are built with positively fastened wheels on their axles and no balance gears and found best that way you will see here is a good precedent.

The steering is not so good. The cable will give trouble if the small pulley is very small and if not the steering will be jerky. I do not think the public will long accept this form of steering. A few can be sold till they learn their defects. If you wish to use this method use a chain around a very small pulley. Your friction drive is all right except that the reverse bevel will not be needed and the small rollers will most certainly be noisy. Better leave them off and use a stiff wheel and shaft. You have room for a long hub to the wheel and it can be mounted on balls or roller bearings.

Your double gimbal joint in the steering post ought to be simplified. One is surely enough. The brakes look all right. Give them ample leverage for they will require considerable pressure—C. E. D.



CHARGING BATTERIES.

Being a subscriber of the Cycle and Automobile Trade Journal, I would ask you to kindly answer the following through the Mechanical and Technical Department. I wish to rig up to charge storage batteries. I have the dynamo. What I want to know is how to connect up same. Will I have to have an ammeter to know the rate of charging, or can I use lamps in the circuit? Please give me full directions.—J. P. WILSON.

You ought to have both volt and ammeter. It is not wise to be in the dark in these matters. Better write the makers of storage batteries for full instructions. There are many little things to be watched for and I do not feel we should use our limited space to give you full instructions. A light circuit must be of the direct current kind and you cannot get much quantity thru a single light. Several lights in multiple will keep down the voltage and increase the amperage, but you need a meter to know what you are doing. Many batteries are damaged by improper charging. Sick cells must be doctored. The quality of the liquid must be watched. This is why you had better get directions from battery makers who are usually glad to supply them.—C. E. D.

AVERAGE GEAR RATIOS.

For a 45 H. P. water cooled, shaft drive, heavy touring car having 3 forward speeds and 1 reverse, direct drive on the high with 2½ to 1 axle, what would be generally considered as standard ratio of gear reduction for the intermediate, low, and reverse.—L. V.

I do not think anyone has ever tried to compile a table of the gear ratios used. They certainly vary widely. And it is well that they should. Not only are weights and powers different but the roads and grades demand different gears in different localities. Personally I have no use for high speed and so believe in low gears. You can decide this better yourself than any one else. Intermediate, 4; low, 10 and reverse 12 will be somewhere near the average I imagine.—C. E. D.

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TROUBLE PROBABLY WITH THE CARBURETOR.

Iola, Kansas.

Will you please try and enlighten me on the following questions, I am a reader of your valuable magazine, I am in trouble with my 2-cylinder opposed motor, nothing but trouble all the time. The cylinders are 5½ by 5 9-16 inch, in good shape, the inlet and exhaust valves are ground to a perfect fit, the inlet valves are automatic. The motor at times seems to develop its maximum power, but at other times it does not. At first my trouble seemed to be in the coil which was not the best in the world so I put on a new vibrating coil. The old one was non-vibrating. After putting on the new coil the trouble seemed to be in the timer which was not very good, so I put on a new one. The old timer had a single brush and a two point commutator, while the new timer has a double brush with a single pointed commutator. My battery system is exceedingly good, 7 volts, 18-25 amperes, the motor seems to start very easily. I use the very best of cylinder lubricant obtainable. The motor seems to run very good on low speed and seems to develop more power on low speed than she does on high speed, just as soon as the throttle is open motor lays down but by closing throttle quick back to slow speed point motor will strike up the old slow speed all O. K. Motor will not stand for the throttle being opened at all from setting point after this trouble commenced. I thought the trouble was in the mixture but after trying out 20 or 30 different mixtures I came to the conclusion the mixture and carburetor were all O. K. The carburetor is of the Schebler make; I also tried a spraying nozzle at end of intake pipe but without any good results at all, I am positive that the exhaust pipes are not stopped up. As to the valve timing, I think it is all O. K. The exhaust valves close a trifle past dead center and of course I need not speak about the opening and closing points of the inlets as they are automatic and actuated by the piston, the inlet valve springs are good and stiff, the former inlet spring was weak. By experience I found out the stiff inlet spring for automatic inlet valves to be the best. Where the piston is good and tight in the cylinders the motor's water jackets get good and hot just as soon as the motor has run a few minutes. This trouble at slow speed I cannot account for, as the water circulation is good, the cooling system holds 9 gallons, all the bearings on motor run perfectly cool, as to alignment of motor all is O. K. Could it be possible that there is liquid gasoline getting into the cylinders? The trouble is the most freakish I ever saw on a motor car. The cylinders have about six inches to the charge, do you think the lift too great for the size of the cylinders? The carburetor sets about 11 inches below the gasoline tank and the float in the carburetor is not large enough to stand full tank pressure from the gasoline tank without the aid of a regulating valve on gasoline line. Both cylinders fire evenly, but the explosions are very weak. At about what speed should this motor run for high speed and about what H. P. should it develop? This motor has run and run well, so why can it not be made to run well all the time or at least a part of the time under the same conditions as it did before?—A. M. K.

You seem to have tried most of the things that should be tried, so your case is a little puzzling. But I have many times put my finger on the trouble at the first jump only to be told that it could not be there for that had been tested; and relying on that assurance I have gone over the whole rig only to come back and test for myself the first point and find the trouble. I feel that your test of the carburetor was not conclusive. The engine gets too much liquid fuel. When you open the throttle some liquid waiting in the pipes is drawn into the cylinder and this is what causes the trouble. Close the carburetor until the engine will not run very well and you know you are not getting too much gasoline; then try heating the pipe near the carburetor or else heating the air and see if that does not act as a richer and better mixture should. If so it will be evidence that the gasoline does not properly vaporize. In many parts of the country the fuel is heavier than it was a few years ago and this makes it harder to get a good mixture with the carburetors then in use.

I do not understand what you mean by a regulating valve in the gasoline pipe. Surely the carburetor float is able to take care of a head of a foot or two. If not then your float is bad and it may be responsible for a flood as soon as you open the throttle. A strangle valve in the fuel pipe will certainly give trouble by not admitting fuel enuf at high speed if it is adjusted to admit the right quantity at low speed. If you have a pressure governor in the pipe you may be able to get along without a float but I do not advise anything but a good float for it is about the best thing known for the purpose to-day. The stiffness of inlet springs depends on the valve weight. Many suction valves have been so heavy that they had to have heavy springs and so have not done their duty in the best manner.—C. E. D.

PROPOSED HIGH WHEEL AUTO PLANS.

As I have been a reader of The Cycle and Automobile Trade Journal I take the liberty of asking you a few questions. I am thinking of building an automobile of the following description, and it would be a great favor to me if you will give me your opinion of such an automobile. Wheels 36 inches, 1¼-inch spokes, 1¼-inch solid tires, Timken roller bearings, front and rear axles I-beam, 4 elliptic springs, 34x1¼ inch, 5 leaves rear, 4 leaves front, angle steel frame 1½x1½x¼ in., 2 angle steel braces to connect front and rear axles. Wheel base 84 inches, tread 56 inches, seat for two passengers, also folding seat to carry more. Engine double opposed, air cooled, 12 H. P., with fan flywheel, engine in front under hood, where it can get draft of air from motion of car. Double side chain drive from countershaft, differential on countershaft, friction drive, 18-in. friction wheel on countershaft. fibre face, which slides on countershaft across the face of an 18-in. friction wheel, which is at right angle to it. Shaft from engine to 18-inch friction wheel, side lever to move wheel on counter-shaft across face of the wheel on shaft from engine, foot lever to increase friction if desired, wheel steering, weight of engine 250 lbs. Weight of automobile about 800 or 900 lbs. Throttle and spark levers on steering column. Please advise me if you think that the engine would keep cool enough to make continual runs for five or six hours, also advise me what parts I could make a change in to better the machine. I also wish to know what size sprockets to use on rear wheels and countershaft to give the car a speed of about 30 miles per hour. The countershaft will turn at same revolution as the engine on high speed.—GUY HAMILTON.

Your specifications look pretty well. It is not possible to pass a valuable judgment on specifications so limited. Your frame should have more depth, unless it is trussed. I doubt if you will be able to keep it as light as you think. I would gear it about 4 to 1. Many would say higher but more cars have been geared too high than too low. You need not fear air cooling. Well-designed air coolers are the best there are for auto work. The more I see of them the more certain I am they will be the final form. Make the friction wheels as large as you can. This saves power. The friction drive is another thing that is all right when it is built right. —C. E. D.

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BUILDING SPECIAL CAR.

Union, S. C.

I am anticipating the building of a special car for my own use, please give the names of some manufacturers who build cars to order, where I can get first-class workmanship at a reasonable price.

I want to use a three-cylinder 2-cycle air cooled motor, of about 25 or 30 H. P. Would like to have your opinion as to the best motor of this kind on the market.

I am thinking of using the Manning Double Friction Transmission, Shaft Drive to rear axle, with a ratio of 4½ to one on direct, or high gear using 56-inch wheels.

Also of using the Midgley steel wheels with 3-inch Motz Solid Rubber tires, triple action springs, and aluminum coupe top.

What do you think of a car of this makeup? About what would be the cost of a car of this kind?—H. T. YATES.

The first advice to give to a man contemplating building his own car is "Don't." It costs money to build a single rig and it cannot be done as well as a regular job because all the workmen are not familiar with just what is wanted and so are likely to go wrong unless supplied with the most accurate drawings and even then they will not do the work as well as if it were a regular, for their hands get skillful by practice. If however you do not see fit to accept this pertinent suggestion, I can recommend the engine that I use in my own product which is of the type you desire and is built in Reading. I feel sure it will please you. Your wheel sizes are right and I think you will get a good car. It is better to have the work done at your own place if you are anxious to get everything as you want it. Many of the concerns who supply parts to the trade will do special jobs such as you want. The cost will depend on so many things that it is not possible to estimate unless specifications more complete are at hand. But it will cost very much more than a similar car can be bought for in the open market. We often hear how a friend bought all the parts for his car for a fraction of the price of a new car but we seldom hear about the price of assembling these parts which usually do not fit each other. It is strange that, if autos can be assembled so cheaply, every one does not build them that way and a big price reduction occur. The fact is, an auto is a complicated unit and must first exist in the mind of the designer and then be built according to his plan and experience. If it is to be better than others, it must have every little detail better, for the whole is made of details, and this explains why the best autos cannot be simply assembled from open market parts.—C. E. D.

ABOUT DRIPPING CARBURETORS.

In your February issue you kindly gave me your opinion in regard to a puzzling case of missing in my 2-cycle, 22 H. P. motor. I have found since that the trouble was in the carburetor, and wish to obtain your opinion further.

On taking off the dust pan underneath the car I discovered that whenever I stopped the motor, that there was a very noticeable leaking or dripping of gasoline from a small pin hole at the bottom of the union of the individual intake pipes leading to each cylinder. In order to make the matter clear will say that there is a pipe from the carburetor leading to a point equidistant from each cylinder, and it is at the bottom of this common union that the pin hole for the escape of excess gasoline exists. I lose so much gasoline that my mileage per gallon is actually cut down.

I sent my carburetor to the factory and they claim they put it in perfect condition, and tested it out thoroly, yet when I used it again, the leakage was as bad as before, and opening the throttle the engine missed explosions and was too slow in picking up.

My ignition, gasoline (quality), valves, compression and all other essential features being O. K. I determined to lower the float in the carburetor and now I have more power, the engine has fine pulling power on slow speeds and there is no missing. But the engine is still a little slow in picking up speed and cannot be forced to exhibit the power it had last summer, and I do not like the excessive dripping of gasoline which still takes place at each stopping of the motor.

Is the float still too high and would I do well to lower it further? It is now at least ¼-inch below the needle valve outlet into the mixing chamber. What other explanation can you offer for the excessive gasoline dripping and slowness of picking up on hard pulls and high speeds?—H. H. FRUDENFELD.

Your trouble is one common to all carburetors with few exceptions. They do not make a perfect mixture and the larger particles of the liquid drop on to the pipe walls and will run out thru any opening when the engine stops. Generally there is enuf suction when the engine is running to prevent this leak but there is a little stream of liquid when a stop is made. Lowering the float makes the engine suck harder to get its fuel and so makes a finer spray but it is not so easy to get started and will not allow charges quite so large at speed. This may account for your loss of speed but before blaming it all on the carburetor, I would look at the various bearings and see that everything ran as easy as it should. Many a time the poor engine is blamed for not doing its duty when it is working itself to death trying to wear out a dragging brake. On this account I favor controlling by engine rather than by brake and find it makes a sweeter running rig as well as a more economical one.

Put a drip cock at the hole and you will avoid loss there except when you feel that you may have an excess, as in starting, and this can be let out by opening the cock. There are some carburetors arranged to hold this excess gasoline till the next start when it serves instead of priming; but there is a chance that it will evaporate and fill the pipes full of vapor too rich to start so no method seems quite so good as fresh liquid at each start.

The old gas tank carburetors did not allow any liquid to get to the pipes and they were the most economical by far but they constantly were affected by the road surface and the temperature of the air and so had to be constantly adjusted. It seems to me that the most nearly perfect carburetor is one that has a constant gasoline level and means for varying the openings of the air and liquid passages according to the suction. By such an arrangement the amount of vacuum is practically constant and the quality of the spray is the same but the quantity varies as the needs of the engine vary.—C. E. D.

CABLE OR CHAIN FOR HIGH WHEEL AUTO.

St. Joseph, Mo.

Being a regular reader of the Cycle and Automobile Trade Journal, you would greatly oblige me by informing me on the following subjects: (1). For cable drive what do you consider the best cable? A chain wrapped with cotton belt or the wire cable sometimes used. (2). Who manufactures these cables and also Sheave wheels to be used in connection with same? A. KARRER.

I have had no experience with cable drives and so my opinion is that of an observer. I would be afraid a wire cable would not have a long life because of the small driving pulley it must run over and so would favor a chain. This if provided with fabric or leather friction surfaces ought to serve you well. Write the High Wheel Auto Parts Co. for them. They can also supply you with the sheaves.—C. E. D.

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ABOUT LUBRICATING A TWO-CYLINDER OPPOSED ENGINE.

Janesville, Wis.

The automatic oiler on the opposed engine of my 1905 Yale car has given me considerable trouble, as I believe any automatic oiler will, and I would like your opinion thru the columns of the C. & A. Trade Journal as to the installation of some new system. There seems to be no place for pulley to drive a mechanical oiler.

As the engine is of moderate speed, it seems to me that a single-feed gravity oiler, feeding about 30 drops a minute into the crank chamber, with grease cups for the end bearings, should be sufficient. Such a gravity oiler could be placed in view on the dash.

Or a method that I might like better would be to have a large reservoir, and a hand pump between it and the crank chamber. A stroke of the pump every five or ten miles should give enough oil.—EARL T. BROWN.

You seem to grasp the matter fully. Many racing machines are fitted with the hand oil pump and the mechanic gives the engine a pumpful whenever he thinks it needs it. The mechanical oilers are beautiful to look at but they add so many pieces that I do not think they should be on an auto for use by the average man. My theory is that an auto should have simplicity as its main feature and that only the simplest forms will survive. Gravity oilers will do the work and splash lubrication is hard to beat; and why a more complicated system should find favor is too hard for me. In an opposed engine some provision is needed to keep more oil from being thrown into one cylinder than into the other but this can be secured by using a slotted plate which covers the open cylinder end leaving room for the connecting rod to move in the slot. The principal advantage of the mechanical oiler is that it feeds a given quantity of oil per revolution. Gravity feeds depend on the amount of time passing, while the perfect oiler would feed according to the work done. This can be secured in a two-cycle engine by mixing the oil with the fuel. —C. E. D.

(Splash lubrication is good enough but the oil level should be maintained as nearly constant as possible. Gravity feed can be made to work satisfactorily if the oil tank is near enough the engine to keep the oil fluid in all kinds of weather and overflows which determine the crank case level are used. A hand pump is all right for an emergency but should not be the only means of oiling, for if it is, the engine is sure to have either a feast or a famine.—Ed.)

ABOUT MAKING PISTON RINGS.

Can you give me a formula for turning the rings for a gas and gasoline engine and oblige.—SIDNEY TURNER, JR.

There is no specific formula for rings. Engineers differ as to how large they should be. Some make them but slightly larger than the cylinder, while others make them much larger. Some makers use steel, but others use cast iron and this is the most common material. The iron varies much and the size of the ring should be made with reference to its stiffness. If the iron is not of stiff quality it is necessary to get the proper spring by making the ring larger than if the iron is stiff. My own practice has been to make the rings about ⅛ inch larger diameter than the piston and this is a quite common practice especially where the step joint is used. If the cylinder is parallel when hot as few cylinders are, there is no need to have the ring much larger than the bore, for it will hold just as well and make less wall friction and so require less horse power. One of the secrets of getting the most out of an engine is to have little things like the fit of the rings just right. Having decided on the size of the ring and its thickness, which must be considered at the same time, turn it off center so as to thin it at the points. If it is much larger than the bore it will need to be brought quite thin at the place where it is to be cut. Next cut it either by a single diagonal cut or by milling two notches on opposite sides so their corners just meet. This kind of a cut will make a step or lap joint. The width of the notches is just enuf to make the ring a little larger than the bore when the cut is closed together. Next tie a flexible string or strap around the ring so as to hold the joint closed and inspect the shape. It will be found to have sprung unequally. Some spots will be high and others low. It is then gripped on a mandrel by its edges so as to leave the outer surface free for turning or grinding and brought to the cylinder bore size or slightly under. If exactly to size and the walls remain cooler than the ring it may expand and bind. As it wears it gets more space between the ends so it is therefore customary to start with only 1-32 or thereabouts. The outer surface will true itself to the cylinder pretty well by usage but the edges of the ring do not get this opportunity to better themselves and so should be ground. This is commonly done by placing the ring on a magnetic face plate and grinding the exposed edge. It is nearly as important to have the rings tight on their edges and faces as it is to have tight valves. The only difference is that the oil helps to pack the rings but does not help with the valves.

The practice of turning or grinding off the high spots does not seem to be just the right one, for the high spot is the place where it bends easiest and so the place that ought to be thickest. Grinding off the inside of the low spots would thin them and let them bend more easily. I have never heard of this being done however. It is quite customary to put the cut ring into a larger ring preparatory to gripping for grinding. This rather forces it to be round independently of the natural spring of the iron. Two or three settings and grindings will get it so it fits all around if a single one does not.

The surface of the ring does little packing but simply takes the wear. A wide ring will wear longer than a narrow one but two narrow ones will pack better than one wide one.—C. E. D.

WANTS SPARK PLUGS MADE.

As a subscriber to the C. & A. Trade Journal may I ask for some information? I have gotten up a spark plug which I think will prove of merit, and I desire to get the name and address of some firm that make a specialty of making the parts for plugs. I want to get a model as I am preparing to have same patented. I would prefer some firm that would build the entire plug for me. Thanking you for this information, I beg to remain.—J. W. BROWN, JR.

I do not know who might make the plugs for you. Most any shop making screws could do so. Write those of our advertisers that seem to be in this line, as given in the January Buyers' Guide number.—C. E. D.

METAL PROTECTION OVER AIR STEM OF INNER TUBE.

Custar, Ohio.

I have a question which I desire to have answered in your Journal. What is the use and benefit of the metal saddle over the air stem in an inner tube and why do they stand crooked with the tube?—H. MANNHARDT, M.D.

The usual purpose is to make sure the air tube does not blow down into the hole provided for the valve stem. This hole in the rim is often larger than it ought to be and the soft rubber stretches till it finds every possible path of escape and if a large hole is left uncovered it will extend into it till cut by the sharp edge and deflated.—C. E. D.

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SMALL GASOLINE ENGINE PATTERNS.

Newark, Delaware.

In looking through several books on patternmaking, I find nothing which enlightens me on what I wish most to know of the subject. First. I wish to know how the pattern is made for a small gasoline engine cylinder, four-cycle, air cooled; overhead inlet valve, with integral head and valve chamber; cooling flanges radiating horizontally from sides of cylinder and valve chamber—vertical flanges on top radiating from spark plug hole in center of head:—in short, similar to a few such motor-cycle motors now on the market. Could the pattern for such a cylinder be moulded in a two part flask, or if not, how then? Second. In designing a crank case for four of such cylinders, I am in the dark as to the making of the pattern. On page 187 of the March issue is illustrated a crank case somewhat similar to my needs, and a sketch and explanation showing the patternmaking and moulding of such a crank case would be greatly appreciated. I am afraid that I have asked too much and that you cannot spare the space this would require, but if you cannot publish what I have asked, will you kindly inform me as to where I could obtain such knowledge.—W. V. DERBY.

Most of the light air cooled cylinders are not cast in green sand, but in sand that is baked as is common for cores. To get the sand in shape, boxes like core boxes are made, often of metal, and the various sand parts are afterward assembled to make the complete mold. The precise shape of the boxes and their number depends on the specific casting and we cannot go into details of interest only to you in this department. You will readily see that longitudinal ribs radiating from the cylinder on all sides with a different set of ribs on the head cannot be cast by using the common two part flask method. If the sand is not too thin between the ribs it is possible to lift the cylinder pattern body leaving the ribs in the sand and then pick out each rib separately. This requires the cylinder pattern to be made in halves and means for holding the ribs in place till ready to lift the half cylinder. The head is usually cast by the use of a third part to the flask or core box. The crank case is largely core work also. The concern which makes the castings can best advise how to make the patterns. You may think their way not so good as your own but if they think differently you will get better work by doing it their way for their way based on experience is probably best.—C. E. D.

MOTOR TOO SMALL AND TAPPETS NEED ADJUSTING.

I have a two-cylinder opposed horizontal water-cooled motor, 4½x4½. The valves are on the bottom of the motor; this motor loses its compression, grinding the valves puts the compression back and it is so strong, can hardly be turned over. But the compression does not last and is gone in a short time. I put in new valves and ground them and the compression was all that anyone could ask, but it would not last. You can move the end of the valve stem where the push rod strikes about one-eighth of an inch play. These valves are 7-16 in. diameter and are 8 in. long, and the car has only been used two summers (no winter driving). Do you think that there is enough lost motion in the guides to cause the loss of compression? About how many drops of Mobile A oil should be fed to these cylinders? Car weighs 1700 pounds and carries four people. I set the intake valve to open 3 inches after dead center on flywheel and close about 5 inches after dead center; exhaust opens 8 inches before and closes about 2 inches after. Don't you think that this timing should give good speed and power to the car with load of four people? Should an Autocoil made at Jersey City, N. J., give much of a spark at the points on the coil, the way this car is wired, one single coil sparking both cylinders? What speed should this car make with load? It is geared 4 to 1 on high with 30-inch tire. Thanking you very kindly for an answer thru the columns of the Journal.—A. C. K.

You do not give size of flywheel, so your measurements tell me but little. They impress me as being for speed rather than for power. I think the engine too small for the car. I have always had 3 cylinders of same size as yours in cars two-thirds as heavy. The speed it will make depends very largely on the road surface. If everything is in perfect order it ought to speed up to 1200 and turn the wheels 300 r. p. m. At this rate it would do a mile in 2 1-3 to 2½ minutes, or about 25 miles per hour. If both cylinders spark at once, the best results are not found. Use either a distributor to send the spark to the proper cylinder or use two coils. Different engines require different amounts of oil. Try it for yourself. Begin with 3 drops per minute, and watch it closely. If valves are to be durable they must seat true. If they strike on one side first, they wear or forge and soon leak. True the stems and bush the guides. Then fit carefully with about .003 inch play instead of .125 inch you now say you have.—C. E. D.

WANTS AUTO CHASSIS FOR R. R. TRUCK DUTY.

Grass Valley, Cal.

I am particularly interested in commercial cars with a view of using one or more for passenger travel on our railroad. We have a 3 ft. gauge road 23 miles in length, a 2 1-5% grade for about one-third of its length and numerous curves and would like to operate the passenger traffic with a gasoline motor train of two cars which, when loaded, will weigh about twelve tons together. the chassis to serve as the truck of one of the cars. Would you please give us information as to the most suitable equipment for this purpose such as to the size and kind of motor required and if friction, sliding gear, or planetary transmission would be the best. The friction gear, if suitable, would serve us best as we often would have to run backwards as rapidly as forwards.—JOHN GLASSON.

I would advise getting in touch with makers of heavy vehicles. They have the experience most nearly in your line. I have spent so little time on heavy work and none at all on rails so I do not feel competent to advise you. The friction drive is all right when made up properly; and with stiff shafts and anti-friction bearings to take the pressure, it is the best thing for the purpose. The commercial vehicles makers who advertise in our columns can undoubtedly serve you.—C. E. D.

IS LOOKING FOR 2-CYLINDER OPPOSED ENGINE OF 35-40 H. P.

As a last resort I have written you to ask you if you can furnish me with the name and address of some firm or person in a position to manufacture a two-cylinder opposed engine of 35 or 40 H. P. water cooled. If you know of any one manufacturing an engine of that H. P. and type will you kindly give me their address—HARRY A. CLARK.

There are more than thirty engine builders who advertise in this Journal and if you will write them you will get their catalogs and if they can not supply you they will be able to tell you who can. I am not able to give the address wanted just now altho at least two letters have been answered in these columns in the last six months pertaining to such engines. 25 to 28 H. P. however, is about as large as engines of this type are usually made. Look over the list of makers in the January Buyers' Guide.—C. E. D.

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PUTTING THIN STEEL RINGS UNDER THE PISTON RINGS.

Would it improve the compression of a four-cycle gasoline engine to insert a thin sheet of metal in the grooves of the piston under the packing rings?—GEO. L. WHITAKER.

I consider it good practice to insert sheet steel as you suggest. I have frequently used clock springs for this purpose. If the ring is pinned, say one-quarter its length, from the ends, the joint in the spring can come at the pin. This gives a double ring with the joints not at the same place, and if the regular ring joint is of the lap or step variety there is no opening for the gas to go in at one side, under the lap and out at the opening on the other side. The spring also adds a little stiffness or elasticity to that of the ring and may be of value to weak rings.—C. E. D.

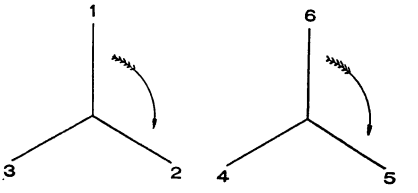
ORDER OF FIRING 6-CYLINDERS.

Montreal, Canada.

I will deem it a great favor if you will tell me the best correspondence school in designing gasoline engines both marine and automobile types.

Also please tell me in which order a 6-cylinder engine should fire and give me a sketch showing disposition of cranks. Which two cranks are at 0 deg. which two cranks are at 120 deg., which two cranks are at 240 deg., starting from fly-wheel end.—H. B.

I think the columns of this Journal are as good a school for engine designing as there is to be found. There have been publisht here many of the latest designs and these show all there is to be learned in this line at any school with the additional value that they are not ideal but are taken from vehicles in daily use. A technical education is of course valuable in this work but unless you can get actual experience with the engines and find for yourself their weak and good parts the technical study will likely do you little good. Next to doing the work yourself, is seeing how others do it. I do not feel like recommending any correspondence school until I know more of you. Better talk it over with any Professor or Engineer in your place who knowing you, will be able to advise better than I.



A six-cylinder motor may fire in any one of several ways. The firing will depend on how the crank shaft is made, also. The best method is to consider it as two three-cylinder engines, one having a right hand spiral shaft while the other has a left hand shaft. These shafts are so connected that the inner pistons move together, the outer ones together and the intermediates together. Now since there are six explosions in each two revolutions, we will get one each third of a revolution. They may therefore fire in 1, 3, 2, 6, 4, 5 order or 1, 3, 5, 6, 4, 2 or 1, 4, 2, 6, 3, 5 or 1, 4, 5, 6, 3, 2. A different setting of the crank shafts with respect to each other will give a different arrangement. Or if both shafts have the same spiral the firing will be different. It is a bit of easy mental exercise to follow these various settings and easily done with the aid of the sketches.—C. E. D.

2-Cycle Engines

HUGH DOLNAR

2 CYCLE ENGINE CATECHISM.

St. Alban, Vt.

Will the Journal please answer the following:

(r) A magazine description of the Premier Model 30 gives the pistons as "chilled" inside. What would be the object and what the effect?

(b) On some pistons why is the middle turned to a slightly smaller diameter?

(c) Does the snap oil ring on some pistons serve to retain the oil above it or prevent its working into the cylinder? Is it only used with splash oiling?

(d) What is the best point for cylinder oil lead with reference to piston rings, piston clear down?

(e) Mr. Dolnar replying to A. J. H. in February issue refers to "experiments by Purdy" as if the most homogeneous mixture may not be the most economical. Is this correct?

(f) Is it probable that the principle of fuel injection into compressed air is well adapted to high speed engines?

(g) Is it probable that if a portion of the charge of a 2-cycle engine escaped through the exhaust port and the exhaust was run through a surface condenser, any gasoline would be condensed with ordinary means of cooling? (For deflector experiments).

(h) How has the efficiency a tendency to differ in long and short stroke engines? The same fuel being used in each, compression carried to the practical limit which would seem to be the same, piston speeds the same, general design similar. The only difference would seem that caused by difference in radiating surface. I do not see how, as sometimes stated, compressions being equal, a long stroke lowers exhaust pressure. JAY A. CHAMBERLIN.

(a) The inside piston chilling is new to me. The effect would be to make the piston metal harder and "closer" on the outside, and as the friction of a trunk piston with a short rod is heavy, the close, hard piston might show to much advantage.

(b) Relieving any slide in the middle prevents wearing to a curve on the sliding face, and in the case of a trunk piston gives an oil and dirt chamber in the middle of the piston, which is advantageous.

(c) The bottom piston ring is placed to prevent over lubrication with splash oiling. Because the snap ring has a hole straight through it, the more rings there are on a piston the less leakage is likely.

(d) If reference is made to an oil groove around the cylinder inside, flooded with oil, this groove must of course be constantly covered by the piston, which approximately fixes the groove location, and makes one piston ring, at least, pass the oil groove.

(e) The ideal charge lights and burns quickly and completely. Hence a charge rich at the spark point and yet containing a surplus of oxygen is best. A rich charge around the spark could be fired when the same amount of fuel equally diffused through the entire charge volume could not be ignited. This was the condition produced by Purdy, at the Rambler test room, with highly favorable results.

(f) In my opinion, pump injection is the very best method of supplying liquid fuel to small internal combustion motors, because it is the only sure way to give the charge a defined quantity of fuel.

(g) As now constructed, the 2-cycle motor allows fuel to pass unburned out of the cylinder into the muffler before it can be caught by any mechanical expedient known to me. The good fuel supply is by jump, porcing the fuel into the pure air charge after the exhaust port is closed by the piston. The whole problem is extremely simple when the wholly uncertain carburetor is eliminated.

(h) With a uniform mixture of fuel and air, ordinary conditions, constant compression, length of stroke makes no difference in terminal pressure. But throttling varies compression and with high compression a small charge may be ignited, burned perfectly and expanded to below atmosphere in a small, quick gas engine.—H. D.

(In regard to question (g). It is very unlikely that sufficient gasoline vapor passes out of the exhaust to be successfully quantitatively determined by such crude means as the ordinary surface condenser. However, by subjecting the exhaust gases to an analysis, the relative amounts of unburned fuel can be determined and doubtless would, other conditions being equal, give a means of comparing one baffle plate with another.—Ed.)

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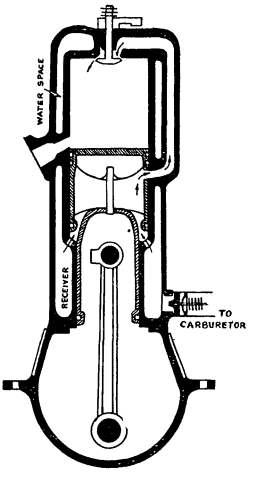
ANOTHER DIFFERENTIAL PISTON IDEA.

E. Oakland, Calif.

Believing that better results can be obtained from a Gas Engine of the two-cycle type by doing away with the use of the crank case as a gas chamber, I have designed an engine to meet same, a sketch of which I herewith enclose. This piston has two different diameters giving a long length for good wearing surfaces. On the up stroke of the piston the mixture is drawn through a horizontal spring check valve into a receiving chamber which is all around the bottom half of the cylinder,



then on its down stroke these gases are compressed in the receiver until the port in the upper part of the piston is open to the cylinder or by pass port, then by-passed to the cylinder head and forced through an automatic inlet valve located in the center of the head to the combustion chamber, driving out all the burnt gases before it, then on its next up stroke the new charge is compressed and ignited.

All the valves and ports on this engine have large areas. I should be very well pleased to have your opinion on this type of Gas Engine through your columns.—R. N.

Your plan does not appeal to me for the reason that the amount of new charge is very small. The area decreases very rapidly as the diameter is lessened and so the most of the cylinder content is at the outside, but you must have quite a little room for the wrist pin and end of connecting rod and this takes away that much space for new mixture. Otherwise the device looks good but there seems to be nothing else new about it. Don't let this discourage you however. There is still much room to improve and you will strike valuable things when least expected if you keep hunting.—C. E. D.

2-CYCLE VS. 4-CYCLE?

Will you kindly inform me which will give the greatest horse power, regardless of the number of revolutions—a two-cycle engine or a four-cycle engine—both having the same piston area; also whether a two-cycle engine will give a greater efficiency than a four-cycle engine.—GEORGE C. MEYER.

The two-cycle engine will give the most power but will be less efficient. It fires twice as often as the four-cycle but it does not scavenge so fully and lets some of its fuel out thru the exhaust. For a given power it will often use 50% more fuel but for a given size it will sometimes do 50% more work. Many causes may affect either the power or the efficiency. Things such as valve timing, kind of spark, and port opening will have an appreciable effect.

This answer is general as most answers in these columns have to be. On the other hand there are those who maintain that a two-cycle can be more efficient as well as more powerful than a four-cycle. Mr. C. P. Malcolm stated in these columns a year ago, his intent to give us an article telling why this could be so but his sudden death prevented this. My own experience with two cycles for auto work, which has been more or less intermittent, has extended over about seventeen years and has finally found me converted to them as the engine of the near future for auto work. When right they show results that we characterize as "crazy" in that they develop great power and speed with very little fuel. The problem seems to be to get them so they will do this at all speeds and this seems to indicate either variable ports or valves.—C. E. D.

POINTS ABOUT 3-CYLINDER, 2-CYCLE MOTORS.

Richmond, Va.

I am planning a 3-cylinder, 2-cycle automobile engine. The cylinder is vertical—60 deg., bore 4½ inches, stroke 5 inches. I would very much appreciate your suggestions in regard to the following points:

(a) Clearance above piston in cubic inches.
(b) Shape of Baffle Plate.
(c) Size of Ports.
(d) Proper cubic contents of Crank Chamber.

I would like also for you to roughly let me know how much power this engine would be good for at a reasonable speed, say 800 to 1,000 R. P. M. Any suggestions on the method of construction would be appreciated and probably adopted.—EDWARD J. WILLIS.

As to (a), if you make your exhaust port 1 inch long you will have four inches compression, and if you compress four volumes of air into one volume of air, you have 60 lbs. pressure, temperature neglected. Somewhere from 4 to 5 volumes to one is common practice for compression.

(b) My choice is for a flat cylinder top, cut down at edges opposite the ports, cuts curved at the bottom, as this carries the coring past deflecting surface.

(c) Ports ¾ and ⅜ or 1 inch and ½ inch long, by 3¾ wide, with one bridge in the middle of each port.

(d) Give your crank box least clearance you can.

As to construction details, use 3 ring packing in one groove in piston only, and avoid fibrous packing.

You should get 15 to 18 H. P. at 1000 R. P. M.

I do not understand your "vertical" cylinders, "60 degrees."—H.D.

V TYPE OR VERTICAL CYLINDERS.

Boston, Mass.

I would like information as to a contemplated 2-cycle, 2-cylinder motor, bore and stroke to be 5½ inches each. (a) Would this motor have more perfect balance if the cylinders were set at an angle of 90 degrees. That is, a "V"-shaped motor. This practice seems to have been largely followed in the case of 2-cylinder motors in Europe, and is claimed to give very good results. (b) Also would the motor be better if I made the stroke a little longer than the bore; or the opposite—the bore longer than the stroke? The Ford runabout for instance, has the stroke shorter than the bore, the motor giving 1800 R. P. M. (c) How much flywheel would you put on, in accordance with these engine dimensions? I would be greatly indebted to you if you will publish the reply in your journal.—(No Signature.)

(a) I see no advantage in inclined cylinders, and much prefer vertical cylinders. (b) Short stroke motors respond more promptly to fuel variations than long stroke motors, and are preferred for that reason. (c) Fly wheel 60 to 100 lbs. as large diameter as you have room for.—H. D.

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2-CYCLE QUESTIONS OF INTEREST.

Cleveland, O.

(a) What advantage is gained by preheating the charge after it has left the carbureter by combining the inlet and exhaust pipe? Will it add to the power of the engine? (b) What advantage has a flat piston head with a plain rib deflector plate over a piston where the head is formed to deflect the charge both in and out by means of easy curves and doing away with sharp corners where the spent gases lodge and preheat charge? (c) Can an engine with a plain deflector plate run with as high a compression as one with a deflector plate that is hollow on the inside and of equal thickness so that the piston is air cooled on the inside up to the point of the deflector plate? (d) What would be considered good economy in a two-cycle engine and a four-cycle as to the quantity of gasoline per horsepower hour for a two-cylinder auto type engine of say 20 H. P.? (e) How would you recommend keeping down the tendency to freeze in the intake header and what degree of heat would you consider the gases should have to get perfect combustion? (f) At what temperature should the air passing to a carbureter be, to use kerosene? (g) Will an engine that is satisfactory for gasoline run with kerosene? Does the compression have to be higher; if so, how much? (h) What is the advantage of feeding oil in the carbureter? Would you recommend it? (i) What is the best practice regarding the pressure in a crank case? Would you recommend a low crank case pressure and a high cylinder compression, or a relatively high crank case compression with a moderately high cylinder compression? (j) Can a two cycle engine be throttled to any extent so as to get flexibility for auto work? What ratio would you expect between high and low? (k) What H. P. can I expect out of a four-cylinder, two-cycle, three-port engine, 5x5 at 850 R. P. M. and approximately what will be the gasoline consumption per H. P. per hour I may expect with good design and proportion? What compression would you recommend?—HARRIE BERGER, M. E.

Replying to Mr. Berger, (a) I have not seen the charge heated after leaving the carbureter. The carbureter intake air is often heated by contact with the exhaust pipe which makes it pick up gasoline more readily than cold air. The charge should be delivered to the cylinder at lowest possible temperature to avoid expansion and so obtain the largest possible volume of charge in the cylinder for maximum power. Such preheating seems not likely to increase motor power.

(b) I prefer the hollow of the piston carried up into the head and the head curved down to the ports, each side the same, rather than a thin deflector either applied to, or integral with the piston.

(c) The piston walls should be as thin as is safe, and I regard the thin deflector as inferior to the raised head and sunken edge at ports. The cooler the piston head, the higher the compression can be without producing pre-ignition or self-ignition.

(d) I cannot answer this question, as all I know of my own knowledge is miles per gallon of gasoline with certain motors and cars.

(e) I am not familiar with stationary gas engine running, and never knew of any trouble from coldness of mixture after leaving the carbureter. The charge should certainly enter the cylinder at lowest possible temperature to give maximum charge bulk and cylinder cooling effect.

(f) I never knew kerosene to be used as gas engine fuel with a carbureter. The liquid kerosene is admitted directly to the intake air, or else forced into the cylinder in liquid form with a pump.

(g) Any gasoline fired motor will change to kerosene as soon as hot, with force pump or needle valve regulation of fuel at the air intake port of the cylinder. The compression can be same for the two fuels.

(h) My preference for carbureter supply would be fuel level maintenance by a pump and overflow, with return to fuel tank, so that the fuel level could not vary more than 1-32 of an inch.

(i) There is no functional relation between the crank-box pressure and the charge compression. The crank-box pressure simply places the charge in the cylinder at atmospheric pressure in two cycle work, as the exhaust port is open to atmosphere all the time the intake port is open, hence charge pressure in the cylinder cannot be above atmosphere when the piston closes the intake port, where the piston performs the intake and exhaust valve functions. Where valves other than the working piston are used, the supply cylinder can be made to force any volume of charge into the cylinder while the piston is making the compression stroke, and under these conditions the supply cylinder pressure is an important factor of maximum power production. With the ordinary two-cycle motor, where the working piston serves also as intake and exhaust valve, crank box pressure cannot possibly do more than fill the space between the exhaust port and cylinder head with the cold mixture at atmospheric pressure, because the cylinder is open to the atmosphere until the exhaust port is closed. The two-cycle motor can be, and often is, supplied with air and a combustible during the compression stroke of the piston, sometimes with pressure in the supply cylinder the same as in the cylinder compression chamber when the compression stroke ends. The more common practice is to make the charging cylinder deliver its entire charge to the working cylinder before the working piston completes its compression stroke, and in this case the pressure in the supply cylinder must, of course, be greater than that in the working cylinder so long as the supply cylinder and working cylinder are in communication with each other.

(j) The two cycle gas engine does not differ at all from the four cycle in action after charge compression begins and before the piston reaches the end of its working stroke, hence if the charges are of equal purity and combustion value, the working possibilities of the two and four-cycle are the same. The power range of a gas engine is from the smallest power, developed by firing the smallest volume of fuel up to the largest power, obtained by burning the largest charge which can be sqeezed into the compression chamber. I have seen a two cycle, crank-box supply gas engine which was strong at from 160 to 3000 R. P. M. The number of strokes to the cycle makes no difference with motor "flexibility," that is to say, range of power production, so far as one working stroke only is concerned. For the complete cycle of strokes, the cycle having the fewest strokes must give the greatest range of action, since no motor can run without energy enough stored in momentum to carry its movements through the complete cycle from the firing of one charge to the firing of the next charge afterward. Hence, in the nature of things, the two cycle must give greater flexibility than the four cycle, other things being equal. The non-flexibility of the crank-box pressure supply two cycle motor is not due to the two cycle, but to the partial supply of charge at maximum, which must, of course, limit the power range. since if the maximum charge obtainable were only enough to cause the motor to run itself, there could be no range of power shown, because charge diminution would stop the motor, while the motor which burns a large charge under high compression can show a speed range inversely proportional to the number of strokes in the cycle used. Obviously, then, the fewer the number of strokes required to complete the cycle, the greater the possible range of power, hence, other conditions being equally favorable, the two cycle motor must show the greater extreme range

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of power development because its power development is the more nearly continuous, or is the least interrupted; as compared with the four cycle or six stroke cycle motor.

(k) I have seen two 2-cycle cylinders, 5x5, develop 50 H. P. without a muffler, 1200 R. P. M., and 40 H. P., same motor, with the muffler connected, the very slight back pressure of the muffler making 10 H. P. difference, maximum, because of resistance to charge entrance into the cylinder. I should say that four 5x5's, good crank-box pressure supply, could be made to show 75 H. P. with a muffler, at 1000 R. P. M. with 85 lbs. cold air compression.

Economy depends entirely on compression and the completeness of combustion. So long as any odor can be detected at the exhaust, unburned fuel is being thrown into the atmosphere.—H. D.

(In regard to query (c) it may be mentioned that during cold weather some owners wrap the intake pipe with heavy cord or lag it with pipe covering material. This prevents condensation and freezing to a certain extent. As to using kerosene in a carbureter it may be said that altho there are some on the market which are claimed to use kerosene, none of them to my knowledge make any special arrangements for its use such as pre-heating the air more than is done for gasoline, but depend solely upon vaporizing it after it has entered by means of the heat of the cylinder—ED.)

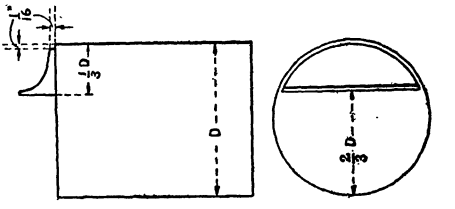
2-CYCLE ENGINE DEFLECTOR.

I, like many others am going to ask you for information, as I can't quite understand the deflector you describe in the Automobile Trade Journal of May 1st, 1907, page 86, right hand column.

You say the main part of the deflector stands about one-third of the diameter of the cylinder from the walls, the bottom of the deflector being one-sixteenth of an inch away from the walls and part of the deflector should be about one-sixteenth inch thick at the edge and thicken up rapidly to assume the form of a concave section, etc. Now I understand by that, that the deflector would be the following shape as per sketch, and will you kindly advise me by sketch just how it should be.

I would also like your advice on the following. My engine will be 2-cylinder, 2-cycle, 4x4, built up cranks of 6x1⅜, disk shaft and crank pin put on tapers and keyed on shaft which is 1½ inch in diameter, main bearings 3 inches long with white bronze bushings, crank pin is 1¼x2, connecting rods 1x1⅞, piston pin 1 inch hollow, compression space 1⅛ inch, exhaust port ¾ inch long, intake ½ inch, both clear around cylinder, 1 inch bridge between, intake from carburetor through end of crank case with disk valve as per your advice. By-pass to cylinder thru piston and a D-shaped port in the cylinder wall. Now what I want to know is what weight you think my fly wheel should be in connection with the four disks which are solid and nothing cut away only for nuts to fasten pins and shafts? Also what shape deflector is best and should I water jacket all around exhaust port or just to it. I am going to use copper water jackets and will have 1 inch space between jacket and cylinder.—H. W. KAEHLER.

The description you refer to is by Mr. Malcolm. He speaks of the deflector as if it were a piece set on top of the piston which is often true and usually true when the pattern is made. This block is 1-16 inch thick at its edge and stands 1-16 inch from the cylinder wall. Its upper surface then slopes across the piston and upwards till the main part of the



deflector is back from the wall 1-3 of the diameter. See sketch. You need not jacket lower than the exhaust port. Make your flywheel as large as possible and the weight accordingly. 50 lbs. and 14 inches diameter will serve if you cannot get larger. The crank disks are too small to help much.—C. E. D.

HAS PATENTS ON TOP EXTENSION OF PISTON.

Regarding the two-cycle engine design shown by Mr. Henderson in the May issue of the Journal would like to say that I have recently been granted a patent on this identical idea, with the exception of the oiling system. The number of this patent is 871,319.

The idea of using an extension on the piston as a valve is about eleven years old according to patent records, but none are shown having a "substantially" valveless mechanism, or which are so arranged that the pump side of the piston can have greater displacement than the working side, thus making possible complete expulsion of burnt charge.

This is accomplished by capping the piston extension which increases the area on the pump side by that amount and incidentally makes possible the "three port" arrangement. —P. R. BISSELL.

2-CYCLE ENGINE MUFFLER.

Will you tell me through the columns of the Journa how to make an efficient and cheap muffler for a 2-cycle, 7 H. P. marine engine, and oblige W. M. MILES.

Regular mufflers are supplied to the trade for as little, I believe, as $1.25 each. See our advertising columns. We cannot recommend any one particular muffler above all others.—H. D.

"The most common error on the part of amateur motorists according to Mr. Coffin of the Thomas Detroit Co., is in neglecting lubrication of small parts. Nearly every one will see that the motor is given its regular quota of oil and that the transmission and rear axle are properly filled, but the lubrication of such things as fan, front wheel, steering connection, spring link, and various lever bearings is entirely lost sight of. Manufacturers place attractive brass oil and grease cups at all important points of the car where it is practicable to do so, but in too many cases they are not used."

By plunging their hands in the dilute solution of sulphuric acid which is used in the batteries that drive motor cabs, and by rubbing that fluid upon their faces, William H. Palmer, Jr., secretary of the New York Transportation Company, and Mr. Wing, counsel for the company, disproved in the Supreme Court a few days ago the general impression that battery fluid is strong enough to burn and disfigure the human body, and on account of this somewhat spectacular demonstration the jury brought in a verdict in favor of the company.

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Opinions and Suggestions

Under the above heading we will be pleased to publish letters from our readers, expressing opinions, stating how they have overcome difficulties, or making useful suggestions. In this department will also be published longer communications or articles, of either a general or technical nature. This department succeeds the "Difficulties Overcome By Users" department, owing to its growth and the varied nature of the matter received.

AN ADVOCATE OF KEROSENE BURNERS AND WATER-TUBE BOILERS.

Bantam, Conn.

There have been several articles written on kerosene burners, but none that exactly suits my case. I have a small steam runabout with Mason engine, and a car built originally by the Steamobile Co. of America, Keene, N. H. I have an Ofeldt water-tube boiler and kerosene burner. Now in justice to the makers, would say that it is the best combination that I have ever had anything to do with.

My experience has extended over the last 8 years, on gasoline burners, fire-tube boilers, and I have caulked dozens of fire-tube boilers, and had numerous "scares" with gasoline burners. Then I have had gauge glass troubles, always happening at some prominent point on the road.

While serving my apprenticeship in the assembling room, I was taught that the ball check valve was for the purpose of closing the opening, should the glass break. I was comforted somewhat by that thought on my initial trips, but, alas, the glass broke and the steam rushed out till the boiler was dry. The "expert" said that there must have been dirt on the ball check seat. There was also big chances of scorching my boiler had I been a little late in shutting off the fire.

Now for the kerosene burner and water-tube boiler. Just think, no gauge glass to bother with, what a consolation. I know I cannot burn out my boiler if my pump takes a notion to stop pumping, and I do not have to crane or stretch my neck to see if there is a little water left in the glass. I have a low water alarm that governs my supply to the boiler, and it has never failed to work in the last four years. It operates on the expansion and contraction principle, and naturally requires no attention.

It is a common thing to have air get in on the water line, and prevent the pump from sending water to the boiler. With a fire-tube boiler this is a serious affair, but with a water-tube boiler there is no danger. And the burner—well, mine has never given me the least "scare," since I had it. Suppose I do flood my burner, turning my main fire on too soon, simply burns off the surplus. Not so with gasoline, as it will find every crevice and corner and usually gets to the panels or sills or back part of the seat.

At first thought one would think that it was hard to vaporize kerosene, but this is not true with the proper fixtures. Kerosene is safer and cheaper than gasoline, and its heat is intense, so what more can you expect?

A last word as to carrying pressure on the main fuel tank. Is this not erroneous? Why should the whole fuel line be subjected to 60 pounds or so of pressure, when you consider that there are numerous connections, anyone of which are liable to spring a leak under the above pressure, especially after a short ride through our picturesque country, and more so when you consider the fact that most connections are under strains (from improper fitting), although most of us were taught never to spring a pipe into place, so as to cause a permanent strain. It is done under the illusion that the strain is temporary or just while springing the pipe in place, but how many of our assemblers ever disconnect a pipe simply to run the die up far enough to make the proper length, as long as they can start the union and make it tight? I have a tank 4 by 8 inches long under my seat and I carry all pressure there. There are few connections to keep tight at 60 pounds as I carry it close to the burner, and no valves to open or close if I want to fill my tank while the burner is going.

I carry a small hand air pump and that is all for air. With the other scheme it is necessary to have a power air pump, either steam or fitted to the head of the engine.

We have a garage connected with our works and there are some very poor and fine specimens of brain work, both among the steam and gasoline cars. Give me a steam car, water-tube boiler, kerosene burner, low water alarm, and pressure system as explained, and when you consider expense, time and that "uneasiness," I think I have the ideal.

This article was written for those that have to get the most joy for little cost and small future expense for repairs.

Yours truly,
E. J. MARTIN.

CHANGE SPEED GEARS SHOULD BE USED.

According to E. E. Coffin designer of the Detroit Thomas the general tendency of motor car design abroad is toward the smaller sized motor. While the roads of Europe are, as a general thing, much better than those in America, yet this in itself does not render possible the small sizes of motors, which are being used in fairly large cars over there. The fact that the foreign driver is much more willing to make frequent use of his gear shift, has more to do with the problem than has good roads.

In America, the demand seems to be that the relation of motor power to weight of car must be such that the machine will go romping up the steepest kind of a hill upon the high gear. As a result of this demand, American manufacturers are being forced to equip their cars with motors which cannot be operated economically upon any low or moderate road speed.

Not only is the first cost of the car increased by the necessity of building its component parts of such strength as to transmit the extreme power of the large motor, but a large power plant cannot be operated economically when 90% of its work is done at about half of its possible capacity. In other words, it is wasteful of both gasoline and lubricating oil to operate a large motor under conditions where only about half of its possible power may be utilized except at rare intervals.

Certainly, sooner or later, the American public will begin to realize, as have the foreign drivers, that it is much better to make use of the transmission which has been placed by the maker in the car for a purpose, than to demand a car with such motor equipment that it may be operated at all times without recourse to the intermediate gearing.

In an effort to meet the demand for a car which will climb any hill upon the high gear, the manufacturer is confronted by two possibilities, both equally bad. Upon the one hand he may equip the car with an abnormally large motor and upon the other he may so reduce the gearing between the engine and the rear axle that the car may perform satisfactory hill climbing feats upon the high gear.

In the first case, there will occur the greater first cost of the large motor and of the heavy driving gear rendered necessary by this large motor. To this may be added also the cost of maintenance, and the lack of efficiency under ordinary road conditions.

In the second case, where the motor of a smaller or more proper size is geared down to such an extent that any kind of hill may be climbed upon the direct gear, it is very

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apparent that for ordinary driving upon the level road, and especially if this driving be at all fast, the motor will be required to have an extremely high rotative speed in relation to the number of revolutions per minute of the driving road wheels. This extremely high speed tends, of course, to shorten the life of the motor, to render adjustment of bearings and other parts more frequent, to increase lubrication trouble, and to cause an unpleasant vibration to be felt by occupants of the car.

Would it not be much better to educate the American public along the line of European practice, building the motor car with an engine of moderate size and with gearing between engine and drive wheels, which would insure to this motor a satisfactory rotative speed at the average driving speed of the ordinary operator. Such a construction would, of course, necessitate the use of the gear shift lever for hillwork, but with the modern designs of gear shift, this certainly cannot be looked upon as a serious hardship. Certain it is, that it would be far more sensible and far preferable from the manufacturers' standpoint, were this done. This, of course, to say nothing of the money saved to the operator and owner, both in first cost and in operating expenses.

Don't be afraid to make use of your gear shift lever. Have your car geared at a proper road speed; such that upon the level your motor is not racing itself to death and upon the hill do not be afraid to shift into your second or your first speed, as may be required. You will find that your machine will stand up better, and that it will be in your service every day instead of sometimes in the repair shop.

CLEANING CHAINS.

If the operators of chain driven cars will properly clean and care for the driving chains, longer life and more quiet running will result. Of course, the humane way is to provide protection for the chain by means of a case, but lacking this, cleaning is the only remedy. A chain should not be run over 2000 miles without a thoro cleaning. First wipe off the surplus dirt and thoroly clean the chain in gasoline. Then submerge it in melted mutton tallow containing a considerable quantity of graphite and allow it to boil until every joint is impregnated with this efficient lubricant. Hang it up to drain, then wipe off the surplus, as this simply collects dirt. Replace it on the car and the results are surprising.

RECIPE FOR MUFFLER PAINT.

The following recipe for paint for mufflers is given by George Jackson Scott, New York agent for the Jackson, and is said to have proved most satisfactory. The quantities given will make about 2¼ lbs of paint, which is quite sufficient to give the average sized muffler and exposed lengths of exhaust pipe two coats of paint. Boiled linseed oil, 1-5 lb.; Japan varnish, 1-5 lb.; spirits of turpentine, 2-5 lb.; lamp black, 1½ oz.; pure powdered graphite, 1½ oz.; powdered oxide of manganese, ⅜ oz. First mix the linseed oil and the Japan varnish well together, then add in the order named, and stirring all the time, the lamp black, the graphite and the powdered manganese. The solids should be added slowly, and the stirring briskly maintained. As the mixture thickens thin it down with the turps, until the quantity mentioned is added. The paint should be used at once, for it dries rapidly, and every time the brush is dipped the mixture should be carefully stirred. It is well to paint the muffler while it is hot, first cleaning it thoroly.

CLEANING LEATHER UPHOLSTERY.

There are many preparations on the market for cleaning and polishing leather but a homemade compound can be prepared by owners, and will be found very effective and can be used on light colored leather with good results. To a pint of boiled milk which has been allowed to cool add a drachm each of sulphuric and hydrochloric acid and after thoroly mixing them add half a drachm of oil of lavender, a pint of vinegar and the white of an egg beaten to a froth. This mixture will remove stains and is applied in the usual manner with a soft cloth and then rubbed with a dry cloth.

As a rule, cars are fitted with smaller tires than they should be, because the smaller sizes cost less. With the tires that are proper to it, in both size and quality, a car will need less repairing, the tires will wear longer and the passengers will ride in greater comfort.

Those who have their own garages might profit by the arrangement used by a dealer, of not only having pits in the floor for inspection of the under side of the car, but also a depression in which a shallow trough of water is kept for testing tires. A neat cover can be fitted with ring or flush handle so the pit is not objectionable when not in use, but is extremely handy when wanted.

In addition to the numerous methods of repairing cracked cylinders may be added that of using a mixture of about equal parts by weight of fine iron filings, sulphur and salammoniac made with water into a stiff paste about the consistency of putty. Fill the chiseled or drilled out groove along the crack and allow the combination to harden.

Owners of foreign machines should watch carefully the kind of repairs made by local garages and repair men as there is a great temptation when a nut with metric thread is missing, to slip on an ordinary standard nut of similar size. These will bind on the thread and hold after a fashion as the threads are so nearly alike, but the practice is very injurious to the bolt and should never be allowed except in cases of absolute necessity. Small diameter nuts conform more closely to metric sizes than large ones and unless cautioned, repair men will occasionally use them when procuring a metric threaded nut might entail some search or delay.

The Eureka Vehicle Co. of Rock Falls, Illinois, well-known maker of buggies and other light horse-drawn vehicles, is now building tops for automobile manufacturers, all its work in this line being done to customers' specifications. Unusual facilities enable the company to promptly meet the requirements of those who want tops in large quantities and duplicates in quantities of any style of top submitted can be made.

Pennsylvania Black Filler & Paint Co. of Williamsport, Penna., manufacture a black filler which is largely used as rough stuff on automobile bodies and parts and is said to produce a fine, hard and smooth surface as it rubs freely and does not crack or peel. It is also used as an iron filler in giving a finish to machinery of various kinds. It is air floated which insures uniformity of texture and is graded to suit different requirements.

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Our Quick Detachable Terminal can be applied to the spark plug cable instantly without tools. It makes a perfect contact, cannot jar off, but allows quick disconnection when desired.

DID YOU EVER

observe how a "fresh" battery speeds up your motor? Experienced motorists have noted this. 'Tis the hotter spark that does the trick. If increasing the heat of the spark will so greatly **increase** the power you can readily appreciate how much **more power** you can get from the **Cleveland Spark Plug** that not only sparks but **"shoots a FLAME"** right into the mixture, causing **instant detonation of the entire charge,** giving **magneto effects** with ordinary batteries and still more powerful results with magnetos. The action of the spiral core makes this the only plug **really** proof against short circuiting, since it **positively** prevents the deposit of carbon on the insulation surface.

"It shoots a flame."

Our printed matter contains interesting information on ignition and explains in detail the wonderful action of the "spiral core."

FREE Write for it TO-DAY and ask for our introductory offer (for a limited time) which gives you FREE with each order for spark plugs, your choice of Battery Connectors or Cable Terminals.

THE CLEVELAND SPARK PLUG CO.

IGNITION SPECIALISTS

980 Power Avenue **Cleveland, Ohio**

The Cleveland Battery Connector gives a tight secure connection, physically impossible to rattle loose, and though easily applied or removed by a twist

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Trade Printed Matter

Munn & Co., of 361 Broadway, New York City, pub- "Manufacturer's Index" which is a directory of concerns who have recently advertised in the "Scientific American." Several manufacturers in the automobile field are included in the list, which is classified according to the products of the makers.

The latest number of the "Rambler Magazine," published in the interest of Rambler motor cars by the makers, Thomas B. Jeffery & Co., Kenosha, Wis., is a Physician's Number, containing accounts of the experiences of a large number of physicians who are using Rambler cars. This number contains 32 pages and cover, and besides the physicians' experience data, contains a large amount of other interesting matter.

The E. R. Thomas Detroit Co., is now publishing a house organ called, "Thomas Detroit Doings," containing information regarding recent performances of Thomas Detroit cars, testimonials from users and other data that serve to impress the reader with the excellence of this make of car.

A very attractive folder has been issued by the Keystone Lubricating Co., Philadelphia, Pa., bringing out the good features of Keystone Grease a mineral lubricant for automobile use. The illustrations are unique and effective and the descriptive matter is presented in terse style.

A new edition of Dyke's "Anatomy of the Automobile," published by A. L. Dyke, of St. Louis, Mo., has appeared. It consists of 725 pages of matter obtained largely from the instruction books of motor car manufacturers and is apparently intended as a guide to operators of cars of all makes. It is bound in a substantial cloth cover. A number of 1907 instructions are included for the convenience of those purchasing cars of that year. Price is $2.

W. S. Sheppard, 21 Lawrence street, Newark, N. J., has lately issued a 16 page booklet dealing with the subject of lubrication and containing, in addition to advertising matter, relative to "Ideal" oils and other products which he makes, some general information regarding the subject of lubrication and the history of the production of lubricants. Mention is also given of a preparation made by Mr. Sheppard for mixing with the water used in the cooling system of gasoline cars.

The latest catalogue issued by the Boston Gear Works, of Norfolk Downs, Mass., is a compact booklet 3½x6 inches and containing 88 pages and cover. This booklet has a very practicable feature in an index on the first inside cover page, the placing of the index on this page being a feature which could be well copied by catalogue compilers, giving, as it does, to the reader a key to the contents of the book as soon as it is opened. This catalogue is known as "Catalogue EI" and very thoroughly covers the subject of gears, chains, sprockets, bearings, steering devices, and other products of the company. They have also issued a special circular on their steel miter and bevel gears with generated teeth. This circular is known as D-I.

A very handsome catalogue has been issued by the Stewart & Clark Mfg. Co., describing and illustrating their 1908 Stewart Speedometer. The decoration of the pages is very attractively done, and in addition to the decorative illustrations, a number of half tone cuts are used to illustrate the device itself, factory and branches of the manufacturers, attractive road scenes, and interior views of the factory showing the processes through which the device passes in its manufacture. One of the most practical features of the catalogue is the use of interior illustrations plainly showing the constructive features of the device. A few of the back pages of the book are devoted to testimonials from users of Stewart instruments. This is probably the largest catalogue ever issued in the interests of a Speedometer, consisting of 56 pages containing a very large amount of descriptive matter, claims of excellence, etc.

Number 8 of the "Reo Echo," which appeared during the last month, is a particularly interesting issue. The "Reo Echo" is a house organ published by R. M. Owen & Co., in the interest of Reo Cars. Among the attractive features of the latest number is an article by Alfred Reeves on the "Motor Car of 1908." Another important article deals with the "Planetary Transmission" by H. T. Thomas, and the editor of the "Echo" has written an article on "Christening a Motor Car," which is quite interesting. Although containing a large amount of matter designed to create interest in the Reo car, the "Echo" contains a good deal of general information, news matter, etc., of interest to any reader.

The Ford Motor Co., of Detroit, Mich., are now publishing a house organ called the "Ford Times," in which is presented to the motoring public plenty of information calculated to cause the reader to desire a Ford car. This publication contains considerable matter of practical value to dealers, such as advice in regard to advertising matter, reproductions of advertisements used by Ford agents, information regarding the methods used in successfully pushing Ford cars, etc.

The Auto Vehicle Co., of Los Angeles, Cal., has published a compilation of the results of 50 races in which is shown that "Tourist" cars made by this concern have won 44 out of 50 events in which they were entered, in every instance the winning car being equipped with Goodyear Detachable Tires and Universal Rims made by the Goodyear Tire & Rubber Co., of Akron, Ohio.

The Firestone Tire & Rubber Co., of Akron, Ohio, recently sent out a legal looking document entitled: "Firestone License," containing 6 paragraphs embodying directions for the proper use and care of tires, which, if followed by users, will result in economy and long service. This "License" is provided with a very legal looking seal in the lower right corner, the design of which comprises a conventionalized motor car wheel across which the well known emblem of the company, a stone with the word "Firestone" on it, is placed in the form of a sticker which is placed over a ribbon interposed between the sheet containing the license and the "Firestone" sticker.

The Reading Standard Co., of Reading, Pa., have just issued a new descriptive catalogue relative to their line of pedal cycles. It contains 24 pages and cover of handy size for carrying in the pocket, and gives specifications and other information relative to a fine line of Reading Standard bicycles, a line including men's roadsters and racers as well as ladies' and juvenile wheels. In addition to the complete bicycle illustrations a number of illustrations of various types of handle bars are given; also line cuts illustrating the Reading Standard Seat-Post Pinch Binder and the Reading one-piece hanger, which are important features of this line. One page is devoted to illustrations of three models of R S Motorcycles made by the same company. This company has also issued a special motorcycle catalogue, consisting of 16 pages and cover, measuring 8x10½ inches. The cover is in gray with the lettering and decoration in black and slate color, making a very dignified and attractive cover design. The illustrations in the catalogue show different views of the motor and other important features of the R. S. machines, such as the R S spring fork construction, oiling devices, etc. Complete specifications and illustrations of each model are given in the rear of the book following a general description of the construction and special features. A cut of the factory is shown on the page following the title page; and an introduction in the form of a salutation on pages 3 and 4, gives some information regarding the ability of the Company to produce first class machines, the facilities at their disposal, etc. The last two pages of the catalogue are taken up with illustrations of the R S tandem attachment, spark plugs, and other accessories furnished with these machines.

THE RED BOOK, FOURTH EDITION.

F. S. Blanchard & Co., of Worcester, Mass., have just published the fourth edition of the "Red Book" an Interstate Automobile Guide containing detailed descriptions of the best routes between the leading centers and coast and mountain resorts of New England, also a gazetteer of cities, towns and villages, street maps of principal cities and towns, and a diagrammatical map of the entire district covered. This new edition has been practically rewritten and is in effect a new book. A number of improvements have been made in the arrangements of the data given, several more routes are described and changes made to render the contents of the book more lucid and more easily accessible. This book contains upwards of 600 pages and a very valuable feature of the same is the system of indexing and cross-references to enable the user to find any particular information without delay. The index to touring routes for example, occupies about a dozen pages, the gazetteer of cities, towns and villages containing detail information regarding post offices, telegraph offices, stations, etc., includes over fifty pages, and beside the name of each city, town and village is given reference to the map containing the same, and the numbers of the routes on which the town lies. One of the important changes made, is the use of the words right or left in place of North, South, East or West, in giving the directions for turns, etc., this method being simpler and much more easily followed.

A diagrammatical map of New England, which accompanies the "Red Book" is in a separate, durable folder, and not bound in the book. Folded up it measures 4½x9 inches and therefore fits the coat pocket.

574 routes covering 26,000 miles of roadway are described in detail with running directions, distances, conditions of roads, danger points, grades, etc., given 69 street maps show how to get in and out of congested districts in the cities, and a selected list of the best hotels and garages is given in connection with each route so that the tourist in looking up any particular route has all the information regarding that route at hand instead of having to turn back and forth to different parts of the book. The price, $2.50, covers the cost of delivery to the purchaser.

The same publishers have also compiled and have now on press a series of Pilot Sectional Road Maps.

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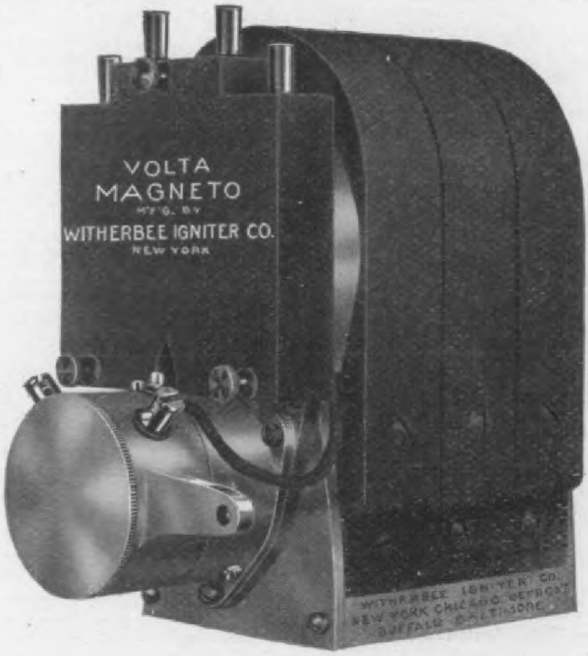
VOLTA MAGNETO



A High Tension Magneto, better mechanically, better in design and simpler in construction than any other magneto on the market.

¶ There is no possible chance nor opportunity for ignition troubles with the Volta. Possesses exclusive features in design, fewer parts, no complicated adjustments, and is as effective in the hands of a novice as in the hands of an expert.

¶ No coil, battery or timer is necessary. The Volta is a **Complete Ignition System** and generates an inexhaustible supply of current synchronously distributed at the moment of greatest power. It will ignite a poorer mixture than the ordinary magneto.

¶ Simplicity and strength, excellence in material and workmanship, is the keynote of its construction. It excels every other magneto on the market.

¶ The Volta is mounted on imported ball bearings throughout.

¶ The Volta Magneto is guaranteed for one year against defects in material or construction.

Write for Particulars

WITHERBEE IGNITER COMPANY
1876 Broadway, New York

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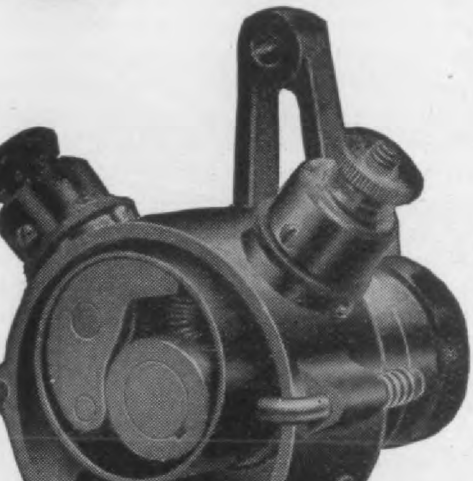
Witherbee Battery

is the one perfect ignition system. The consistent relia performance of the Witherbee has so standardized this proc that it is included as part equipment on the greater majority motor cars.

Wico Spark Plug

is guaranteed against imperfections in material, workmanship, porcelain bre age by heat. It excels every other plug on the market because it is better design—because it possesses the exclusive micrometer adjustment feature wh permits the setting of the spark gap to 1-1000 of an inch—to a KNOW DISTANCE. No guess work—no worry—no trouble of any kind if use the WICO.



The Wico Ring an Roller Timer

more simple, accessible, compact and durable than other Timer. The Ring MAKES DIRECT CU RENT between the two contact points, bridging a ga about a quarter of an inch—reduces resistance to a m mum. Prevents unnecessary wear on the bearings, cau by current passing through them. The ring recei all electrical action. When worn, the Ring can be ea removed by lifting out with the fingers, and can be si larly replaced, practically making a new Timer.

Witherbee Igniter Company

1876 Broadway, New York

UFFALO
Main St.

CHICAGO
1429 Michigan Ave.

DETROIT
220 Jefferson

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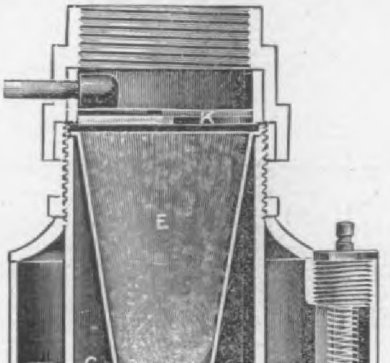
lical and all but detail refinements, the vice has not previously been given more n brief mention in these columns; hence now publish a detailed description with ference to the accompanying lettered tional illustration so that our readers y be thoroly conversant with the conuctive features of this now widely known rburetor, the product of the F. E. Bow- Co. of New Haven, Conn. This carburr functions automatically, correctly reguing the density of the mixture for differ- motor speeds. It is of the float feed e and has one main and two supplentary air inlets. The air from all inlets drawn directly thru the gasoline spray that the gas is completely formed before ving the mixing chamber.



Sectional View 1908 "Bowers" Carburetor.

Referring to the sectional drawing, A ws spray nozzle concentric with reser- r B, assuring no change of level in noz- when on grades. C shows center tube. erted in this tube is a truncated cone pen at the bottom to a diameter of two hes and extending to the top of the spray zle. This cone admits the main supply air. E shows an upper conical shell two hes in diameter at its upper end, reicted at its lower end to a diameter table for the size of the motor, and ving a flanged collar extending below, ich extends over the lower cone leaving annular space all around between the cones; this space varying in size acding to the size of the upper cone inted. F is an annular float controlling gasoline inlet by means of a trip G.

Tube C, after cones are inserted, for an annular vacuum chamber of consid able size.

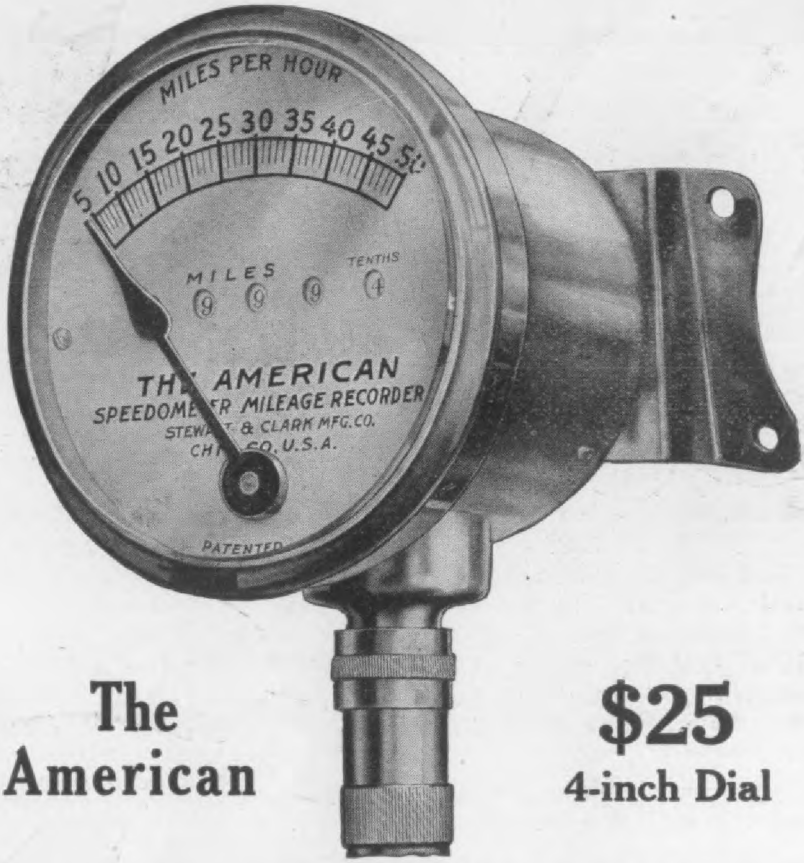
In operation, air first enters thru the b of the lower cone, in a large volume. is restricted thru the small upper passa attaining great velocity around the sp nozzle, causing the gasoline to spray fr the nozzle and producing a dense va suitable for starting. As the speed of motor increases, a strong vacuum is ated in chamber C, which acts on supplementary air valves, causing them open and admit air. This air rushes o the outer walls of cone D, meeting at top the rich vapor issuing thru summit cone D. Owing to shape of the passa caused by the flanged collar of cone E, the outer walls of cone D, thru which passes, this air breaks thru the center or with a whirlwind effect, breaking up gasoline into minute molecules, each panding into the gradually increased sp of the upper cone, a complete mixture the finest possible consistency ready be measured off to engine by throttle va K.

Keystone Grease

Keystone Lubricating Co., 20th street a Allegheny avenue, Philadelphia, puts a lubricant called "Keystone Grease" whi is said to be a pure petroleum product c taining absolutely no talc, asbestos, res resinous oil, beeswax or any other adult ant to obtain artificial body. It is claim that "Keystone" grease will not char in consistency and therefore cannot fl too freely from the cups. As there are vegetable oils or animal fats in Keysto grease it cannot become rancid or devel fatty acids that would attack the metal the bearings.

For grease cups on automobiles t maker recommends No. 1 density which solid and is used in compression cups. F gear cases and for splash lubrication in t crank case, No. 3 is recommended, t being a semi-liquid that remains at t same consistency regardless of tempe ture changes same as the No. 3 densi It will not thin out and leak thru the c ing. This company maintains warehous in several large cities and sells its produ under a strong guarantee. We are advis that every bearing shipped by the Standa Roller Bearing Company of Philadelp is packed with Keystone Grease.

Better Than Any $75 or $100 Speedometer on the Market



The American

$25
4-inch Dial

OUR THIRTY-DAY TEST OFFER

Put a Stewart or an American Speedometer on your dash, alongside one of the magnetic type (or any other), test it for 30 days—if the Stewart or American Speedometer does not absolutely prove to you within that time that it is the one you want, return it to us and the trial will cost you nothing

COVERED BY AN IRONCLAD 5-YEAR GUARANTEE

Send for our New Catalog

Stewart & Clark Manufacturing Company

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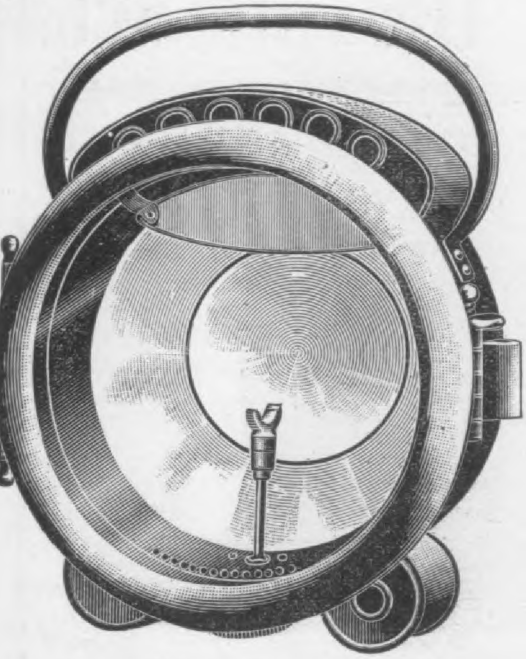
3 line of "Continental" lamps a new dlight fitted with two imported lenses. center or short focus lens projects ingle powerful ray, while the outer throws a large, wide-spreading ray. result is an intense light that can be n at a great distance.



"Continental" Double Lens Headlight.

his headlight is made of extra heavy e brass, riveted thruout. Two sizes offered. The height of No. 1 is 13 es; width, 10½ inches; depth, 5¾ es; price, $30 each. No. 2 is 11 inches , 9 inches wide and 5 inches deep, and at $25 each.

'Buckeye" and "Whiz" Cleansers

or cleaning automobile bodies and all ted surfaces, leather and polished sur- s of all kinds, The J. P. K. Davies Co., Dayton, Ohio, manufactures a cleanser ed the "Buckeye" which being a veget- oil product does not injure any sur- to which it is applied. Being made linseed oil it retains enough of the perties of the same to act as a pre- ative of the leather or painted or var- ed surface to which it is applied. It can sed in cold water, or the water may be med sufficiently to take off the chill but ourse hot water should not be used on automobile body. This cleanser can be ed with water as used or a quantity can prepared in a barrel and used as need- It is said to leave the polished surface ht and lustrous and entirely devoid of

Fellwock Rumble and Folding Seats for Maxwell Runabouts

The two types of rear seats here illustr ted have been designed especially for th Maxwell runabouts and are manufacture by the Fellwock Automobile & Mfg. Co 318-324 Upper Fourth street, Evansvill Ind. One is the "Winner" rumble se which is easily attached or detached an

The "Winner" Rumble seat for Maxwell Runabouts

gives the car a tony appearance. It furnished in either single or double sty measuring respectively 18 and 24 inch in width. Either accommodates grown pe sons. Painting and striping matches th of the car and the upholstering is in gen ine leather not tufted so that it will she rain. A tool box is provided under th seat. No change in the body of the car necessary excepting the removal of t

The "Little Dandy" folding seat for Maxwell Runabout

rear deck. This seat weighs 35 pounds an

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Don't waste time looking for that circular on lamp
ark plugs, carburetors, tires, tools or clothing that y
ad last week.

Look in the new Excelsior catalogue. It's ther
nd so is everything else that you can possibly need a
nany new things for comfort, convenience and econor
hat you have never heard of.

Write for it to-day; it is the one big book for t
utomobile owner and is yours upon request.

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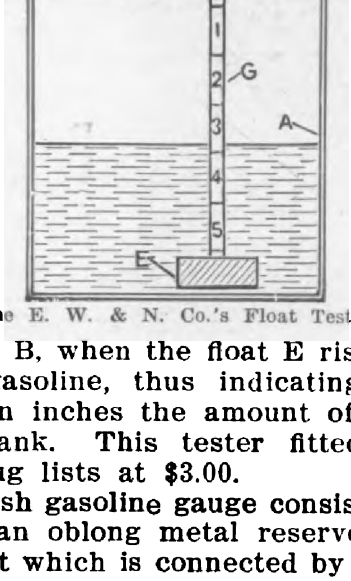
EXCELSIOR SUPPLY COMPAN

ch., are manufacturing a number of tomobile specialties, including an emergcy wheel, a float tester and a gasoline k gauge.

The gasoline float tester manufactured this concern consists of an annular col- B, in the centre of which is screwed centre plug C. The lower end of the m F is fitted with a float E. To test, stem F is unscrewed from the annu-



The E. W. & N. Co.'s Float Tester.

collar B, when the float E rises to the of gasoline, thus indicating on the m G in inches the amount of gasoline the tank. This tester fitted to any ng plug lists at $3.00.

The Dash gasoline gauge consists princiy of an oblong metal reservoir carry- a float which is connected by means of able to a dial placed directly above the ervoir. The gasoline tank is connected the dash reservoir by means of a pipe. course, the gasoline tank and the reser- must be on a perfect level with each er when the car is standing on level und, so that any variation in the gaso- tank will show a corresponding varia- in the dash reservoir. The dial is rked with numbers from 1 to 10. The le which connects the float with the cator is held normally under tension means of a spiral spring, so as to acately register the fall of the float. The h reservoir is equipped with an autoic closing valve which prevents all rflows in going up or down steep ines. The price of this gauge is $10.

"King" Leather Tires

ing Leather Tire Co., Racine, Wis., ufactures a non-skid, leather tire and stress on the fact that its product not a tire protector but a complete, posite tire made of leather, rubber and ric all vulcanized solidly together and

proof. The leather covers the entire c ing including the bead and is firmly v canized to the rubber. Three layers used, the layer constituting the side wa being of very pliable leather which, bei softer than rubber is claimed to add the resilience of the tire. The leather c

The "King" Leather Tire, sectional view showing la of canvas, rubber and leather also the rivets for p venting skidding. This is not a tire protector, but composite rubber, fabric and leather tire, all layers be thoroly vulcanized together.

be preserved by keeping it soft by an casional application of Viscol oil. The l ing next to the tube is a soft, tight-fitti fabric which forms a smooth, frictionle wall and thus prevents the generation undue heat. The price of the 30x3-in King tire is $43.25; 32x3½-inch $68; 34 inch, $85.75; 36x4½-inch, $109.75; oth sizes being listed at proportionate pric Old tires will be covered with the Ki leather covering at one half the list pric of new King tires.

"Fillem"

Under the name of "Fillem," Greenwa Rubber Co., 29-33 Church street, Buffa N. Y. is marketing a preparation for quic ly and permanently repairing cuts, pun tures, curb injuries and sand blisters tire casings. This material is a compo tion of self vulcanizing rubber which am gamates with the tire casing immediate after being applied. By repairing cu etc., at once with this material, furth injury by the entrance of grit and mo ture is prevented and the life of a ti is therefore greatly prolonged. "Fillen can be applied without removing the tir

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BAILEY'S

"WONT SLIP"

SKIDDING

That **one terrifying moment** when if your car had been equipped with

BAILEY'S "Won't Slip" Tires

The **accident** would not have **occurred.** Moral: "Do it now," and you will **avoid** such **accidents.** You see them **everywhere.** Ask the **rider,** he knows. For sale by all **dealers** in **every part of the world.** There is no **metal** in the Bailey Tread to **heat** the tire, **pull** loose from the rubber or tear the **road bed.** The **rubber studs** of the Bailey Tread are the **true** principle that give **perfect traction** and prevent **skidding.** They are to the automobile what the **rudder** is to **the ship.**

TREAD TIRES

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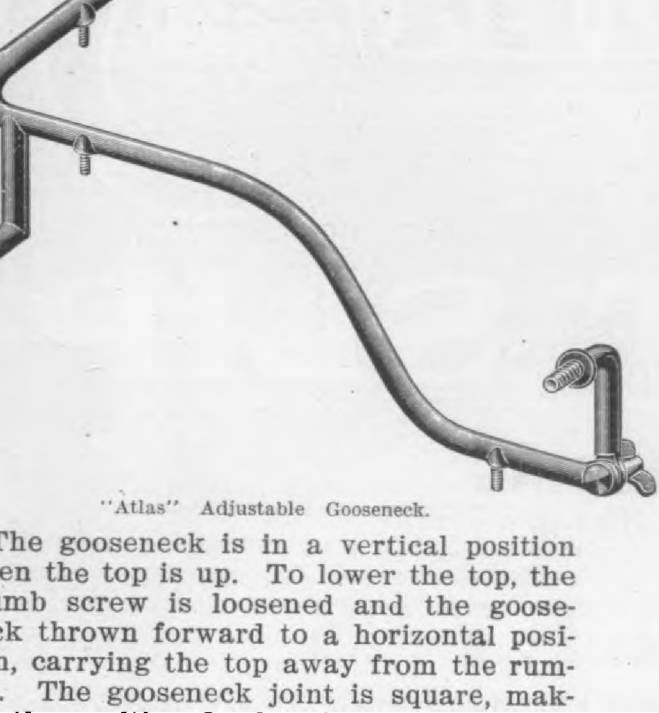
N. B.—The extra cost of the Bailey Tread

Write us for descriptive booklet.

the matter of providing a top that will t be in the way of the rumble seat when ded back, The Cortland Forging Co., of rtland, N. Y., has brought out an adstable gooseneck for use in connection th the shifting rail as illustrated by the companying cut.



"Atlas" Adjustable Gooseneck.

The gooseneck is in a vertical position en the top is up. To lower the top, the mb screw is loosened and the gooseck thrown forward to a horizontal posin, carrying the top away from the rum. The gooseneck joint is square, mak the position fixed and solid.

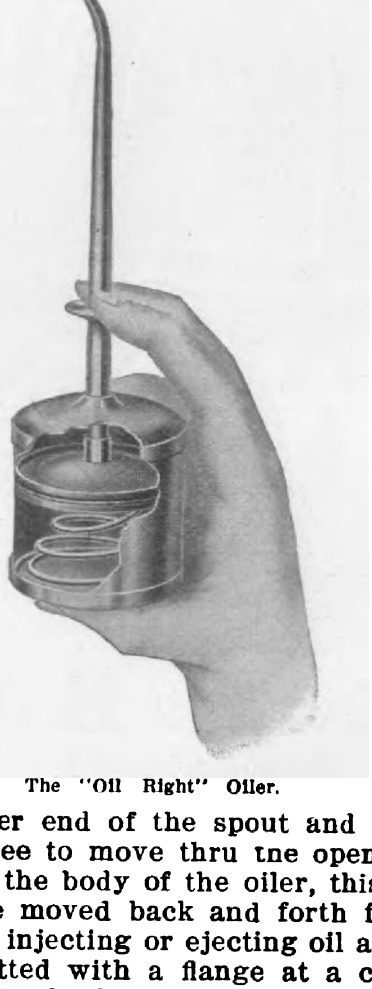
The Cortland Forging Company also ke bow sockets for the popular Dusne style top.

The Reo Motor Car Company informs us t it has recently increased its shipping acity from 40 to 60 cars per day, or cars per week. This is an increase of per cent over its former capacity and n keeping with the growth of the Reo anization.

. M. Germane, well known in the autoile trade, and formerly located at cago as western representative of the ndard Roller Bearing Company, has just n appointed Sales Manager of this comy, with headquarters at the factory in ladelphia, where he has been situated the past eighteen months.

as. L. Gibney & Bro., 213 N. Broad St., ladelphia, are marketing a wood sh for cleaning and restoring varnished faces such as automobile bodies. It is l to eliminate scratches and bruises, king the process of scraping and re-

tant and to make filling an oiler a mat of convenience and ease the Harvey M Co., 526-532 Granite Building Rochester, Y., has placed the "Oil-Right" oiler on t market. This oiler has a plunger attacl



The "Oil Right" Oiler.

to the inner end of the spout and as t spout is free to move thru the opening the top of the body of the oiler, this pl ger can be moved back and forth for t purpose of injecting or ejecting oil and t spout is fitted with a flange at a conve ient point to facilitate this act. A spri is interposed between the under side the plunger and the bottom of the oi so that the plunger is normally held against the top of the oiler. By placi the thumb on the bottom of the oiler a the first two fingers on the spout flan with the fingers stradling the spout, t plunger can easily be depressed and after depressing the plunger the open e of the spout is held in a receptacle of while the plunger is allowed to return, spring pressure to its normal position, t oiler will fill with oil. Similarly, if t plunger be thus depressed while the oil is filled or partly filled with oil, the oil w be ejected forcibly from the spout. T makers claim that the flow can be exact regulated to deliver from a drop to stream 15 feet long. Other merits of t

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Tires Tires Tires

Great sale of DUNLOP and CLINCHER casings, plain, wrapped, flat, and Midgley Treads, at less than 50c. on the dollar.

Casings Casings Casings

Size	G. & J. Clincher Type	Pennsylvania Clincher Type Round Tread	G. & J. Clincher Type Midgley Tread	G. & J. Dunlop made for 1905 Rim	G. & J. Dunlop made for Universal Rim	G. & J. Dunlop Bailey Tread for Universal Rim	G. & J. Dunlop with Midgley tread Universal Rim
28x2½	$7.50	$7.50	.....	$8.50	$8.50	.....	.....
30x2½	9.00	9.00	.....	.....	.....	.....	.....
26x3	8.25	8.25	.....	.....	.....	.....	.....
28x3	.....	12.00	.....	14.90	14.90	.....	$17.85
30x3	.....	14.00	$17.00	15.75	15.75	$16.00	19.10
32x3	11.00	.....	.....	16.90	.....	.....	.....
34x3	9.75	9.75	.....	.....	.....	.....	.....
28x3¼	.....	.....	.....	.....	.....	.....	.....
28x3½	.....	.....	.....	18.95	.....	.....	.....
30x3½	.....	16.50	20.00	19.75	19.75	20.79	24.74
32x3½	15.50	15.50	21.50	21.70	21.70	22.08	26.40
34x3½	16.80	16.80	23.00	.....	.....	.....	.....
36x3½	14.00	13.50	25.00	.....	.....	.....	.....
30x4	17.50	17.00	22.50	21.95	21.95	24.04	28.48
32x4	.....	.....	25.00	24.75	24.75	25.57	30.41
34x4	21.50	22.00	28.00	25.85	25.85	27.13	32.34
36x4	22.50	21.00	32.00	27.42	.....	.....	.....
32x4½	17.00	15.00	.....	.....	.....	.....	.....
34x4½	24.00	24.00	32.50	31.90	31.90	35.25	.....
36x4½	25.00	24.00	38.00	33.75	.....	.....	.....
34x5	25.00	21.00	52.00	.....	.....	.....	.....
36x5	27.50	24.50	55.00	.....	.....	.....	.....

SPECIAL :: SPECIAL :: SPECIAL

Independent Casings and Innertubes strictly guaranteed. Made and guaranteed by the Diamond Rubber Company. All 1908 regular goods. We only have them in following sizes. All these goods are first quality, with the name on.

Size	Casings	Innertubes	Size	Casings	Innertubes
26x3	$11.75	$2.90	30x3"	$13.50	$3.50
28x2½	12.25	2.75	30x3½	17.50	4.50
28x3	12.75	3.00	32x3½	18.00	4.75

INNERTUBES, QUEEN BRAND, Strictly Guaranteed

28 x 2½	$2.50	30 x 4	$6.50
28 x 3	3.00	32 x 4	7.00
28 x 3½	3.50	34 x 4	8.00
30 x 3	3.25	36 x 4	8.50
30 x 3½	4.00	34 x 4½	9.00
32 x 3½	4.25	36 x 4½	9.50
34 x 3½	4.50	36 x 5	10.00
36 x 3½	4.75		

SPECIAL BARGAINS

CONTINENTAL CASINGS, 34x4, strictly firsts and guaranteed $30.00
GENESEE CASINGS, 28x3 ..... 12.50
INTERNATIONAL Q. D. CASINGS, 30x3½ 18.00

All makes of TIRES at cut prices. Send us the size you need and we will quote.
Our catalog is ready for mailing; everything at cut prices.

TIMES SQUARE AUTOMOBILE CO. TIMES SQUARE AUTOMOBILE CO.

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Send for list.

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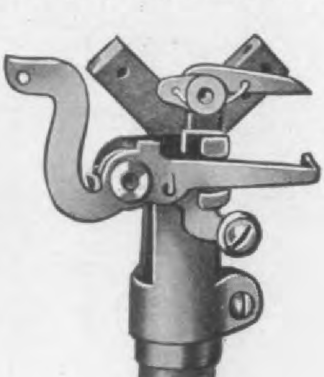
ll known series of burners two modifi-
ions adapted to motor car lamps burn-
gas.

s supplied either burner can be connect-
to the batteries of the ignition system
a touch of the finger does the lighting.
e "Gem" hand lighter can be attached
any of the different forms of the acety-
e gas burners. The mere pressure of
finger on a lever throws a spark in the
h of the gas which ignites instantly.
ile the "Gem" is somewhat less conven-
t than the "Jewel" automatic burner,
"Gem" is perfectly practicable and
able.



e "Jewel" Automatic Gas Lamp lighter. The "Gem" Hand lighter.

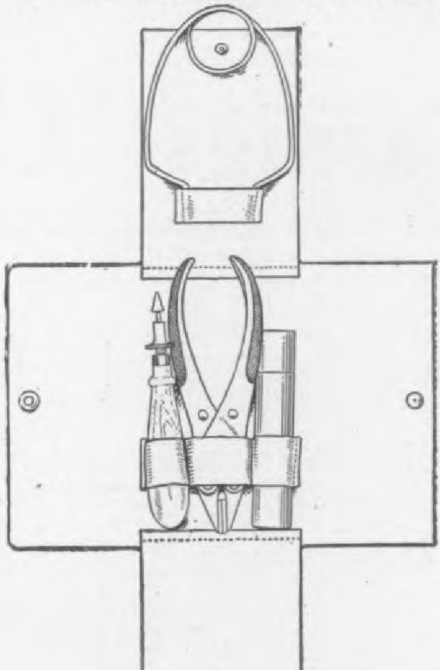
Where the engine is ignited by a make
brake system with spark coil, an ad-
onal wire is run from the coil to the
ners. Where a jump-spark coil is
d an extra spark coil which occupies
same space as a dry battery must be
erted in the circuit between the batter-
and the burners. Only one spark coil
be needed in any case, whether one
nore "Gem" lighters are employed.

he "Jewel" Automatic lighter requires
rely the pressure of a push button
ed on the dash board to instantly light
acetylene lamps. No spark coil is
d in this style. One lamp or more may
ighted at the same time from the same
ton. The "Jewel" burner is adapted
n the "Advance" automatic acetylene
ner, thousands of which are in use
esidences, in all parts of the country.

he "Time-Saver" Tire Repair Kit

uto Time-Saver Repair Kit Co., 176-180
onshire street, Boston, Mass., manufac-
a repair plug for repairing tire tubes
hout using patches and cement or re-
ing to vulcanizing. This plug is es-
tially different in form from other re-

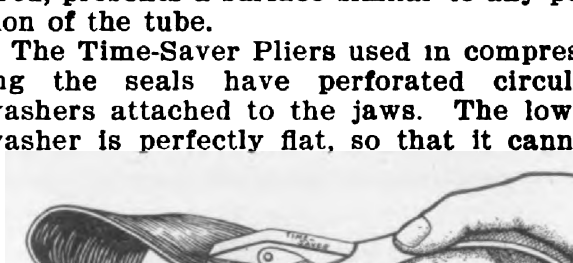
The Time-Saver Plug consists of tw
circular brass disks, joined by a solid po
3-16 inch long. The disks are grooved
that when clamped together they will ho



The "Time-Saver" Repair Kit.

the rubber securely. The solid post do
not collapse, but remains intact, furnis
ing ample support for the pressure of th
disks against the rubber, so that there
no possibility of the disks becoming sepa
ated. The entire plug, being rubber-co
ered, presents a surface similar to any po
tion of the tube.

The Time-Saver Pliers used in compres
ing the seals have perforated circul
washers attached to the jaws. The low
washer is perfectly flat, so that it cann



Applying a "Time-Saver" Repair Plug to Inner Tube

cut the inner tube. The upper washer
convex to further insure a tight pressu
on the circumference of the plugs, obvia
ing any possibility of a leak.

The American car in the N. Y.-Par
race has been supplied with Time-Save
plugs.

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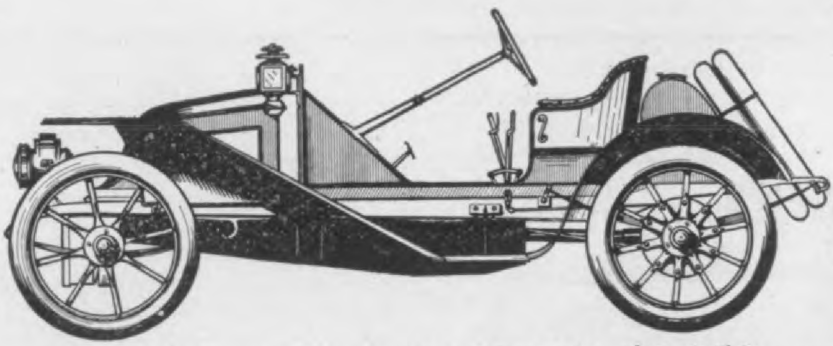
PALMER-SINGER

All cars sold by us are licensed under Selden patent and guaranteed for one year.

Palmer-Singer Six-Sixty Runabout 6 Cylinders 60 H. P. $2,850

Palmer-Singer Town and Country Car 28-30 H. P. $3,000



Palmer-Singer Six-Fifty Racing Car 6 Cylinders 50 H. P. $2,450

Palmer-Singer Four-Forty Seven Passenger Touring Car 40 H. P. $4,000

Palmer-Singer Skimabout, 28-30 H. P., **$1,950**

The Palmer-Singer Skimabout is on Exhibition in Our Salesrooms. It is the Motor Car Sensation of the Year

The "Skimabout" is a town runabout that will make forty-five miles an hour over country roads, climb any climbable hill, outrun and outwear most runabouts and still give a town and traffic service that none of them can give. It is the trimmest, most stylish and most attractive medium-power runabout on the market; for the man who has little chance to go touring far afield it fills a long-felt need.

Nickel steel throughout. Imported F. & S. ball bearings exclusively. Bosch high tension magnetos and multiple disk clutches in all models. Nickel steel, double and single drop frames. Drop forged I-beam, nickel steel front axle four-speed selective type, sliding gear transmissions with direct drive on third speed. All brakes equalized, all expanding type and on rear wheels. Universal joints on all steering connections. All types shaft-driven, all moving parts inclosed in dust-proof cases.

Sole distributors **Palmer & Singer Mfg. Co.** Metropolitan distributors

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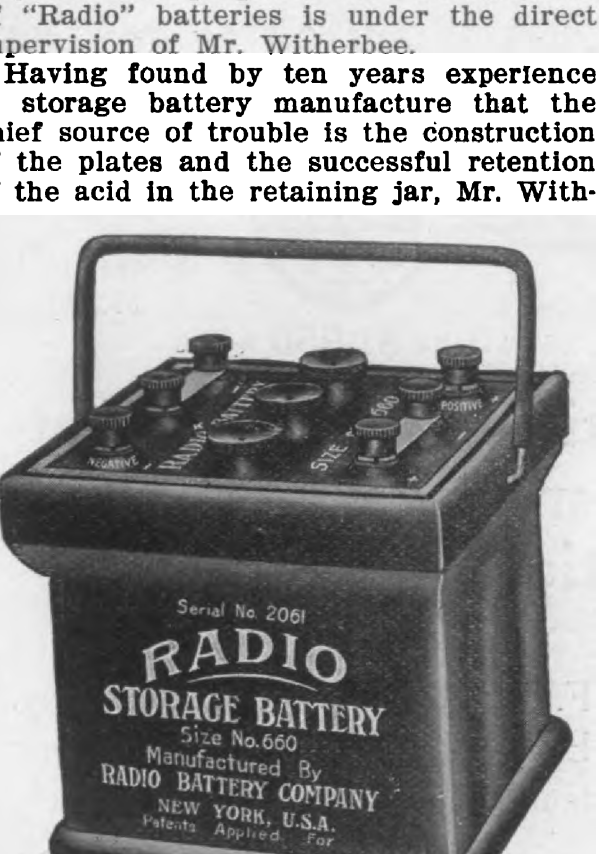
gniter Co., is the inventor of the "Radio" orage ignition battery, here illustrated, product of "Radio" Battery Co., 433 W. 3d street, New York City with which Mr. Vitherbee is now associated. This latest roduct of the genius of Mr. Witherbee already meeting with favor and we are lvised that the "Radio" Company equipp- l the U. S. Warship fleet now making a orld tour with batteries for the wireless legraph system and that the Italian avy is also using the same make of bat- ry for this purpose. The manufacture "Radio" batteries is under the direct pervision of Mr. Witherbee.

Having found by ten years experience storage battery manufacture that the ief source of trouble is the construction the plates and the successful retention the acid in the retaining jar, Mr. With-



The "Radio" Storage Ignition Battery.

bee has kept these features in mind in signing the "Radio" battery and endea- red to guard against any trouble from ese sources.

The plates are of the Faure or pasted pe and are made with great care of the rest materials obtainable. The maker's ject is to obtain the highest possible pacity and longest life without sacri- ing mechanical strength and it claims at these plates, if given proper care, ll last from three to four years with- t renewing and even then the expense small.

The cover clamps are made of enam Bessemer steel, correctly formed to fa the cover to the jar and also secure handle. They are non-corrosive.

The handle is also made of enam Bessemer steel and provided with a rubber grip. It can be folded down, removed if desired.

Wiring clips made of rolled copper which to fasten to the ends of the vice wires, are furnished with each bat and are made to fit the positive and negative terminal screws respectively owing to the difference in diameters the holes in the clips it is impossibl make a wrong connection.

The construction, it will be noted very simple and secure, consisting flanged compartment jar, a cover, and elastic washer interposed between the and the cover. The washer is first mented to the jar and is then compres and a special clamp is placed around flanged edge of the jar and over the rib edge of the cover. The pressure is t released and the clamps are securely in place by the pressure of the ela washer, thereby producing an acid t battery case without the use of screw exposed metal parts.

The containing jar is of the flan compartment type, made from a new e trical insulating, acid proof, vegetable c pound. It is formed in one piece and vided by a new method into separate which are insulated from each ot thereby preventing internal leakage, wl is the cause of a cell losing its volt by internal discharging. The jar is vided with a soft rubber cushion or s which protects the bottom and lower s of the jar from sudden shocks, thus el nating any liability of breakage.

The cover is composed of the same terial as the jar, made in one piece the terminal bases and vent tube, an provided with a special ribbed edge. polarity of each terminal is pl ly embossed on the cover so that th can be no mistaking of the negative f the positive. The washers are made f pure Para gum which is impervious to acid and hermetically seals the c forming acid tight joints around the te nals and top edges of the jar.

Gas ventilating caps screw into the tubes. They are made acid tight with vent tubes by aid of a soft rubber was and contain a ball valve which allows escape of the gas after it has attai

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STRENGTH

is a feature of the 1908 Rushmo
Lights. From the first, we ha
used sheet brass and copper abo
one-third heavier in gauge than
found in competing lamps. T
spin the back cap and front do
in such heavy material has requir
several annealings. These anne
ngs left the center of the back cap soft.

We now stamp and draw these parts in powerf
presses. The drawing operation itself stiffens t
metal, and the back cap, heretofore soft in the cent
s now struck out in two operations without annealin
t is approximately twice as stiff as it was, and twi
as effective a protection for the lens mirror.

The Rushmore is the only automobile gas lamp
which the parts above named are press-formed. A
others are spun—from much thinner stock—and a
subject to all the defects inseparable from that pro
ess. We mention these facts to show how far t
SHAPE of a lamp may fall short of indicating
real quality.

Rushmore Dynamo Work

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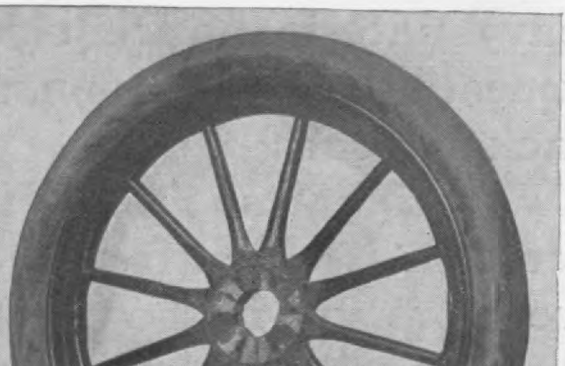
a, S. C., has bought out an automobile heel attachment which permits of adsting the wheel position on the spindle d therefore permits varying the wheel ge to suit the tracks of vehicles on roads various parts of the country. Practilly all motor cars are made with 56 or ½-inch gages while in some parts the country a different wheel gage is evalent, for example, in the South comon practice is the use of a 60-inch gage, d this McMaster adjusting device, invent by a Southern man, allows of changg a motor car gage from 56 to 60-inch vice versa.

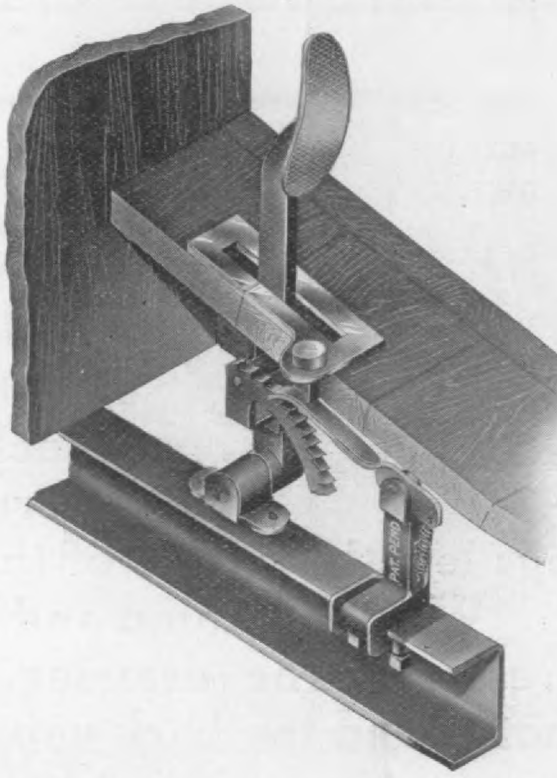
This device consists essentially, of a two ch thick circular block having a hole in e center to allow slipping the block on e axle spindle. This block is interposed tween the wheel and its inner hub flange hen a wide gage is desired and shifted



heel knocked down, showing brake drum, hub (which he same on both front and rear wheels), bolts, "McMcter" hub-cap extension block (patent applied for) and lar washer.

the other side of the wheel between it d the outer flange when the regular gage desired. Of course the blocks can be de any thickness to bring the gage up any width desired, and they can also made in sections if desired, this form construction making shifting more easy the wheel does not have to be removed m the spindle to shift the sectional ck. This gage adjusting device, as will noticed, requires no alteration of the

the market by Le Compte & Diffender Mfg. Co., 217 North Calvert street, Ba more, Md. This attachment can be plied to the Ford brake pedals withc making any change in the present c struction and without even drilling a ho thus this lock can be put on by any c with a wrench in a few minutes. The lustration herewith so clearly shows t



Le Compte Safety Brake Lock for Ford Runabouts.

construction of the device that a detail explanation is not necessary. If while t brake is on it is necessary to remove t foot boards they can be taken up and placed without disarranging the lock, that access to machinery can be had the steepest hill without danger of t brake being released. The lock attach to the frame of the car under the flo board and the pedal is operated in the ual manner. A floor button is provid the lower end of which is ha ened and presses upon a flat spring bri ing it in mesh with the ratchet teeth the quadrant attached to the brake lev This holds the brake lever until releas by the operator which is accomplished pressing the foot pedal, the spring i mediately freeing the ratchet, allowing free movement of the brake pedal, until is again desired to lock it.

E. L. Lincoln, 130-134 Summit aven Brookline, Mass., manufactures an insp

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WRAPPED TREAD
TIRES

ARE GUARANTEED FOR 5,000 MILES RIDING

THE AJAX TIRE that does not come through that 5,000 miles with satisfaction to its owner, loses money for its maker.

You may be pretty sure, therefore, that every AJAX TIRE is made "up to" that guarantee.

As long as no other tire manufacturer dares to back his product with as strong a guarantee, it is a natural conclusion that the AJAX **must** be the best.

Write for copy of guarantee, stating size tire you are using.

DEPT. G.

AJAX-GRIEB RUBBER COMPANY

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Factories: Trenton, N. J.

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Denver, 1529 Cleveland Pl.
Seattle, 1102 Broadway
San Francisco, 460 Golden Gate Avenue
Los Angeles, 1040 South Main Street

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Indianapolis, Fisher Automobile Co,
St. Louis, 3948 Olive St.
Jacksonville, Fla., 317 W. Forsythe St.
Buffalo, N. Y., Jos. Straus & Sons Co.
Kansas City, Mo., Maxwell-Briscoe Motor Co.
Dayton, Ohio, Borderwish & Glancy Automobile Co.
Des Moines, Ia., Automobile & Supply Company
Sioux City, Iowa, Wm. Warnock
Porto Rico, 32 Marina, San Juan.
Tampa, Fla. James Bros.
Watertown, N. Y., Warner Auto Co.
Springfield, Mass., Geisel Auto Co.
Milwaukee, Wis., 382 E. Water St.

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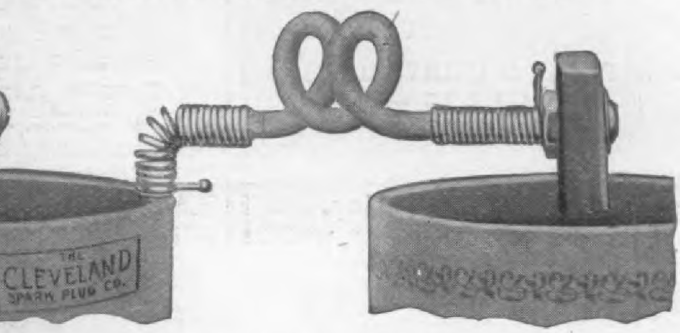
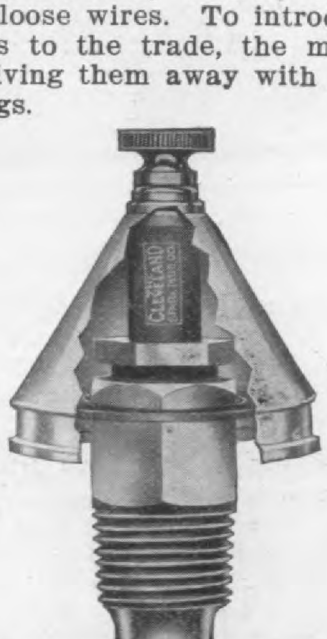
) Power avenue, Cleveland, well known the makers of the spark plug "with e spiral core," recently described in ese columns, have placed upon the mar- t a battery connector of very interest- ; and simple construction. As will be en by the accompanying illustration, the leveland" battery connector consists of xible cable, which is especially made this purpose, having a very heavy con- ctor, and a firm insulation layer. Each d of the cable is equipped with a short ction of coiled bronze wire, the extreme d being bent upwards in the form of a ob. In applying, the device is readily ced over the battery threads holding nly by the shrinkage of the bronze coils. hen so applied, it is claimed that no ount of vibration or movement of the y cells can cause the connector to be- me loose, it being even impossible to pull off, unless the projection on the free



The "Cleveland" Battery Connector..

d is turned to the left to expand the onze coil. It will thus be seen that this nnector does away entirely with thumb ts and loose wires. To introduce these nnectors to the trade, the manufactur- are giving them away with orders for ark plugs.

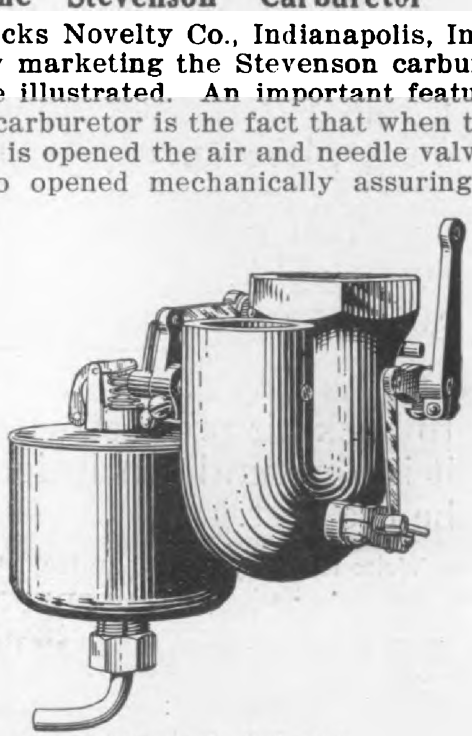


The Cleveland Spark Plug Protector.

heavily nickel-plated enhances the pearance of these parts. The Clevela spark plug protector does not interfe with a ready attachment or removal the cable terminal and while particula designed for use with the Cleveland pl will however fit almost any plug on t market.

The "Stevenson" Carburetor

Henricks Novelty Co., Indianapolis, In are now marketing the Stevenson carbu tor here illustrated. An important featu of this carburetor is the fact that when t throttle is opened the air and needle valv are also opened mechanically assuring



The "Stevenson" Carburetor.

greater fuel supply when the demands the motor require it and increasing bo air and fuel proportions uniformly and a tomatically which should result in a u form richness of mixture at all engi speeds. When the throttle valve is op the air valve is open and there is no o struction to the free passage of the m ture, hence maximum power and speed a attainable. One adjustment to suit a particular engine of course suffices for time, and the whole control of the mixtu is in the throttle so that the best mixtu for the conditions under which the engi is running can be obtained. This carbu tor can be throttled very low.

Keystone Lubricating Co., 20th stre and Allegheny avenue, Philadelphia, making a special offer to automobile de ers and garage proprietors to introduce "Keystone Grease." With each initial o der of 500 pounds, 100 pounds will be giv free. This company is inaugurating an e tensive advertising campaign to create a

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GIBNEY

SOLID ENDLESS MOTOR AND CARRIAGE TIRES

The development of **Gibney Tires** is the result of profiting by the **Other Fellow's Mistakes.**

Gibney Tires combine resiliency and durability to a degree equalled by no other tire yet constructed.

We are also distributors for

Continental Pneumatic Tires

The Low-Cost-Per-Mile-Tire

We carry a complete line of

Automobile Accessories

for the Automobile Owner and Chauffeur

Our NEW CATALOGUE is Yours for the Asking

JAMES L. GIBNEY & BRO.

PHILADELPHIA, U.S.A.

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oof houses for automobiles, motor cycles d motor boats which possess some at- ıctive features. These houses are made structural steel and are therefore not ly fire proof but are strong and the roof ısses are of sufficient strength to support e weight of an automobile body so that e body can be lifted from the chassis repairs by means of a block and tackle ached to the roof trusses without dan- r of injury to the roof. Another prac- al feature of this house is the high or space enabling a car to enter with up. One of their specialties is a house asuring 12 feet wide by 20 feet long, and feet high, the door opening being 8 feet ıare. These dimensions allow easy en- and provide plenty of room for repair ıch inside.

The foundation can be timber, stone or ıcrete as desired, and the manufactur- furnish foundation bolts and foundation ıns showing the location of the bolts. e frame is made of structural steel an- s, well braced, consisting of 8 angle sts, 4 roof trusses with angle purlins d single girts all designed to be inter- ıngeable. The heaviest assembled part ı be readily lifted into place by two men. parts have holes punched and are plain- marked to facilitate erection. The ming bolts are also furnished. The

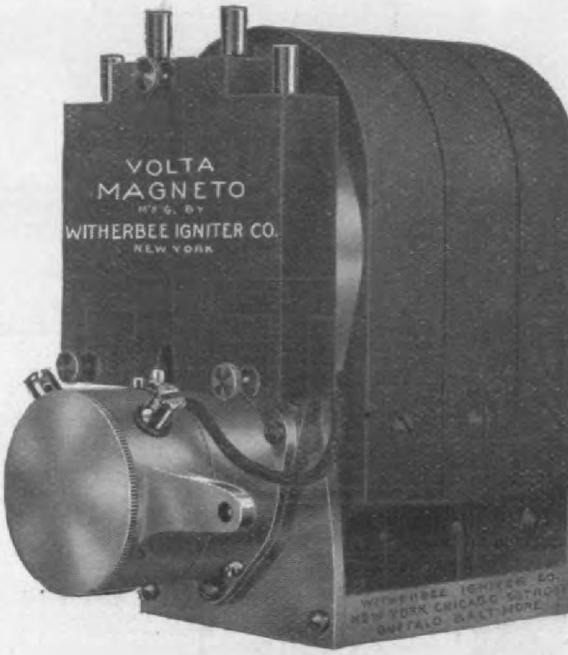
e style of Rodgers' Fire Proof Automobile House.

es are sheathed with corrugated steel, a steel clap board. These sheathes are to the required length and fitted around doors, windows and gable ends so that cutting is required in the erection of the ıse. The roof is covered with corru- ed steel or steel crimped roofing, all athes being cut to the required length, a ridged cap is furnished for the peak the roof. Two 4 foot x 8½ foot angle me doors are furnished with the steel ering in place. All hinges and other essary fittings are furnished. Three

garages designed to meet special requ ments.

The "Volta" Magneto

This magneto made by the Witherl Igniter Co., 1876 Broadway, N. Y., is the permanent magnet type using a rot ing armature mounted on imported b bearings. The "Volta" magneto has be designed on such simple lines that it is lieved the chances of trouble through a cause whatever are reduced to a minimu



The "Volta" Magneto.

The rotating armature generates an terating current which attains its ma mum twice in each revolution, these ma mum points being exactly 180 degre apart at which point the spark is produc

This magneto is provided with a d tributor geared to the armature shaft a arranged in such a manner that when t armature is correctly geared to the engi the ignition will be effected in the vario cylinders at the proper time.

Provision is made for properly adva ing or retarding the spark. It should noted however that a better spark is p duced when the timing lever is advanc rather than when it is retarded. The fore to start the motor on the magneto should be well advanced.

To render the magneto inoperative wh desired a switch is arranged in such a ma ner that a wire is led from the bindi post on the top of the shifting case

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BRISCOE RADIATORS

WE make many different types, as, Honeycomb, Flat Tube, Round Tube, Staggered Tube, Film Tube; with either horizontal or vertical flow; with or without casing; to use with or without pump. These types and arrangements differ from one another in efficiency, compactness, cost and appearance. If you will let us know the conditions and the problem we can generally work it out for you.

Remember we have been the leaders in this business since the automobile industry started in the United States.

We also make Fenders, Tanks, Hoods, etc.

Delivery insurance of two plants with duplicate equipment and duplicate patterns for each order.

We repair all kinds of radiators. Send them to our nearest factory. Write to-day for our new Catalog.

BRISCOE MFG CO.

DETROIT, MICH. **NEWARK, N. J**

The Jones Speedometer

does not **have to be sold with a written guarantee. The fact that a speed indicator bears the name "Jones" is a sufficient guarantee of its accuracy and efficiency. The "Jones"** ***does not*** **have to be "demonstrated" or placed on thirty days' trial. It is sold on ITS MERITS--and on its reputation as the best speed indicator built--nothing else. It is backed by eight years of actual performance, eight years of constant accuracy, eight years of unfailing reliability.**

No broken shafts with the "Jones." The new Lower Bevel Gear Section eliminates all possibility of shaft trouble.

Jones Speedometer

76th and Broadway **NEW YORK**

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ering gears, change speed gears, etc., just brought out a new steering gear

The "Brown-Lipe" Steering Gear No. 3.

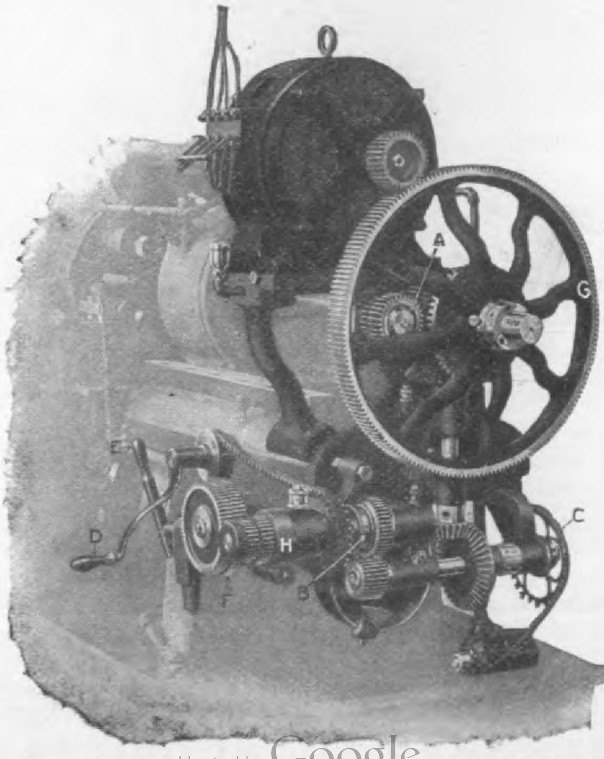
ed No. 3. Recognizing the ideal ad-tages of the rack and pinion arrange-nt but realizing, too, the disadvantage the lack of irreversibility in this con-

The Brown-Lipe No. 3 gear is made int ral with a friction disc which produces th back-lock because the bearing of the pi ion is the outer surface of the disc and th angle of the thrust is at such a tange that it is practically irreversible an shocks delivered to the steering arm an checked by the friction disk in its conta with the steering gear case so that n vibration is transmitted to the steerin column and the operator therefore ge no shocks at the hand wheel. The spu pinion is of such small diameter in com parison with the diameter of its bearin that ideal conditions are created for cus ioning the shocks on the steering arm.

It is also claimed for this steering gea that the development of excessive lo motion is impossible on account of wea of the parts as the spur pinion whic meshes with the steering segment is mad of nickel steel and the most durable m terials are used thruout. A number leading car makers are trying out this gea with a view to using it in their 19 models.

No. 56 Motor Driven "Acme" Screw Machine

Acme Automatic Multiple Spindle Scre Machines have been before manufacturin interests of the country for more than te



End View of the No. 56 "Acme" Automatic, Multi Spindle Screw Machine, with motor drive. (a) Back ge

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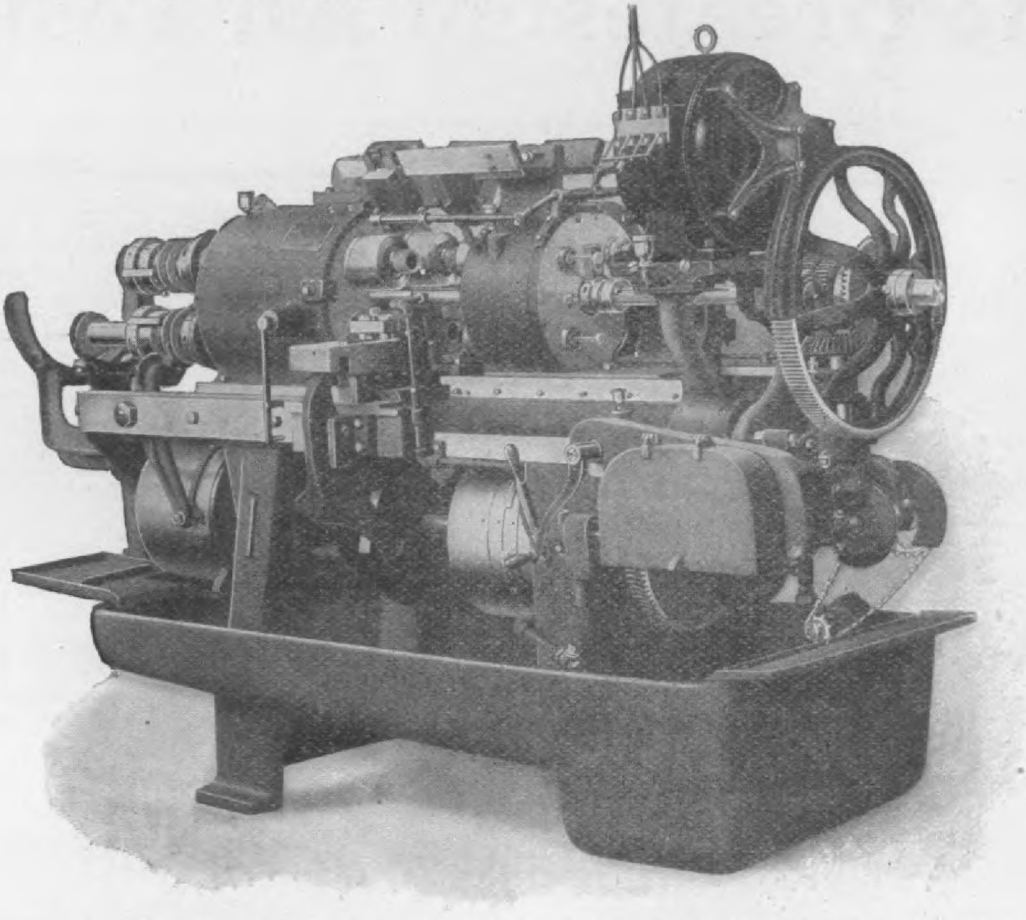
e general run of screw machine work. It the product of the National-Acme Mfg. , of Cleveland, Ohio, in whose plant are ed several hundred of these machines rning out a large variety of screw work d duplicate parts, this very extended exrience having been instrumental in deloping the machine to its present high

due to the fact that the transmiss mechanism is cut loose entirely by mea of free wheel "G." Eighth.—The ti necessary for changing the speed of ca shaft is considerably less because of t more convenient location of the chan gears, "F." Ninth.—The oil pump is driv at a constant speed. Tenth.—Control



No. 56 "Acme" Automatic Multiple Spindle Screw Machine with motor drive.

ate of efficiency and usefulness. The anufacturer has recently improved the o. 56 Acme, here illustrated, so that the ngle belt drive can be readily converted to motor drive by substituting gear (H) r the pulley and placing a motor platform d motor as shown in the end view hereth.

The advantages afforded by the single lt drive and the relative changes are: rst.—That they make the relation beeen the cam shaft and the spindle drive aft always positive; eliminating accints to tools due to belt slippage. Secd.—Belting troubles are reduced to a inimum on the single belt drive and enely eliminated on the motor drive. hird.—The countershaft is simplified or minated. Fourth.—The output of the achine is increased because the positive ntrol of the change of speed for the tools

hand and power movements of the c shaft mechanism as well as the flow oil is brought within easy reach of the erator while in a position to observe action of the tools.

The company is in a position to sup No. 56, (2¼-inch), machines equipped single belt drive or for motor drive, w or without motor. Any standard mo can be used without the slightest alte tion in the motor.

The size of the motor required, var from 3 to 5 H. P., depending upon class of work for which the machine is be used.

The annual meeting of the stockhold of the Monarch Motor Car Co., Chic Heights, Ill., was held at the Chicago tomobile Club, Chicago, Tuesday, May

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TRUFFAULT-
SHOCK
The Greatest of All Tests

The Truffault-Hartford Shock Absorber is the only spring retarding device manufactured with a regulating dial. It is automatically lubricated, absolutely dust and water proof, interchangeable, practically indestructible and fully guaranteed.

Write for our "Ruff Road" booklet, Dept. D, or a demonstration will convince you

CAPITAL $5.000.00

1AMARONECK AVE.
AND POST ROAD
WHITE PLAINS, N.Y.

Isotta Fraschini Headquarters,
BRIARCLIFF TROPHY RACE.

New York, April 27, 1908

Hartford Suspension Co.,
67 Vestry St.,
New York City.

Gentlemen:-

It will probably be of interest to you to hear of the perfect success of your Shock Absorbers with which my Isotta was equipped.

At Savannah these Shock Absorbers were of material benefit to me when driving at very high speed.

In the Briarcliff Race I very much doubt the possibility of my being able to make the speed that I did over the very rough road if my car hadn't been provided with Hartfords.

I understand that the Thomas car that I am to handle in the Grand Prix is already equipped with Hartfords, as they are regular stock equipment on all Thomas cars.

Hoping that your Hartford Shock Absorbers will always meet with what they deserve, I am,

Yours very truly,

Lewis Strang

Lewis

Mr. Lewis Strang driver of the Isotta car, which won the Briarcliff race, speaks highly of Truffault-Hart-

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Hartford

HARTFORD
ABSORBER
New York to Paris Race

Remarkable demonstration of the perfection and durability and the increased comfort resulting from the use of Truffault-Hartford Shock Absorbers.

Write for our "Ruff Road" booklet, Dept D, or a demonstration will convince you

New York City, N.Y., April 6th, 1908.

The Hartford Suspension Co.,
67 Vesty St.,
New York City.

Gentlemen:

It affords me pleasure and I think it is only right to advise you of the remarkable results obtained from the use of the Truffault-Hartford Shock Absorbers on the Thomas Flyer, "America's Champion" in the New York to Paris race, which I drove from New York to Cheyenne, Wyo. In addition to having the right car, I feel that your Shock Absorbers contributed largely to our success in the race so far.

In spite of the fact that we encountered every kind of road imaginable and had to go through snow drifts, slush and water, heavy mud which was sometimes frozen in hard furrows, and over railroad ties for many miles in places where the roads were practically obliterated, we lead all of our competitors across the continent and reached Cheyenne on March 9th, 516 miles in advance of the nearest competing car, without breaking or ever straining the springs and the added comfort for the occupants of the car en route was considerable. The car has since reached San Francisco March 24th with a load of 1206 miles.

Wishing you all kinds of success, I am

Yours truly,

Montague Roberts.

Read what Mr. Montague Roberts, who drove the Thomas Flyer, "America's Champion" from New York to Cheyenne, Wyoming, in the great International Race, has

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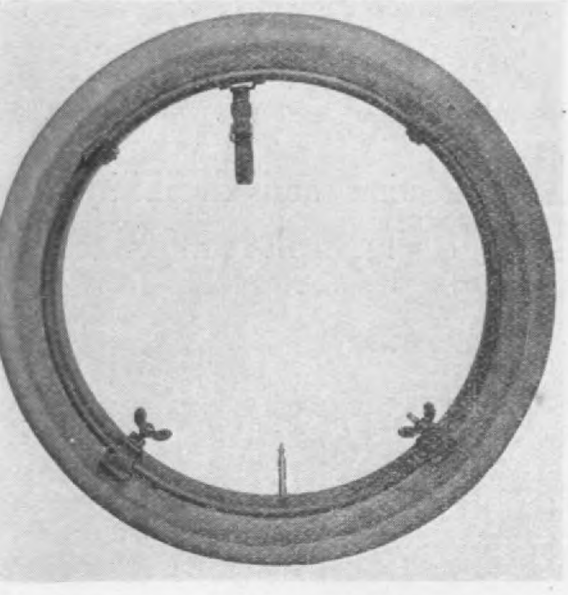
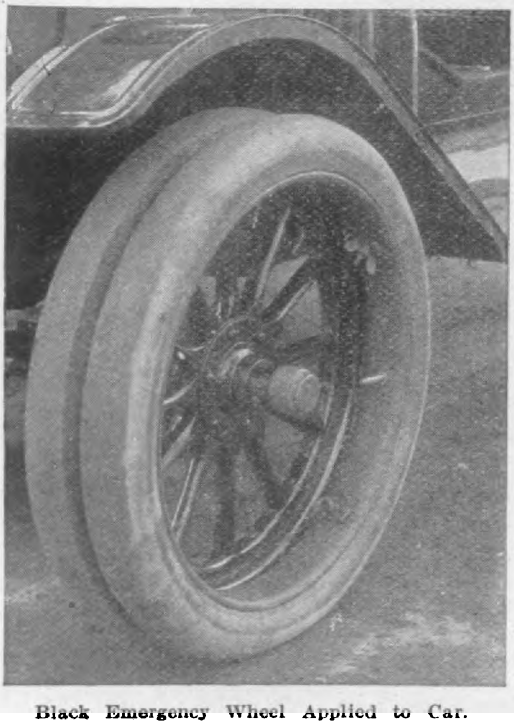
BRANCHES

of a steel rim carrying a tire and hav- two stationary and two adjustable mps. To apply the wheel the stationary



Side View of the "Black" Emergency Wheel.

mps are placed over the rim and the is then pushed forward, the adjustable mps slipping over the rim of their own ord after which the thumb screws are ntened up. The thumb screws are bevel- and will tighten up sufficiently without use of a wrench. Jacking up the wheel

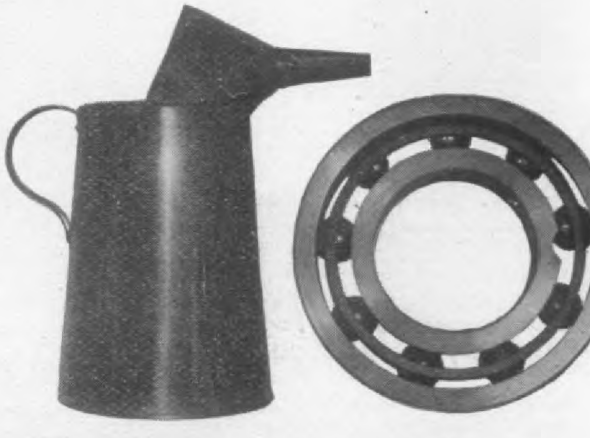


Black Emergency Wheel Applied to Car.

not necessary and no tool is required

immense line manufactured or market by The Auto Supply Co. of 1733-17 Broadway, N. Y.

The combined measure and funnel h been designed, as is obvious, for the pu pose of combining the functions of bo measure and funnel and for the great convenience obtained by using one devi instead of two in filling tanks, cra cases, oilers, oil cans, etc. It is made both tin and copper. The tin measur list at from 20 cents for the ½-pint si to $1 for the gallon size. The prices the copper measures range from 65 ce to $3.



"The Funnel-Measure" and the R. I. V. Radi Bearing.

The main feature of the R. I. V. annul ball bearing, which is imported by T Auto Supply Co., is the method employ to separate the balls. It has been t purpose of the designer to provide a se arator that would not break or beco distorted. The R. I. V. bearing is ma with an anti-friction ring cast around t balls after they are placed in proper po tion and the balls are then loosened by special process so that they will revol freely. This ring, besides acting as spacer, aids in the lubrication of the be ing and is indestructible under all possib conditions. The main rings of this be ing are made of a high grade steel that hard and tough and the balls are of hi carbon crucible steel, are hardened a accurately finished.

It is understood that the Acme Mot Car Company, of Reading, will build a s cial car for the Vanderbilt race and w not put in one of the stock of sextuple

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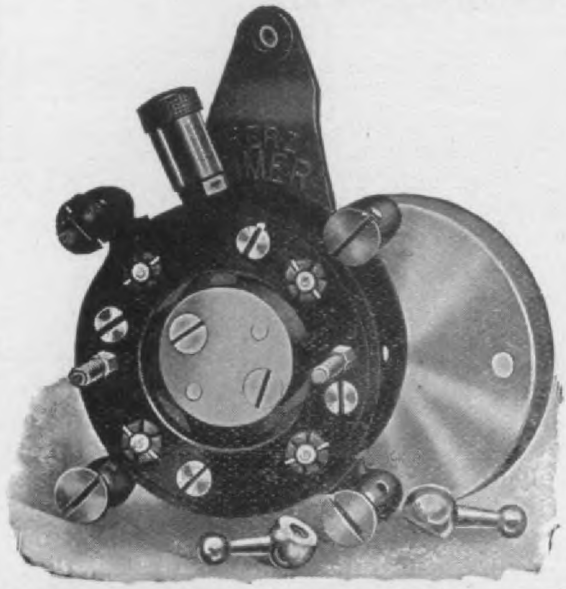
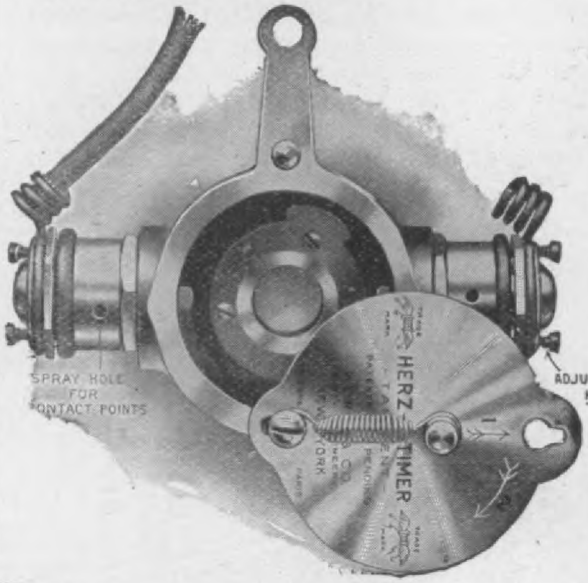
HERZ TIMERS





OVER 100,000 IN CONSTANT USE HERE AND IN EUROPE.

IT'S **TOOLSTEEL** VERSUS **TOOLSTEEL**

30% SAVING ON GASOLINE AND CURRENT, AND 99% LESS OF IGNITION TROUBLE. BEWARE OF IMITATIONS.

20 DIFFERENT STYLES TO SELECT FROM, OR YOU MAY SAFELY LEAVE SELECTION TO US. JUST STATE MAKE OF YOUR MOTOR WHEN ORDERING —DIRECTLY OR FROM YOUR NEXT DEALER.

WE WILL BE GLAD TO MAIL YOU A COPY OF OUR

"IGNITION BOOK" FREE

IT'S MORE THAN A CATALOG
IT'S A REFERENCE BOOK
WRITE FOR IT

HERZ DISTRIBUTOR

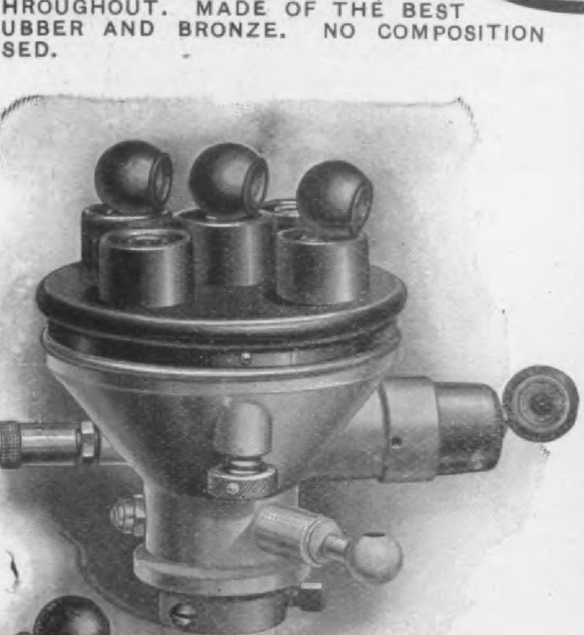
- COMPACT -

THE IDEAL OUTFIT FOR DOUBLE IGNITION. ABSOLUTELY DEPENDABLE. BALL BEARINGS, SPRING BALL CONNECTIONS. DISASSEMBLED IN A SECOND. TOOLMAKERS' WORK THROUGHOUT. MADE OF THE BEST RUBBER AND BRONZE. NO COMPOSITION USED.

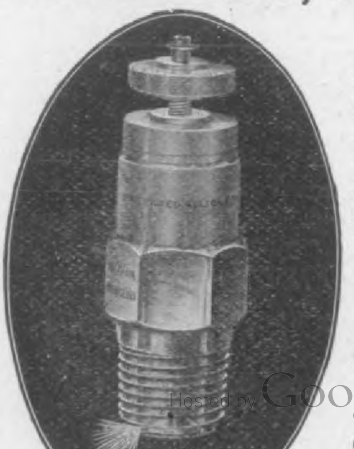
IF WE WERE OFFERED

A MILLION DOLLARS

TO MAKE A BETTER PLUG THAN THE "BOUGIE MERCEDES" WE COULD **NOT** DO IT — AND WE HAVE BEEN MAKING PLUGS FOR **15 YEARS.** DISCARD THOSE MANY THINGS WITH FANCY NAMES AND A LOT OF ADVERTISING BUT **NO** VALUE BEHIND THEM. THIS IS THE BEST VALUE IN SPARK PLUGS EVER OFFERED.



HERZ PLUG, $1.50 POSTPAID



GUARANTEED FOR **ONE YEAR.** ABSOLUTELY PROOF AGAINST OIL AND SOOT. ABSOLUTELY **SELF-CLEANING. DOUBLE STONE, NO** PORCELAIN.

THIS STONE WILL NEVER **CRACK**— PORCELAIN DOES.

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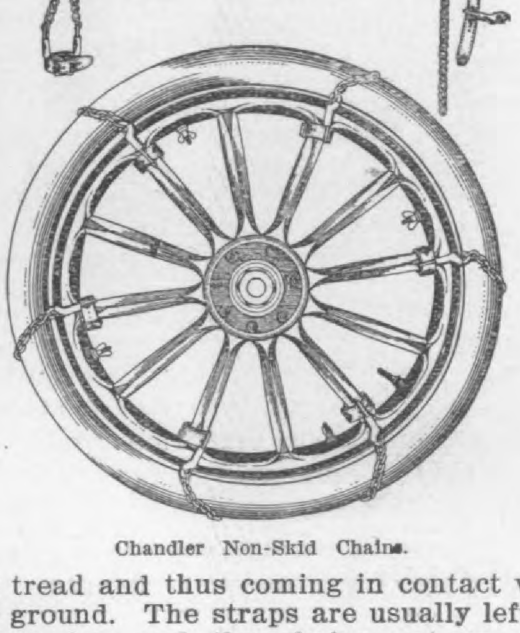
SEE OUR ADV. ON

eature of which is their easy detacha-
ty. These chains are attached at each
ke the attaching device consisting of
trap carrying two snap hooks and pro-
ed with a buckle for fastening around
spoke. The snap hooks each take one
l of the chain, the latter going around

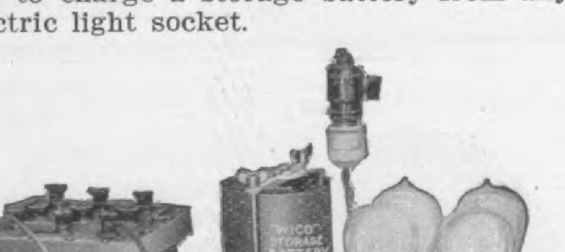


Chandler Non-Skid Chains.

tread and thus coming in contact with
ground. The straps are usually left on
spokes and the chains put on only
en needed, the operation of hooking on
chains taking but a minute or two.
ese chains list at $10 per dozen.

The "Wico" Battery Charger

'he Witherbee Igniter Company, 1876
adway, N. Y., is now manufacturing the
co Battery Charger which enables any-
to charge a storage battery from any
ctric light socket.



e "Wico" Charging Apparatus for Ignition Batteries.

he illustration shows the charger con-

or charge of the battery to be determin
By grasping the handle of a small swit
and placing the knife on the contact c
posite that in which it is normally held
the spring, the battery is disconnect
from the charging circuit and connected
a small lamp. This lamp takes about
amperes, and unless the battery is ful
charged, will not burn brightly.

The apparatus is designed to be carri
on the car in a pressed steel box whi
goes with it. The complete outfit is sma
very light and is extremely convenie
for touring, as it enables a car owner
charge his battery as often as desire
Thus, annoying delays necessary for co
plete recharges when batteries become e
tirely exhausted, are prevented.

One or more batteries may be charg
simultaneously at no increase in expen
over charging one. Thus garages, that
not have enough business to warrant t
purchase of a large mercury arc rectifie
will find the Wico Battery Charger a val
able acquisition.

The price complete with six packages
harmless chemical for recharges of t
rectifier is only twenty-five dollars ($25.0
Additional recharges list at 50 cents p
package of 6.

The Wille piston described in our Fe
ruary issue, page 112, is not only of use
a renewal piston, as mentioned, but
recommended by the maker, P. A. Wil
17 Herkimer Place, Brooklyn, N. Y., as
initial installation in new engines.
this piston has but recently been intr
duced it is of course being applied most
at present to motors with worn o
bores and, when applied, prevents furth
wear of the bore but it is equally app
cable to and even more valuable in ne
engines as it prevents wear and has bee
so used by a number of persons who ha
given Mr. Wille strong testimonials.

The Gearless Motor Car Company,
Rochester, N. Y., has organized with t
following incorporators: Wm. Bausch, vic
president of the Bausch & Lomb Compan
George F. Roth, collector of customs po
of Rochester; W. H. Rogers, president
the Rochester Brick and Tile Compan
John W. Breyfogle, vice-president a
treasurer of the Gearless Transmissi
Company; and John J. McInerney, attorne
The new corporation takes over the m
tor car business of the Gearless Transm
sion Company and will continue the mar

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Safeguarding the Garage Against Fire

(Continued from May)

STORAGE OF VOLATILE OILS.

"All gasolene and similar volatile oils should be stored in good heavy tanks sunk under the ground as far from the garage as practicable; tanks to be of ⅜-inch boiler iron tested to 100 pounds per square inch and coated on the outside with tar; all connections for filling and pumping to be made in top of tank, and the tanks to be encased in a concrete covering on all sides and over the top at least 12 inches thick to prevent as far as possible leakage and consequent filtering of the oil through the ground into cellars. Where it is necessary to place the tank under ground in close proximity to a building under which there is a cellar or basement, the top of tank should be sunk below the level of such cellar or basement so as to eliminate the danger of drainage from a possible leak. Pressure systems and gravity flow of volatile oils are both to be condemned, as the presence of oil in pipes inside of building is not good practice and in case of a leaky pipe or valve, oil may find its way into the building. In cases where there is no yard room for the storage of gasoline, it may be stored under the sidewalk, subject of course, to the local rules of the city and in accordance with the general condition suggested.

"The best method for handling oil from tanks is by an approved pumping system and whenever the physical conditions will warrant it the pump should be placed in a fire-proof building outside of the main structure and not communicating therewith. If, however, it is absolutely necessary to place the pump inside the building a fire-proof room or closet should be constructed securely cut off from the garage and ventilated by a brick flue extending at least six feet above the roof of the main building, said flue to have metal double gooseneck cap so arranged that openings in same shall be at least 10 feet from any exposed windows. This flue to be built from floor and to have openings at floor and ceiling inside of pump room not less than 6 x 6 inches; all openings in flue and gooseneck to be protected by fine brass wire screen.

"Storage tanks for volatile oil should be filled from the outside of the building and pipes for filling same should not pass through any portion of the garage.

"Tanks of machines should not be filled inside of the building, but should it be imperative to so fill them, a filling station should be constructed about 20 feet from the entrance of the garage; the station to be of fire-proof construction and cut off from balance of building, and all machines to be brought to this point for filling. If this arrangement is not practical, a portable metal tank, mounted on wheels, of about ½ barrel capacity, filled from main supply tank outside of building and having a screw cover over filling opening may be provided for the gasolene. This tank should have a registering pump attachment with tube to fill automobile tanks. If it should be considered impracticable owing to small size of garage or because of other features to use the above described portable tank a five-gallon safety can may be substituted but it is not good practice to use them. Whatever may be the means of filling auto tanks neither cans nor portable tanks should be allowed in the garage when not in actual use but should be stored outside of the building.

"As to general conditions in the building, care should be exercised in the matter of storage of calcium carbide and comprest gas tanks; the former should be stored strictly in accordance with rules of the National Fire Protection Association, and the latter should be so stored as to obviate the possibility of being exposed to high temperature in case of a fire; that is they should never be stored inside the building as the sudden expansion of the gas consequent to a rise of temperature in case of fire, may cause a disastrous explosion. A strict prohibition against smoking inside the garage should be enforced and as far as possible the carrying or use of matches in the building should be strictly ruled against. Floors should be kept swabbed clean of all accumulation of oils or gasolene and the proper disposal of oily waste insisted upon. All unnecessary assembling of individuals in or about the garage should be discouraged and only those employed about the building or owning machines in same should be permitted inside.

"An abundant supply of sand pails should be provided in all rooms where

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gasolene is stored or used. In other parts of the garage water pails present the best means of controlling a fire. There have been cases where comprest air has been very successfully used to blow out a fire ignited by a sparking motor. Automatic sprinklers have also been very successful in not only holding a fire in check but in completely extinguishing it even when large quantities of gasolene were exposed in open receptacles within a few feet of the blaze."

Thoro Methods in a Retail Business

The Auto Trading & Repair Co., 2167-2169 East Ninth street, Cleveland, Ohio, have built up a very progressive retail business, handling both new and second-hand cars, and their success has been obtained by careful attention to customers' wants and a constant endeavor to give satisfactory and efficient service in each case, whether the customer desires to sell the car thru them, purchase a new or second-hand car, or is having repairing done. They make a special feature of an individual department service in the sale of used cars. A purchaser is given the privilege of leaving his machine for 30 days with them without charge, and they advertise and demonstrate it at no cost to the owner, following up carefully all inquiries. The owner names the price he desires to obtain for the car and the Auto Trade & Repair Company add to this price a proper sum to cover their commission and the expenses of the sale. This company also offers to purchase cars for persons who desire to obtain good second-hand machines. Their method is to obtain from the intending purchaser information regarding the make or type of the car he desires, and to endeavor to obtain such a car at the price he desires to pay. Being in close touch with the owners of cars desiring to sell, or knowing of cars that might be for sale if the owners knew of an opportunity, the company is in a good position to find just the car which is desired by any particular intending purchaser at about the price he wants to pay.

This company has issued a circular calling attention to the nature of its business, and containing three blanks to be detached and forwarded to it by persons who desire to make use of its services. One of these blanks calls for information regarding cars that may be for sale, and an owner of a car can use this card in giving particulars regarding his machine if he desires this company to obtain a purchaser for it. Another card is for furnishing information regarding the kind of a machine desired by some one looking for a second-hand car, and the third blank calls for particulars regarding jobs of overhauling, repairing, or alterations of any kind. When any of these cards are forwarded to the Auto Trade & Repair Co., they promptly take up the case and give the matter very careful attention until the transaction is completed.

R. F. Robertson's Cadillac Agency, Joplin, Mo.

R. F. Robertson of 115 East 5th Street, Joplin, Mo., for the past year has been conducting a very successful agency for the Cadillac cars in that district, and believes that his success is due largely to individual efforts altho he regularly carries advertisements in the three newspapers on Wednesdays and Sundays. He believes in good demonstrations for prospective customers accompanied with sensible talk and no "hot air."

Prospective customers are supplied with catalogs and printed matter which will make them familiar with the principle features of the cars.

Mr. Robertson does not conduct a garage, but does general repair work.

No outside salesmen are employed as Mr. Robertson's experience with outside workers has been that the majority of them simply used the cars, did very little profitable work and were looking for all the graft possible.

Second hand cars are taken in exchange when their condition in his judgement is such that a good profit could be made on them, in fact, he states that in every instance in which cars have been exchanged during the past season, more money was made on the deal than if a new car had been sold outright. A point is made of always keeping on hand a full line for customers to choose from.

W. G. Palmer, in "The Hardware Review," calls attention to the fact that some hardware dealers are taking advantage of the opportunities opened up by the widespread use of motor cars and are stocking up on such sundries. He advocates at least the handling of such types of ordinary hardware used by automobilists and suggests that hardware dealers gradually work into this business more deeply. The goods that are included in the ordinary hardware line and used by automobilists include a full and complete line of nuts and bolts, rubber hose of various kinds, especially small sizes of special quality; copper rivets in a wide variety of sizes for use on brake bands and clutches; special insulated cable for high-tension wiring; copper and brass tubing; jacks suitable for automobile use; special automobile vises; open-end and other suitable wrenches; sheet brass; wire cable suitable for brake connections, etc.; tools of high quality and suitable design; metal polishes; collapsible pails; funnels containing fine sieves, etc.

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New Agencies

The Acme car will be represented in the south by the new Acme Motor Car Company of Georgia, located at Savannah.

The Glide will be sold in Minneapolis during the next year by the Ranger Barrett Auto Co., 308 Tenth street S, who have secured the northwestern agency.

The New England agency for the Haynes car has been placed with Mr. Chas. S. Henshaw, who is located at 288 Columbus Ave., Boston, Mass. Mr. Henshaw will represent the Haynes in Boston and the N. E. States.

John S. Johnson, the former champion cyclist and skater, has been appointed Winton sales representative for Minnesota.

Mr. Frederick Phillips, Jacksonville, Fla., has taken on the Franklin line. He will handle the Franklin exclusively.

The Michelin Tire Co. has opened a branch at 2001 Euclid Avenue, Cleveland, Ohio, under the management of R. B. Tracey.

R. E. Graham, Vice President and Sales Manager of the Acme Motor Car Company of Reading, Pa. has just organized the Acme Motor Car Company of San Francisco, which will hereafter act as the general distributor for California of Acme cars.

The Garfield Park Auto Garage, Douglass Blvd. & Harrison St., Chicago, have recently been appointed as agent for the Grout Motor Car.

The 1908 agents of the Nordyke & Marmon Co., Indianapolis, will be as follows:
F. E. Wing Motor Car Co., 12 Columbus avenue, Boston, Mass.; Brazier Auto Works, Thirty-eighth and Market streets, Philadelphia; Snodeal Automobile Co., 2552 Madison avenue, Baltimore, Md.; H. T. Hearsey Vehicle Co., 113 West Market street. Indianapolis; Pennsylvania Auto Co., Hay street and Knight avenue, Wilkinsburg, Pittsburg; C. S. Anthony, 110 East Ninth street, Los Angeles, Cal.; Van Automobile Co.. 1706 Washington avenue, St. Louis, Mo.; Waterloo Automobile Co., Waterloo, N. Y.; Heller-Spawn Motor Car Co., Binghamton, N. Y.; John Ure, Jr., & Co., Milwaukee, Wis., and Rickey Machine Co., 92 Eaton place, East Orange, N. J.

The Hamilton-Kull Company, of 1677 Broadway, New York, in addition to the Aerocar line which it is at present carrying, has arranged for the New York agency for the Oakland car, which is made in Pontiac, Mich., by the Oakland Motor Company.

An agency for the State of Georgia and part of Florida for Acme cars has been placed with the Savannah Automobile Brokers, J. C. Finney, president.

John J. Gibson, of the Buffalo Automobile Exchange, 401 Franklin Street, Buffalo, N. Y., has taken the agency for the Pope-Hartford automobile, and will handle it in connection with the Franklin cars.

C. S. Mack, Schenectady Garage, Schenectady, N. Y., has taken the agency for the Thomas.

Mr. A. W. Davis, Cortland, N. Y., has taken on the Franklin and will also handle the Buick.

T. F. DeBruler & Co., Shawnee, Okla., have opened a show room and repair shop and will handle the Franklin exclusively.

Acme cars will henceforth be sold in New York by Cordner & Flinn, a new metropolitan concern which recently opened salesrooms of imposing appearance at the northeast corner of Broadway and 76th Street. The firm succeeds to the agency formerly held by J. B. Brewster and Company.

Midland cars will be represented in New York by the Allenhurst Garage and Auto Station, 135 W. 37th Street.

George Salzman, for six years Assistant Superintendent of the E. R. Thomas Factory at Buffalo, resigned that position to become Treasurer and General Manager of the American Motor Car Company of Atlanta, Ga., sales agents for the Thomas Flyers. Mr. Salzman's clever driving at the Savannah races led to this change.

Retail Notes

A new selling Company to handle Acme Cars in Southern territory, was recently organized under the style Acme Motor Car Co., of Georgia, with headquarters at Savannah, Georgia. John E. Finney is manager.

Auto Plating and Mfg. Co., Euclid avenue, Cleveland, Ohio, makes a specialty of repairing battered lamps and is doing quite a big business, not only in Cleveland but in the surrounding territory.

Avery Portable Lighting Co., has established a Chicago branch located temporarily at 390 Wabash avenue, and in charge of George D. Armstrong. A Michigan avenue location will be secured as soon as possible.

Akron Pneumatic Tire Co., of Cleveland, Ohio, has opened at 1922 Euclid avenue, an agency for the Akron Pneumatic Tire Co., of Akron, Ohio, maker of a tire protector.

The Bradford Co., of Wilmington, jobbers and retailers, has opened a large building at Delaware Avenue and Tatnall Street, which was altered and improved to meet the Bradford Company's requirements.

City Motor Car Company has been organized at Mt. Vernon, N. Y., with $20,000 capital stock and will operate a garage and deal in supplies.

Jamaica Motor Car Co., of Hillside Branch, Queens county, N. Y., has been incorporated with a capital stock of $1000, by J. A. Jones and F. B. Anderson.

C. H. Letcher, of San Jose, Cal., has opened a garage and is handling the White, Packard and Cadillac cars.

Maxwell-Briscoe Southern Co., has been formed at Atlanta, Georgia, to represent the Maxwell car in that territory. Joseph M. Austin, C. E. Adams and S. C. Austin are the officers.

General Automobile Co, of Boston, has been incorporated to deal in motor cars.

John H. Johnson, formerly a champion cycling racer, who has been assistant to Manager Earl Kiser, of the Pittsburg branch of the Winton Motor Carriage Co., was recently appointed Winton sales representative for Minnesota.

William M. Perrett has given up the management of the Diamond tire branch at Detroit, Mich., and established headquarters at 842 Woodward avenue, where he handles the products of the Empire Auto Tire Co.

L. D. Robbins is now in charge of the motor car agency heretofore conducted by his brother, Alfred N. Robbins, in Boston, who recently quit the motor car trade and identified himself with Porter Fibre Bottle Co., of Lewiston, N. Y.

Raymond-Clark Garage, 940 Jefferson avenue, East Detroit, Mich., has commenced business as agents for White and Northern Cars.

The Schacht Mfg. Co., of Cincinnati, Ohio, recently opened a Chicago office, at 1420 Michigan avenue, under the management of W. S. Crain.

The Studebaker Automobile Co., has opened a branch at 417-423 East Weber avenue, Stockton, California, under the management of Wilbur & Barnett.

Utica Cycle Co., a large dealer in bicycles and automobile supplies, is erecting a new four-story building on a lot at 11-13 Columbia street, Utica, N. Y., exclusively for its own use.

Thomas cars will be handled in Atlanta, Ga,. by the American Motor Car Co., recently formed in that city with George Salzman, formerly assistant superintendent of the E. R. Thomas Motor Co., as treasurer

The West Side Garage recently opened a repair shop at 398 Troup street, Rochester, N. Y., and will soon add a sales department for supplies. Morgan Bodenstein and Chas. I. Bodenstein are the proprietors.

Wilson Automobile Co., of Wichita, Kan., has established branches at Kingman, Pratt and St. John.

Wing Bros., of Tacoma, Wash., are building an additional story to their garage on St. Helens avenue, which is of concrete construction and measures 50x120 feet. The addition will cost $3000.

The H. H. Franklin Mfg. Co., Syracuse, N. Y., has recently established the following agencies: Fruit Oil Co., Sharon, Ohio; E. T. Byram, Galesburg, Ill.; Colonial Motor Car Co., Springfield, Mo.; Salina Automobile Co., Salina, Kansas; Montana Lumber Co., Lewiston, Mont.; E. R. Nelson, Ishpeming, Mich.

Mr. Benj. Gerdelman has recently been appointed the St. Louis representative of the Jones Speedometer Company, and will look after its interests in that City. Mr. Gerdelman will still remain agent for the Witherbee Igniter Company, with whom he has been associated for some years.

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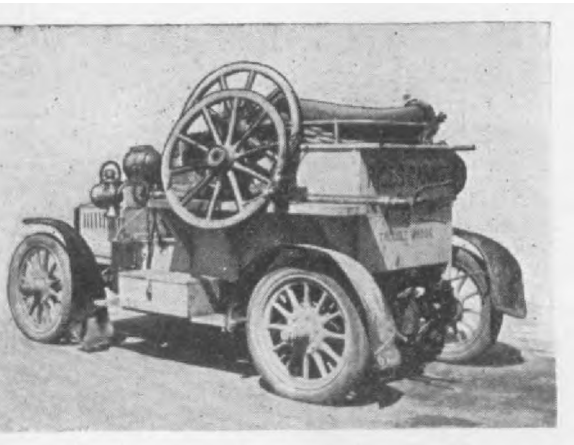
gon, which we illustrate herewith, for ding out to machines in trouble on the d anywhere within reasonable range ts place of business. This machine was rhauled at the Rice Garage and fitted this particular work. They took an 2-cylinder car, rebored the cylinders, nged the transmission to a fast high



Trouble Wagon used by Rice's Garage.

l good pulling low gear and fitted the chine with a special body containing ee large drawers, and a box under the chanic's seat. The outfit carried in this chine includes practically everything t can possibly be needed on a road air or tow job, including all small parts, er tube cases of various sizes, spark gs, etc. It carries at all times 100 ft. 1-inch rope, 200 ft. of ¾-inch rope and louble and single pulley block, an axe, dge hammer, crow bars, a complete kit tools of all kinds, extra gasoline and ter cans, etc. On the left side of the dy is a work bench provided with a 3-h vise. The wheels are fitted with a avy wagon axle for use when an axle a car is completely broken down.

Garage Notes

nerican Motor and Garage Co., is erecting a new ding at Spruce and Water Streets, Bear Lake, Mich., will make a specialty of caring for cars and deliver- same to owners' doors when wanted.

vany & Quealy, of Hastings, Minn., have planned rect a brick and stone garage 66 ft. square.

e Dooley-Meyer Automobile Co., opened a repair at 541 Wabash Avenue, Chicago, Ill., where it also handle second-hand cars and supplies.

new garage will be opened on California street, near , Denver, Colo, by Thomas Botterill.

car L. Bland and August G. Mueller, Milwaukee, , have formed a partnership under the name of the d-Mueller Co., and have established a garage at th and Prairie Streets.

C. Bidwell, a jobber and dealer of Buffalo, N. is building a new fire-proof garage.

L. Cooke and H. C. Morehause are building a mod-

ship and opened a garage at 3 Marshall street, News N. J.

A new garage has been opened at 417-419 Reed str Red Oak, Iowa, by Red Oak Automobile Co., with C. Petite in charge.

The Rittenhouse Garage, No. 214-220 South Twen third street, Philadelphia, has undergone a change management. Messrs. Fraser and Reynolds, its for proprietors, having been bought out by new intere The business will be continued under the firm name the Rittenhouse Garage and every effort will be m to cater to the wants of its patrons. William H. Rod has been elected president of the new organization, w H. C. Du Bois will be its vice-president and a Little its general manager.

Southern Motor Works has opened a fine brick, a and concrete garage at 341-349 North Royal street, Ja son, Mich., and is handling Studebaker electric and g oline cars. The building is 65x140 feet and fully equip with electrically driven machine tools.

Wuld Brothers, of Milwaukee, Wis., have begun erection of a large concrete block repair shop on tional avenue between Second and Third avenues.

Westminister Auto Co., has opened its new garage 71-75 Mott avenue, New York City. It is under same management as the Broadway Auto Co., of 36 John street.

Wayne Auto and Supply Co., of Detroit, Mich., is owned by Arthur Hoffmeyer, who conducts a garage repair shop at 102-104 St. Aubin avenue.

C. R. Zacharias, of Asbury Park, N. J., has incorpor his business as the Zacharias Garage Co., capital st $100,000.

"American" Talc Products

The American Talc Powder Co., 20 Custom House street, Boston, Mass., min talc and manufactures from the same s eral products of interest to the auton bile trade, namely, tire powder, talcu hand cleaner and a lubricating compou "Imperial" tire powder is put up in tractive cartons and in lithographed ca and tubes of various sizes. This t powder is bolted very fine and is ma from three grades of powder, each select because of special features that make desirable for lubricating and cleansi purposes. The metal cans are furnish with either plain or perforated covers a when the goods are ordered in 3-gross lo the dealer's name is put on the labe Two sizes of tubes are put up, one 5x1 inches and the other 12x1½ inches. T former has gold lacquered top and b tom, a perforated swivel outlet. The l ger tube has an adjustable nickel top a is very convenient to use. The carto hold 1, 2 and 5 pounds respectively.

This company's talcum cleanser is su able not only for hand cleaning, but removing grease and dirt from autor bile parts, cleaning copper, brass, zi etc., and can be used with either hot cold water.

"American" lubricating compound is gears, sprockets, chains, shaft bearin axles, slides, etc., and is said to be

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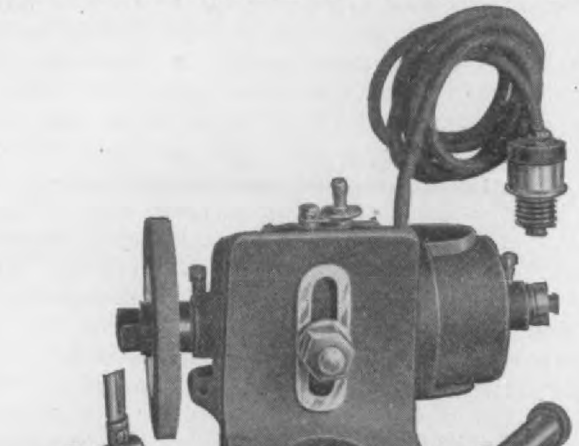
y placed on the market by the United States Electrical Tool Co., 1938-1946 W. th street, Cincinnati, Ohio.

The grinder is made with an angle plate, which is made to straddle the tool-post of lathe. The angle-plate is tightened by means of the tool in the tool-post. This

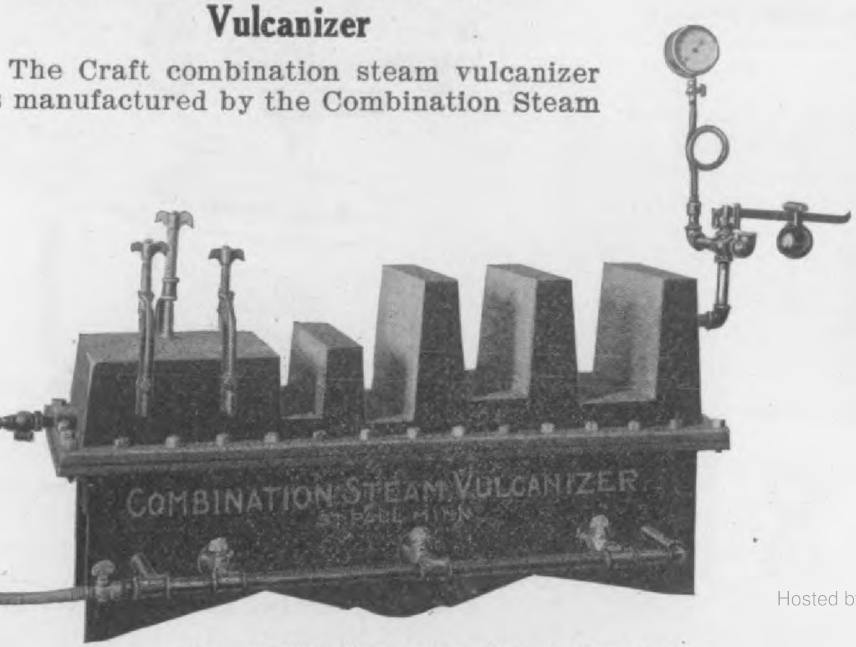


The "U. S." Centre Grinder.

ay of holding the motor makes the grinder very rigid and stops all vibration in he motor, as the motor is attached to a hank. The angle-plate grinder can be aised or lowered to bring same in line ith the centres or can be set at any anle. The bearings are adjustable to wear nd are dust-proof. The motor is of the ir-cooled type.

The "Craft" Combination Steam Vulcanizer

The Craft combination steam vulcanizer manufactured by the Combination Steam

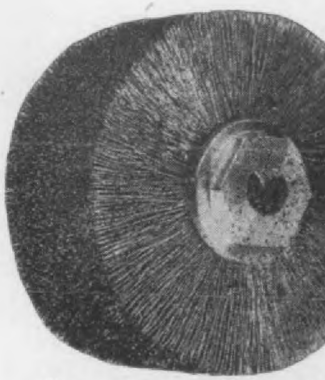


if preferred. It is claimed that this canizer will vulcanize a blowout in a in less than half an hour, and will blowouts in a casing from one inch twelve inches in length. The machi fitted with all sizes of moulds for s tube, Fisk and Clincher moulds and tubes. The price of the machine wit moulds is $150. It weighs about 375 Single tube moulds list at $5 to $9; tire moulds, $6 to $12; Clincher mo $6.50 to $12.50.

Mr. W. C. Craft, the designer of this canizer, has had many years' experi in vulcanizing. He built the first vulc ing plant in St. Paul, and in his stud the tire question, visited all the promi tire factories. His vulcanizer, he st is built for doing first-class work by grade workmen. He advocates first- tire repairing as the best economy, calls on tire repairers to help in educa the motoring public to this view, w would result in lessening the moto expense account in the long run.

"Osborn" Grinders and Roughin Brushes

The Osborn Mfg. Co., of Cleveland, is offering to automobile tire manufa ers and repairers a line of tire roug brushes and is also making a light gri which will be found of use in garage well as factories and machine shops.



The "Osborn" Tire Rough Brush with Brass Hub.

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rn out can be replaced by new ones at
s than half the cost of a complete brush.
e wire is made especially for this pur-
se and on account of the peculiar con-
ruction of the brush cannot break off,
t has to wear out. The brass hub brush
re illustrated is made with No. 30 and
sizes of wire and in 5 and 6½-inch di-
neters. The price of the 5-inch wheel
th either No. 30 or No. 36 wire is $10.80,
d of the 6½-inch wheel, either size of
re, $14.00. This company also furnishes
10-inch brush, with No. 35 wire and steel
b at $9.50.

The "Osborn" Grinder.

The Osborn grinder is suitable for all
nds of light grinding and lists at $12.00.
e dimensions are as follows: base, 9⅛
ches x 6 inches; bearings, 3 inches x 4
6 inches; length of spindle, 18 inches;
ameter of spindle ¾ inches; size of
lley, 4 inches x 3 inches; distance be-
een wheels, 10 inches.

he Garrecht Striping and Stencil Wheel

Automobile body and gear finishers in
th factories and repair shops will be in-
rested in the Garrecht striping and sten-
wheel, herewith illustrated, a simple

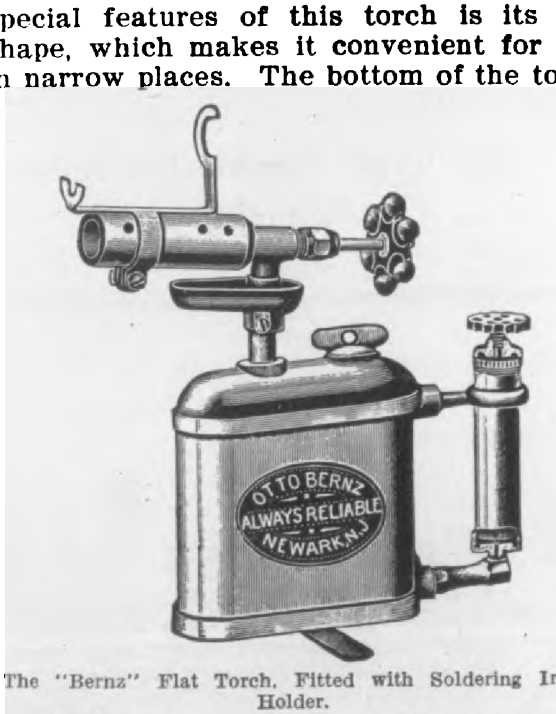
Garrecht Striping & Stencil Wheel and a few suggestions of its work.

unscrewed and filled with the color of
size to be used. A suitable marking wh
(4) is then inserted according to the
sign desired and the machine is ready
use. By slightly pressing the bulb
the color is ejected upon the feeder wh
(2) and passes from it to distribu
wheel (3) and from the latter to the ma
ing wheel by which it is transferred to
surface to be decorated. To take the
vice apart for cleaning prior to using
new color, the bulb is unscrewed, the s
plate (5) raised and the pins pushed
allowing removal of the rollers.

A few of the designs that can be p
duced by this wheel are here illustra
but are only suggestive as a very w
variety of designs can be produced by
Ten plain wheels and one ornamental
furnished with each device, the whole
fit listing at $3.50. Illustrations of vari
designs for which wheels are furnis
can be obtained by writing the manu
turers.

The "Bernz" Flat Auto Torch

The accompanying cut shows the Be
gasoline torch, gotten out specially
automobile repair work. It is manu
tured by Otto G. Bernz, 25 South 13th
Newark, N. J. The torch is equipt w
the Bernz never leak pump. One of
special features of this torch is its
shape, which makes it convenient for
in narrow places. The bottom of the to



The "Bernz" Flat Torch, Fitted with Soldering Iron Holder.

is fitted with supports which preven
from tipping over when set down. Th
supports are so arranged that they can
turned under the bottom when the to

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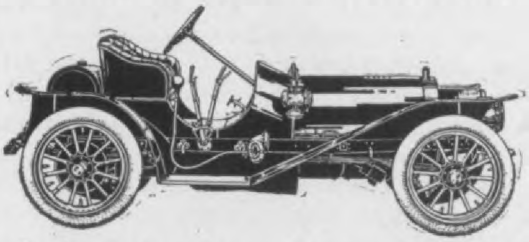
National

MOTOR CARS

"The All Ball-Bearing Cars"

The 1908 Line consists of

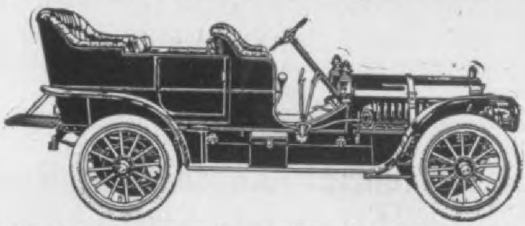
Two 4-Cylinder and Two 6-Cylinder Models



In Touring Cars, Limousines and Roadsters

each equipped with

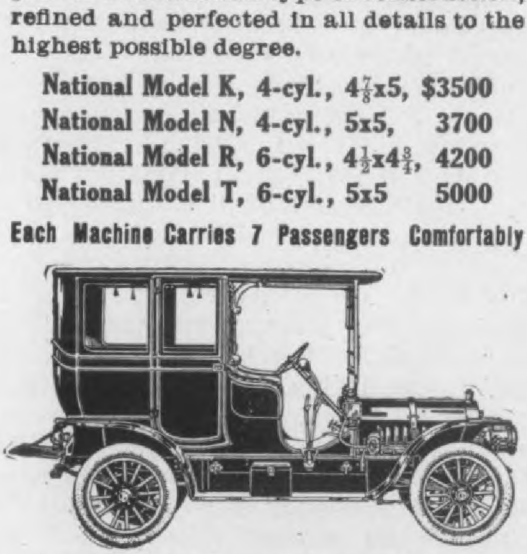
National Ball-Bearing Motors



The entire line embodies the tried and proven NATIONAL type of construction, refined and perfected in all details to the highest possible degree.

National Model K, 4-cyl.,	$4\frac{7}{8}$x5,	$3500
National Model N, 4-cyl.,	5x5,	3700
National Model R, 6-cyl.,	$4\frac{1}{2}$x$4\frac{3}{4}$,	4200
National Model T, 6-cyl.,	5x5	5000

Each Machine Carries 7 Passengers Comfortably

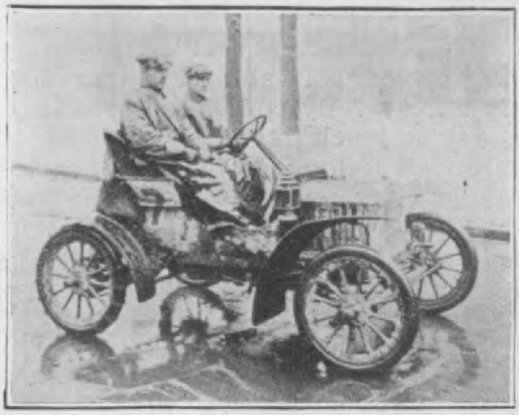


Write for Descriptive Matter

National Motor Vehicle Co.

THE BRUSH

Runabout



Ran 435 miles on 18 gallons of gasoline

In the Detroit Dealers' Endurance Run

That is 24 miles per gallon, and only the ordinary gasoline, as bought along the route. Over half the course was through mud, often up to the hubs. The only mechanical trouble was one bolt working loose. Not a thing was touched or adjusted, and the motor never missed an explosion, the car finishing in perfect condition, running better than when it started. This was not a special seasoned car, but came down from the assembly room three days before the run started. It ran in the same class with the big fellows up to ten times its price and rated horse power.

Brush also gets best percentage in the Third Annual Algonquin Hill Climb, Chicago Motor Club, on May 12th.

Talk doesn't count. Results and accomplishments do

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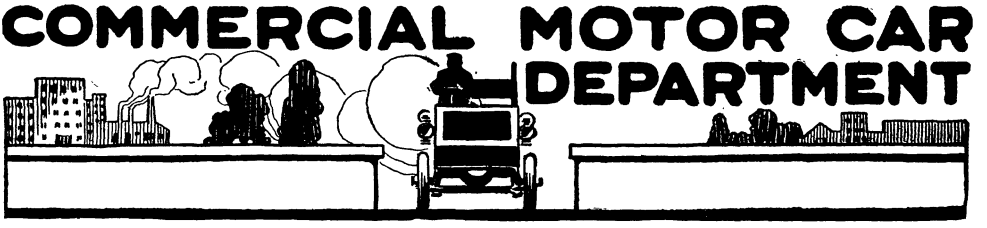
Brush Runabout Co.



Experience of Commercial Motor Car Users

Logan Truck Makes Impressive Demonstration

One of the most remarkable trips undertaken by a commercial motor truck was recently successfully completed by a three-ton model S truck manufactured by the Logan Construction Company, of Chillicothe, Ohio. Arrangements had been made to do some demonstrating with this truck at Cincinnati, Ohio, and it was decided to run the truck overland to Cincinnati loaded, in order to test its capacity and endurance in the most thorough manner.

Arrangements were made with the Sears & Nichols Canning Company, of Chillicothe, Ohio, to carry 100 cases of canned goods to be delivered to the A. Janszen Company, of Cincinnati. These cases weighed 45 lbs. each, making the load 4500 lbs., considerably under the truck's capacity, but still enough to test it over the rough and soft roads which must be traversed.

The truck started from Chillicothe on the afternoon of April 6th and reached Washington Court House at night, having made a distance of 32 miles in about 4 hours, despite the fact that in many places the road was being repaired and great care had to be exercised in going over it. One bad wash-out was also encountered, which was also passed without difficulty.

Some demonstrating was done at Washington and the next day the journey was continued to Dayton in the midst of a pouring rain, which made the roads very slippery. Dayton, 81 miles from Chillicothe, was reached safely, and Wednesday was spent there demonstrating for various firms. The start for Cincinnati was made about 7 o'clock Thursday morning and the 62 miles between that city and Cincinnati were covered in good shape, the truck arriving at the garage of the Cincinati Automobile Company at a little before 6 o'clock Thursday evening.

Not a tool had been touched during the trip, and most of the way had been made on the high gear. Friday morning was spent in showing the truck on the Cincinnati streets, and 1 o'clock Friday afternoon the truck was backed up in front of the wholesale storehouse of the A. Janszen Company and the goods delivered. The Janszen Company showed its appreciation by sending the following letter to the Sears & Nichols Company, of Chillicothe:

"The 100 cases of No. 2 sugar loaf baked beans forwarded to us on auto truck have reached us at 1 P. M. to-day in perfect condition. If it would be possible to have all our goods forwarded in this manner. we would surely highly recommend such deliveries, as it would avoid frequent handling and make deliveries to us in far better shape than those made by rail."

For ten days the Logan model S remained in Cincinnati, we are advised, taking all the hills and doing perfect work throughout day after day without requiring any attention of the mechanic other than oiling up. Perhaps the most remarkable demonstration was for the A. Janszen Company, when a load of 8700 lbs. of miscellaneous groceries, together with five men, were taken up Price Hill, one of the steepest and longest hills in the city.

Uses Cadillac Runabout in Real Estate Business

In his experience with the automobile in the real estate business, Mr. George W. Pettinger, of Asbury Park, N. J., finds the automobile to entirely satisfy his wants and to do all that can be expected. Besides using his car for business purposes he also uses it for pleasure driving, getting lots of pleasure out of it both in driving and in caring for it. His car is a single cylinder, 10 horse-power Cadillac runabout, costing $950. On an average 35 miles are covered per day. Mr. Pettinger has been using this car for the last two years. During last season his average monthly expenses for gasoline, lubricating oil, repairs on machine and tires amounted to $13.50. Last year Mr. Pettinger stored his car at a garage at a cost of $10 per month, but this season he is storing it himself, having recently erected a cement garage with slag roof, 14 ft. x 15 ft. inside, at a cost of $280. Recently Mr. Pettinger overhauled his car, taking it all apart down to every part. Upon examination it was found that the only part necessary to replace, after running the car two years, was a front sprocket and one new piston ring.

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ianapolis, Indiana, have been using a 24 I. P. Rapid gasoline truck for the past hree months in the wholesale cigar busiess, and so far it has given entire satisaction. The car replaced six horses and hree light, covered delivery wagons.

The car cost the company $1700. An avrage load of about 1000 lbs. is carried vith the car and 50 to 60 miles are covered aily. Three trips are made per day, with bout 50 calls per trip. Gasoline expenses verage about $15.00 per month and luricating oil $5.00. They store their car t a garage, for which $20.00 per month is harged. So far no expense has been inurred for repair work or repair parts. The perator's wages are $50.00 per month. hey have had no touble in securing a

sion a gasoline fire apparatus consis of a Knox truck chassis equipped wi Watrous pumping apparatus. Not fin on the market a motor fire apparatus actly conforming to their ideas, these purchased a Knox truck chassis and ha fitted with a pump made by the Wat Gasoline Engine Co., of St. Paul, Mi the chassis being the product of the K Automobile Co., of Springfield, Mass. Type D-6 chassis is used, having a 2 inder, air-cooled motor and plane change speed gear.

The pump on this machine is driver a separate engine of the four-cylinder with cylinders of 6-inch bore and 6-i stroke. The cooling is accomplished b

"Knox" Fire Fighting Apparatus used by Fire Department of Wayne, Penna.

river, having taken one of their former agon drivers and drilled him into runing the motor car. This concern has very ttle to suggest in the way of improveents in the motor car, as the features ound in this car about meet all requireents of its business. A summary of exenses and work done by the replaced orse-drawn equipment is as follows: Veight of load carried by each team, 500 s.; 2 trips per day; 30 calls per trip; ost of each wagon, $150; cost of each orse, $100; harness, $35.00 per set; averge monthly cost of care and feed of each orse, $15.00, and shoeing, $5.00; average onthly cost of repairing each vehicle, $5, nd monthly wages of drivers, $50. This

bleeder pipe from the pump, and amount of cooling is adjustable so as to readily adapted to the requirements service. There are two separate and tinct systems of ignition provided, con ing of two coils, two commutators, storage battery units and two sets spark plugs, so as to avoid delays in starting of the engine. The oiling is complished by a force feed oiler, driven, and practically the entire lubr tion of the engine is taken care of by system. The pump is of the rotary t is connected by clutch directly with the gine shaft and has a capacity of ab 400 gallons per minute. The pump is vided with an intake for the suction p

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and 100 feet with 1¼-inch nozzle. Us- 500 feet of hose, a stream of 150 feet length was thrown by the 1-inch nozzle. th 300 feet of hose a stream of water s thrown directly into the air and ainst the chimney of the Springfield ater Company's plant, as the motor eeded up, the stream gradually lifted foot foot until it mounted the top of the mney, 155 feet in the air.

The next test was with 300 feet of hose, th two connections to the pumping en- e, throwing two streams; both streams re thrown 125 feet. The crews of both ces of apparatus then mounted upon em and speeded over the road a dis- nce of one mile to a fireplug. Connect- up with this, where there was an ad- ional water pressure of sixty pounds, a eam was thrown at the end of 1000 t of hose a distance of 160 feet. With feet of hose two streams were thrown feet, an unusually good test for such apparatus.

In all of these tests spray was thrown considerable distance further than the ures given; but measurements were ken only to include a stream that would effective for fire-fighting purposes.

Taxicab Drivers' Licenses

Taxicabs are now being purchased by me individual cab drivers, who feel that e horse is not sufficiently up to date. ost of these men have had absolutely no eparation for the handling or caring for ch vehicles, other than a couple of su- rficial lessons in driving. Others will on follow in purchasing such cabs, and all probability some companies will even ake inducements to purchasers of this nd by offering cars on the instalment or eekly payment plan.

vehicle in congested traffic.

While the use of taxicabs is confined operating companies, the superficial quirements for obtaining a drivers' licen may not result in much damage, as t companies, for their own protection, hi none but competent operators. Howev if any individual cabby can purchase motor cab on easy payments, and aft a couple of short preliminary spins wi the agent obtain a licence to operate our crowded city thoroughfares, it is hi time more strict license requirements a inaugurated and the public somewhat sa guarded.

Taxicab Service for Club Members

The Union League Club, of New Yo City, has adopted the taxicab to exclusi of the horse; an action already emulat by several other exclusive Gotham clu The Union League Club cabs are for t use of members exclusively, except th drivers are allowed to pick up a fare wh making a return trip. Statistics have be prepared by the operating company sho ing that up to April 14, 1908, the ca have averaged $29.89 per day, while t business turned away by the club r limiting their use to members would e ily have increased this amount to fi dollars. Thomas cabs are used, and ha been giving the greatest possible satisf tion.

In Denver, Col., 15 real estate men Franklin motor cars. With but two ceptions all are Type G. One real estate m says that the real estate business in Den could not be conducted successfuly un modern conditions without the use of au mobiles.

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One-Ton Truck

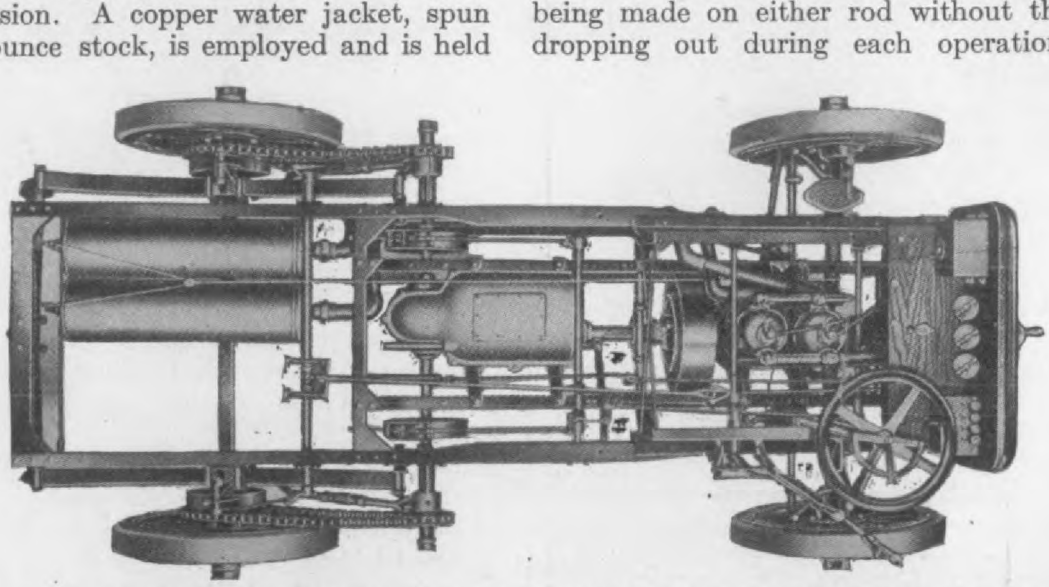
The chief aim of Mr. L. W. Coppock of the ppock Motor Car Company, Decatur, Indi- a, in designing the Coppock truck was to oduce a machine with as few parts as pos- le and a power plant that would be as iable in the hands of unskilled drivers as in e hands of the most experienced.

reamer, the pistons and rings being grou to size. The rings are of the Cartwri steam packing type, the outer being $\frac{5}{8}$ in. w by $\frac{1}{8}$ in. thick and split at 45°. This is master ring and under it are two eccent rings measuring $\frac{1}{16}$ x $\frac{1}{8}$ in. All the rings held by a single pin passing thru the lap of

The "Coppock" Model A, 1 Ton Truck.

The power plant of this truck consists of a o-cylinder, two-cycle motor of the three rt type, with cylinders of $4\frac{1}{2}$ in. bore by 5 stroke. The cylinders are cast without ter jackets and the exterior of the cylinder ound the jacket is machined in order to ure a perfectly round cylinder and to equal- expansion. A copper water jacket, spun m 16 ounce stock, is employed and is held

master ring and between the two eccentr An allowance of $\frac{1}{16}$ in. in depth of the r groove over the height of the two rings be made to facilitate lubrication. The cra case is of special aluminum alloy, the lo half being cast in two pieces and flanged gether at the center to permit of adjustme being made on either rod without the sh dropping out during each operation. T



The "Coppock" Model A, 1 ton truck chassis; 2-cycle, 2-cylinder, 20-24 H. P. motor, 4½" bore by 5" stroke; force rication; 3-speed forward and one reverse progressive sliding gear; internal expanding cork inserted clutch; double in drive; solid rubber tires; 87" wheel base; 60" tread; weight 2900 pounds; price of chassis, $2500; equipment: ric side lights, complete set of tools and horn.

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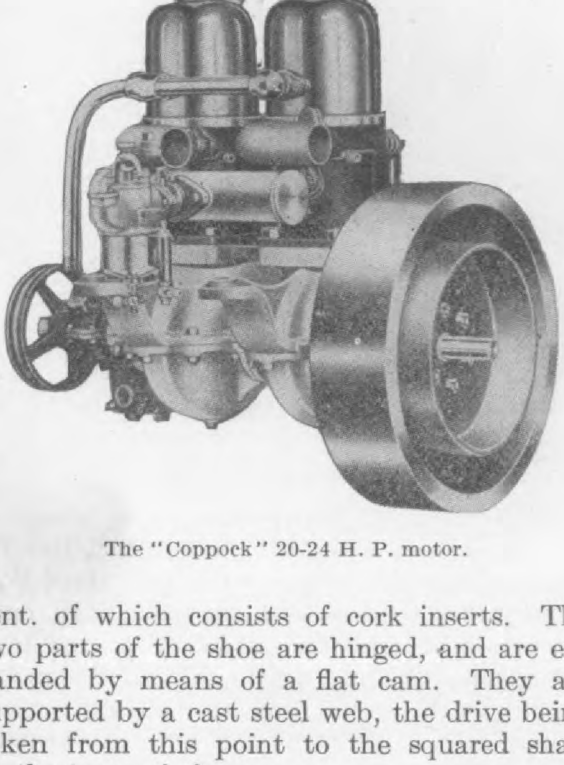
on pump and the timer. The timer shaft mounted on three ball bearings, due pro-ision having been made for adjustment in ase of wear. The radiator is placed forward nder the foot boards and holds 176 lineal et of tubing.

The clutch is of the internal expanding ype, consisting of a bronze shoe 10 inches in ameter and having a $2\frac{1}{4}$ inch face, 8 per



The "Coppock" 20-24 H. P. motor.

nt. of which consists of cork inserts. The vo parts of the shoe are hinged, and are ex-nded by means of a flat cam. They are pported by a cast steel web, the drive being ken from this point to the squared shaft the transmission.

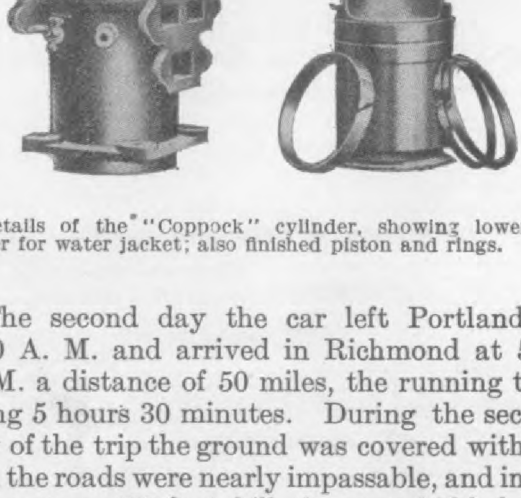
Lubrication is by means of a gear-driven, rce-feed oiler which provides a positive eans of lubricating the piston and connect-g rods. One oil lead terminates at a boss the outside of the cylinder, communicating th a groove $\frac{3}{16}$ inch wide and $\frac{1}{8}$ inch deep the cylinder. For the lubrication of the d end bearings the piston pin is hollow two-irds of its length. A second oil lead registers th this hollow end. The wrist pin is drilled that when the crank is in a vertical position e hole registers with a tube running down e channel of the rod to the large end. This stem has been designed to run with a min-um amount of oil and no waste. Grease is ed to lubricate the crank journals and is fed om cups placed on the dash, the leads con-ting of $\frac{3}{8}$ in. gage copper tubing. Ignition by a storage battery and with Apple Gen-

weight of the car is 2,900 lbs. The chi lists at $2,500. The equipment furni includes two electric side lights, comp set of tools and horn. Any type of body be built to order.

ON THE ROAD.

Recently a trip was made from Deca Ill., to Cincinnati, Ohio with the first Copp truck completed by the concern. Prev to this trip this truck, it is said, travele least 20,000 miles. The distance trav on the trip was 156 $\frac{4}{10}$ miles and the same made in 18 hours running time.

On the first day the car left Decatur at A. M. Feb. 5th, during a downpour of which lasted all day so that the ground covered to the depth of 6 or 7 inches slush of snow and ice. Portland was reac at 3.40 P. M. a distance of 32 miles, with running time of 5 hours, the balance of being consummed by stops along the line to the inclemency of the weather.



Details of the "Coppock" cylinder, showing lowe tainer for water jacket; also finished piston and rings.

The second day the car left Portland 7.30 A. M. and arrived in Richmond at P. M. a distance of 50 miles, the running t being 5 hours 30 minutes. During the sec day of the trip the ground was covered with and the roads were nearly impassable, and in ing over a 450-foot hill the car skidded went over a 12-foot embankment, but a chopping down some trees and a fence it pu itself out again on to the road without assistance. The third day the car star from Richmond at 8.15 A. M. and arrived Cincinnati, at 11 P. M. a distance of 7 miles, in a running time of 7 hours and minutes.

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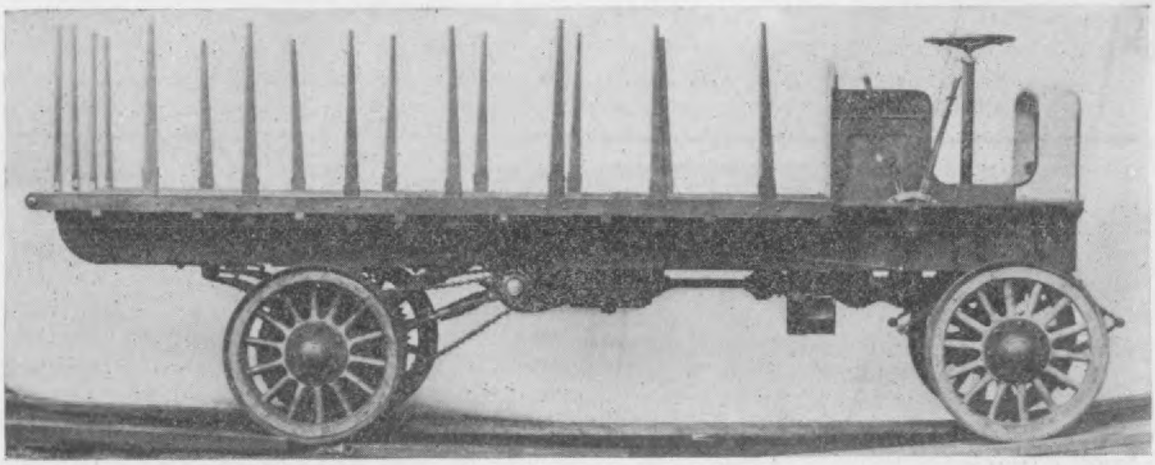
son a 2-3 ton truck at $3500 and a $750 iness runabout with a load capacity of pounds. While providing such practi- features as are necessary in a busi- s vehicle this company has also in- porated in the design of the Chase ck such features of pleasure cars as venience of control, protection from

tions a two-horse team will earn abo $5.0 0. This unexpected economy is n only due to the high efficiency from a cooling but also to the method of contr of the Chase engine which eliminates th usual waste of a 2-cycle motor. As is we known when throttled beyond a certa point a 2-cycle engine is likely to fire i

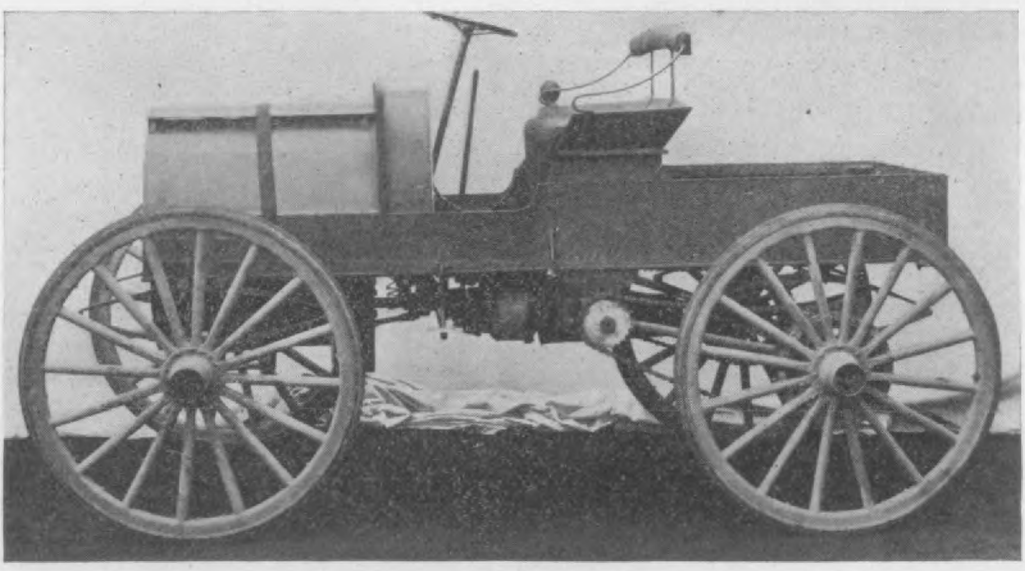


The "Chase" 2 to 3-ton truck. Price $3500.

ther, protection from mud and accesi- ty of the various parts. Both machines driven by 2-cycle air cooled motors, -cylinder motor being used in the busi- s runabout and a 4-cylinder motor in truck.

he 2-3 ton rating given is the load cap- y of the truck under fair conditions of d bed. Every part of the machine is lt to stand with perfect safety a 50 per

regularly and discharge much unburne fuel thru the muffler. When the Cha truck is running with full power on, the driver throttles the motor the valv closes to a pre-determined point at whic the power of the engine is reduced b all cylinders receiving sufficient charge fire regularly. As the hand throttle clos still further, a valve in each intake pi shuts off the supply of charge to the cy



The "Chase" Business Runabout, Price $750.

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t. overload, the limiting conditions of

inders beginning with No. 4 so that t

aste of fuel.

The Chase truck weighs 5000 pounds and s a wheel base length of 128 inches while e gauge is 56 inches. The platform mea- res 12x5½ feet. Front tires are 4x36 ches; rear 3x36 twins. The motor cyl- ders are 4½x5 inches and develop 30 rse power. Drive is by side chains and progressive sliding gear gives three for- ard speed changes and a reverse. A aymond brake operates on the jack shaft d expanding brakes are used in the rear bs. Front springs are full elliptics and e rear ones semi-elliptic. Jump spark nition is employed. The high gear speed 8 miles per hour. Twenty gallons is the soline tank capacity. Spark and throttle ntrol levers are on the steering post; one dal disconnects the clutch and another e jack shaft brake while the speed ange gear and the emergency brake are erated by side, hand levers.

The Chase business runabout supplies e demand for a light delivery wagon of all load capacity which is adapted for nning over unpaved streets and country ads, a machine of simple construction, eat reliability and low cost of operation. e body is similar to a democrat wagon arranged that the entire space between 56 inches. A 2-cylinder, 10 H. P. Chase cooled motor is used and a planet change speed gear, while drive is by s chains. Wheels are 40 inches in diame and are fitted with 1⅝-inch Firestone s wire solid tires. Spark and throttle lev are on the steering wheel. Full ellip springs are used all round. The gasol tank capacity is seven gallons. This chine is capable of speeds up to 15 mi per hour and lists at $750.

Specifications have been sent out by War Department covering the construct of a supply wagon for use by the Signal Co of the United States Army. The specif tions for this supply wagon specify that motor must be 24 H. P., air-cooled.

The H. H. Franklin Mfg. Co., through Quaker City Automobile Co., its Philadelp dealers, has just sold one of its 2000-pou trucks to the Thacker Coal & Coke Co. T truck will be fitted with wheels with st flanged rims and will be run upon railr tracks throughout the Pennsylvania mi and shipping yards of the Thacker Co. T Franklin truck it is said was given prefere on account of its air-cooled motor.

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Times Building, New York, N. Y.

We furnish Business Automobiles of all types and makes—machines exactly suited to any class of service.

We especially call attention to the SAFIR Motor Truck manufactured in Zurich, Switzerland. Descriptive circular and record of past performances mailed on request.

5 TON HEWITT TRUCK

CUSTOMERS ALL SATISFIED

1000-Pound Light Delivery. Simplest car Made. Best Record

HEWITT MOTOR CO., 10 E. 31st St., New York City

H. H. Franklin Co. to Manufacture Trucks Extensively

The H. H. Franklin Manufacturing Company has begun the manufacture of commercial motor vehicles on a large scale. In a quiet way the company has been experimenting for several years, light trucks and delivery wagons having been used in the Franklin Company's own business for

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The Different Kind of Truck

Write for Full Particulars, Specifications and Prices.

INTERNATIONAL MOTOR CAR CO

514 N. Broad St., Philadelphia, Pa.

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forms of light work, a 3000-pound tru

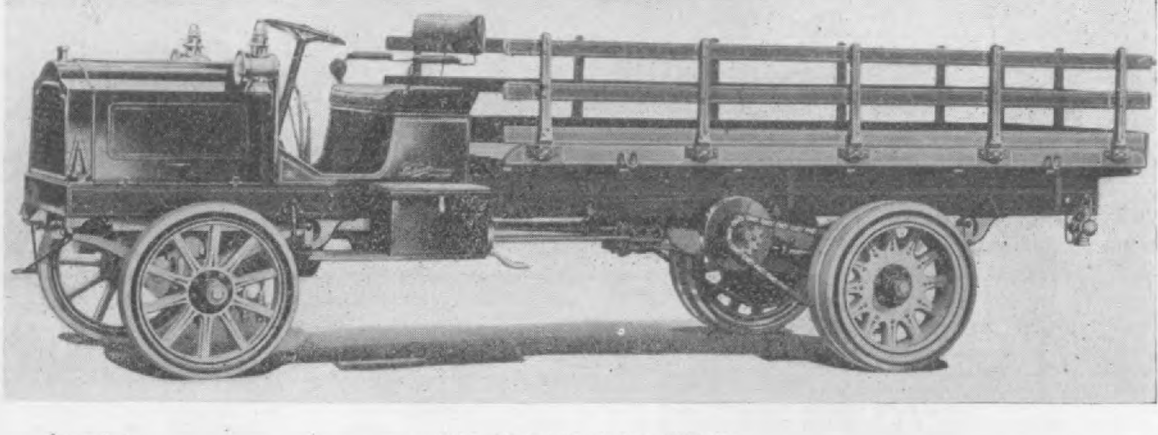
ruck with a load capacity of three tons, he result of five years of careful develop- nent of truck principles, and reflects also he successful experience of the maker n the pleasure car field. It is service- ble in a wide range of hauling, as it pro- ides large carrying space for light, bulky nerchandise, as well as for heavier goods.

The wheel base of the Packard truck is 44 inches and the tread is 68 inches. The ront wheels are 34 inches in diameter, nd the rear wheels 36 inches. The for- ner are equipt with 4-inch solid tires, vhile the latter have 4-inch dual solid ires. The heavy front axle is hammer- orged from solid steel, with exceptionally eavy, large steering knuckles. The prings are semi-elliptical both front and ear, and have been chosen particularly for heir special purpose in respect to all de-

automatic governor, which regulates spark advance and the motor speed.

The clutch is of the Packard inte expanding type. Transmission is by a peller shaft, and a Packard type, t speed and reverse sliding gear s change set, combined with the differe in a rigid housing on the counter s This set corresponds in principle to well-known Packard rear axle, or br assembly. Final drive from the cou shaft is by sprockets and side chain the rear wheels.

The regular brake is operated b pedal, and acts on internal drums at ends of the counter shaft. The emerge brake is operated by a hand lever and on internal drums on the rear wheels. emergency brake lever is provided wi notched quadrant for locking the br



The Packard 3 ton Truck.

ails, such as kind of steel, width, number f leaves, curvature and length. The front prings are 45 inches long and the rear nes 50 inches.

The main frame is 39 inches wide and s length, back of the driver's seat, is 148 nches. The frame is made of solid steel f channel section, all joints being cold veted. Steering is by a worm-and-sector ear operated by a hand wheel.

The motor is four cylinders, cast in pairs, ith integral water jackets. The bore of e cylinders is 4½ inches and the stroke ½ inches. The carburetor is of the Pack- rd type, float feed, with automatic auxil- ry air inlet and is warm water jacketed. gnition is by jump spark, with the cur- ent supplied by a gear-driven Eisemann agneto and an imported storage battery r reserve and for starting on the switch. transformer coil for the magneto and a ibrator coil for the battery are in a box n the dash, with a lock switch between.

The motor is lubricated by splash from

whenever necessary. The gasoline tank pacity is 21 gallons; the water sys holds 4 gallons, and the oil reservoir gallons.

The platform back of the driver's is 6 feet by 12 feet 4 inches, giving a rying area of 74 square feet. The floo of hard wood, with iron protecting st At the sides there are 2¾-inch angle ir The height of the floor from the gro is 42½ inches. The standard crib cons of five stakes at each side and three inch slats. The driver's seat has a pacity of two persons, and is upholst in black leather, the cushion being tu and the back and arms plain.

In the standard finish the entire b driver's seat, bonnet and frame are pai Packard blue, striped with cream yel The entire running gear is painted cr yellow, striped with Packard blue. tool equipment includes a tool box, se wrenches, oil cans and jack. The appu nances are side and tail lamps, horn, st

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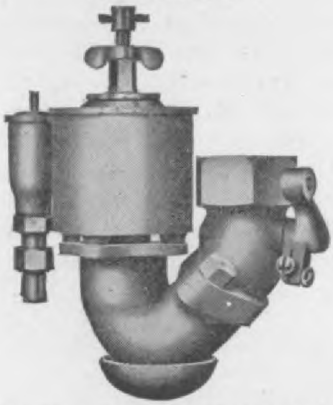
Carburetor

1908 MODEL



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Stationary Hit and Miss, or Throttling Type; Four Cycle gh Speed Motors, all Types; Two Cycle Two-Port; vo Cycle Three-Port; Convertible 2 or 4 Cycle.

FIT ANY MOTOR. Gasoline Connection Changeable 3 Points. 45 degree Flange Connection Permits of Top or le Outlet.

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are never out of true cannot collapse

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The Ideal Commercial Car

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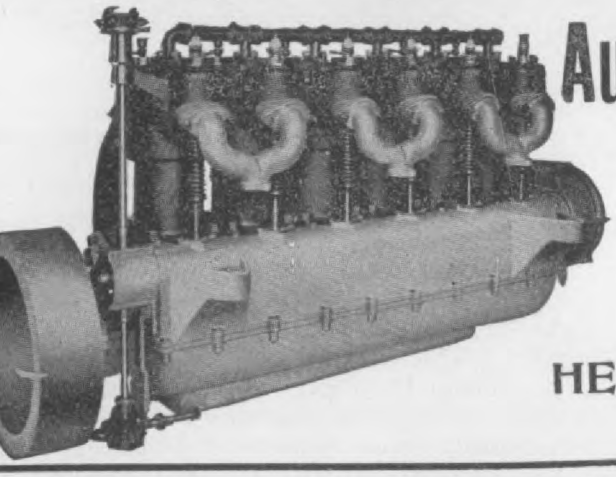


Automobile and Truck MOTORS

16-18 H. P.
24-30 H. P.
45-55 H. P.

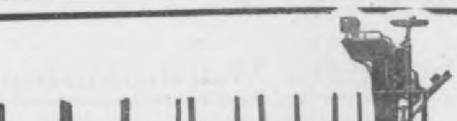
HERSCHELL-SPILLMAN CO.

W. Tonawanda, N. Y.

Parsons' Manganese Bronze Axles

Stronger than steel. Thousands in use. None have ever broken.

The Wm. Cramp & Sons Ship and Engine Building Company
Philadelphia, Pa.



The 4-wheel drive that never stalls

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In addition to the standard body, the ackard Company is prepared to submit signs for, and quotations on, special dies or special finishes for any particular quirements. Also, the company will sell e chassis complete without body, so that e customer may fit to it a body of his n design. When the chassis only is furshed, it is painted in the "lead."

The price of the complete truck with andard body, equipment and finish, is 850.00, f. o. b. factory.

this year of a new construction method signed to overcome a most frequent ca of trouble in all makes of tires—the bility of the tread to blister and separ from the carcass as a result of hard d ing.

It was believed that this general feat of weakness was due to the fact that process in universal use of hand-wr ping the tread onto the carcass prior vulcanizing did not apply uniform tensi and that therefore at those points wh

Great Arrow 45 H. P. 4-cylinder Fire Chief Car sold by Geo. N. Pierce Co., of Buffalo, N. Y., to the aul, Minn., Fire Department thru the Pierce dealer in St. Paul. The body of this car is built especially e purpose, having a disappearing rear seat. The rear under portion of the body is arranged to accomodate boo elmet and other paraphernalia of the fire chief.

The New York cab drivers have clubbed gether and are making an exhaustive test motor cabs, including statistics of operation st, earning capacity, public demand, and preciation charges. All of this information s now been collected with exception of the preciation charge, which will be determined thin the next few weeks.

It is reported that a new beach has been scovered at Duluth, Minn. which is as od for short distances as Ormond.

the bandage was least tight the union imperfect.

The new method substitutes mechan power for muscular power in this v operation, assuring it is claimed not o absolute uniformity but much higher sion in the wrapping, and consequent fect union between the tread and body every tire. The machine which is hig ingenuous, was invented by the experts the Pennsylvania Rubber Company, use in its this year's product.

AUTOMOBILE PARTS GAS ENGINE PARTS

Anything turned from solid bar or tubing.
Case-hardening and grinding.

ALAM Standard Material ALAM Standard Workmanship

State of Georgia. A company has been organized with ,000 capital stock.

'he Auto Delivery Co. has commenced operations at ısing, Mich. The new company delivers groceries for r firms on Washington avenue, and has several other spective patrons who are waiting to see how the scheme ks out.

'he Auto Transit Company, which operates the Broad et bus line in Philadelphia, has been reorganized the new name will be, "Autobus Company." The k of the Auto Transit Company will be exchanged re for share for that of the new company, the capital which will be the same, $1,000,000. The new com- y has also an authorized issue of $150,000 6 per cent. ateral trust bonds. $100,000 of these will be issued once, and they have already been underwritten. The ceeds will be expended in the purchase of twenty new and the payment of the company's present floating t and to provide additional working capital.

uffalo Sight Seeing Company has been formed at falo, N. Y., with $50,000 capital stock to conduct a or livery and sight seeing business.

he Columbus, Urbana and Western Traction Co., of umbus, Ohio, recently started an automobile line at terminus of its electric street railway line, at Fish- r's mill, the automobile line running to Dublin and liard. A 20-passenger machine is used.

he Chicago Auto Livery Co., has embarked in the or livery business in Chicago, Ill., using White mers. Its headquarters are at 2920 S. Park Avenue.

etroit city officials expect to save $100,000 a year by blishing in a central location an automobile fire com- instead of increasing the number of men in each pany, for which $180,000 recently was appropriated. answering all alarms the motor company will provide for companies shorthanded by leave of absence or ness.

welve Rapid Sight Seeing Cars are used by Seeing Salt e City Company, of Salt Lake City, Utah, each car ying up to 18 persons. Four trips are made daily.

he new stage line running from Eureka, Cal., south connect with the railroad, is boosting Humboldt nty, which hitherto has been cut off from the outside d, except by means of water transportation. During months of the year and as much longer as possible, ther permitting, five 7-passenger White steamers will run. The actual running time, according to the dule, between Eureka and San Francisco, will be hours for the night trip and 34 hours on the day- t trip.

oggins and Coggins, of Colorado, Texas, have pur- ed four 7-passenger Thomas cars and established daily mobile service between Colorado, Markel and Sweet- r.

n automobile stage line has been established between county (Cal.) resorts and Napa City by A. R. ith, manager of the Auto Cab and Touring Car Co., San Francisco.

xicab Co., of California, has been organized at Los eles, to provide a motor cab service. Ten machines be placed in commission within 30 days and 15 as soon as possible.

urham and Chapel, N. C., are now connected by an mobile line. The car used carries 30 passengers and es 3 trips per day.

. F. Buchanan, J. A. Street, C. C. Carpenter, J. R. gherty and C. L. Barber, have formed a company operate an automobile line between Tucumcari and rillo, New Mexico.

e Overland Stage Co.'s line between Eureka and San ncisco, Cal., has been purchased by N. H. Pine, G. Noe, F. W. Smyth and W. Dodge, who have nged the style to Overland Auto Company.

of the Locomobile Co., of America, and will be loc at the factory at Bridgeport, Conn. He was form with the Electric Vehicle Co.

W. E. Dolson, of the late Dolson Automobile Co., been appointed assistant sales manager of the A Automobile Co., of Grand Rapids, Mich.

The Harrisburg Taxicab and Baggage Company, of risburg, Pa., has been recently incorporated with a pital stock of $5000.

Hollywood, California, has ordered its second n fire engine, a 15 H. P., 2-cylinder, car, with a 40 lon chemical tank, 800 feet of hose, four sections of der and a full complement of axes, picks and t It accommodates, also, 8 men.

The Federal Taxicab Co., has established a tax service at Washington, D. C., using Thomas Taxi E. R. Thomas is president of the company which is corporated under New Jersey laws, with an autho capital stock of $250,000.

E. P. Blake & Co., are establishing a taxicab se in Boston and expect to have 15 cabs in operation

The Irvington, N. J., fire department, has ordere motor fire apparatus of the Knox Automobile Co. It carry two chemical tanks of 25 gallons capacity 1000 feet of hose and ten men.

So successful financially has the New York Tax Company been that a new 4-story brick garage wil opened on September 1, in West Fifty-seventh Street, tween 11th and 12th Streets on a plot of ground x250 feet. The building will contain the business o repair shop, storehouse, and garage of the company. T will be elevators and runways, and a block signal sy will be used for the cabs. This is the French sys and engineers are now working to perfect it. More 900 machines may be stored in the building. 500 ditional machines were recently ordered.

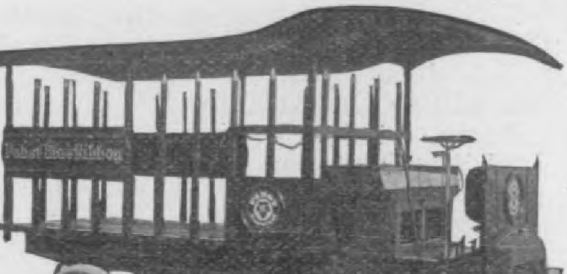
Norwalk and New London, Ohio, are to be conne by a motor bus line running via Olean and Fitch The line will later be extended to Ashland and Gr wich. Combination buses will be used, accommodatin passengers each besides baggage.

The Pennsylvania Taxicab Co., recently incorpor under New Jersey laws, will soon commence opera 100 taxicabs in Philadelphia.

The Taxie Cab Co., is the name of a new company corporated at Los Angeles, Cal., for the purpose of ope ing a taxicab line in that city.

Three local capitalists of Wilkes-Barre, Chas. N. L land, John Flannigan and T. A. Wright, recently organ a company to operate a bus line. The buses will commodate 16 passengers each.

In view of the difficulties surround the successful operation of motor trucks relatively unskilled hands, it is interest to note that the Oscar Lear Automob Company, Springfield, Ohio, has made Atwater-Kent Spark Generator the sole nition outfit on its vehicles instead of conventional type of coil equipment. T action is explained by the absolute nec sity of the truck performing its duty ste ily and without even "trifling" delays su as the owner of a pleasure car would mind.



THE MEISELBACH TRUCKS

One, Two and Three Tons

Friction Drive, Perfectly Supported. All Wheels on Timken Rollers. Powerful Brakes. The Simplest and Easiest Controlled Trucks yet shown. Thirty Horse Power.

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MOTOR CYCLE DEPARTMENT

A 1600-Mile Motorcycle Run

A motorcycle event, which for size and importance to the sport has never been equaled in this country, has been planned by the newly organized Western District of the Federation American Motorcyclists. At the end of the National Federation annual meet, which will be held in New York early in July, the Western District members will start for Chicago awheel, and will follow a devious course, taking in all the large cities in the east and middle west. If the present plans are carried out, the trip will cover about 1600 miles, and will take not less than ten days. The finish will be enlivened by a Western District championship meet at a track in or near Chicago. Probably the Harlem or Libertyville track will be chosen. The tour is proposed in order to arouse interest in the two-wheeled vehicle, and to demonstrate its efficiency and reliability under hard highway conditions demanding considerable sustained speed. The idea is said to be favored by the manufacturers generally, and virtually all of the important makes of motorcycles will be represented.

The touring committee of the Western District, F. A. M., under whose management the run will be undertaken, consists of I. F. Alofsin, of Chicago, chairman; Irving R. Hall, John F. Ball, of Milwaukee; W. E. Rheutan, of Aurora; John T. Fisher, Edward A. Thiem, of Minneapolis, and John S. Woodworth. Rules similar to those used on Glidden automobile tours will be drafted for this occasion.

The F. A. M. annual endurance run will be held June 29 and 30 at New York City, and the annual meet during the four days following.

A new motorcycle club has just been formed in New York, called the Concourse Moto-cycle Club. Arthur N. Morse, president; Chas. A. Busch, Vice-President; F. Larsen, Treasurer; W. A. Fischer, Secretary; Maurice P. Sullivan, Captain.

It is said that a physician of Olympia. Washington, is still using a 1900 model motorcycle in making professional calls, the machine being the 21st turned out by its maker. This speaks well for the durability of this construction.

Motorcycle Races at Narragansett Park

Narrangansett Park, one of the finest race tracks in the country, will be the scene Memorial Day of a motorcycle race meet, under the auspices of the Providence Motorcycle Club. A sanction has been granted by the Federation of American Motorcyclists. It is proposed to have the finest list of special events ever held in America, in which the fastest riders in the country will compete and to hang up a string for this meet that will attract motorcyclists from all over the country.

"American" Belts

American Belting & Tanning Co., 135 Oliver street, Boston, Mass., manufacturers of motor cycle belts and leather belting of all kinds, advise us that their customers report best results from 3-ply motor cycle belts as this type of belt does not stretch tho pliable and otherwise thoroly satisfactory. Some of this Company's motor cycle belts it is said have lasted almost 3 seasons, a demonstration of durability that is exceptional.

This Company's V-belt for motorcycles is made with the inside ply smaller than the outer plies, so that there is no compression of the inside plies when the belt is wound around the pulley, thus strains are eliminated which would otherwise result in the rapid deterioration of the belt. All the leather used by this company is tanned by a secret process, which is claimed to make the leather absolutely insoluble and the best French steer hides are used.

Richmond, Virginia, is the latest city to adopt motorcycles for the use of the police department, having recently purchased two "Indians" for this purpose.

A motorcycle pleasure club of one hundred members has been formed in Milwaukee, Wis., and it is claimed that there are not less than one hundred and twenty-five other motorcycles in daily use in that city. Chief Ahern, of Kansas City, has been advocating the formation of a police motorcycle squad for a long time, but he was thwarted last season by oppositon in the ranks of the councilmen.

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Club and Party Runs Should be Encouraged

The value of ocular demonstrations and their effect on the public is frequently lost sight of. The individual is largely influenced by what the majority of people, or a goodly number of them, do or refrain from doing. This fact is quite noticeable in the season's changes of clothing, particularly at the beginning and ending of the straw hat season. Few individuals have the temerity to act in defiance of custom and most individuals want to do the thing that is popular.

This characteristic of human nature should be taken advantage of more generally than it is in widening the circle of motorcycle users, and this can best be done by working up club and party runs, a popular diversion indulged in by riders of pedal cycles some years ago, and one of the strongest influences in enlisting new riders. The healthfulness of open air exercise, especially rides into the country; the advantage and enjoyment of pleasure gatherings of congenial persons; the educational advantage of touring and all other attractions of cycling, motor cycling and automobiling are well known and readily admitted and it is a good thing to write about the various phases of such pastimes, but the difficulty is to get people to act on the suggestions of the writers who give us such attractive pen pictures of the joys of touring. It is one thing to show people the advantages of some ideal line of action but unless the opportunity is brought right home to them they are likely to agree to these arguments—and forget them. Hence the club or party run of motor cyclists is the most potent force in gathering new riders into the fold. A pedestrian seeing a party of a dozen or more, possibly a hundred, motorcyclists whizzing past him without muscular effort bound for a pleasant day or afternoon in the country will be more forcibly convinced of the advantages of the motor cycle than by reading all the literature in creation on the subject. Devotees of the sport of motorcycling, dealers in motorcycles and even manufacturers should, therefore, do all in their power to work up club runs, or where no clubs exist, party runs so that every community in the country will in time have demonstrated to it in the plainest and most impressive manner the joys and advantages of motor cycling. The manufacturer is of course not in a position to do much toward the development and encouragement of club and party runs, this being essentially a local matter; and the individual rider being concerned more with his own enjoyment of motor cycling than in increasing the sale of motor cycles generally cannot be expected to do much in the matter; hence it rests largely with the dealer and after all he is the most concerned.

Motorcycles Proved their Usefulness in Briarcliff Race

The recent Briarcliff automobile races gave an opportunity for displaying the usefulness and adaptability of the motorcycle to a wide range of work. Motorcycles carried messengers and others quickly and surely to various parts of the course before and during the race and served the purpose much better than 4-wheeled vehicles could have done. The great speed attainable by the motorcycles, their ability to find good paths on almost any kind of a road and to take corners at high speed without danger of overturning are all factors in favor of the use of these machines in such service. At half-past six on the morning of the race a defect in the bridge across Murray's Creek was discovered by one of the motorcycle men, who reported the matter to headquarters and piloted a repair car to the scene. When the wheel of the Maja broke a motorcyclist quickly reported the accident, so that a doctor was promptly dispatched to fix up the wounds of the driver and his mechanic. Two cars were ditched at Kensico and help was quickly brought by the motorcycle squad. Where race officials and others could not be reached by telephone the motorcycle was used in getting important messages to them, and in many similar emergencies the motorcycle proved its dependability and adaptability in the Briarcliff event.

Motorcycles for Chicago Police

Chicago, which up to the present has enjoyed the distinction of being the only large city in the United States that does not own either bicycles or motorcycles for police use, has experienced a change of heart. Chief Shippy has at last decided that the only means of curbing lawless automobilists is by use of motorcycles, and a special force of mounted officers, which will be known as the automobile squad, will shortly be placed on the streets. Chicago automobile dealers have promised the chief to co-operate with him in his campaign against the reckless driver, and President Leinen, of the Chicago Automobile Club, will organize a committee of ten from the leading clubs to aid in the effort to make the city's streets and boulevards safe.

Remarkable Motorcycle Hill Climbs

Speed of sixty-five miles an hour up hill was shown at Danville, Ill., recently in a motorcycle hill climb in which a number of Chicago and Indiana riders competed. The winner, C. W. VanSickle, of Hammond, Ind., climbed Langley Hill, a 1600-ft. rise, in :26½ in one trial and :27¼ in another. Several automobiles competed, but the motorcycle showed more speed than its more powerful rival.

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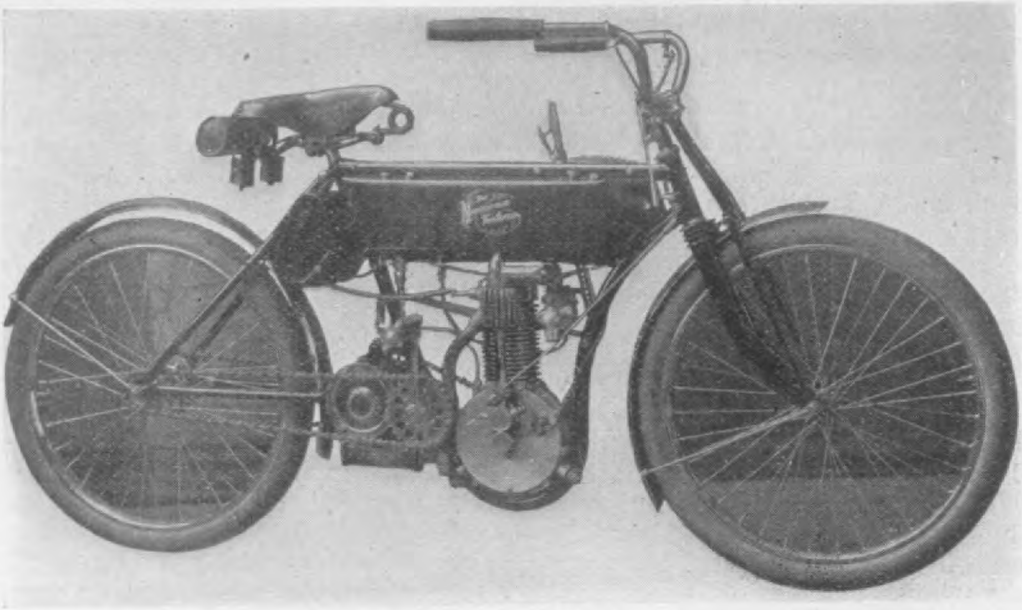
otor Cycle Co., 315-319 South Seventh
eet, Minneapolis, Minn., is responsible
its introduction. This machine is
ven by a 3 H. P. Thiem motor, and is
presentative of modern practice in mo-
cycle building in all important features,
t of course the feature that will attract

engages the cone shaped, leather faced
face of the internal gear, and holds
fast, thereby producing the reduced ge
through the small pinions and the revo
ing spider which is connected to t
sprocket outside of the case. This clut
may be set to grip firmly or to slip sligh



The Minneapolis 2-Speed Motor Cycle, Price $235.

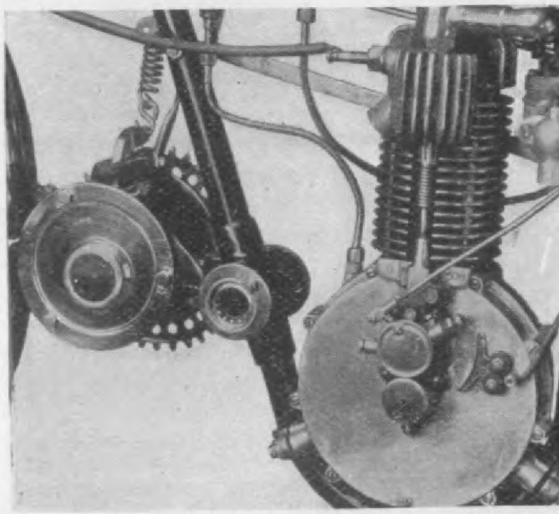
ost attention is the two-speed device, an
terior view of which is here shown.
e "Michaelson" transmission, as this de-
ce is called, consists of a small planetary
ange gear of special design placed on the
untershaft, which is journaled within the
lindrical casing. The journals are of
e approved ball-bearing type and eccen-
ically situated in the head plates to
rmit chain adjustment. The adjustment
the chain is accomplished by loosening
ree bolts, the heads of which are shown
cut, and turning the head plates to
ght or left as desired. This movement
es not affect the working of the pronged
ifting lever which is pivoted to swing
o ways.

The device on the countershaft consists
an internal gear, loosely mounted on the
aft, four small spur gears on a spider
eshing into it, a center or drive pinion
yed to the shaft, two individual clutches
d a pronged lever that operates both
utches.

The high speed clutch is held normally
place by a coil spring around the shaft
d always revolving with it, thereby elim-
ating friction. The friction from the

as the rider desires, by use of the ratc
lever.

The transmission case is oil-tight a
when carrying one-half cup of oil is s
ficient for 75 to 100 miles' lubrication.



The Michaelson 2-speed transmission used on the
neapolis Motor Cycle.

The main bearing on right side
screwed into the head plate and held

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a special gray iron and the cylinder is ored, reamed and ground to accurate size nd to a true and smooth finish. Bushings re all of hard bronze. Shafts, crank n, piston pin and gears are of special eel and are hardened, ground and polhed to a high finish. The connecting d is a drop forging and the crank case made of special nickel-alloyed aluminum. The motor rests in a loop of the frame nd the transmission casing is a part of e frame, very substantial construction eing employed at this point. The chains sed are ¼ x ⅝ pitch roller chains, the speed device being carried on a counteraft. Wheels are 28 inches in diameter; res, 2¼-inch G & J or M. & W. Lurication is by sight-feed oilers feeding to e transmission case and motor. Control in the grips, the right grip controlling e spark and the left operating the throte. The speed change lever works on a ctor attached to the top tube of the ame near the head.

The wheel base is 55 inches. Speed can varied from 6 to 45 miles on the high ar and from zero to 15 miles on the low ar. The weight of the machine is 140 s.; the price $235. Some option is given equipment, high-grade standard goods ing furnished in any case.

ules for Motorcycle Endurance Runs

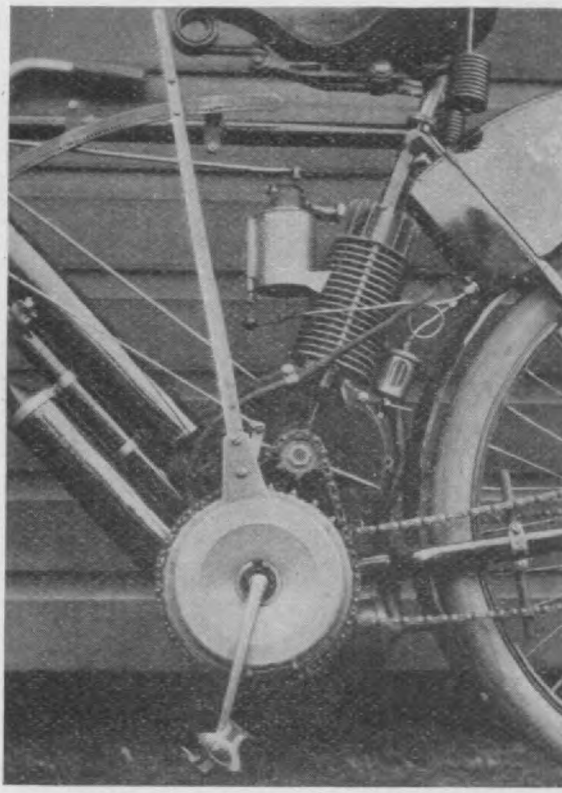
In planning endurance runs for motorcles, for which sanctions are to be asked om the Federation of American Motorclists, care should be taken to see that e rules of the federation will be comed with. No event will be recognized an endurance run or reliability contest ich is of less distance than 300 miles; which the travel averages less than 150 les per day; in which the course is reated more than once; in which the conls are less than twenty-five miles apart, d in which arrival times at controls e not definitely fixed, or in which more an thirty minutes are allowed as neul time at controls.

he "Bushnell & Cannon" 2-Speed Device

A two-speed and free engine device for otorcycles has just been placed on the rket by Bushnell & Cannon, of 1266-1270 st Eightieth place, Cleveland, Ohio, and here illustrated. The cut shows the de-

of the machine. The increase in the wi of the tread is so small as to be alm a negligible quantity so far as the c fort of the rider is concerned. The wei has been reduced to the minimum c sistent with required strength of part

The gears and pinions are enclosed in oil tight drum, enabling them to be in a bath of lubricating oil, thus do away with the necessity of frequent oil on the part of the rider.



The "Bushnell & Cannon" 2-speed device for Motor Cy

The operation is by means of a sin lever working in a quadrant; when in forward position the machine travels the speed normally obtained through gearing of the sprockets, the reverse sition throws in the low speed, which giv a reduction of 2 to 1; an intermediate sition gives a free engine; all obtained the use of a single lever, and that w but a simple forward or backward mo ment.

W. T. Marsh, of the American Mo Co., recently established a record for m torcycling when he drove one of the M. cycles 100 yards from a standard start 9 seconds. The trial was the result a wager between R. A. Pickens and C

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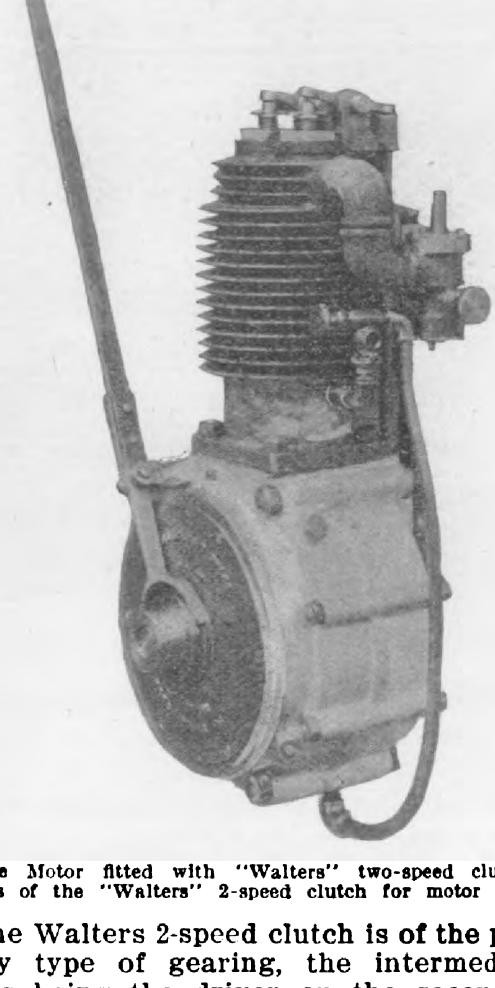
ent a 2-speed clutch have an opportunity
' securing possession of a patent or shop
ghts under a patent owned by J. W.
Valters, of Glens Falls, N. Y. Several
ears ago the offer of a prize by the Ger-
an Government for a 2-speed device for
otorcycles led Mr. Walters to design and
atent such a device, but as he has been
lly occupied in other lines and has no
esire to enter the motorcycle trade, he
as not placed his device on the market,
it the very evident and growing demand
r 2-speed motorcycles recently exhibited
this country has lead him to offer the
atent rights to the trade.



Cycle Motor fitted with "Walters" two-speed clutch.
etails of the "Walters" 2-speed clutch for motor cycles.

The Walters 2-speed clutch is of the plan-
tary type of gearing, the intermediary
ears being the driver on the secondary
peed. The operating lever moving the
isk has but ⅛-inch movement to accom-
lish its functions of high speed, neutral
nd slow speed. The proportion of speed
eduction is optional and can be made any
atio from 2 to 1 to any other number
hat the requirements of the use of the

rights to use the idea in motorcycle
struction. as he has use for the des
in other fields.

Standard Sager Toe Clip for Mo
cycle Pedals

Since the introduction of the Stand
No. 3 rubber pedal for motorcycles
strong demand has developed for a
clip adaptable to this pedal, and the ma
The Standard Co., Torrington, Conn.,
met this demand with the Sager mo
cycle toe clip here illustrated. This mo

Standard Sager Toe Clip adapted to the Standard
3 Motor Cycle Pedal.

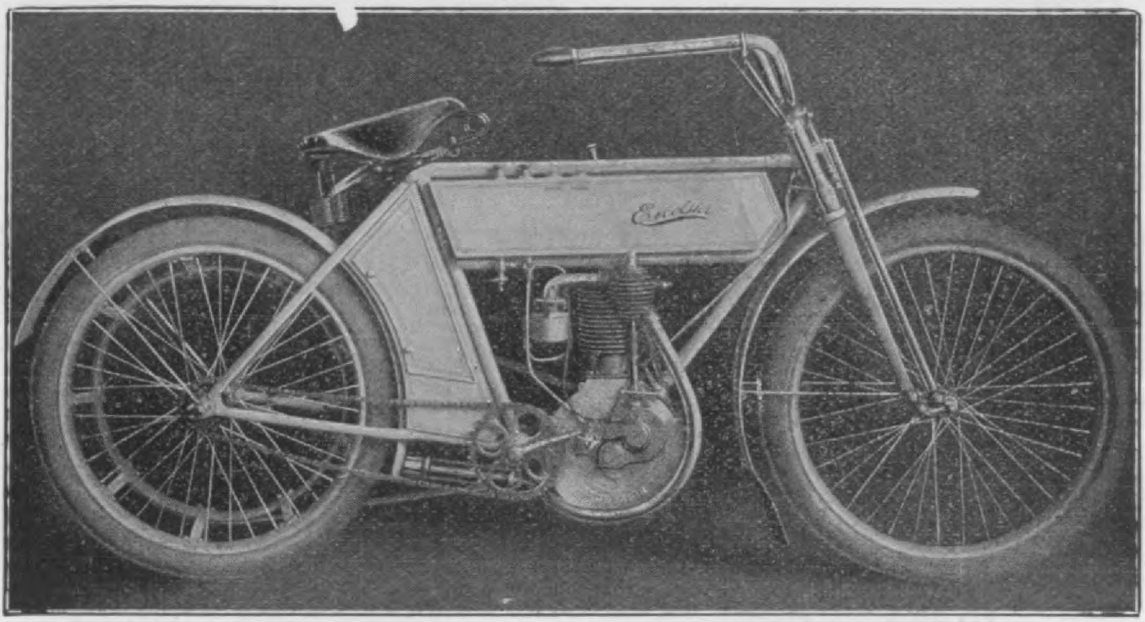
cycle toe clip is made on the same l
as the Sager bicycle clip, but adapte
the No. 3 pedal. It is made of sp
steel, hardened and tempered in oil.
will be seen by the illustration, the cli
attached to the pedal very securely
is virtually a part of the pedal.

About 8000 cycling enthusiasts witne
the racing at the reopening of the V
burg track at Newark, N. J., May 10.
track has been reconstructed and is
a 6-lap, board saucer, called the New
Velodrome. One motor cycle event
included in the opening.

The entire motorcycle corps of the D
army has lately been furnisht with S
motorcycle headlights made by Ba
Brass Mfg. Co., of Kenosha, Wis.
great conservatism of the Dutch War
partment in selecting supplies and eq
ment makes its selection of Solar la
an exceptional compliment to Ameri
made goods, as it seldom has seen fi
go abroad for any portion of its equipm

The New York Motorcycle Club hel
annual spring single and double cen
run over the Long Island roads on Ma
Over one hundred riders faced the sta
in two divisions. The first to get a

THE EXCELSIOR AUTO CYCLE



A combination of engineering skill and the best of material builded into a motor ycle that is RIGHT and proves it by actual accomplishment on the road.

It marks the triumph of scientific design over the cut-and-try and makeshift nethods that have heretofore obtained in motor cycle construction.

Some of the special features thus developed are:

FREE MOTOR, CORRECT DISTRIBUTION OF WEIGHT, LOW COMFORTABLE SADDLE POSITION, PERFECT SHOCK ABSORBING SPRING FORK, LONG WHEEL BASE, END-LESS BELT TRANSMISSION AND ABSO-LUTELY VIBRATIONLESS MOTOR : : :

The motor is rated at 3¼ H. P., but every one is subjected to a dynamo test and lelivers fully 4 mechanical horse power before passing the inspectors.

Write for our new catalog which gives much valuable information on subjects of eneral interest as well as full description of THE EXCELSIOR AUTO CYCLE.

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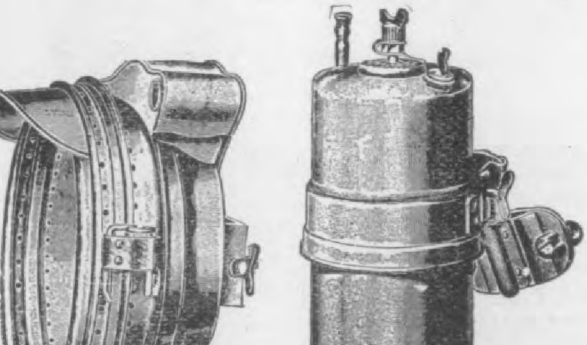
EXCELSIOR SUPPLY COMPANY

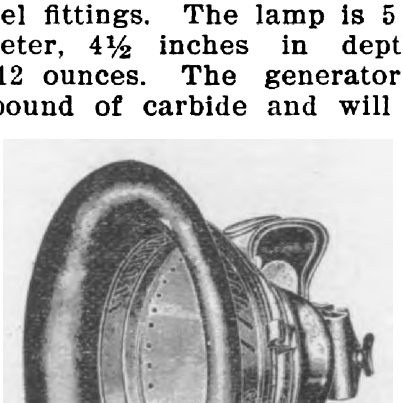
St., New York City, has recently placed the market some new imported motor-cle headlights and separate generators, o of which are herewith illustrated.

Set No. 53A and 53B consists of a beau-ully designed oval headlight, nickel-ted and elegantly finished, and a gen-tor which has a capacity of 1¼ lbs. of bide, and which will suply a ¼ ft. burn-



C. E. Co.'s Motorcycle Lamp and Generator; Set No. 53A and 53B.

from 12 to 14 hours. The headlight is ted with a nickel-plated hood to protect e face of the lamp from rain. The diam-ers of the oval fronts are 5¼ inches and inches, while the depth is 4 inches. e generator is 9 inches high, 3½ inches diameter and weighs 26 ounces. This , complete with bracket and rubber tub-, lists at $10. Set No. 55A and 55B is ry light and compact, and consists of a re front lamp, finished in nickel and hav-nickel fittings. The lamp is 5 inches diameter, 4½ inches in depth and ighs 12 ounces. The generator holds half pound of carbide and will supply

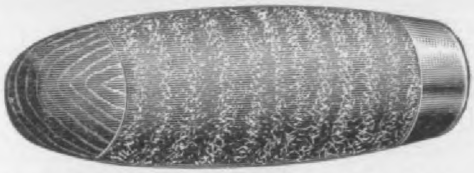


M. C. E. Co.'s Motorcycle Lamp No. 55A

capacity of ¾ lbs. of carbide and will s ply gas to a ¼ ft. burner from 8 to hours. The weight of the generator is ounces, and it is 6½ inches high by 2 inches in diameter. The price complete $8.00.

Peckham Motorcycle Grips

O. T. Peckham, 87-89 Sixth street, Gra Rapids, Mich., well known as a maker bicycle handle bar grips, includes in line a number of styles for motorcycle u and reports that its motorcycle trade increasing very rapidly. One of its le ing motorcycle grips is style 66, which made of the best leather thongs glu and wrapped on a wood core. The ca and ferrules are brass, nickle plat Style 68 is another very popular han bar grip and has a solid hard maple co wrapped with leather thongs, the cap a ferrule ends being of wood and integ with the core. These ends are given natural finish and highly polished.



Peckham Style 75 Leather and Wood Grip.

Style No. 74 is the same in construct as No. 68, but is given a different fini The cap and ferrule ends, while being wood and part of the core, as in style are stained in imitation of a wound leat used in the center of the grip and giv a high polish. Style 75 grip is also si ilar in construction to 68, but the ferr end is fitted with a brass nickel pla ferrule. The cap end, instead of havi a natural finish, is stained in imitation leather and highly polished. All Pe ham grips are packed in boxes of 12 pa each, making the stock very easily hand by jobbers. Any of these styles of gr are furnished for ¾, 13-16, ⅞ or 1-in handle bars.

A new motorcycle organization has be founded in Boston, known as the Massac setts Motor Club. Its first road meet w from Copley Square, Boston, to Walth Weston, Sudbury, Marlboro, Shrewsbu Worcester, Framingham and home.

The Pacific Motorcycle Club of S Francisco, Cal., has changed its name the San Francisco Motorcyclists. A la

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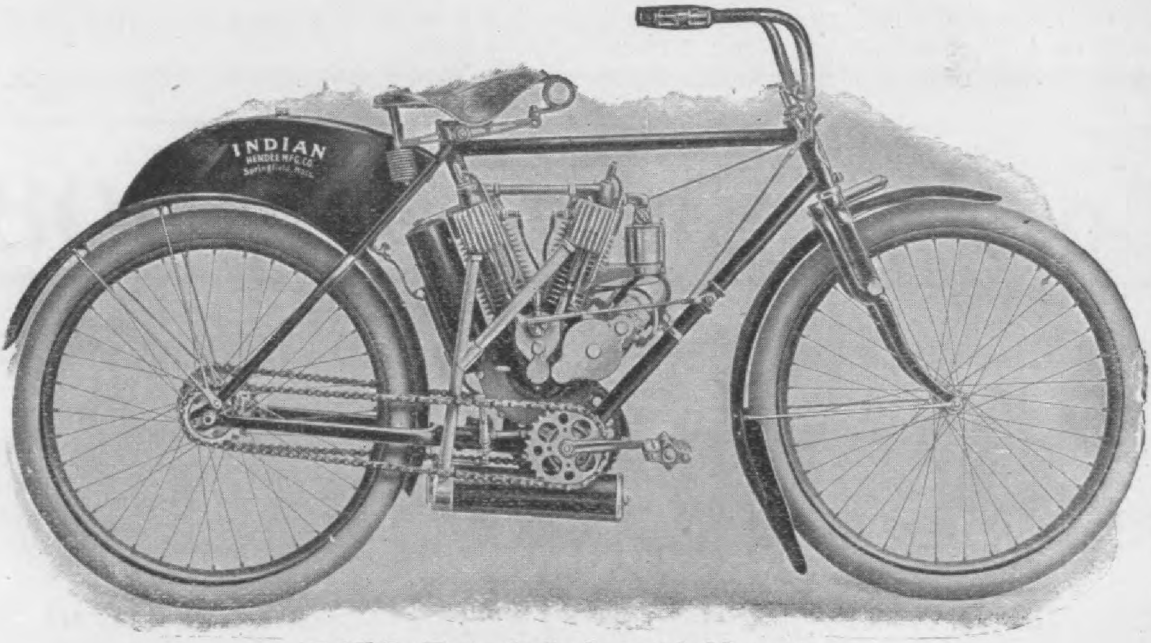
FOR MOTOCYCLES



5 H. P., Twin Cylinder with Magneto

SUCH A RECORD WAS NEVER BEFORE MADE BY ANY MACHINE IN ANY COUNTRY

WHY NOT HAVE A WINNER?

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HENDEE MANUFACTURING CO. SPRINGFIELD

E OR FORE CAR FOR ROUGH ROADS?

Laredo, Tex.

your opinion is the Side or Fore car i-car) the most satisfactory motorcycle chment for hilly and very sandy roads n not wider than wagon tracks, with a erous sprinkling of gullies and stumps.

he side car does not seem to have enough ibility to negotiate road depressions satctorily but has the advantage of a changegauge, while a Fore or Tri-car seems to e the desired flexibility but on a narrow l will run in ruts not to mention stumps ch the driving wheel may encounter and ch, owing to narrow road and deep ruts cannot dodge.—GUS BECKER.

rom my experience on some Texas roads ould recommend neither tri-car or foreattachment for motorcycles. To be sure as produces everything under the sun that be named, even in the road line; from the st level McAdam and shell surfaces, to vilest sand, mud, rut, hump and stump glomeration that man can conceive.

answering your question broadly I would there is not much choice between the two chments named. The tri-car has the adtage in appearance and in the steering, for the driver does not have to learn to st this as he does a side car, which is apt to a little tricky until accustomed to it. T side-car is lighter, cheaper and may be ma adjustable to the road track. In either ca a good road clearance is necessary for I fou frequently on these roads, tree stumps, lar stones, and a high crowning centre betwe the wheel tracks. It would be useless to e pect an ordinary motorcycle to drag alo anything except a single rider in Texas any long tours are anticipated. You are su to strike some districts where riding is ne to impossible even with the single machi on which one is able to dodge from side side, taking a narrow path which might ridable, and frequently dodging trees a stumps. This is the charm of the motorcy even when you are compelled to sandwich a mile or two occasionally of trundli through some especially bad places. But such things become a curse when more th the light single track machine is used.

I have penetrated into districts of Tex where the chug, chug of the motor never b fore has been heard and many another d will pass before the two track machine w be able to enter.—C. H. M.

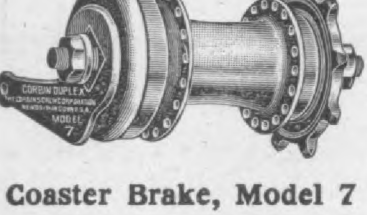
---

he Auto-Bi Company, of Buffalo, N. Y., been compelled to establish a downn agency in its home city on account the increasing demand for "Auto-Bi's." agency is located at 707 Main street, is in charge of U. S. Dietzer.

Motorcycles can now be shipped fro St. Louis and Chicago to Denver at t same rate charged for bicycles. This duction is due to a new ruling made Commissioner Prouty, of the Intersta Commerce Commission.

Corbin Hubs for 1908

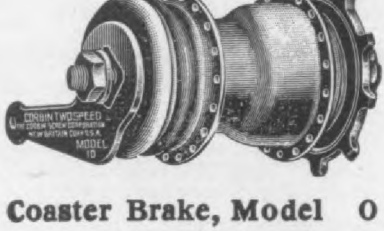
CORBIN DUPLEX



Coaster Brake, Model 7

Special Heavy Models for either Chain or Belt Drive Motorcycles

CORBIN TWO-SPEED



Coaster Brake, Model 0

Catalogue on request

CORBIN

Front Hub Model 16

Window Display Cards on request

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The Corbin Screw Corporation

CYCLE AND
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TRADE JOURNAL

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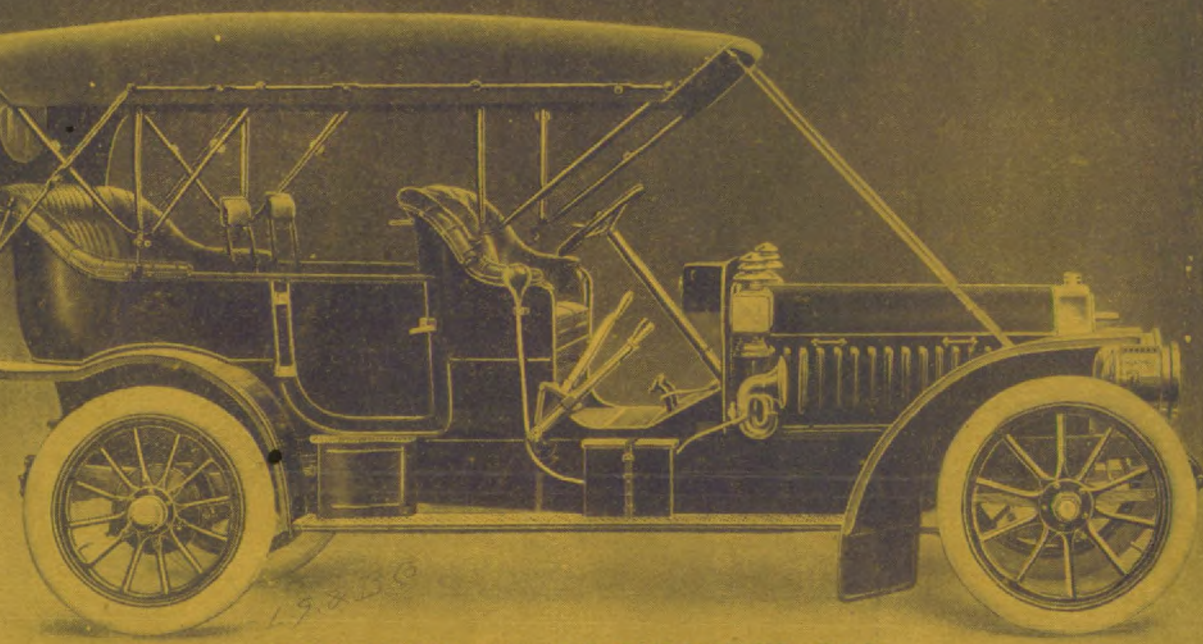
AME IMPLIES

Peerless

LEADS THE
YEARS PROGRES



THE PEERLESS SIX CYLINDER CAR

The six cylinder car displays its most important advantages where slow procedure is required. Silently and smoothly it performs its work with utmost ease—its power being simply and easily controlled.

Descriptive catalogue "F" sent on request.

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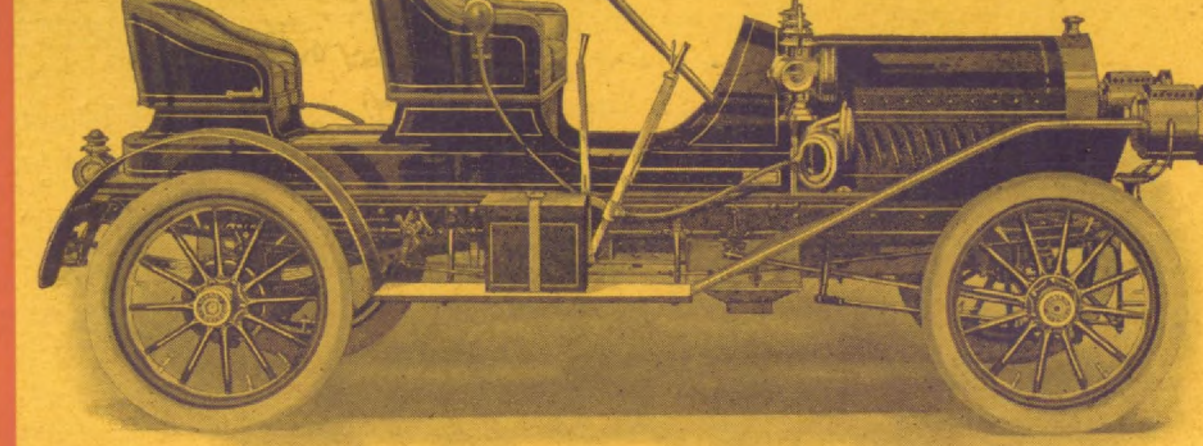

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MECHANICALLY RIGHT.

Because——

You are assured of a **Mechanically Right** Car built on up-to-the-minute lines; of first-class material, with the best machinery obtainable, by skilled workmen, with extreme care.

No other manufacturers in America combine in their cars all the points of superiority found in a Mora.

Comparison of mechanical advantages and prices with any car built in America proves the Mora to be **The Greatest Value Offered for 1908 in High Grade Cars.**

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Mora Motor Car Co.

17 Mora Place

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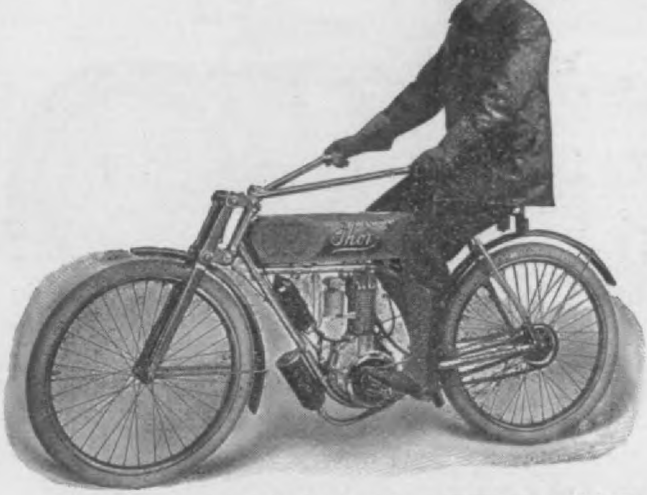

Thor

Motorcycle

You will know it when you see it.

You will appreciate it when you ride it.

There are models to suit all:

SINGLE CYLINDER, DOUBLE CYLINDER and MAGNETO MODELS

Quality Predominates—Finish Excels

Dealers should remember that variety and superiority stimulate trade. If interested in Motorcycles write us today.

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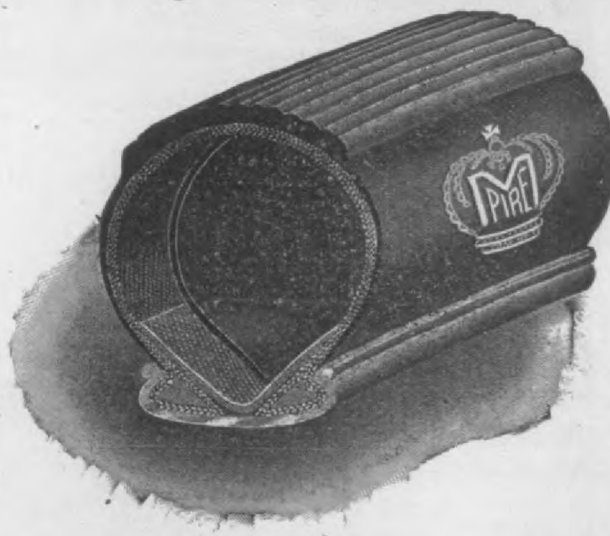
Empire Motor Cycle Tires

Try them; you will find they are the Best Easiest to Handle "Wear Longest"



EMPIRE AUTOMOBILE TIRE CO.

TRENTON, NEW JERSEY, U. S. A.

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Yale-California MOTOR CYCLE

"A MOTOR CYCLE IN EVERY SENSE OF THE WORD"

Yale and Snell Bicycles
Hussey Handle Bars
Consolidated service is the Best

Send for Catalogue and Circular describing the new Consolidated Hanger

The Consolidated Manufacturing Co.

1710 Fernwood Ave., TOLEDO, OHIO

"THE MERKEL WAY"

is the only way. The 1908 Merkel is the machine that makes "all roads smooth roads, and every ride a pleasure ride." We would like to tell you about the comfort of the Merkel Spring Frame and extra long Wheel base; about the speed and power assured by its 3 H.P. Ball Bearing Motor (with Magneto Ignition if desired) and about the safety afforded by its Double Grip Control. Write for our catalogue.

Price, $210. With Spring Fork, $225. With Magneto Ignition, $40 additional

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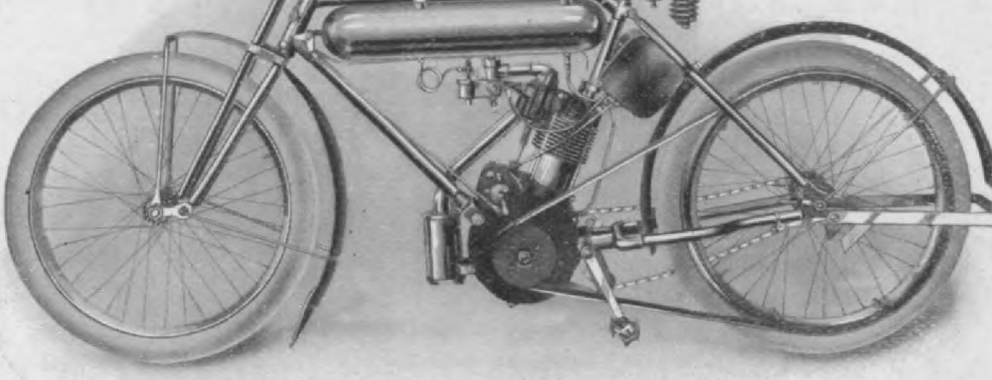
M.M.

Simplicity together with

M.M.

Efficiency

is the one great reason why the



M. M. Motorcycle

is the acknowledged leader in this country. Simple of construction, simple of control, its splendid 3½ H. P. non-vibrating engine can and does deliver the power when and where you need it. Its efficient bel transmission together with its perfect spring fork make Motorcycling a real pleasure.

Agents Wanted —Special proposition. Immediate deliveries—not prompt promises

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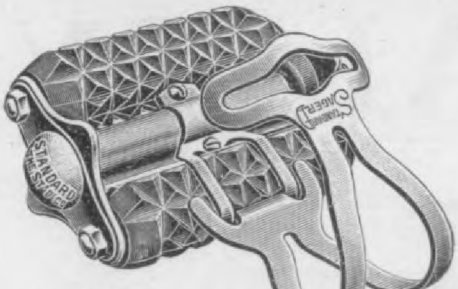

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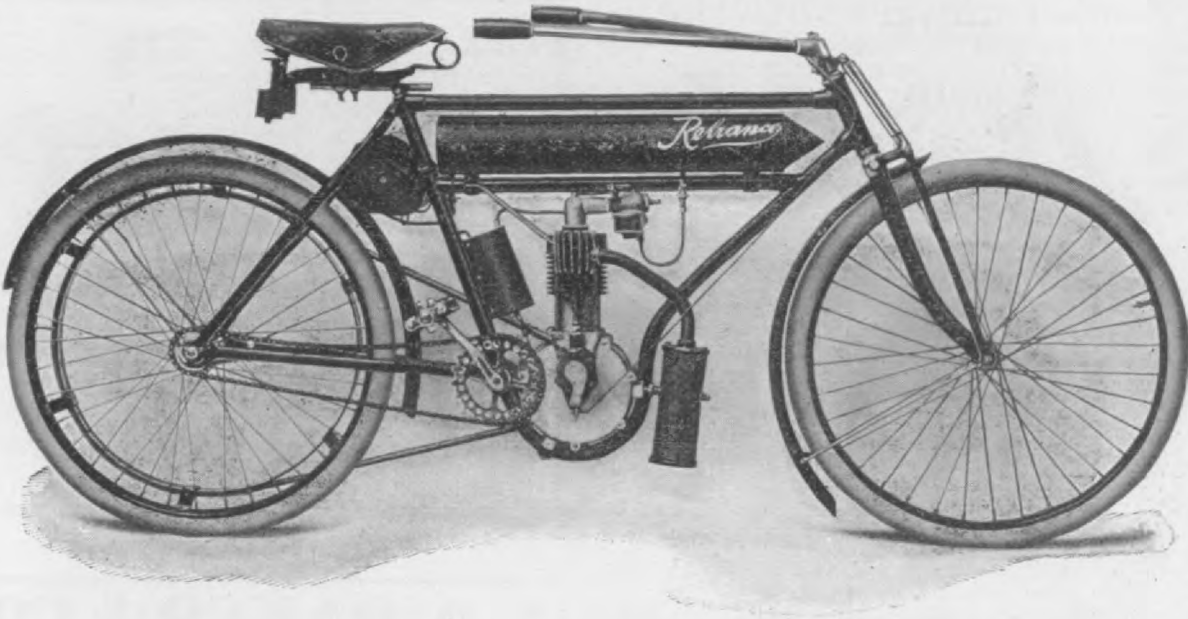

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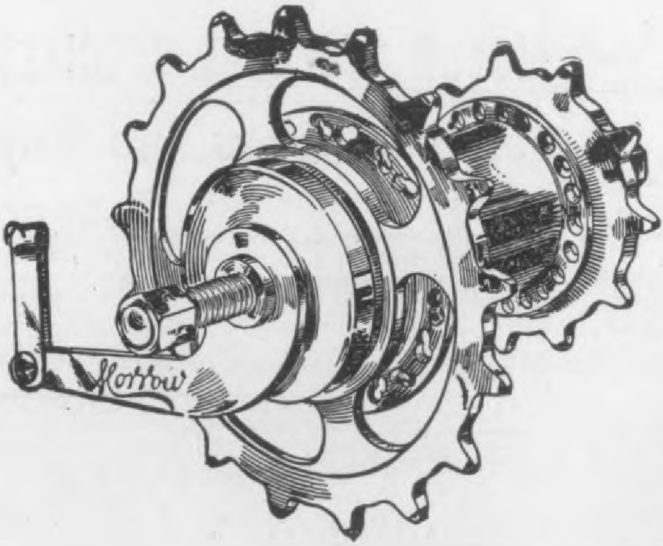

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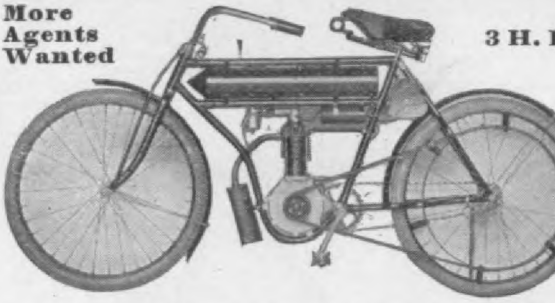

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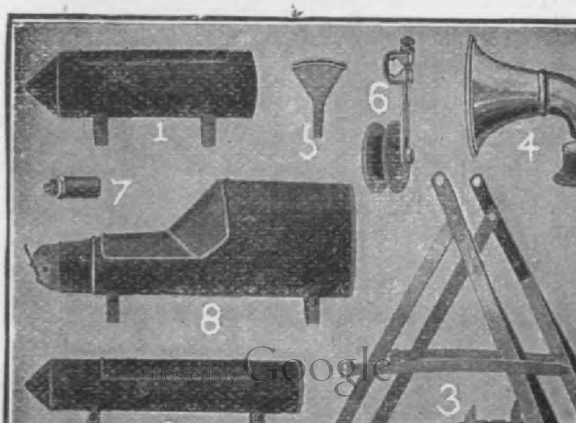

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1. First two cylinder motorcycle in America.
2. Motor adopted by U. S. War Department.
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Acknowledged to be the strongest, smoothest running and most powerful machine on the market. Read of the other exclusive CURTISS features. You can't afford to be without them. "Make every customer a booster for your business!"

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They are the highest quality, easiest riding and are the easiest to repair. If you want the very best bicycle tires made—the kind that will wear the longest and give the best satisfaction, get

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Hinged joint on front springs prevents breaking and gives more life to spring.

THREE SIZES
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The top is raised in front and back sufficient prevent the rider from slipping forward or ckward—is curled-hair padded and has the form a horseback saddle.

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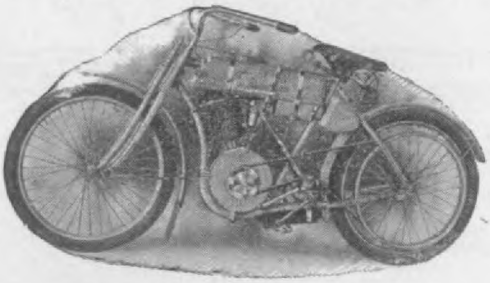

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Torpedo Motorcycles

Model B.,	2¼ H. P.,	-	-	$190.00
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THE HORNECKER MOTOR M'F'G. CO
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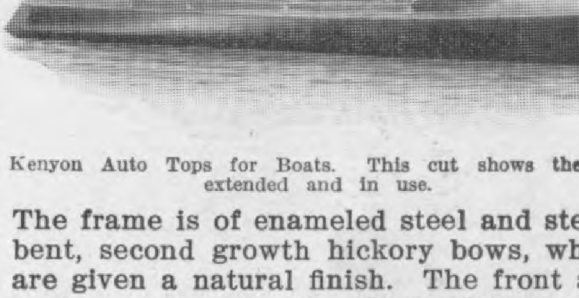
Marine Coming Events

June 6—Bermuda Cup Contest for Sea-Going Power Boats; w York to Bermuda. New York Yacht Club, Bermuda cht Club and Motor Boat Club of America.
June 13—Start of the New Haven Yacht Club's point ces, New Haven, Conn.
June 28—Motor Boat Race, Staten Island.
July 3—N. Y. Bay Racing Association, Around Long and.
July 4—Detroit (Mich.) Motor Boat Club Annual Re-tta.
July 4—First Annual Regatta, Mississippi River Power at Association, Muscatine, Ia.
July 4—Independence Day Races (general).
July 4—Annular Regatta of New Haven Yacht Club, w Haven, Conn.
July 10-11—Elimination Trials for boats entered in ternational Trophy Race.
July (date later)—Long Distance Race, Seattle to Van-ver.
July 15—Springfield Yacht Club Annual Cruise to Ston-ton, Conn.
July 18—Race for Motor Cruisers; Marblehead, Mass., New Rochelle, N. Y. New Rochelle Yacht Club.
July 19-25—Annual Meet Interlake Yachting Associa-n, Put-In Bay.
July 29, 30, 31—Lakewood Yacht Club Annual Regatta, veland, O.
July 21—Larchmont Y. C. Motorboat Races.
August 1—Race for British International Club won last r by "Dixie," Huntington Harbor, N. Y. Motor Boat b of America. Walter M. Bielings, Secretary, 9 Murray , N. Y. City.
August 3-8—Race Week of the Motor Boat Club of erica.
August 8—Huguenot Yacht Club, Auxiliary Race, New chelle, N. Y.
August 11—A. P. B. A. Cruise from New York to usand Islands.
August 20, 21 and 22—Gold Challenge Cup Race, Chip-a Bay (N. Y.) Yacht Club.
August 22—Boston Y. C. Ocean Race to Shelburne, Nova tia, for Motorboats.
August 29—Open Regatta for all classes of boats, under pices of New Haven Yacht Club, New Haven, Conn.
Sept. 5—Larchmont Y. C. Motorboat Racing.
Sept. 12—Buffalo Launch Club, Letchworth Races, Buf-o, N. Y.

Kenyon Auto Tops for Boats

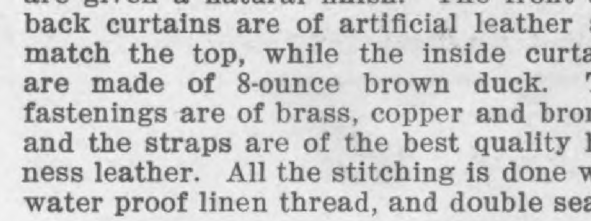
The R. L. Kenyon Co., of La Crosse, is., well known to the motor boat trade a manufacturer of cushions, has lately aced on the market an extension top r motor boats, this top being of the au-mobile type, as shown by the accom-nying illustration. This top can be lded back half way, leaving the forward lf of the cock-pit open, or it can be lded back entirely free of the cock-pit, shown in one of the illustrations here-ith, when not in use. Folding it back quires only a few minutes, the forward stenings being sprung into place auto-atically and therefore removable by

iently out of the way. This top can closed with front, back and side curta and light is admitted by means of six la Fibreloid lights. The cover used in type is of the best quality of artifi leather furnisht in seven different col



Kenyon Auto Tops for Boats. This cut shows the extended and in use.

The frame is of enameled steel and ste bent, second growth hickory bows, wh are given a natural finish. The front back curtains are of artificial leather match the top, while the inside curta are made of 8-ounce brown duck. fastenings are of brass, copper and bro and the straps are of the best quality ness leather. All the stitching is done w water proof linen thread, and double sea



Boat fitted with the Kenyon Auto Top showing the folded back, as when not in use.

are used wherever any strain is likely occur. The prices of the various si are obtained by obtaining the area of cock-pit in square feet and counting for each square foot of this measurem Ten per cent. additional is charged if tificial leather side curtains are used.

The National Association of Engine Boat Manufacturers, 314 Madison A New York City, is conducting a Bureau Employment for its members, who, it expected, will make extensive use of

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nbines features of both 2 and 4-cycle tors and is called the "twice-two-cycle" cause the four functions, inspirating, npressing, combustion and exhausting, divided between two cylinders, two ctions being performed in each cylinder. e makers claim to have nearly ap-ached the 2-cycle engine in simplicity l to have exceeded the 4-cycle in effici-y. While poppet valves, mechanically rated, are used, they are actuated by ans of cams attached directly to the nk shaft and therefore no two-to-one rs are used. Three valves suffice for

combustion cylinder but it travels up mu slower, this change in the relative spe of the two pistons on the up-stroke bei accomplished by means of an arrangeme shown by the accompanying cross sectio view of the charge cylinder. It will observed that the piston rod in this cyl der has a pivot joint and a radial guide provided to control the movement of t rod and cause a slight loss of moveme during the early part of the up stroke that this piston reaches the top of t cylinder later than the other.

The charge is drawn in thru the val

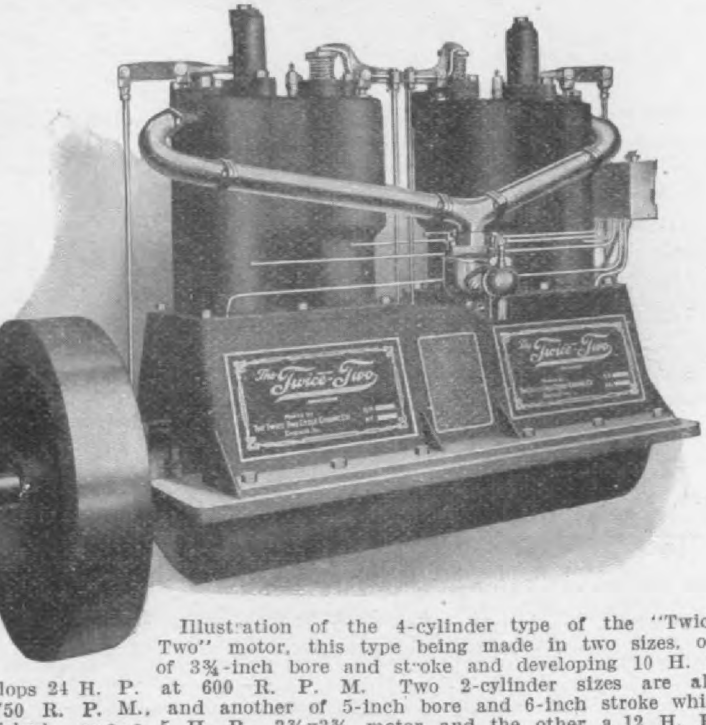
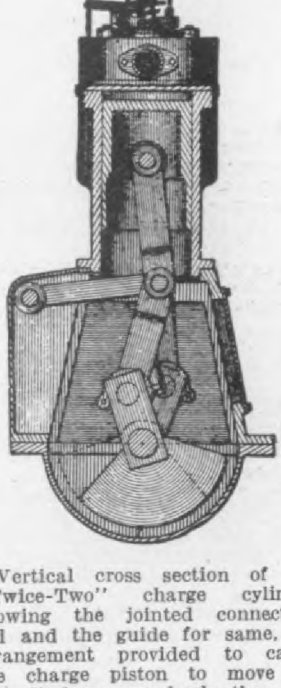


Illustration of the 4-cylinder type of the "Twice-Two" motor, this type being made in two sizes, one of 3¾-inch bore and stroke and developing 10 H. P. lops 24 H. P. at 600 R. P. M. Two 2-cylinder sizes are also 750 R. P. M., and another of 5-inch bore and 6-inch stroke which ished one a 5 H. P., 3¾x3¾ motor and the other a 12 H. P., motor, their powers being rated at speeds of 750 and 600 R. M., respectively. Price of the 5 H. P. is $250; 12 H. P., $400; H. P., 4-cylinder, $475; 24 H. P., 4-cylinder, $750. The 3¾x engines, both 2 and 4-cylinder sizes, have 16-inch flywheels and other two have 18-inch flywheels. The weights of the complete rs are as follows: 5 H. P., 195, lbs; 10 H. P., 350 lbs; 12 H. P., lbs; 24 H. P., 875 lbs.



Vertical cross section of the "Twice-Two" charge cylinder showing the jointed connecting rod and the guide for same, an arrangement provided to cause the charge piston to move up its cylinder more slowly than the power piston in the other cylinder.

cylinders, an intake valve in one nder, an exhaust valve in the other a transfer valve between the two nders. Only one spark plug, of course, used in a 2-cylinder motor of this type, nbustion taking place in only one of cylinders but this type of motor can furnished in any multiple of two cylin-s and the makers are at present fur-ning two sizes of 2-cylinder motors and sizes of 4-cylinder motors as ex-ned in the caption beneath the cut of complete engine herewith shown.

eferring to the sectional cuts, the longi-

at the left of the left hand cylinder on t down stroke of the piston as in the usu four cycle motor, the piston in the oth cylinder descending at the same time. the up-stroke the charge is compressed the charge cylinder, but is not transferr to the combustion (right hand) cylind until the piston in the latter has reach the top of its stroke at which point the is a clearance of only 1-16-inch betwe the piston head and the cylinder head. this point the transfer valve between t two cylinders is opened mechanically a the charge starts to pass into the co

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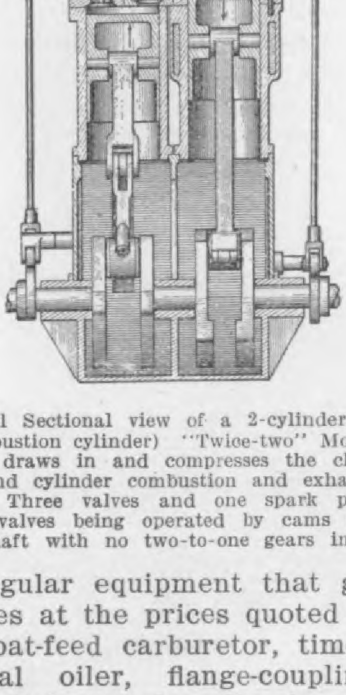
ansfer valve. As the compressed charge oves thru the transfer passage at a gher rate of speed than the rate of the ropagation of the flame, there is no back-ring into the charge cylinder for by the me the flame could reach beyond the ansfer valve the charge will have already assed that point. The best results are btained when the charge piston reaches e end of its upstroke and the transfer alve closes just as the ignition of the harge is completed and adjustment to btain these conditions is easily made by ny intelligent operator, it is said.



Longitudinal Sectional view of a 2-cylinder (one charge d one combustion cylinder) "Twice-two" Motor. The left nd piston draws in and compresses the charge and in e right hand cylinder combustion and exhausting is ac-mplished. Three valves and one spark plug are em-yed, the valves being operated by cams directly from e crank shaft with no two-to-one gears interposed.

The regular equipment that goes with l engines at the prices quoted is as fol-ws: Float-feed carburetor, timer, pump, echanical oiler, flange-couplings, bat-eries, switch, spark coil, plugs, starting rank, kit of tools, and instruction book. Reverse Gears will be supplied as fol-ws: 5 H. P., $12.00; 10 and 12 H. P., 30.00; 24 H. P., $50.00.

Propeller wheel, with necessary stern earings and propeller shaft, stuffing box-s, and all similar equipment will be fur-ished with engine, to suit any particular equirement at actual manufacturer's cost.

---

he "Ropeless" Steering Gear and the "Security" Ignition Set

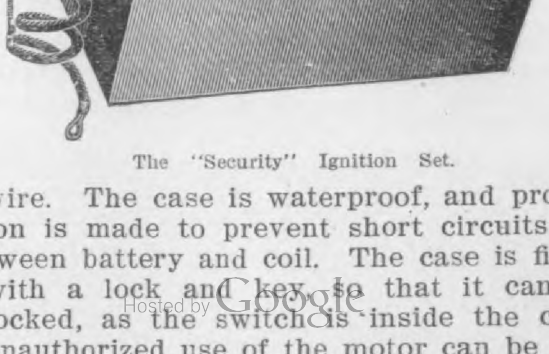
The Ludlow-Harris Company, 1 Madison ve., New York City, is offering two new

the way it is installed in a cabin boat special steering wheel is furnished open launches which may be attached the coaming. The transmission shaft ning between the steering wheel and quadrant connections may be placed either side of the engine bed and under floor. Extra connections may also be on this shaft for a second steering wh

The "Ropeless" Steering Gear.

when a pilot-house and bridge combina is desired. The price list is as follo No. 1, for boat 20 to 30 feet water-l $25; No. 2, for boats 35 to 50 feet wa line, $40; No. 3, for boats 55 to 75 water-line, $55; No. 4, for boats 80 to feet water-line, $75. Prices include st ing wheel, transmission shaft, two sproc wheels, two shaft bearings, chain con tions and quadrant complete.

The Security ignition set includes a tery, coil and switch in a case wit special compartment for extra plugs



The "Security" Ignition Set.

wire. The case is waterproof, and pro ion is made to prevent short circuits tween battery and coil. The case is fi with a lock and key, so that it can locked, as the switch is inside the unauthorized use of the motor can be

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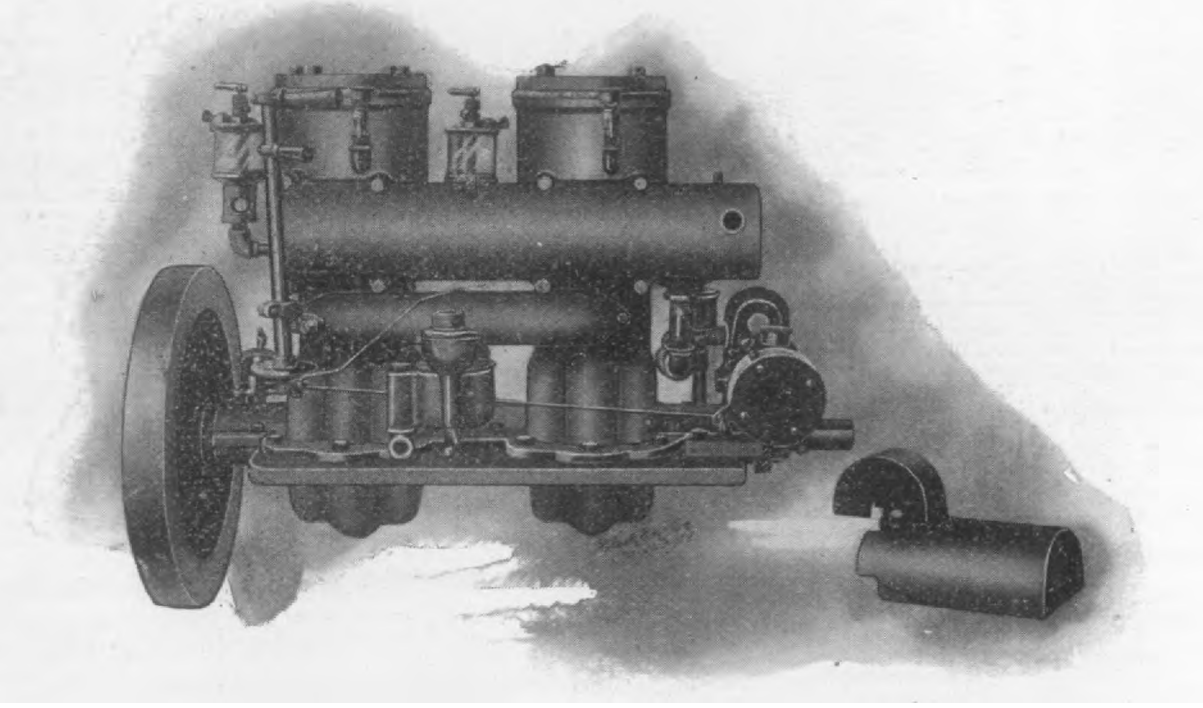
the season of 1908 offers a line of two-
le marine motors, one of its latest
dels, a 6 to 8 H. P., being here shown.
he cylinders are 4-inch bore and stroke.
ey are turned and tested and allowed
season, when they are ground to exact
ensions, giving the most perfect re-
s possible. The crank-shaft bearings
of unusual length and large size, and
he best hard babbitt, while the connect-
rods are of crucible steel with inter-
ngeable babbitt bearings. The special
tures of the motor are the solid firing
mber with a detachable water-jacketed
d, allowing access in case of fouling in
waters, but eliminating blowing out
packing. The lubrication feature is ab-
tely positive, being thru a hollow
st pin and connecting rod, thus insur-
positive lubrication of both of these
rings as oil passes to the base.

denses the exhaust gas as it meets
plate chilled by the incoming cold wat
resulting in an increase of power with great
fuel economy.

The Syracuse heavy duty engine is built
precisely the same lines as the 6-8 horse-pow
motor, but has a 6 in. cylinder with 7 in. stro
and is made in 10, 20, 30 and 40 H. P. siz
The motor here illustrated lists at $2
complete.

The "Hall" 27 Ft. Compromise Stern Launch

L. H. Hall, Amesbury, Mass., is buildi
a complete line of power boats, row-boa
and tenders, making a specialty of
popular 27 ft. canoe torpedo, or compr
mise stern launch. The launch has a 7
beam and can be fitted with any size mot
of from 6 to 12 H. P. The decks, t



The "Syracuse" 6-8 H. P. 2-Cycle Marine Motor.

he speed control sytem is also new and
usive, being of the automobile type
consists of a hollow standard at the
t of the engine, carrying two short
rs operating the timer and throttle.
of the latest improvements made on
motor is a new condensing water-
keted exhaust on which patents are
ding. The outside piping is entirely
inated with the exception of a very
rt piece connecting the pump with the

stroke and coaming are of oak. The i
side of the boat is sheathed, and finish
in natural wood and varnished. The bo
can be furnished complete with motor i
stalled or in the shape of a bare hull, wit
out rudder, trimmings or motor.

New Haven Yacht Club's Doings

The New Haven Yacht Club has decid
to start the point races on Saturday, Ju
13 and to race every Saturday until Se

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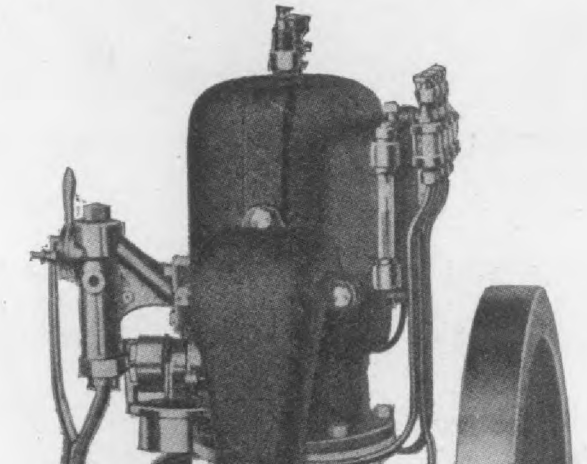
oit, Mich., and have been designed for use ith either gasoline or kerosene for fuel. hey are made in single, double and quad-ıple-cylinder forms in horsepowers of 4-6, 9, 14-18 and 35, the single cylinder mo-rs being made in two sizes, 4x4 and 5x5, hile the two and four-cylinder forms have x5 cylinders. One of the main features f the Yale is the mechanical by-pass hich, it is claimed prevents base firing nd four-cycling while giving a wider range f control. It is said that this motor can e run at 2000 r. p. m. and immediately owed down to 150 r. p. m. without miss-ıg an explosion. There are no working arts in the mechanical by-pass and it andles kerosene vapor as well as gaso-ne.

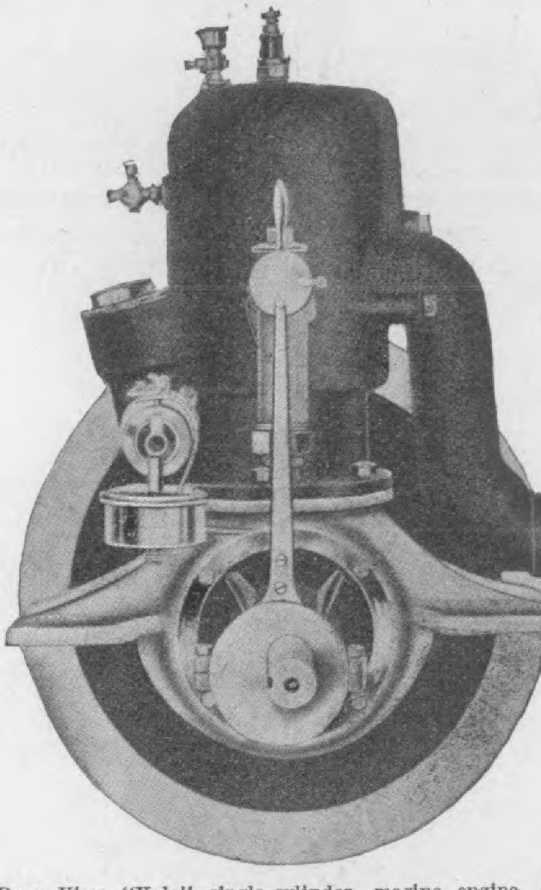
The exhaust manifold of Yale engines water jacketed, all cylinders are cast f best gray Scotch semi-steel. The water ıcket gives ⅞-inch of water space the ntire distance around and extends 3 ıches below the exhaust port. All parts



Starboard view "Yale" Single-Cylinder marine engine, owing the exhaust manifold water overflow which is st fast to the cylinder and is carried to the bottom of e boat. This cut also shows the ample length of the arings, and the lubricating system.

f the Yale motors are ground, bored and nished to jigs, so that any part can be eplaced without cutting or fitting. The pis-

connection with their water circulat pumps. The pump is of the high press plunger type and is so arranged that small spray nozzle (furnished for $3 tra) can be attached so that the overf of water can be used for washing the b



Rear View "Yale" single-cylinder, marine engine, ing the eccentric commutator and the mechanical by

or used for extinguishing a fire. A buretor is fitted to the company's own sign. Altho the engine is regularly eq with jump spark ignition, the make break system can be furnished for $ extra. The prices of the Yale motors as follows: 4 to 6 H. P. equipt for fr water $110.00, salt water $117.00. 7 t H. P., fresh water $150.00, salt water $ 35 H. P. fresh water $700.00, salt w $340. 35 H. P. fresh water $700.00, salt w $745.00. These prices include the en complete ready to run and everyth necessary to install in a boat, namely, peller wheel, bronze stuffing box, sh coupling, batteries, spark plug, swi wire and muffler.

General Kimball, Supt. of the Federal Saving Service, states in his annual re that by the use of gasoline motor boats persons were saved from drowning. Se

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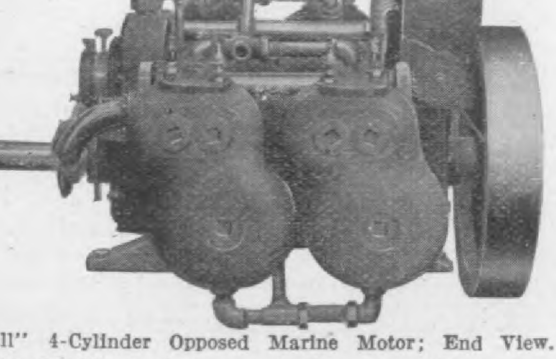
lding a line of 4-cycle, 2 and 4-cylinder posed marine motors, from 2 to 50 horse-ver. The main claim of the manufac-er is that nothing has been left undone ich would tend to make the engine bet-, more serviceable or more durable.

all" 4-Cylinder Opposed Marine Motor; Front View.

e Hall 4-cylinder motor is herewith wn in front and end views. Special ention has been paid to the accessibility the motor. By removing four cap ews, which are located in a very con-ient place, the whole top part of the nk case can be lifted off and the oper-r can easily get at the inside of the tor. All moving parts are protected m grit and dirt, and all parts are en-sed perfectly tight in the cylinder and nk case castings and run in a bath of All valves are mechanically operated. rication is effected by means of a sight l oiler. A special carbureter of the t feed type is fitted, which the manu-turers state will work exceptionably l in zero weather.

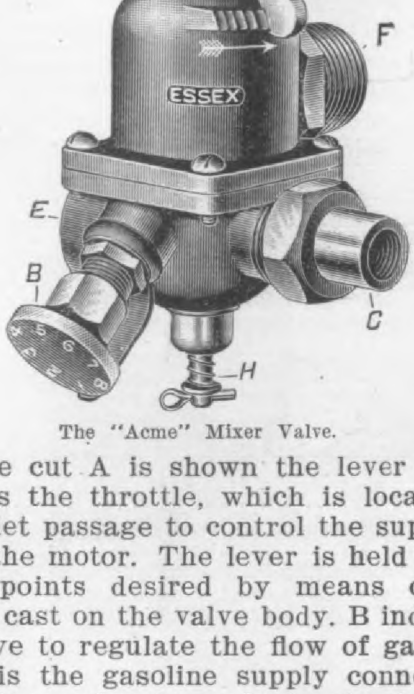


ll" 4-Cylinder Opposed Marine Motor; End View.

ll Hall motors are fitted with gover-s. One great advantage of the gover-is that in making landings the clutch be thrown in and out without paying attention to the engine; when the ch is thrown out, which relieves the ine of its load, the governor automati-y reduces the amount of gas taken into

This valve was designed by the G. Essex Brass Co., 480-86 Franklin stre Detroit, Mich., to meet the demands fo simple and practical mixing device two-cycle motors.

The body of the valve is cast in t sections, and is held together by fo screws, making it possible to examine t disc and valve seats, and regrind them necessary. The disc is specially design to make it light, and the port area is a increased in order to minimize the lift. T throttle can be manipulated to get a speed desired instantly, and held in t position by a ratchet cast on the body.



The "Acme" Mixer Valve.

In the cut A is shown the lever whi operates the throttle, which is located the outlet passage to control the supply gas to the motor. The lever is held at d ferent points desired by means of t ratchet cast on the valve body. B indicat the valve to regulate the flow of gasolin and C is the gasoline supply connectio This mixer valve is made in six sizes, follows: ½ inch, $4.50; ¾ inch, $5.50; inch, $6.50; 1¼ inch, $7.75, 1½ inch, $9. and 2 inches, $19.60.

The "Thomas" Air Compressor

The Thomas air compressor is design to pump compressed air into a stora tank to supply the whistle used on mot boats and launches. The compressor operated by means of a belt and pull driven from the propeller shaft or ca shaft of the engine. Metal packing rin are used to insure perfect compressio The bore of the cylinder is 1 13-16 in and the stroke is 2½ inches. The leng of the piston is 2¾ inches. The manuf turers guarantee the compressor to mai

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pon the size of the tank used. A ten-allon tank is large enough for most cases, et the size of the boat and whistle used hould be taken into consideration. The eight of the compressor is 18 lbs. About ne-third horse power is required to pump s maximum pressure. The compressor

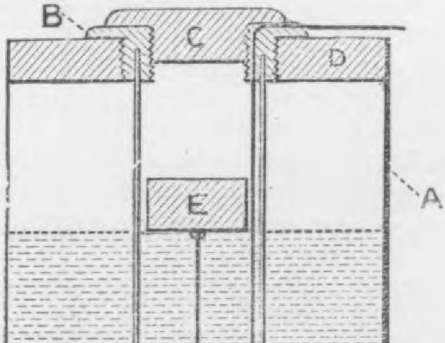
The "Thomas" Air Compressor.

manufactured by W. K. Thomas, 1876 roadway, New York City, and lists at 5.00 without pulley and at $16.50 with lley. With pulley and belt tightener the ice is $17.50, and with clutch pulley, 0.00.

Mr. Thomas also furnishes whistles, nks and gauges at the following prices: histle, with valve No. 6, $3.25, and with lve No. 14, $4.00; 10-gallon tank, $6.00; -gallon tank, $7.00; pressure gauges, on case, brass rings. $2.75; brass case d beveled glass, $3.50, and nickle case d beveled glass, $3.75.

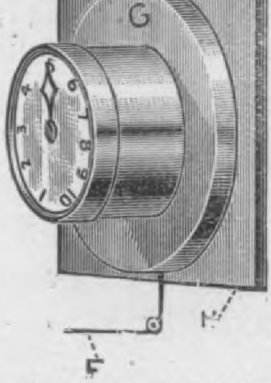
The "Sailors' Gauge"

In addition to its line of automobile soline tank gauges the Emergency Wheel Novelty Company, 625 Huron avenue,



Float Cable, etc., of the "Sailors' Gauge."

t Huron, Mich., is also manufacturing



Dial of the "Sailors' Gauge."

the filling opening, fasten the dial in so conspicuous place and connect the cab The price of the outfit is $10.00.

The "Detroit" Marine Battery

The accompanying cut shows the Det marine battery, which was placed on market by the Detroit Engine Works, troit, Mich, to meet the demand for a l priced serviceable outfit. This battery first offered last season. It is composed unit, chemical cells packed in an in structible, hermetically sealed sheet st case fitted with a carrying handle. It

The "Detroit" Marine Battery.

not affected by atmospheric conditions a can be run in any position. Only two t minals are visible on the outside of t steel case, all other connections bei

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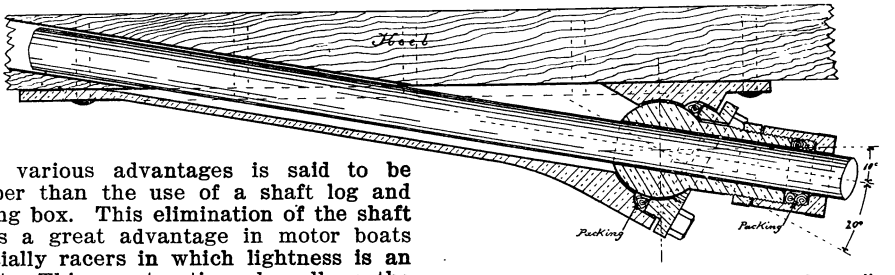
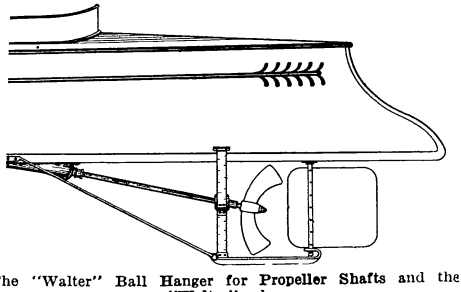
"Walter" Propeller Shaft Stuffing Boxes, Ball Hangers and Skegs

Glens Falls Mfg. Co. of Glens Falls, N. Y. has brought out a ball stuffing box for propeller shafts the object of the device being to do away with the necessity of a shaft log, prevent binding and friction, add to the strength of the keel and allow the shaft to be placed at any desired angle. The "Walter" construction while offering these various advantages is said to be cheaper than the use of a shaft log and stuffing box. This elimination of the shaft log is a great advantage in motor boats especially racers in which lightness is an object. This construction also allows the use of a lighter keel.



Longitudinal Section of a Boat keel and propeller s haft showing application of the "Walter" Ball Stuffing Box.

A ball hanger for supporting the propeller is also furnished as shown in one of the cuts herewith and a skeg can also be furnished if desired. No rebabbiting of the hanger bearing is necessary as a new ball is put in when it become worn, making a new bearing which is of bronze and therefore durable. The ball can be replaced easily by the amateur. The ball hanger is separate from the skeg but the latter is easily attached to the hanger. The hanger and skeg are both illustrated herewith. The hanger is adjustable to any pitch of shaft, any width of boat and any diameter propeller.

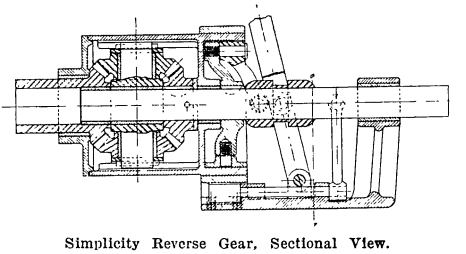


The "Walter" Ball Hanger for Propeller Shafts and the "Walter" skeg.

Simplicity Reverse Gear

The Simplicity reverse mechanism is of the miter gear type, the gears being made of the best obtainable grade of steel for this purpose. In this reverse gear the gears are only used on the reverse and in the neutral position and are always in mesh. The forward drive is direct and is obtained by the use of an expanding ring, which, when in use, causes the entire drum holding the gears to revolve, acting as an auxiliary fly wheel. The wear of this band is slight, but the provision is made for taking it up by an adjusting screw on the expanding arm, the screw being very accessible and always in view. Reverse is obtained by compressing an iron band around the gear case, this band being controlled by a cam movement, which in turn gets its motion by the movement of the cone on the main shaft. The arm conveying the movement of the cam has a screw adjustment similar to the adjustment of the direct drive expanding ring. The entire internal mechanism runs in oil, and as the casing is oil tight the matter of lubrication requires attention only about once or twice a season.

Three sizes of this gear are made, transmitting, respectively, 1-6 H. P., 6-12 H. P., and 12-20 H. P. No. 1 weighs approximately 28 pounds, and lists at $15; No. 2, 33 pounds, list $26; No. 3, 55 pounds, list $45. The main dimensions of No. 1 are



Simplicity Reverse Gear, Sectional View.

15½ inches over all length, 6⅝ inches over all heighth, 5 11-16 inches diameter of casing. The shaft is 1⅛ inches in diameter. No. 2 gear is 17 inches over all length by 7¼ inches in heighth, and 6⅝ inches diameter of casing, while No. 3 is 20½ inches long, 9 inches high and 7⅞ inches diameter of casing. The shaft of No. 2 is 1⅜ inches in diameter, and of No. 3 1⅝ inches. These gears can be obtained from the Simplicity Gear Co., Detroit, Mich

A reorganization of the Sales and Engineering Departments of the Brown-Cochran Company, of Lorain, Ohio, has been effected, and Wm. M. Maxwell is now general sales manager. J. O. Brown, president of the company, who heretofore had charge of the Sales Department, is now devoting his entire attention to the executive affairs of the company. C. I. Longnecker, M. E., has been appointed chief engineer of the company.

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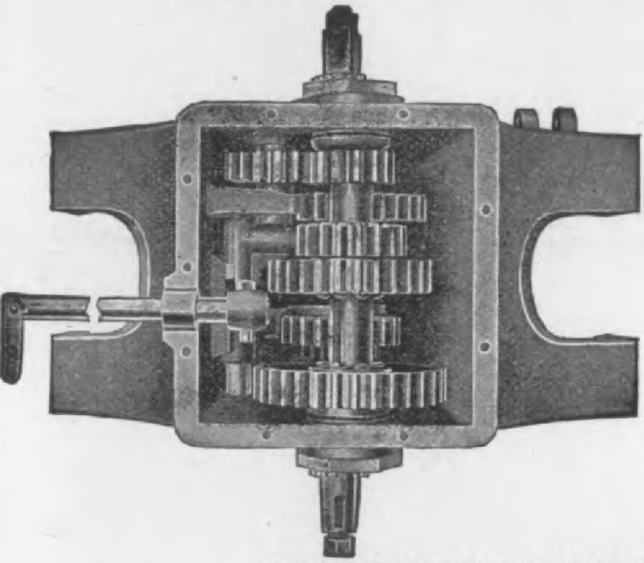

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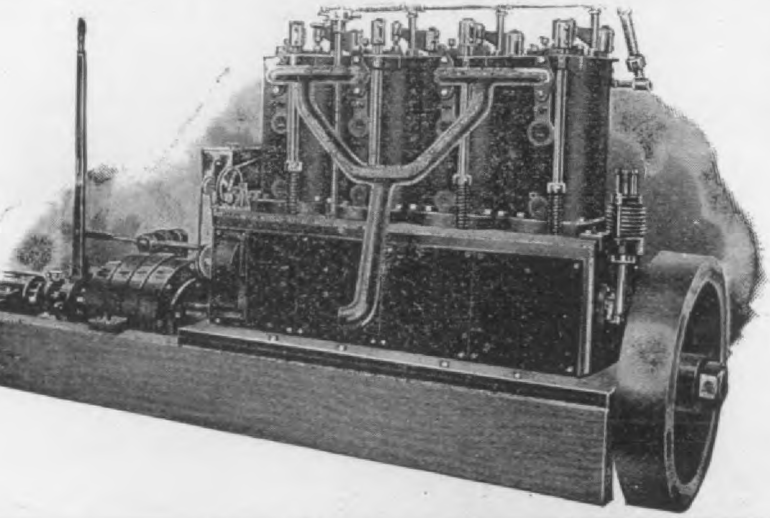

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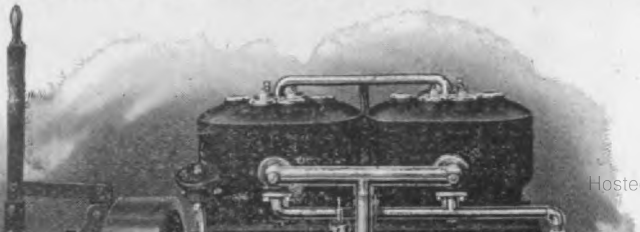

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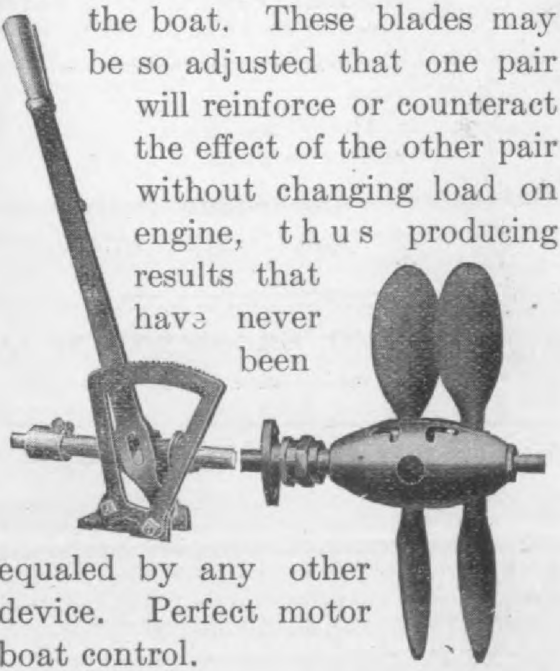

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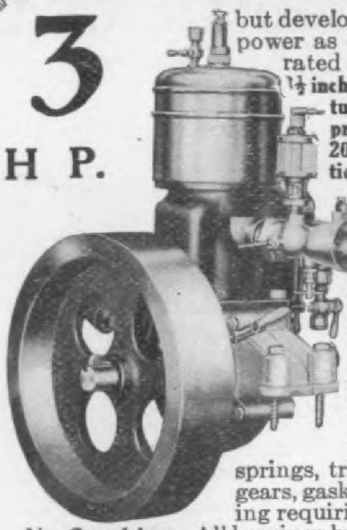

but developing as much power as other motors rated 4 H. P. **Bore 1½ inch; stroke 3½ inch; turning a 12-inch propeller, 17 pitch, 200 to 800 revolutions a minute.** Weight 50 lbs. Reliability, strength, simplicity, power and durability. **Only four movable parts.** Exclusive float feed carburettor. No valves, springs, triggers, cams, gears, gaskets, nor packing requiring attention.

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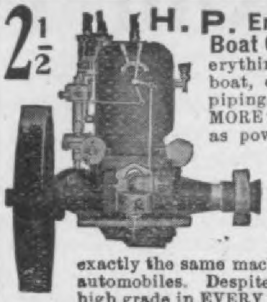

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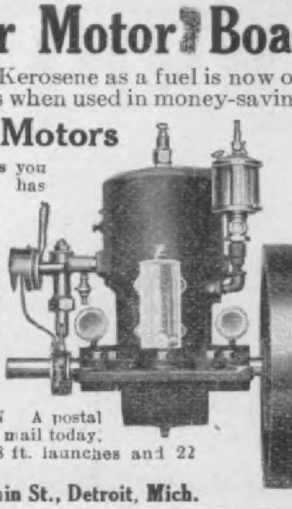

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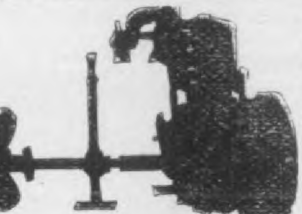

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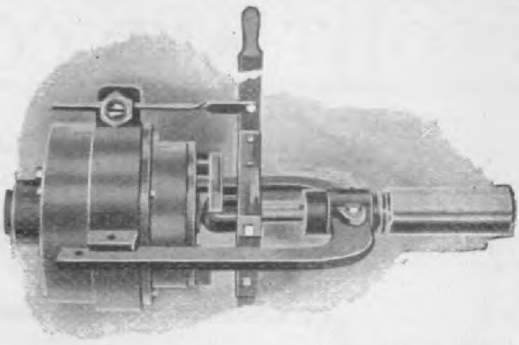

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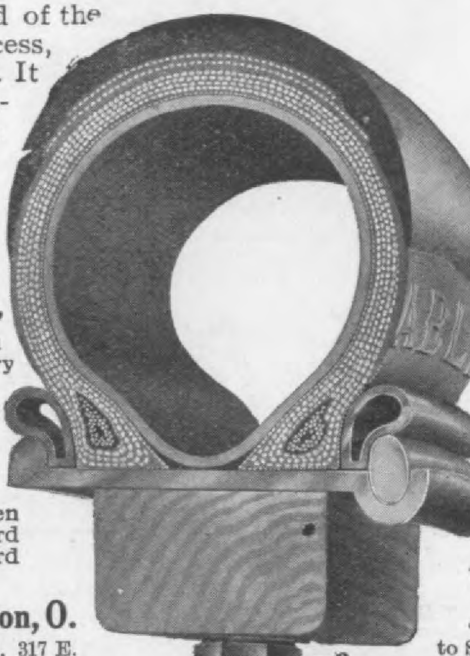

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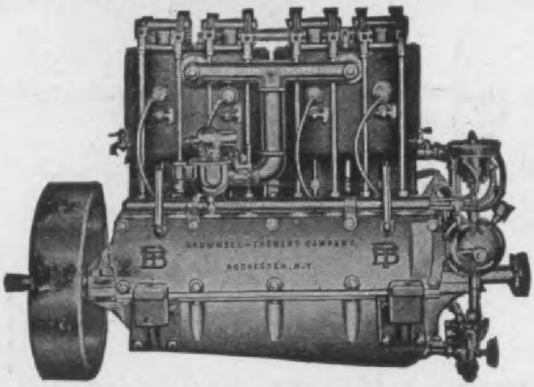

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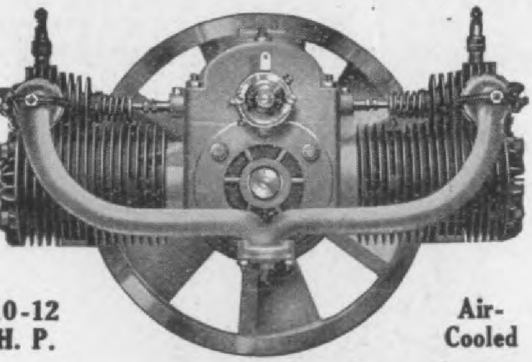

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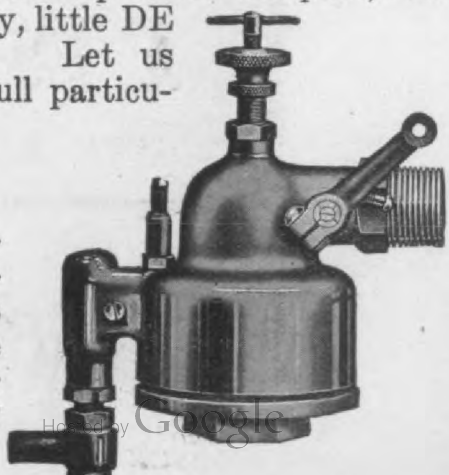
THE SPEED CARBURETOR

vill be a revelation to you. It is positively guarnteed to develop greater power, speed, flexibilty and economy in your engine, and if it doesn't ccomplish this result we refund the purchase noney. Could anything be fairer or show our onfidence in our product in a greater degree? Try THE SPEED at our risk.



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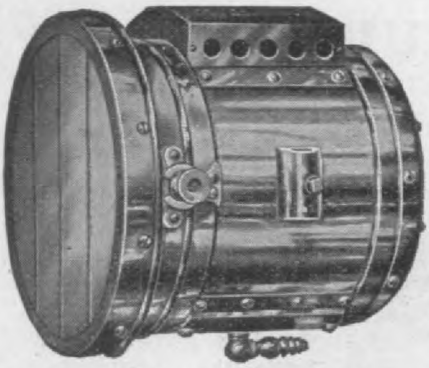
Phoebus Lamps and Generators

Designed for the automobilist who wants the best. They are constructed on attractive lines of excellent materials and finest finish.



1/16" brass body, reinforced with extra bands 1/8" thick. Full size Bausch & Lomb Mirror, Adjustable Focus.

Double Generator, Heavy Gauge brass, Automatic cut-off Valve; water jacket cast base.

Very handsome square lamp, heavy gauge brass, silver reflector, perfect draught; will stay lit.

We can meet all competition in **Price, Quality and Prompt Delivery.**

Get Our 1908 Booklet

Manhattan Screw and Stamping Works, New York City

Established 1840

"THE OLD RELIABLE"

DIETZ MOTOR CAR LAMPS

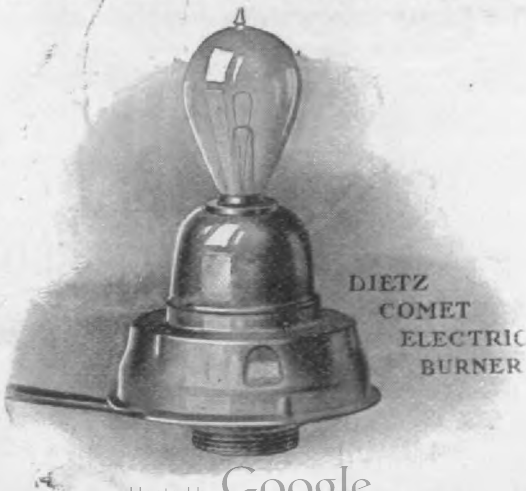
NONE "JUST AS GOOD"

OUR "INTERCHANGEABLE" FEATURE

DIETZ MOTOR CAR LAMPS

INTERCHANGE IN THE SAME LAMP
FROM
OIL TO ACETYLENE OR ELECTRICITY!

Dietz "PRESTO" (Acetylene) $1.25 Each



Dietz "COMET" (Electric) $1.60 Each

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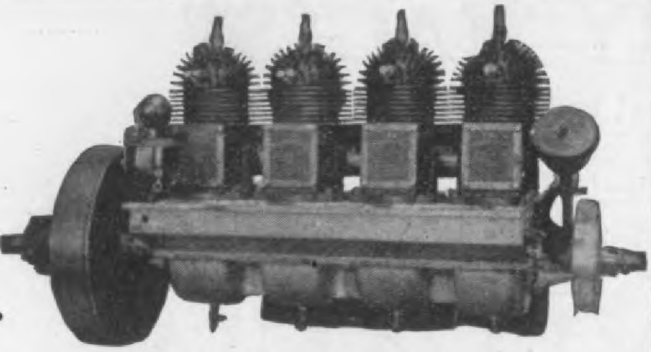


40 H. P. Motor Without Cooling Hood or Fan.

1908 Models. Just Out.

40 H. P. 4 cylinder
30 " " 3 "
20 " " 2 "
15 " " 3 "
10 " " 2 "

All air cooled and cooled beyond a doubt. Best of material and finest workmanship absolutely guaranteed in every respect.

Send for quotations.

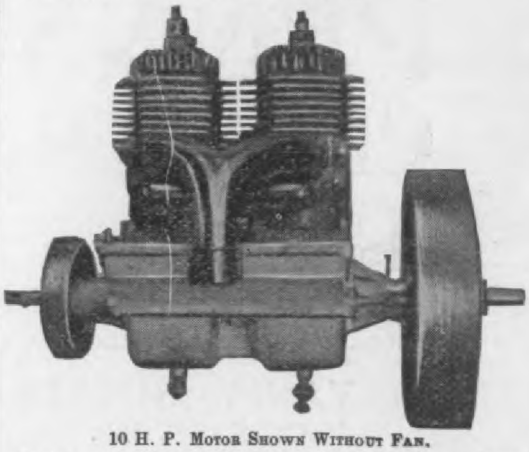
To manufacturers of light cars or auto buggies we will state that we can furnish our 10 and 15 H. P. motors complete with clutch and a 3 speed forward and reverse selective type transmission at a price that will stun you. Also bevel gear rear axle. This will give you an auto buggy whose details have been tried on touring cars and found best by experience. Does away with all chains or ropes, or friction, at very slightly higher price.

If you are in the automobile business for your pleasure, health, or to get rid of your surplus money, then continue to use 4-cycle water cooled motors. But remember that your fate is only a question of time. To prove this look back over the last year and see all the failures.

The public demands extreme simplicity with 40% less weight and 75% less parts which really **spells "Speedwell" 2-Cycle Air-Cooled.**

To the Individual Owner:

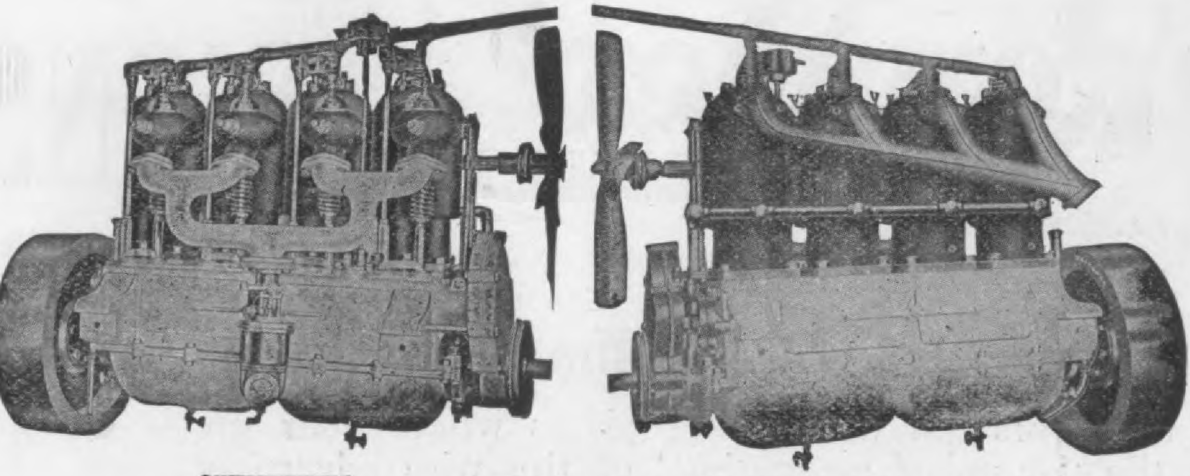
If you buy a new car don't buy trouble, but try and buy simplicity. If you have a car with poor motor, substitute one of our motors and you will ride thereafter in happiness, free from all valve troubles, and such antiquities; but with a motor of the future.

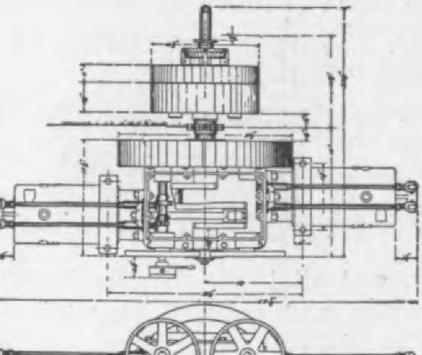


10 H. P. Motor Shown Without Fan.

Not an untried motor but one that has been used for 3 years.

A. H. YOCOM & CO. - - - - READING, PA.





If interested in the most powerful line of motors ever produced, considering weight, where bearing surface and strength have not been sacrificed, write for circulars giving full description. The 50 H. P. 4 cylinder with complete equipment weighs 480 lbs., the 24 H. P. double opposed with complete equipment weighs 350 lbs. D. O. Built in two sizes, 5 x 5—18 H. P. 5 x 6—24 H. P.

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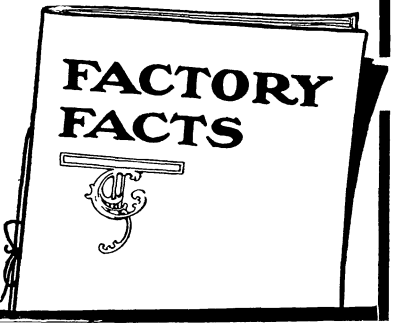
We have issued a very practical book "FACTORY FACTS"

telling down to the bone what motorists often wonder about — *just how tires are made.* It gives clear understanding of tire-making in general and particularly describes *some exclusive* operations that guard against the slightest defect in a single one of the whole output of

PENNSYLVANIA CLINCHER TIRES



Every *buyer* of tires should have this book. Write for it and *read* it.

PENNSYLVANIA RUBBER CO.
JEANNETTE, PA.

BUFFALO 717 Main St. NEW YORK 1741 Broadway
DETROIT 237 Jefferson Ave. CHICAGO 1241 Michigan Ave.
SAN FRANCISCO 512 Mission St. BOSTON 20 Park Square
CLEVELAND 2131-6 East Ninth St

Rambler AUTOMOBILES

Selling by

SIGNS

Day and Night

(A Meyercord sign produced in miniature)
Actual size 11 x 36 in.

Meyercord Decalcomania Window Signs

on the doors and windows of places where your goods are sold are the "*practical realization*" of the wise advertiser's aim. *The most profitable publicity for the smallest expense.* Large manufacturers realize the value of **"MEYERCORD SIGNS"** placed *right where the goods are sold.* Hence their unfailing endorsement of the **"MEYERCORD"** way.

"DON'T DELAY, DO IT TO-DAY"

Transfer Trade Marks, Crests, Name Plates, Decorations, and all kinds of Decalcomania Products for Automobiles, Motor-Cycles, Bicycles, etc. Samples and original sketches free.

THE MEYERCORD COMPANY, Inc.

1107-1112 Chamber of Commerce
CHICAGO, ILL., U. S. A.

American Manufacturers of Guaranteed Decalcomania Transfers

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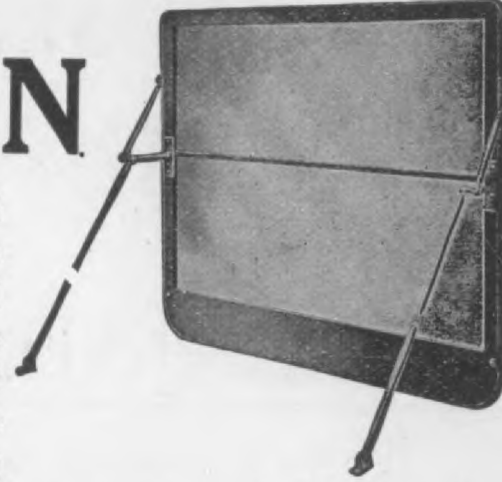
market, but only one

ACKERMAN



To this you will agree without question, if you are the fortunate possessor of one. To those who are not familiar with the **ACKERMAN PARTING WINDSHIELD,** we would state that it is one of the best and neatest ever offered the automobilist. It is positively rigid, being free from the annoying rattle which is an unvarying accompaniment to so many windshields. No adjustments are required in operation. It is operated from the seat, and can be put up or down in five seconds. Regular shield, like illustration, will fit 90 per cent. of all cars built and the price is satisfactory.

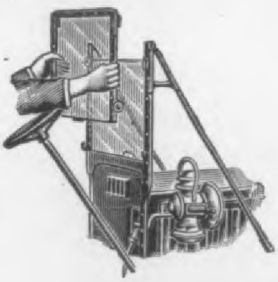
By the way, our catalog is a veritable "buyer's guide," containing illustrations and descriptions of many articles you need: **COAT AND ROBE RAILS, FOOT-RESTS, CURTAIN FASTENERS LAMP BRACKETS, TIRE HOLDERS, etc., etc.** It will pay you to send for it.

JOS. N. SMITH & CO., Manufacturers

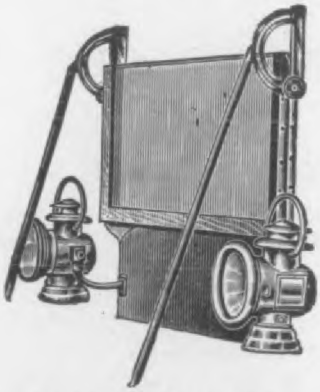
DETROIT, MICH.

The 3 Best

Divided Wind Shields



VOLTZ



BEECHER

SCHILDBACK

A Shield for everyone. Write for ***right prices.***

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SEND FOR

Dealers' Catalog

OF AUTO

TIRES, INNER TUBES and SUPPLIES

It is very complete and you will find it up-to-date in every respect, as is our method of handling orders

Manufacturers' Supplies Co.

418 Arch Street ∴ PHILADELPHIA, PA.

AUTO TIRES—Overstocked

TUBES

28 x 3	$2.75
30 x 3	3.00
30 x 3½	3.50
30 x 4	4.00
32 x 3½	3.50
32 x 4	4.20
34 x 3½	4.20
34 x 4	4.00
34 x 4½	6.00
36 x 4	6.00
36 x 4½	7.00
30 x 2½	2.50

				SHOES LIST PRICE	SHOES OUR PRICE	TUBES
28 x 3	International	First	Grade	$25.50	$12.00	$2.75
30 x 3	"	"	"	28.50	14.00	3.00
30 x 3½	"	"	"	35.00	18.00	3.75
30 x 4	"	"	"	44.25	20.00	4.20
32 x 4	"	"	"	50.00	21.00	4.90

These are fresh clean goods, brand new. Let us quote you on any size.
International Quick Detachable, will fit Goodyear or Universal Dunlop rims.
30 x 3½ Bailey Tread, $18.00
30 x 4 Smooth " 20.00

Quick Detachable Shoes will fit Universal, Dunlop, Goodyear or Midgley Detachable Rims. They are last year goods and sold as seconds. Name buffed on account of price.

30 x 3½	$13.00	Quick Detachable.	
32 x 3½	16.00	"	"
32 x 4	19.00	"	"
34 x 4	20.00	"	"
34 x 4½	24.00	"	"
36 x 4½	26.00	"	"

Clincher Shoes, 1907 Stock, high grade makes. Name buffed on account of cutting prices.

30 x 3	$11.00	34 x 3	$ 9.00	34 x 4	$18.00	34 x 4½	$21.00
30 x 3½	13.00	36 x 4½	25.00	32 x 4	16.00	34 x 5	24.00
32 x 3	8.00	30 x 2½	6.00	32 x 4½	17.00	36 x 3½	16.00
32 x 3½	14.00	34 x 3½	15.00	36 x 5	26.00	36 x 4	19.00
						26 x 3	9.00

Kindly don't think this is a lot of goods that are a job lot; they are all clean legitimate tires. If you order and are dissatisfied on receipt, will refund purchase price.

We are selling Alpha Type Lamps, list price, $40.00; our price, $10.00 pair.
" " " Phoebus " " " 30.00; " " 8.00 pair.

We have been selling tires for 15 years. Can refer you to thousands of satisfied customers all over the WORLD, or we refer you to any Rubber Co. about us or State Bank, 5th Ave. Branch, N. Y. City.
Let us quote you on any make or size; will save you big money.

A. H. KASNER,
LARGEST TIRE DEALER IN U. S.

STOREHOUSE, 104 Chambers St.
" 88 " St.

Salesroom 152 Church St., N. Y. City.

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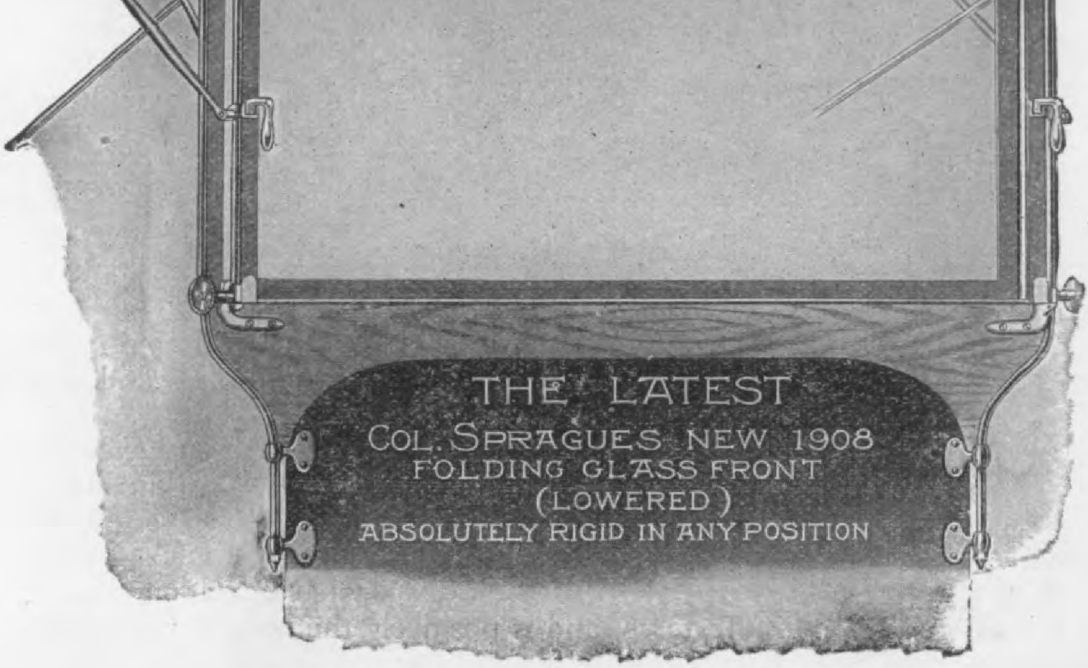


AUTO FRONTS AND TOPS

Col. Sprague's New 1908 Common Sense Goods for sensible people. A gentlemen's outfit. One in one—that's all. We kill the bugs—We don't catch 'em and hold 'em. They are fool proof. No set screws. No plunge bolts. No other rattle traps or monkey shines. Simplicity, Durability and Elegance. All the working parts made of phosphor bronze and can't break. Ask for our catalogue.

THE SPRAGUE UMBRELLA CO., Norwalk, O.

"DON'T TAKE THE DUST"

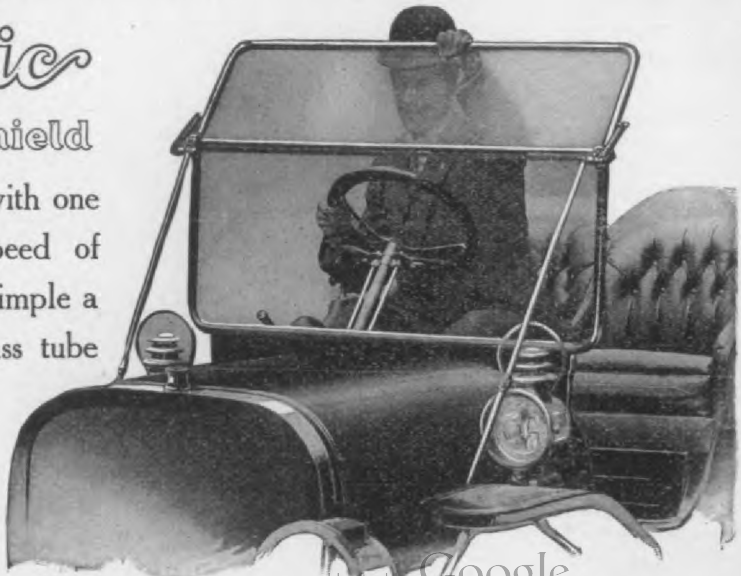
BE PREPARED WITH

The Automatic

Formerly the Coover

Folding DUST AND WIND Shield

Instantly raised or folded with one hand, without decreasing the speed of the car or leaving the seat. So simple a child can raise or fold. All brass tube and glass. Anti-rattle.



Send for Catalog, just issued.

No. 1—29 x 41½ inches - - - $50.00
No. 2—29 x 44 " 55.00

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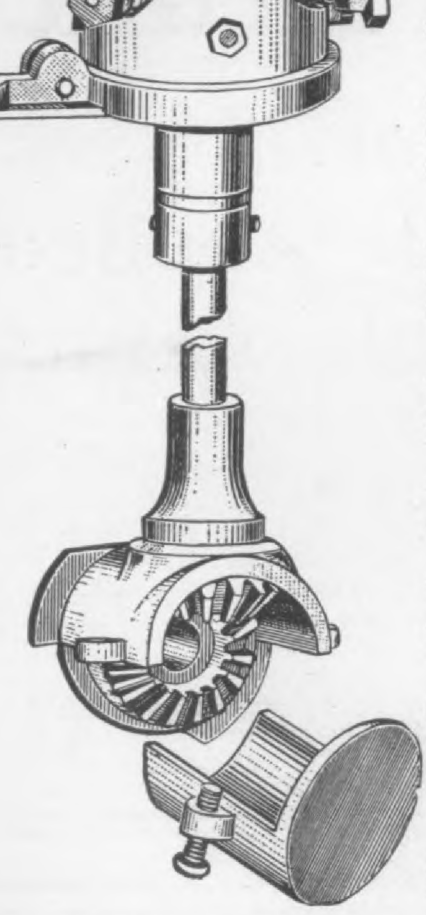


applied to Ford cars, Models "N" and "R."

As will be seen, it comprises a pair of bevel gears, casing for the same, a vertical shaft, on top of whi is mounted a STERLING DOUBLE CONTAC timer.

This vertical timer obviates all the disadvantag of the timer in its present inaccessible position whe it is also subject to dust and grease, and it is givi universal satisfaction.

The application is extremely simple, no machi work being required except the drilling and tapping two ¼-inch holes in the cylinder.

Everything is furnished in the outfit except the wi for wiring up. The material and workmanship is fir class, and the outfit is guaranteed in every particular.

The STERLING DOUBLE CONTAC TIMER, used on this device has a number of no features, and is positively the best on the market.

Write for descriptive circular and prices.

Sterling Alternating Ignition C

No. 11 Mill Street, BINGHAMTON, N. Y.

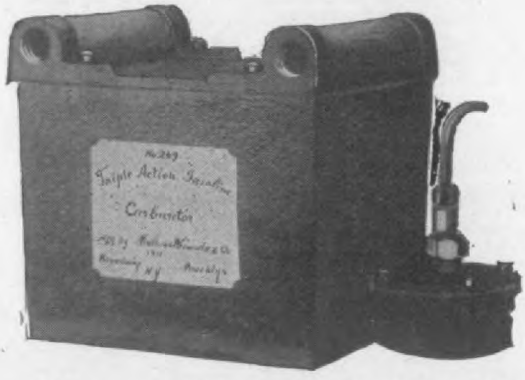
Manufacturers of the STERLING DOUBLE CONTACT and M.I.P. Timers, and the ALTERNATING MASTER VIBRATO

TRIPLE ACTION GASOLINE CARBURETOR

PATENT ALLOWED

Delivers a Saturated But Dry Gas

We guarantee you from 20 to 30 per cent. more power than is given by any other Carburetor in the world.



Fuel Record ½ Pint Per H.P. Hour

Send for circulars. Agents wanted everywhere.

Manufactured by MATHIAS WEIWODA & CO.

1660 to 1668 Bushwick Avenue, BROOKLYN, N. Y., U. S. A.

Branch Office, 1814 Broadway, Brooklyn, N. Y.

CAPITAL OR PROMOTER WANTED INSTANTLY

We advise Manufacturers

"Not to use the Triple Action Gasoline Carburetor"

"IF" their engines are not built to stand a "High Pressure Explosion," as the Triple Action Gasoline Carburetor puts the main thing behind the piston,

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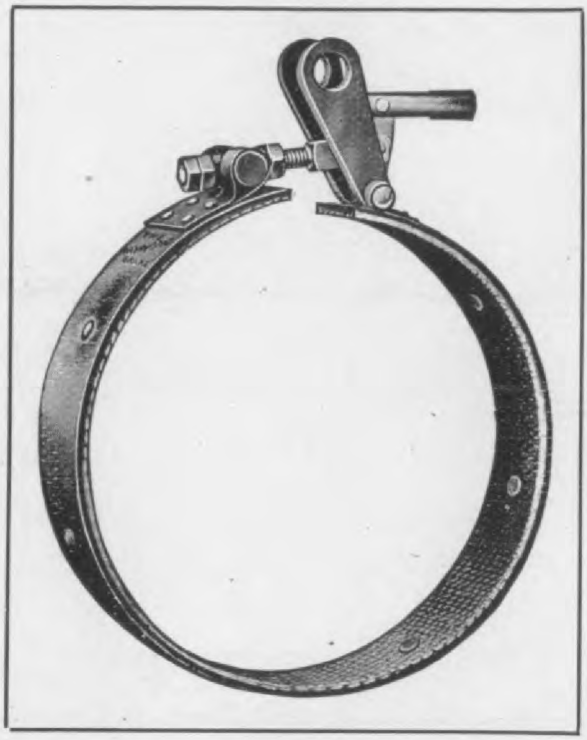
The Raymond Brake



Powerful
Easily Applied
Double Acting

It either stops a car quickly or decreases the speed, as you like.

Thousands of them in use today

ROYAL EQUIPMENT CO.

151 Housatonic Ave. Bridgeport, Conn.

BIBB NOSE Spring Key Cock

LUNKENHEIMER
SPRING KEY COCKS

NEVER LEAK

EASILY OPERATED **ALWAYS SATISFACTORY**

LUNKENHEIMER SPRING KEY COCKS

Never need adjusting. The spring will always hold key firmly seated within the body, but does not prevent the easy operation of same.

Combined Priming Cup and Relief Cock

Particularly adapted for Automobiles and Motor Boats, where the constant vibration would soon loosen cock keys rigidly held in place as are the ordinary kind.

Ours is a Complete Line

The Lunkenheimer Company

Largest Manufacturers
Of High Grade Engineering Specialties in the World

General Offices and Works

CINCINNATI, OHIO, U. S. A.

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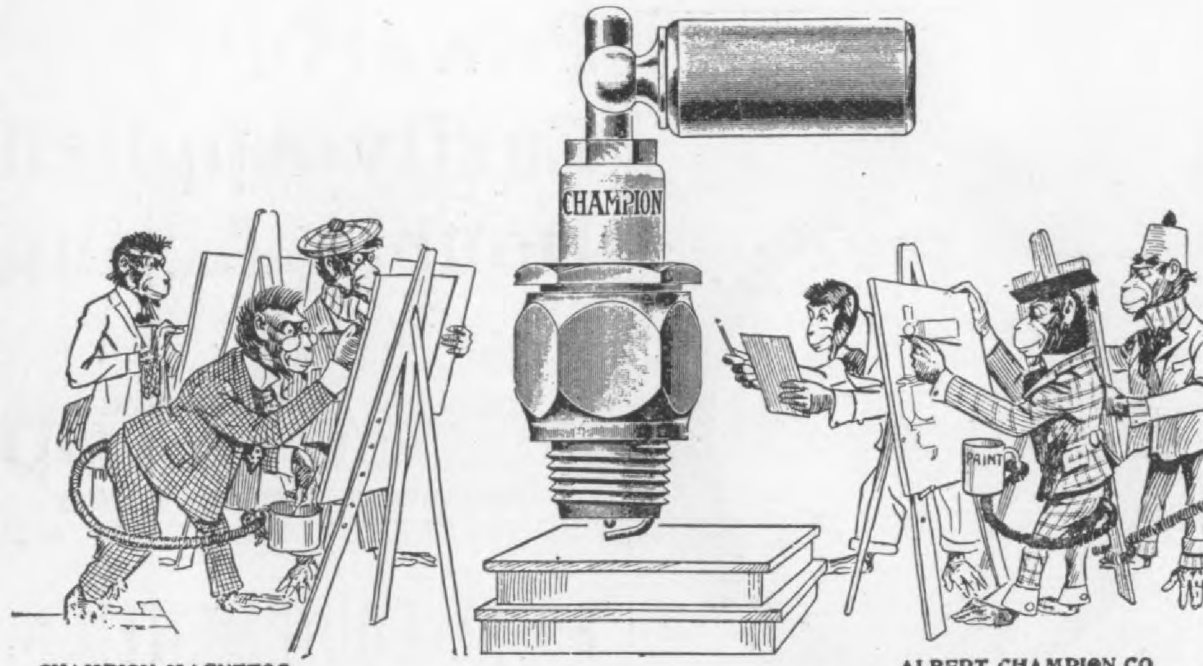

CHAMPION MAGNETOS
IMPORTED IGNITION WIRE

ALBERT CHAMPION CO.
38 WHITTIER ST., BOSTON, MASS

Rex Storage Igniters

for

Automobiles and Motor Boats

How our Igniters are protected from breakage:

First :—A quartered oak box.

Second :—A casing of shock-absorbing material ⅛ in. thick around and below the rubber jar, between it and the wooden box.

Third :—A hard rubber jar of generous thickness.

Can you break the three?

Write for Prices

The New England Motor Co.

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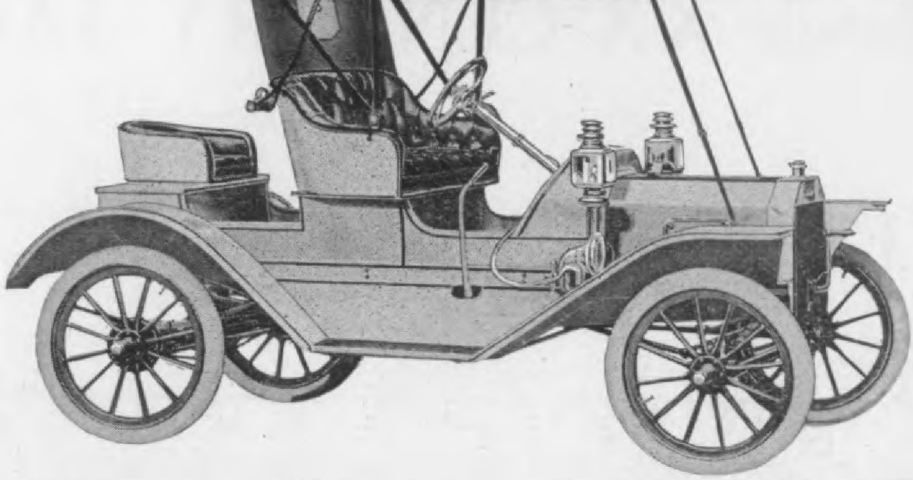

Newton "Roadster" Top

Made in All Materials and from $25.00 Up

W. H. NEWTON & SON

123 ELM STREET :: :: CORTLAND, N. Y.

ALLEN'S

Are Guaranteed Satisfactory

AVOID SUBSTITUTES

Look for the Name

OUR MOTTO

"What we do, we do well"

ALLEN'S

Tire Cases		$4.0
Tire Holders,	No. 1	10.0
Tire Holders	" 2	8.0
Tire Locks	" 1	10.0
Tire Locks	" 2	7.5
Tire Locks	" 3	5.0
Tire Locks	" 4 (single)	3.5

All Yale Locks.

The best material obtainable is used i the manufacture of our goods.

WARNING: We have entered suit against the Nathan Novelty Mfg. Co. fo infringement of our patent on tire covers, and warn the public t use care in the purchase of Button Tire Cases. Ask for the "Allen Tire Case" and se that the buttons bear our name "Allen," thus securing quality, perfect fit and complet

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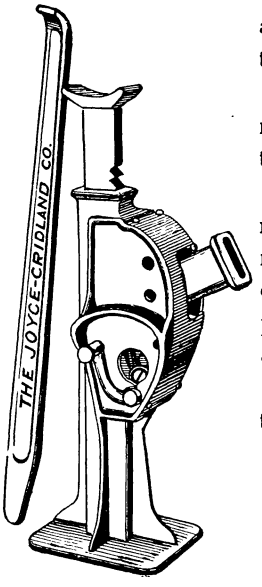
We Want Hustling Agents in Every City to Handle XX CENTURY JACKS



and are ready to make an attractive offer if you will carry them in stock.

XX Century jacks are strictly a quality product, they are made from the best materials, carefully machined, and contain no cast iron or delicate jiggers to queer their action.

This is the strongest and safest light weight jack on the market, costs no more than others, sells on sight, and always makes satisfied customers. We further help our agents to increase their trade at no expense by sending to them appropriate literature printed with the agent's name and address.

If you can sell XX Century jacks write for our liberal terms and special prices for sample jack.

The Joyce-Cridland Co.

DAYTON, OHIO

Western Representative: J. Curtis Barcus, Farina, Illinois. 25

MICHELIN

FRANCE ENGLAND ITALY AMERICA

MICHELINS WILL HELP TO SELL *YOUR* CAR.

We have received and filled orders for such representative American car manufacturers as: Packard, Pierce, Peerless, Stearns, Thomas, Stevens-Duryea, White, Olds, Stoddard-Dayton, Elmore, Premier, Pope Hartford, Pope Toledo, Northern, Austin, Grout, Rainier, Corbin, American, Marion, Franklin, Garford, Pennsylvania, Chadwick, Acme, York-Pullman, Buick, Reo, Maxwell and others. Of course you know that the leading foreign cars are universal in equipping with Michelins--that over half the tires in use in Europe today are Michelins.

MICHELIN TIRE CO., Milltown, N. J.

NEW YORK
1763 Broadway
BUFFALO
908 Main St.

BOSTON
895 Boylston St.
DETROIT
247 Jefferson Ave.

CHICAGO
1344 Michigan Ave.
SAN FRANCISCO
426 Golden Gate Ave.

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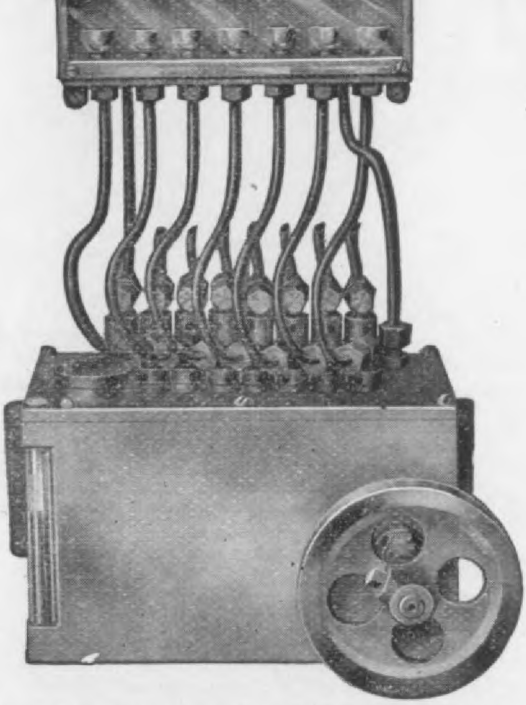


MECHANICAL FORCE SIGHT FEED MULTIPLE OILER

The Simplest—Most Reliable and in all respects the most satisfactory and best oil pump

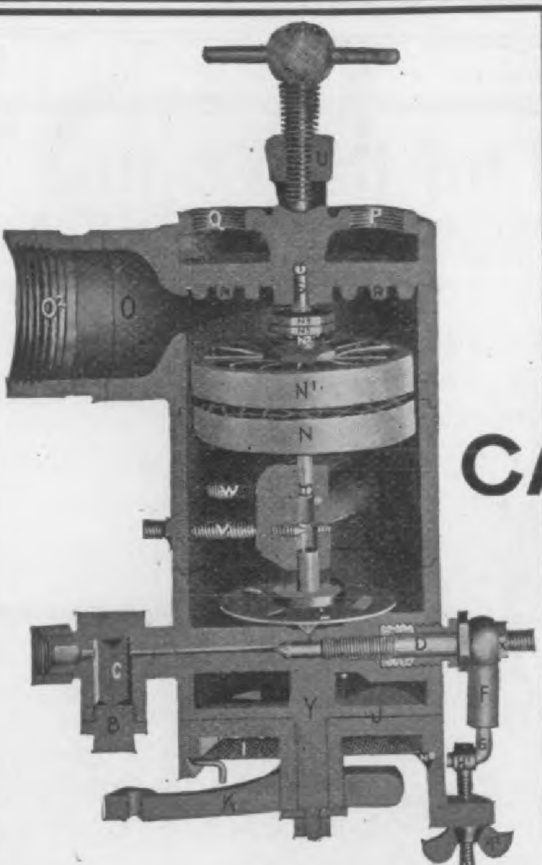
Set of Sight Feeds and Pump Reservoir separated so that each can be located at most convenient point, or furnished with sight feeds on reservoir so that entire device can be located at one place.

Does not depend on gravity for feed of oil from sight feeds to cylinders, but gives a positive mechanical feed of oil to the sight feeds and from the sight feeds to the parts to be lubricated.

SHERWOOD MFG. CO., BUFFALO, N. Y.

Manufacturers of Multiple Feed Oilers, Oil Cups, Grease Cups, Lubricators, Oil-Pumps

CARBURETORS WRITE FOR CATALOGUE AND PRICES



REMEMBER WE GUARANTEE FOR "THE SCIENTIFIC CARBURETOR"

25 Per Cent. More Everything

Power, Speed, Economy, Flexibility, etc.

30 DAYS FREE TRIAL

(Money back if you want it.)

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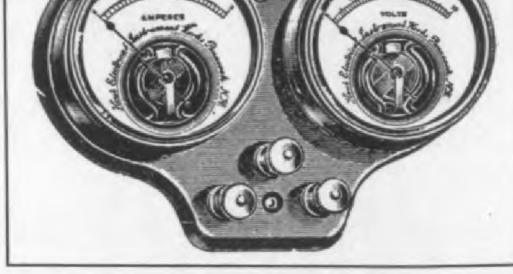

tion keeps you constantly informed as to the actual condition of the Ignition System. If there is any trouble with the batteries, coils, vibrators, timer, spark plugs or wiring, it will inform you where it is. It will increase the efficiency of your engine, and lengthen the life of your batteries and vibrators. It will tell you, at all times, the mileage there is remaining in your batteries. It is to the Ignition System what the steam gauge and water glass are to the steam boiler.

If your car is not already equipped with this System you should know about it. It is simple, yet effective. If you are interested, send for bulletin T-J describing it.

Hoyt Electrical Instrument Works

PENACOOK . . . . . **New Hampshire**

The Oil for the Engine That Wins

Vacuum MOBILOIL is *the* oil for crucial engin tests that depend on perfect lubrication as much a on the merit of the engine itself. MOBILOI makes the selection of the right oil an easy ce tainty instead of a matter of expensive experimen

VACUUM

MOBILOIL

compounded in five different grades, each exactly adapted to a par-cular type of automobile engine. The use of the special grade for *ur* engine avoids the possibility of expensive mistakes in lubrication, wers cost of maintenance and reduces wear.

A valuable booklet listing every automobile made and giving correct instruc-

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up if knowing that it is fitted with the proper mirror. It is not enough that the searchlight should be sightly in appearance; but it should be provided with a scientifically constructed mirror, because the power and volume and proper direction of the light depend upon *the mirror.*

Bausch & Lomb Searchlight Lens Mirrors

are not mere arbitrary forms of glass, but lenses ground by experienced lens grinders to an exact formula. Then they are silvered by our special process, made to withstand the high temperature and be durable.

¶ Insist upon having your searchlight fitted with our mirror, every one of which is stamped "B. & L." on its face.

PRISM IS A LITTLE MAGAZINE OF LENS INFORMATION. SEND FOR COPY

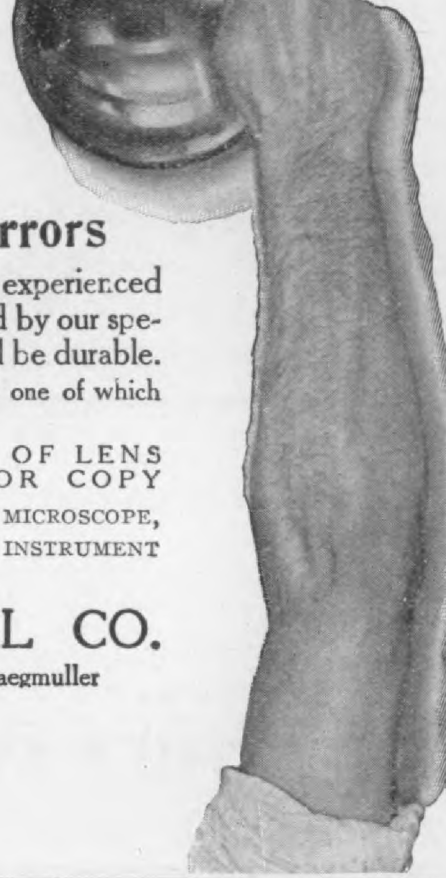
¶ OUR NAME ON A PHOTOGRAPHIC LENS, FIELD GLASS, MICROSCOPE, LABORATORY APPARATUS, SCIENTIFIC OR ENGINEERING INSTRUMENT IS A MARK OF QUALITY.

BAUSCH & LOMB OPTICAL CO.

Carl Zeiss, Jena — B-L Z S — George N. Saegmuller

Offices: New York, Boston, Chicago, San Francisco, Washington, London, Frankfort

ROCHESTER, N. Y.



Concentrate your line of Sundries

and especially spark plugs, and you will have less dead stock on your hands at the end of the season.

"SOOT-PROOF"

plugs are easy sellers because they possess **real merit,** and sell at the right price.

$1.00

to fit any make of car.

None genuine without this name on the porcelain.

C. A. Mezger, Inc., Manufacturers

1750 BROADWAY, NEW YORK

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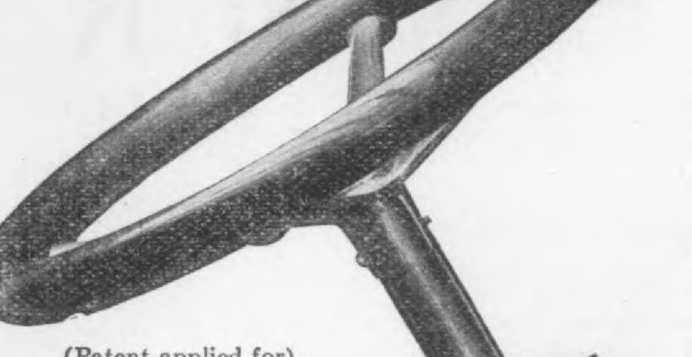

(Patent applied for)

But get a Thief Proof Auto Lock With this Lock attached to the steering column you can lock car and it cannot be driven away. It's the latest and best invention of its kind; you need not have any fear of leaving your car stand. You lock it while sitting in the seat. How to obtain one of these valuable articles: Send us $10.00 giving make of car and diameter of steering column and we will send post paid to your address one of our Thief Proof Auto Locks with full directions how to attach same. It can be easily attached to any car.

Agents wanted Every where. Jobbers and Dealers write for particulars.

THE THIEF PROOF AUTO LOCK CO.

208 S. Illinois Street :: INDIANAPOLIS, INDIANA

REMEMBER that we make shipments the same day your order is received, and our prices are very low compared with the high grade of goods we sell.

¶ Give us a trial, and you will find that there is at least **ONE** house in Philadelphia that deserves your patronage and will take care of it after it gets it.

The Autolight and Motor Supply Co.

INCORPORATED

506-508 NORTH BROAD STREET, PHILADELPHIA

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SIX-CYLINDER ENDORSEMENT

¶ At the present time (May, 1908,) there are 1011 Stevens-Duryea Six-Cylinder Cars in use—from Portland, Maine, to Portland, Oregon—from Minneapolis, Minnesota to Mexico City, Mexico.

Every Stevens-Duryea SIX is giving perfect satisfaction

¶ It is an acknowledged fact that any one who has ever driven a Stevens-Duryea SIX will never go back to a Four, excepting for a smaller car. This strongly shows the tendency of the future. Any one purchasing a Four-Cylinder Car of more than forty horse power and paying over $2750 should preferably secure a SIX.

SEND FOR STEVENS-DURYEA DESCRIPTIVE MATTER

STEVENS-DURYEA COMPANY
700 MAIN STREET, CHICOPEE FALLS, MASS.
MEMBERS A. L. A. M.

The Serviceable Baker Runabout

is the ideal car for either gentlemen's or ladies' use. It is speedy, powerful, and always ready for instant service. It provides the most pleasurable and satisfactory form of transportation between home and business; for making calls; for pleasure riding; or for my lady's shopping tour.

Baker Electric Vehicles

will run further and faster than any other electric car manufactured.

The Baker Electric has stood all tests of time and use. Their Mechanical construction is as near perfection as the best mechanical and electrical engineers can make them. They are handsome in design, elegant in all their appointments, and absolutely dependable.

Let Us Send You

our 1908 catalogue that illustrates and describes the complete line of Baker Electric Coupes, Brougham, Victoria

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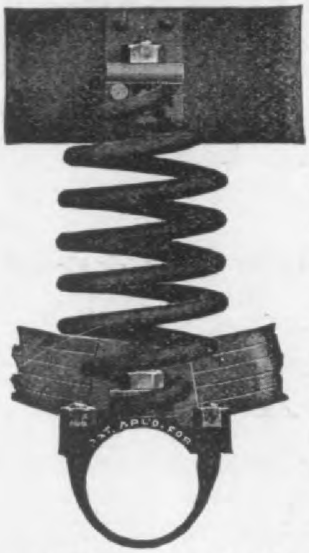


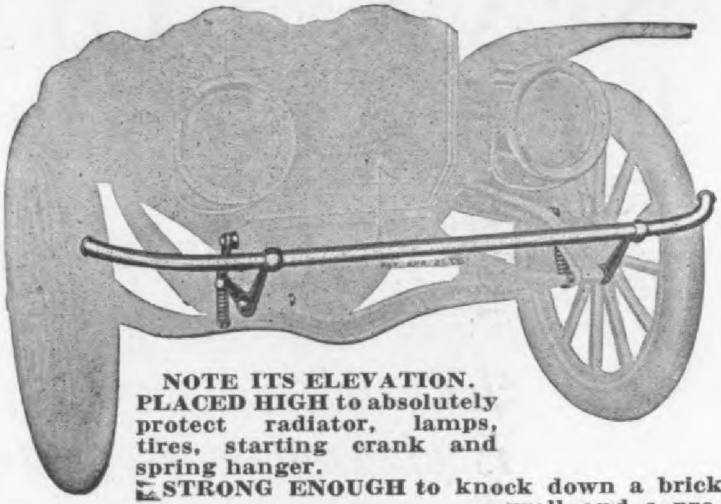
Good Thing for Bad Roads

Not Bad for Good Roads

PATENTED SEP. 4, 1906.

25,000 Equalizing Springs in Use

It Costs Nothing to try Them Write Today for Interesting Booklet



NOTE ITS ELEVATION. PLACED HIGH to absolutely protect radiator, lamps, tires, starting crank and spring hanger.

STRONG ENOUGH to knock down a brick wall, and a protection against "Road Hogs."

A money-saving device.

SAGER

CROSS CHAINS

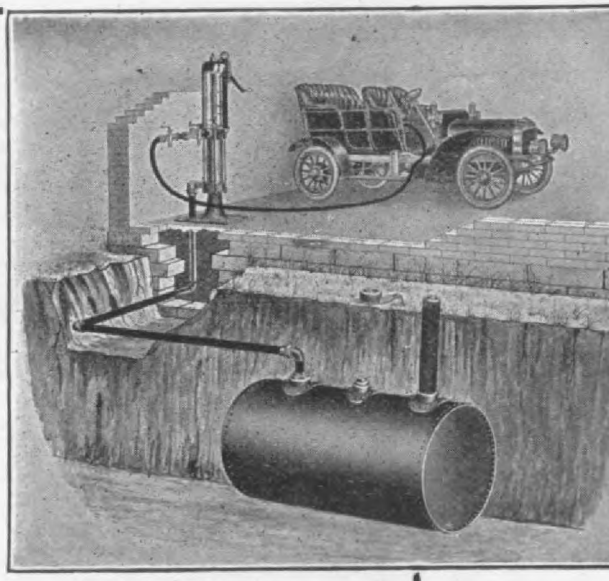
So Simple that a Child Can Attach Them.

J. H. SAGER COMPANY, - Rochester, N. Y.

IF you even suspected that you were losing from $50.00 to $200.00 a year, wouldn't you try to stop it?

By buying your gasolene at retail, or storing it in ordinary tanks, you are losing that much or more.

Catalog T shows you just how you are losing this money and illustrates storage tanks that will stop it. Send for it today.



CUT 41—LONG-DISTANCE OUTFIT
The Standard Garage Equipment for Gasolene Storage

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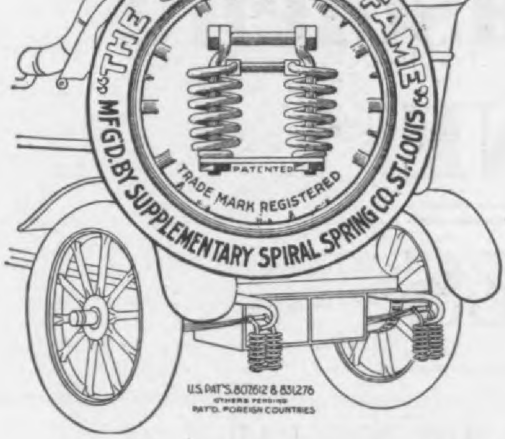

WORTH THEIR WEIGHT IN GOLD TO ANY CAR

Over 10,000 Cars Equipped

The greatest device in the World for saving your Car

WHAT OTHERS SAY:

"100,000 miles and not a broken side spring."
C. W. Nugent, St. Louis.

"I cannot praise them enough."—H. L. Turner, Boston.

"Am thoroughly satisfied with them."
E. W. Gibson, The Point, Tasmania.

"They ride extremely nice."
British-American Co., Coventry, England.

"They are everything you claim for them."
Dr. F. E. Buck, Jacksonville Fla.

"I cannot understand how I did without them."
Leopold Kahn, New York City.

"Make the car ride very comfortably."
S. N. Briggs, Los Angeles, Cal.

"A regular repair bill saver."—Sylvester Simon, Chicago.

The above extracts from a select few letters recently received give an idea of the range of territory in which the Supplementary Spiral Springs are popular. We have too many to print.

Send for "MISSOURI PROOF"—we show you—and our 1908 BOOKLET—it's interesting.

Beware of worthless makeshift single or double-coil imitations and infringements.

Liberal NO RISK proposition to the trade.

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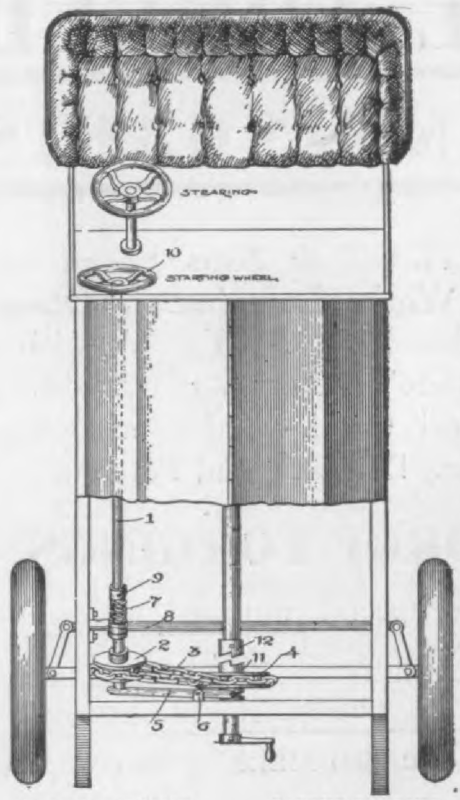
Main Office, 4522 Delmar Ave., St. Louis, Mo.



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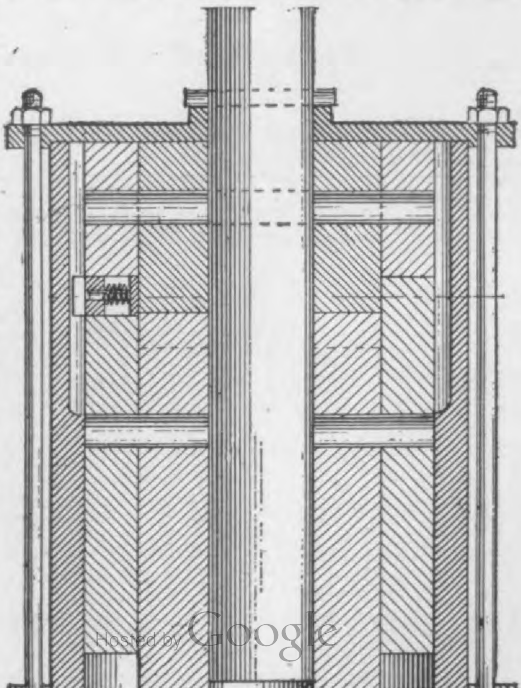
NO MORE CRANKING

THE ADAMS ENGINE STARTER

Absolutely the only successful automatic automobile engine starter on the market. Operates from the seat, completely eliminating all danger of "kicking" and accidents from cranking. Can be operated by women as well as men as only one quarter the amount of energy is required in starting the engine as by the cranking device. Greatly adds to the salability, utility and safety of automobiles. Detailed drawings to automobile manufacturers on request, or will send man to demonstrate. Price, $25.00. Agents everywhere, write today.

No more injury while starting a car.

The Adams Safety Device



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Gas and Gasolene

ENGINE

VALVES

We are specializing in the Forging of High Nickel Alloy for this purpose.

We are Succeeding—Present orders prove Material Right—Workmanship Right—Prices Right.

Ask for list and prices of over one hundred stock die sizes.

We also make Drop Forgings generally.

Crescent Forgings Company

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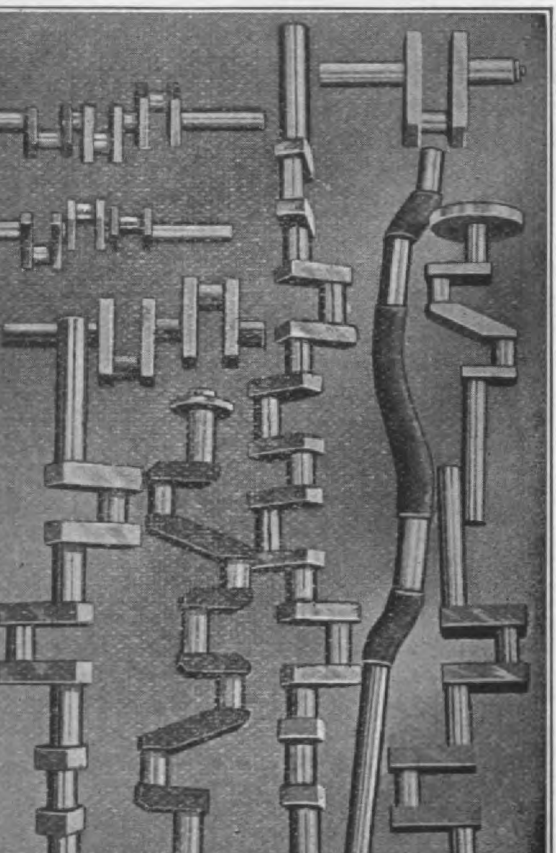

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CRANK-SHAFTS

The P. H. Gill & Sons Forge an Machine Works, Lorraine and Otseg Streets, Brooklyn, N. Y. We wish call the Trade's attention to our Chron Nickel Steel Crank-Shafts and Ge Blanks, etc., Domestic and Foreign.

NO DROP FORGINGS

We have special adapted Crank P Machines for making Crank-shafts tru round within one-quarter-thousandth an inch. We also make axles complet finished or forged only; also all kin

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Diamond Chains

for they are strictly a quality product.

Every real improvement in chain construction appeared first in Diamond Chains, and we spare no effort or expense to maintain a high standard of material and workmanship. Take for instance, our nickel steel rivets, which have never been equaled for resisting wear and breakage, our chrome nickel side bars, which increase the tensile strength, altho they make a lighter chain, and our new built-up block which, because of its added rivet-bearing surface, will pull enormous loads without unreasonable wear.

Diamond Chains represent 18 years' experience concentrated exclusively on chain transmission problems, and have long been the acknowledged standard.

The new Diamond Repair Block makes repairing easier on a riveted chain than on a detachable chain.

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THE DIAMOND CHAIN & MFG. CO.

(Capacity 8,000,000 ft. per year)

260 W. Georgia St., No. 27 **Indianapolis, Ind.**

Smith Automobile Parts

Smith Pressed Steel Frames are made of high carbon, nickel and chrome nickel steel, from stock conforming to special analyses of our own, and are heat treated by us. Through the successive operations from sheet steel to finished frame, thorough tests are made and rigid inspection enforced. Every frame receives this careful attention to detail. The result is "Smith" quality.

A. O. SMITH CO. **257 Clinton Street**

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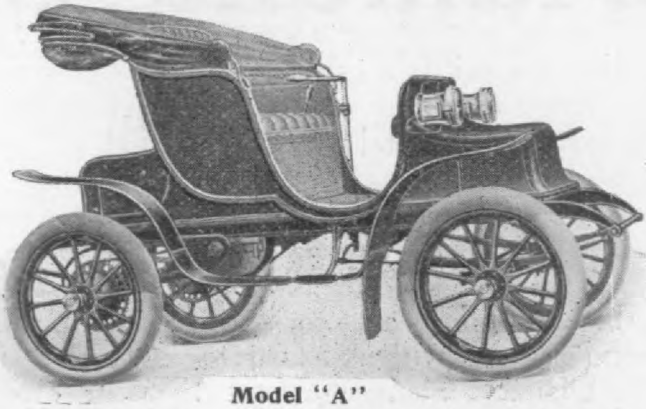
(The latest and best)

The World's Record Beaten for Distance Run on a Single Charge

Four Models to Select From



Model "A"

Two, Three and Four Passenger Cars

Ran from Washington to Baltimore and Return

No apologies need be offered. The "Detroit" Electrics are handled by Agencies who can afford to handle nothing but the best. All bodies interchangeable on one chassis, enabling a change from an open to a closed car, or vice versa, without delay. Our New Yale Locking device makes stolen "Detroits" impossible.

Write for our Catalogue and Agency proposition.

THE ANDERSON CARRIAGE COMPANY, DETROIT, MICH

THE MARMON

"A Mechanical Masterpiece"

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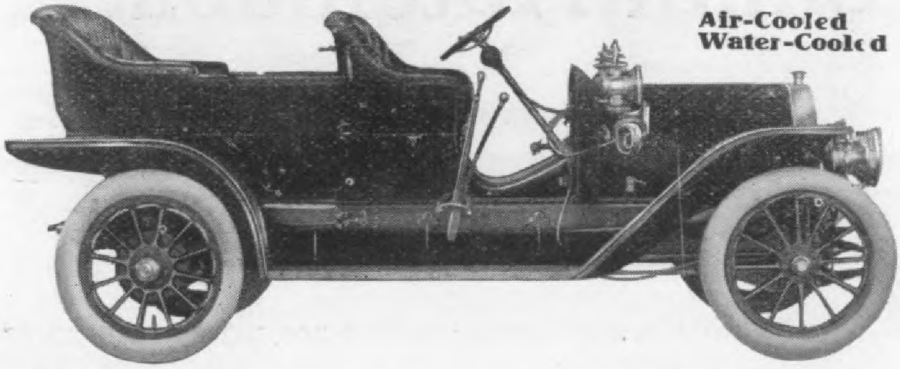

Air-Cooled
Water-Cooled

This is the one car for the man of family. Its wonderful ease of motion is both attractive and important to the feminine passenger. There are many other vital advantages which make a Marmon demonstration very convincing. Write us about your territory.

45-50 H. P., Touring Car, - - $3500

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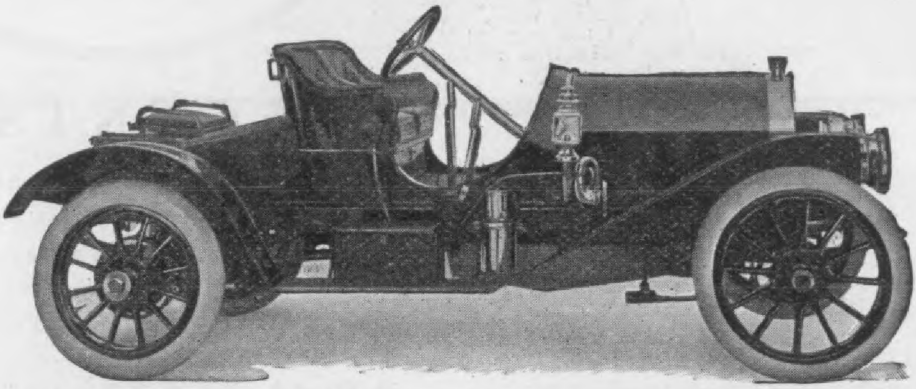
PENNSYLVANIA

Roadster, $2800



A DEMONSTRATION will convince the most **particular prospect** that the **PENNSYLVANIA** is all we claim. Catalogue upon request.

IN ITS ENTIRE CONSTRUCTION FAULTLESS. IN ITS APPOINTMENTS MOST COMPLETE

PENNSYLVANIA AUTO MOTOR CO. - Bryn Mawr, Pa.

GROUT CARS

FOR 1908

Touring Car, Complete with Top, $2500
Tourabout, 4-Passenger - 2400

¶ Agents who desire to represent a factory, willing to give EVERY POSSIBLE AID in selling are asked to communicate with us.

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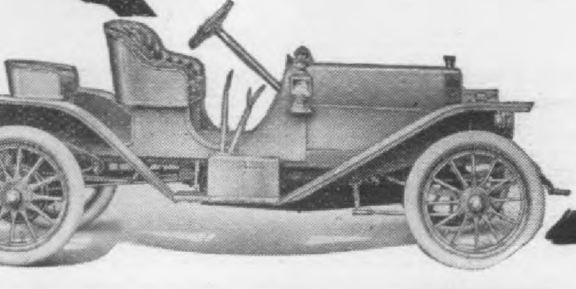
A full description of this wonderful Midland, which is the sensation of 1908. The Midland is one of BEST—made so by men who have spent years building Automobiles and know how. A glance at our specifications surprises those who know Automobiles, for our price is but $2,250.00. The Midland Motor is one of the lightest, strongest—most powerful—most compact—and most convenient ever put into a car.

MIDLAND

Quality in other cars costs $1,000 more than we charge. We are building this car for the thousands who want better value for their money. We will make less on each, but sell more. We have the facilities to turn out the best at fair prices. **Once learn the Midland advantages and you'll buy right away.**

WRITE US FOR FULL INFORMATION

Four cylinder—30-35 H. P. Speed 5 to 50 miles on high gear. Disc clutch. Pressed steel frame. Transmission selective type sliding gear. Timken roller bearings throughout. Three speeds and reverse. SHAFT DRIVE: Spark and throttle stationary on steering wheel. Foot accelerator. Full equipment, all lamps, horn, tools and tire repair outfit.



THE MIDLAND "STERLING" MOLINE, ILL., U.S.A.

AGENTS

write for uncovered territory. Midland never fails to sell on first demonstration. Our Agents say that each car sold sells two more. Big opportunity for live men. Write quick.

Midland Motor Co.
MOLINE, ILL. - - U. S. A.

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ONE YEAR GUARANTY

Write for complete catalog and book of customers' letters. How well we have succeeded in building the best motor car in all the world is told by our customers themselves, who, as a class, are the most prominent men of affairs in this country.

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are so easily controlled a child can run one wit
perfect safety.

NOISELESS--ODORLESS--CLEA

In beauty of finish and luxury of appoin
ments, they are the ne plus ultra of the carriag
makers' art.

All points of mechanical excellence including SAFETY LOCKING DEVICE and ELECTRIC BRAKE CONTROL are fully patented and used exclusively on RAUCH & LANG CARS.

Book illustrating and describing complete line of eleven different models mailed free-
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Proved Reliability

Type XV—12 H. P.—$1200

Two horizontal opposed cylinders under hood. Shaft drive. Sliding-gear, roller-bearing transmission. Three forward speeds and reverse. Full equipment including top, gas lamps, generator, etc. Three passengers.

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has proved its unexample
efficiency and durability i
actual road work in the hand
of thousands of private own
ers. Built of honest material
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backed by Autocar experienc
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"The Doctor's Car

is the ideal car for business use or light touring. It is the one car that has successfully di
placed the horse in the physician's professional rounds.

The Autocar Touring Car, 30 h. p., $2750

Four vertical cylinders. Shaft drive. Sliding-gear, roller-bearing transmission. Three forward speeds and reverse. Five passenge

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MOTORS { 1 – 2 – 4 – 6 – **CYLINDER**

TRANSMISSIONS { PLANETARY, SLIDING GEAR, JACK SHAFTS, COMBINATION

STEERING GEARS

MACHINE WORK TO ORDER

QUALITY OF WORK GUARANTEED

WRITE FOR ESTIMATES OR SUGGESTIONS ON YOUR DESIGNS WE'LL HELP YOU ALL WE CAN.

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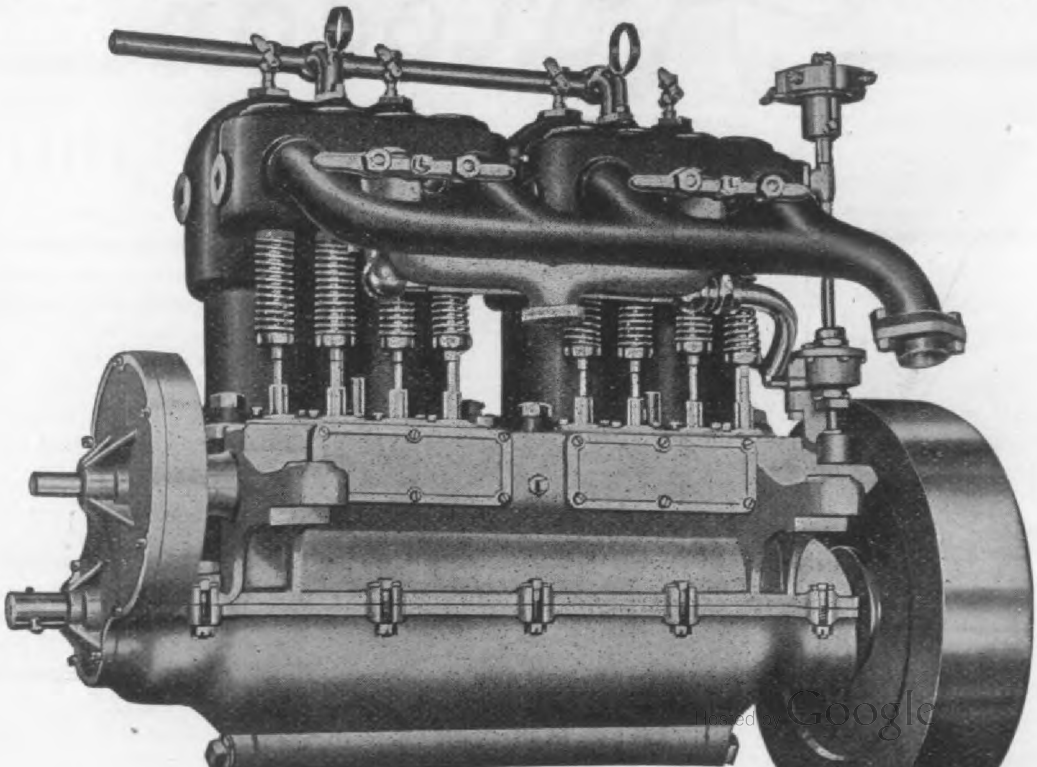
High Grade Beaver Motors WORK LIKE BEAVE Silent. Sure Satisfacto



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THE AGENT WHO DOES NOT **SPEEDILY** GET A LINE ON THE **ATLAS** PERFECTED **TWO-CYCLE** MOTOR AUTOS, IS FAST LOSING GROUND, AND WILL **SEE IT** MIGHTY SOON. COMPLICATION AND FUSS HAVE **GONE** IN THE AUTO WORLD, AND **"ATLAS"** SIMPLICITY AND POWER ARE **HERE** TO STAY.

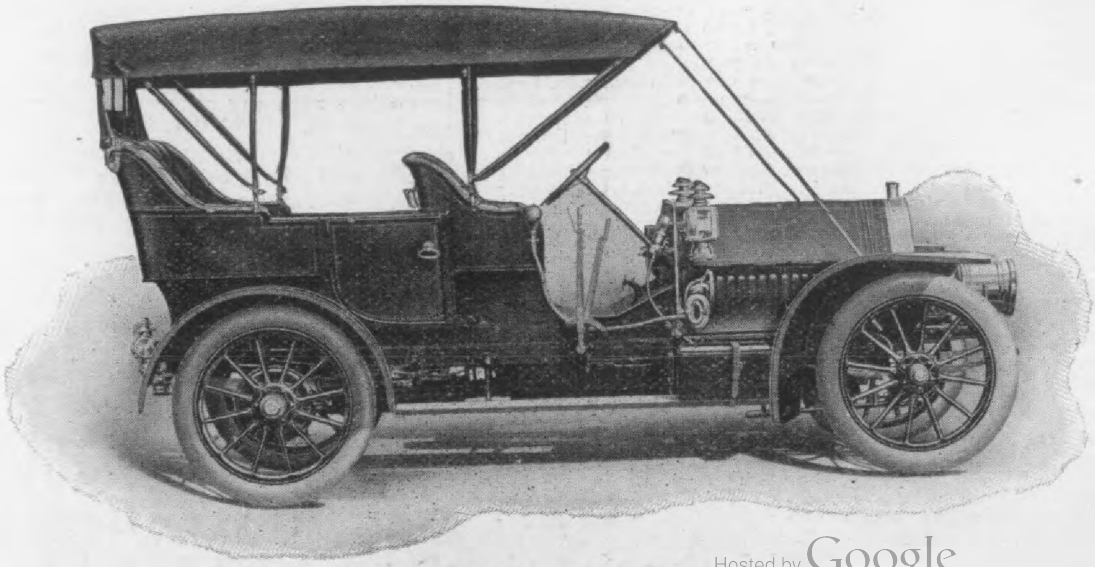
The Atlas Motor Car Co.

Springfield, Mass.

HARRY A. KNOX, Pres.

THE JEWEL

The Non-Skidding Car



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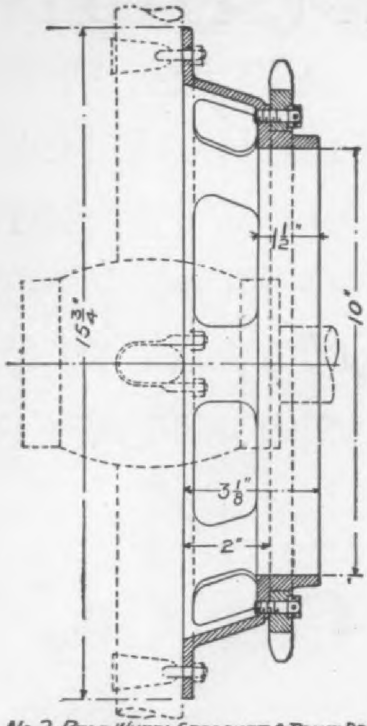
SPECIFICATIONS

Cullman High Wheel Auto Sprockets



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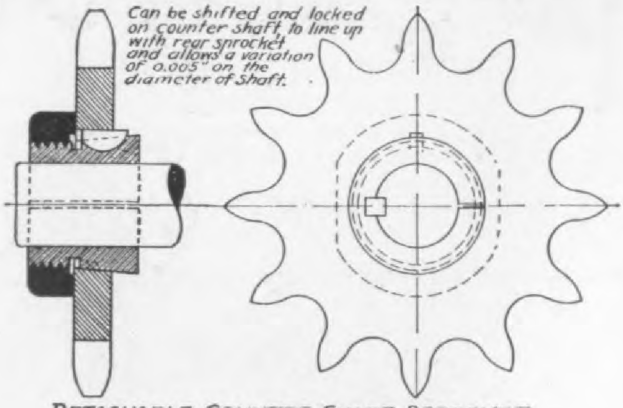
PATENTED.
CULLMAN WHEEL CO.
CHICAGO, ILLS.



DETACHABLE COUNTER SHAFT SPROCKET.
PATENT APPLIED FOR.
CULLMAN WHEEL CO.
CHICAGO, ILLS.

and DIFFERENTIALS in stock or order. *Send for complete Catalog.*

CULLMAN WHEEL CO.,
1020 Greenwood Terrace, Chicago, Ill.

A TEST OF PRINCIPLE AND QUALITY

Probably one of the hardest tests an Automobile has ever been put to, has been met by the American entry, A THOMAS FLYER, in the New York to Paris Contest. The front wheels of this car are fitted with **Timken Roller Bearings,** the hardest service on a car for bearings—but up to the present time has given no trouble or needed any attention.

E. R. Thomas Motor Co., Buffalo:

Gentlemen:—It gives me great pleasure to inform you that the TIMKEN ROLLER BEARINGS which were used on the Thomas Flyer, which is America's entry in the International Race from New York to Paris, gave no trouble whatsoever from New York to Cheyenne, where I had charge of the car. I also believe that they have given no trouble since. These bearings, as you know, are placed where the greatest strain is on them, and it is a considerable pleasure to inform you, that I believe the high quality of workmanship and material in your bearings is such, that they must be able to stand up under any and all road conditions, as the strain placed upon them, and in fact the entire mechanism of the Thomas car in this race were most extraordinary, and probably the hardest strain that could be put upon any motor vehicle, either under ordinary or extraordinary circumstances. The highest praise that I can give your bearings is, that I believe that they are fit component parts for the Thomas Flyer.

Yours very truly,
MONTAGUE ROBERTS

TIMKEN ROLLER BEARINGS

are made to use on all roads, rough or smooth, and represent a special knowledge of load and tractive requirements, with a wearing quality impossible with any other form of frictionless bearings. And that is why over 60 per cent. of all the high grade American Automobiles and 95 per cent. of the Trucks made in this Country recognize **The Timken Principle Correct and The Timken Quality Supreme.**

If you are building Automobiles or Trucks we would like to furnish you some data, based on facts that will not only interest you, but save you money.

The Timken Roller Bearing Axle Co.
Canton, Ohio.

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BRAKE LINING

Has the greatest amount of friction and wear-resisting qualities ever found in any lining. It cannot carbonize under the fiercest heat, neither will oil, water or gasoline injure it in the least. It will wear for many thousands of miles and fills every demand for an all-around satisfactory brake lining. Send for circular.

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Manufacturers of Raymond Brake

Thermoid Brake Lining

Positively Will Not Burn—Lasts Indefinitely

IT IS

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THE CRESCENT ACETYLENE BURNERS

IMPERIAL

Bike Tip, 15c

Manufactured under license 589342, Aug. 31st, 1897

30c per piece **$3.00 per dozen**

There are **more Crescent Acetylene Burners sold in the United States** than of any other Acetylene Burners.

Every Burner Absolutely Guaranteed That is why we employ no agents, our burners are their own drummers.

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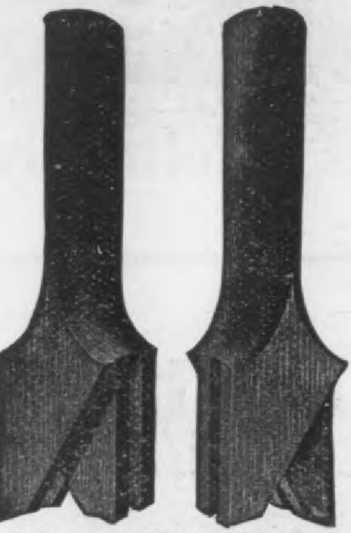
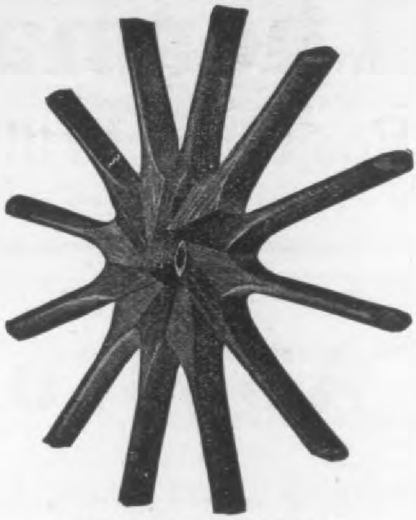


Schwarz Patent Spoke.

The SCHWARZ WHEEL



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The tenons of the spoke are grooved and mortised for interlocking, and are put together at one time under pressure. They can never work loose. The wheel can be made complete and shipped without the hub.

The Best and Strongest Artillery Wheel Made

Will stand where every other fails.

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Air Pumps
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QUALITY IS THE TRUE TEST OF CHEAPNESS

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Granulation is the basic cause of all "cutting." NON-GRAN is the only bronze in the world that won't granulate.

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on your transmission and engine parts, gear blanks, etc., without sacrificing quality?

Let us make these parts for you better, quicker and cheaper from large diameter bar steel than from forgings.

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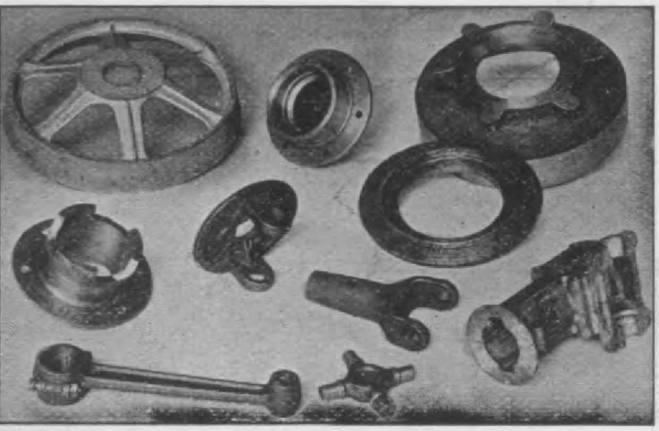

We can also machine your Castings and Forgings and are in position to take care of orders.

LET US DO YOUR MACHINE WORK

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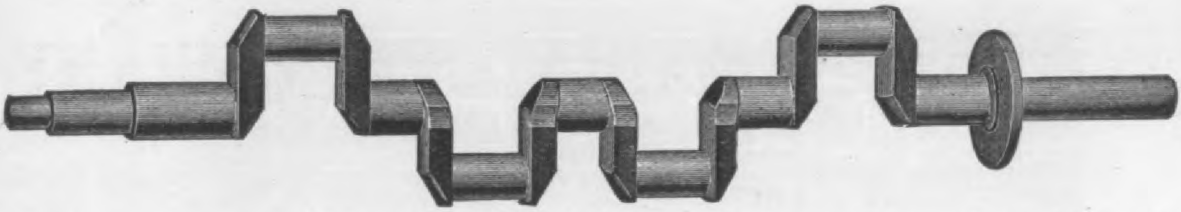
ROCHESTER, N. Y.



OUR CRANKSHAFTS "MAKE GOOD" BECAUSE THEY ARE "MADE GOOD"

¶ Into each we put the very best of materials, the most careful workmanship, and the benefit of our years of experience. For this reason our product is always satisfactory, and used by the largest and most exacting manufacturers.

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STRENGTH AND RELIABILITY

To produce the most satisfactory results with the least possible expense

IN AUTOMOBILE CONSTRUCTION

you must employ the simplest method of producing the necessary parts. Our Equipment and Experience in Electric Welding has been proven to be "The Best" process. *Write for full particulars.*

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¶ We manufacture Radiators of any Shape, in any Quantity, in One Manner only—the BEST.

¶ Our Patented Tubes enable us to GUARANTEE the Greatest Efficiency and Freedom from Leaks.

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More Routes and Greater Mileage Than Any Other

Practically a new book from cover to cover, doubled in size. Thoroughly revised and re-written. Contains

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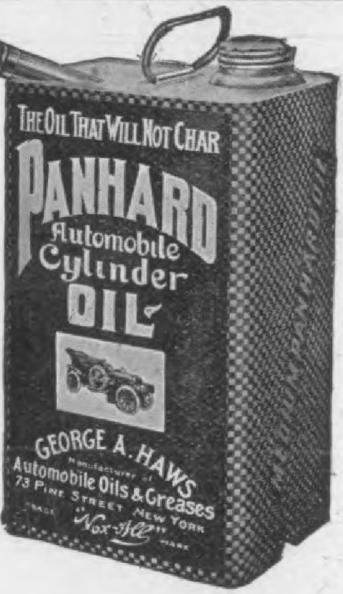

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"The Oil in the Checkerboard Can"

Gives 100 per cent. of lubrication and eliminates carbonization.

For the protection of our customers, we have adopted a sealed can which prevents the substitution of inferior and cheaper oils; **see that the seal is unbroken.**

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Get a CADILLAC

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Repair Cost, 50 Cents a Week—Over 18 Miles per Gallon of Gasoline

Actual figures are the strongest argument for economy. Here they are—averages obtai from the *sworn* reports of a large number of single-cylinder Cadillac owners, taken at rand from all over the United States, covering all imaginable road conditions—mountains, hills, sa snow, mud. The story they tell is of vital interest to every prospective purchaser. Read it

"The Truth About the Automobile and What It Costs to Maintain One"

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These figures—by disinterested people—conclusively *prove* Cadillac economy. The cars themsel prove their service and durability. You see these sturdy, rugged little machines everywhere—alw thoroughly alive to any test or requirement—*always going*. There are 16,00 daily use; many of them are in their sixth season, yet they are just as smo powerful and reliable as ever, with never even a suggestion of faili

DEL S
nabout

In fact, we have yet to hear of the first one put aside cause unfit for further use. This is *real* automobile ser —the Cadillac kind.

Capable of thirty miles an hour; offers the fullest com ment of that pleasure, convenience and recreation which a car like the Cadillac can afford. Described in Catalog N

Prices include pair dash oil lamps, tail lamp and horn.

CADILLAC MOTOR CAR CO., Detroit, Mich. *Member A. L.*

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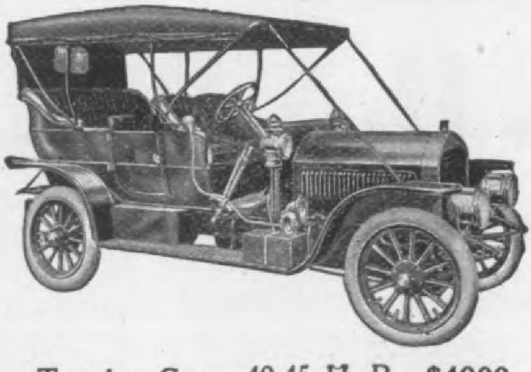
The Car of Character and Distinction



Touring Car.—40-45 H. P.—$4000.

THEY are well made, attractive in appearance, and thoroughly reliable, and never fail to give satisfaction. You will find the Frontenac line one of the best you can handle.

We have the following models to offer:

Touring Car.—40-45 H. P.—**$4000**
Runabout. —40-45 H. P.—**$4000**
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Runabout.—40-45 H. P.—$4000.

In addition, we are building gasoline

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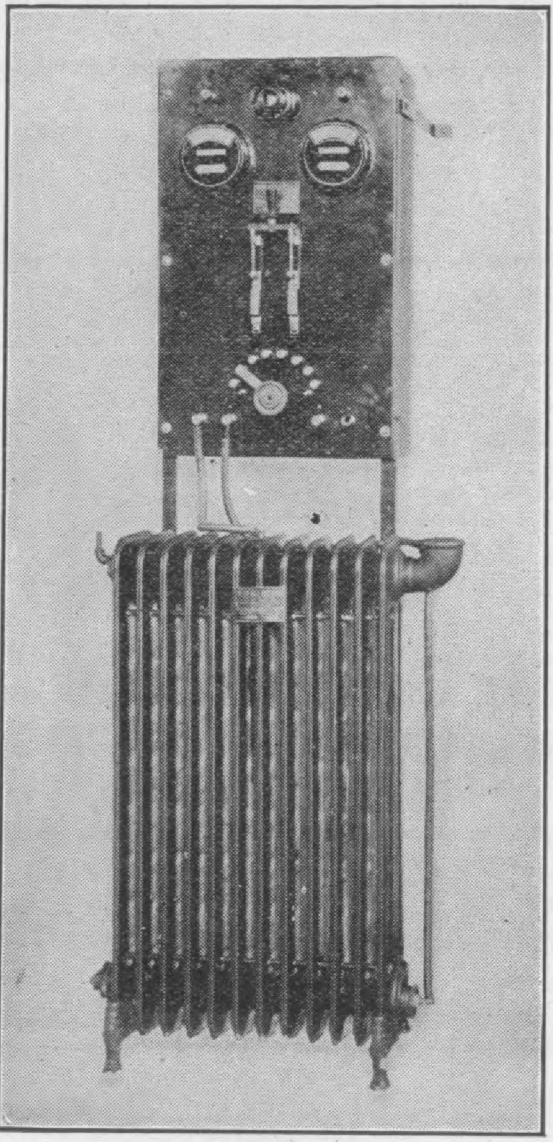
Patent Alternating Current Rectifier



TYPE C

'or transforming alternating current into irect current at a minimum loss.

A complete, reliable and practically in-estructible instrument, for charging Elec-ric cars and storage batteries, operating irect current motors and electro-plating, tc.

If you use Electric Motors or Dynamos, ou need

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Write for catalog.

The New Terminal Clip Handle of the BREECH-BLOCK SPARK PLUG

DO YOU USE Breech-Block Plugs?

Then, by all means, you should have one of these handles. "The most convenient thing ever devised," you will say after using it. It is made of enameled wood, impervious to heat, and is a non-conductor, thus preventing burns and shocks.

The handle is inserted in the clip in place of cable. The regular cable clip is attached to the Breech-Block clip with a small brass screw and nut, which are furnished with each plug. With the cable thus attached to the clip at right angles, the clip is easily removed from the plug. The handle is an insulator and is very convenient for testing the spark by detaching clip from plug and forming a spark gap.

Better order one,—**NOW.**

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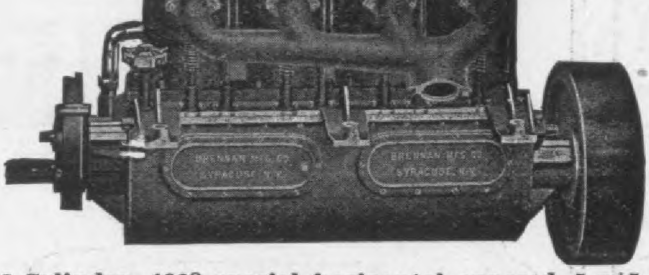

2-Cylinder, 1908 special horizontal opposed, 5 x 5 annular ball bearings.
2-Cylinder, horizontal opposed, 5½ x 5, annular ball bearings.
4-Cylinder, 1908 special vertical, $4\frac{9}{16}$ x 4, $4\frac{9}{16}$ x5.
4-Cylinder, vertical, 5 x 5.
4-Cylinder, vertical, 5½ x 6, also 6 x 6, and 7 x 6.

We also build, to order, 4-cylinder chassis complete, and will be glad to furnish estimates on application.

NOTE THE FOLLOWING TESTIMONIAL:

Wallingford, Conn., April 29, '08

Brennan Mfg. Co.,
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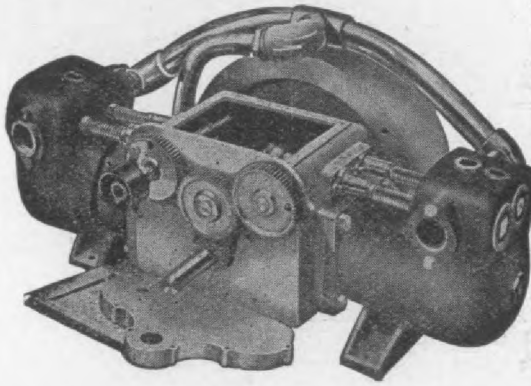
Gentlemen:—

The two cylinder engine which I purchased of you last month I have now run 500 or 600 miles and am delighted with it. I think it is the strongest, best hill climbing two cylinder machine there is on the market and would be glad to write you a testimonial concerning what I have been able to do with it, if it would be of any use to you.

I have done some great stunts with it.

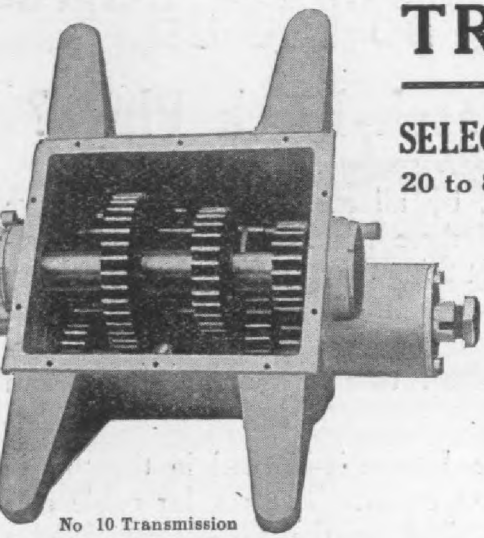
Yours,
Henry Stone,
Wallingford, Conn.

BRENNAN STANDARDS have for years been the choice of the well-informed because of their quiet-running qualities, their flexibility, economy and efficiency. They will give **you** the best service you have ever secured from any motor, irrespective of cost. We furnish them complete, mounted on sub-frame, to fit all standard makes of cars such as Aerocar, Olds, Pope Hartford, Cadillac, Wayne, Queen, Ford, Marion, etc.



Brennan Motor Manufacturing Co., Syracuse, N. Y.

TRANSMISSION GEAR



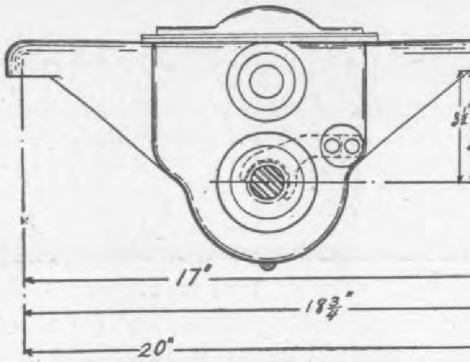
No 10 Transmission

SELECTIVE TYPE

20 to 80 H. P. Shaft and double chain drive.

PLANETARY GEARS

Chain or shaft drive, in three sizes. Prices on application.



SYRACUSE GEAR CO., Syracuse, N.

Holley Carburetors, $2.25

WE have a stock of 1907, Model L, 1-inch carburetors, over-runs on manufacturing

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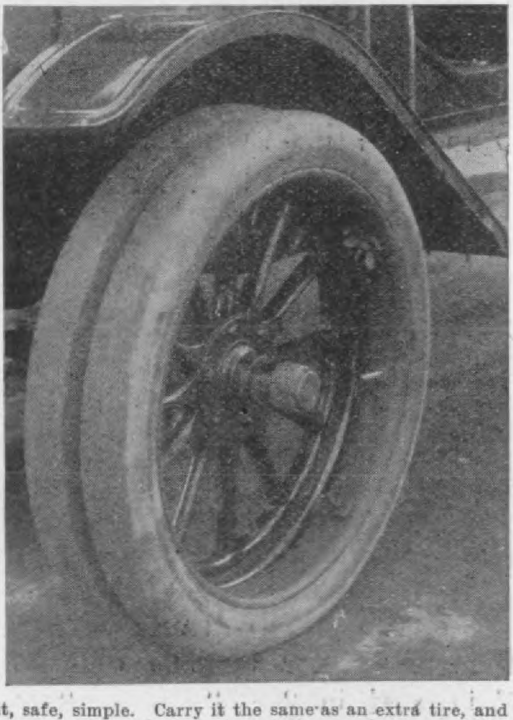
Just when it
starts to Rain
—that's the time
to put on your
Weed Grips
WEED CHAIN TIRE GRIP CO.
28 MOORE ST. NEW YORK

ANT EVERY MOTORIST IN THE UNITED STATES TO HAVE THE

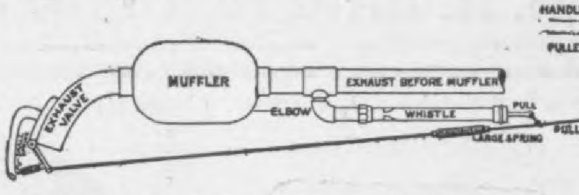
EMERGENCY WHEEL



t, safe, simple. Carry it the same as an extra tire, and when
ve a puncture place the two stationary clamps over the rim of

the NIGHTINGALE WHISTLE

Demands Right of Wa



Superior to any warning signal on the market.
long distance whistle, always pleasing to the ear, pos
sing a six note trill that is *distinctive*, melodious, n
fails, and can be heard for miles. The Nightin
Whistle cannot become clogged. It is closed when
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to any make of car by chauffeur, to exhaust pipe
muffler. Operates from any part of car by hand-p
lever or pedal.

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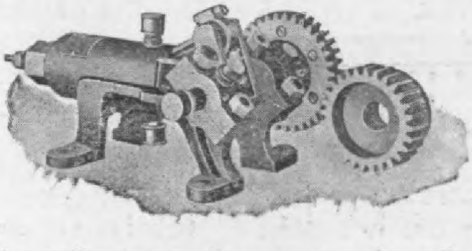
The Tire Inflator Delpeuc

Inflates the largest tire in less th
one minute.



A small compact air compressor of excellent wo
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grease cups. Any mechanic can attach it. Oper
by sliding pinion controlled from the dash. Gives p
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Each of the necessary accessories are for sale
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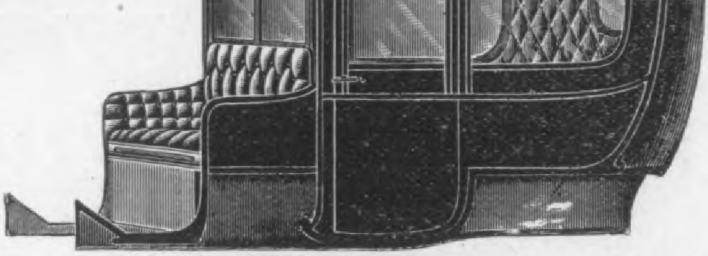
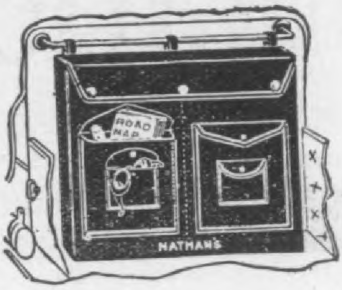


Builders and Designers of all styles of bodies for the Automobile trade.

H. H. BABCOCK COMPANY, Watertown, N.Y.

NATHAN'S AUTO FABRIC SUPPLIES ARE THE STANDAR

Send for 1908 Catalog



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EVERYTHING MADE OF FABRIC FOR THE AUTO

NATHAN NOVELTY MANUFACTURING CO. - 84 to 90 READE STREET, N. Y.

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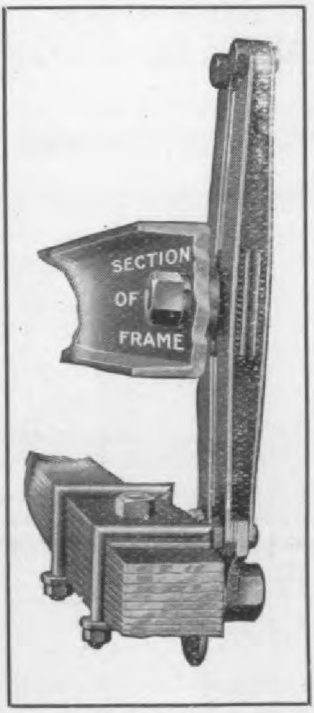

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Friction is gradually applied in proportion as shock becomes greater—makes riding smooth and easy—saves tires and springs—the only shock-absorbers that allow free play of springs up to their elastic limit.

Attached to any car or spring.

Ask for The Gabriel Horn, Cut-Out Valve and Shock-Absorbers on your 1908 car.

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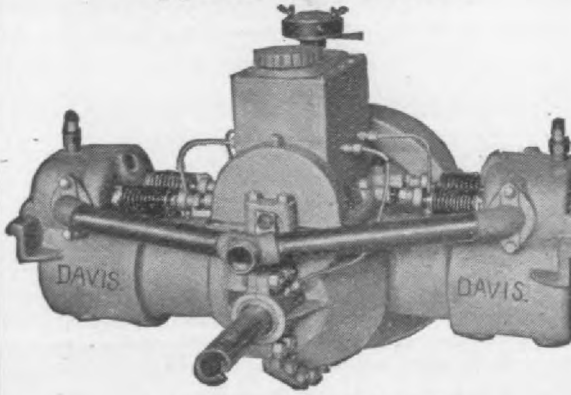
OUR LATEST
5 in. x 4 in.-Two Cylinder
Opposed. 18 H. P.



WE ALSO MAKE

4½ in. x 4 in. 2 Cylinder Opposed
5½ in. x 4½ in. 2 " "
6 in. x 4½ in. 2 " "

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The Genuine "EXIDE" Plate has "EXIDE" moulded on the Lug.

MANUFACTURED BY

THE ELECTRIC STORAGE BATTERY CO

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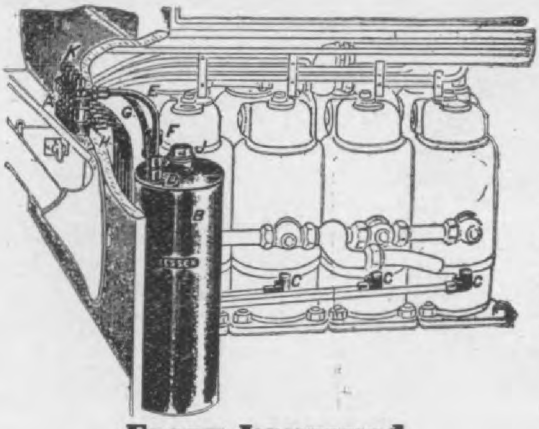
Sales Offices: NEW YORK BOSTON CHICAGO ST. LOUIS CLEVELAND ATLANTA SAN FRANCISCO TORONTO



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Automatic

Lubrication is the only successful method of lubricating **Automobiles.** Always ready and never get out of order. 30,000 in use.

G. B. ESSEX BRASS CO.
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The Elwell-Parker Electric Co. of America

Manufacturers of following Parts for Electric Vehicles, for both pleasure and commercial purposes:

Motors
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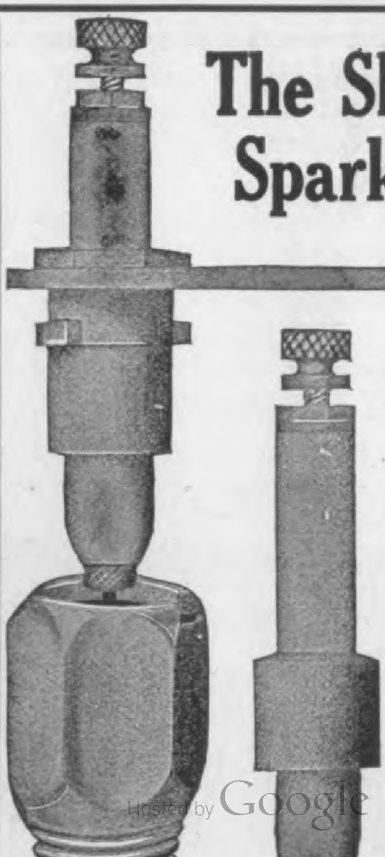
Front and Rear Axles
Power Plants
Complete Chassis, ready for body, tires and batteries

Office, No. 4223 St. Clair Ave.

The Sherma Spark Plug



Price, $1.5

A plug instantly separable for cleaning purposes, priming the engine, or replacing the core.

Practicall soot-proof, constructed to make it positively leak-proof.

Mechanically perfe and made o high-grade material.

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ESTABLISHED 1791

Harland's English Varnishes

Specially manufactured to meet the requirements of the automobile trade

Auto Body Finishing
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These varnishes have all the well known characteristics of our world renowned Coach Builders' Varnishes, with special drying qualities which render them unique in their value to automobile manufacturers. Their quality of standing up under the severe conditions to which they are subjected is unsurpassed.

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For quickly, thoroughly and economically cleansing all grease and chips from newly made machine parts preparat to being case hardened, plated or assembled, also handy cleansing parts of machinery of all descriptions in repair sh or garages, which are being repaired or overhauled. M economical and safer to use than gasoline for cleansing. Hea by Bunsen gas burner or blue flame kerosene burner. Be than steam jacketed kettles because they are portable and quire no expensive steam traps, special piping or drain One size only. Ten gallons capacity. Low cost as compa with steam kettles. In stock ready for prompt shipm Send for descriptive circular K today.

THE GRAY & PRIOR MACHINE CO.
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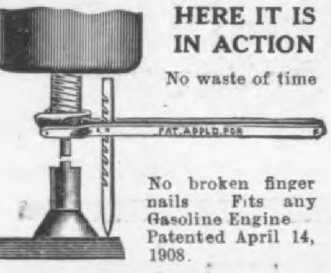
Triumph Valve Remover



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No waste of time

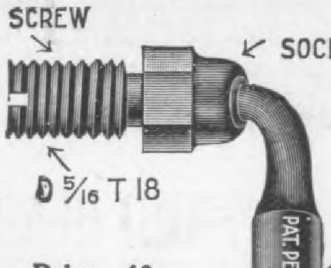
No broken finger nails Fits any Gasoline Engine Patented April 14, 1908.

Enables you to remove valve key or valve spring with no side strain or bending of valve stem. Price, $1.00 each. Discounts to manufacturers and jobbers. For sale by supply dealers throughout the United States. If your dealer cannot supply you, send us P. O. order for $1.00 and the Remover will be sent you postpaid.

Manufactured by

Adjustable Ball Joints

for throttle and spark levers, connecting carburetor and timer with levers on wheel steer, eliminating all lost motion and giving a more perfect control to these levers at all times. Easily and perfectly adjustable.



For Spark and Throttle Levers

Price, 40c

Cut shows exact size.

Adjustable stock size, steel, 40c each. Adjustable stock size brass, 50c each Non-adjustable stock size, steel, 20c each.

MECHANICAL & ELECTRICAL MFG. CO., 52 N. Desplaines St., Chicag

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SEAMLESS-STEEL-TUBING
ONLY TUBE MADE SUITABLE
FOR BICYCLE CONSTRUCTION
SEND FOR OUR ILLUSTRATED
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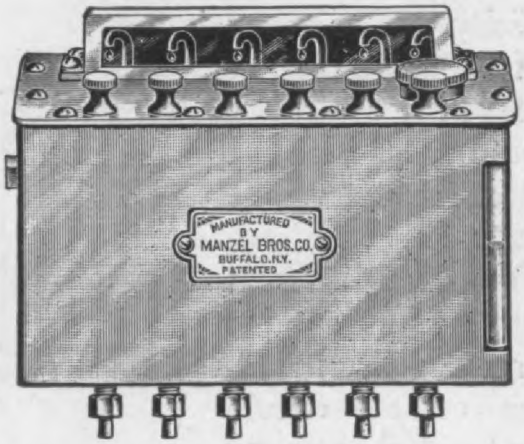

For lubricating the cylinders and bearings of all kinds of Gas and Gasoline Engines.

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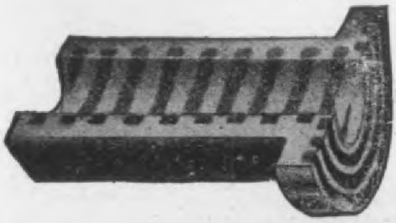

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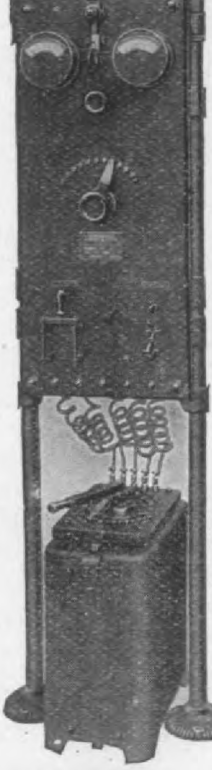

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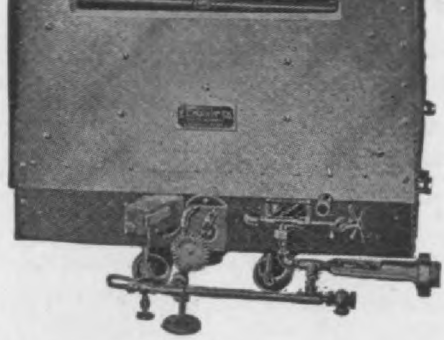

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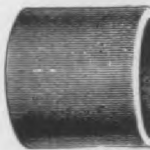

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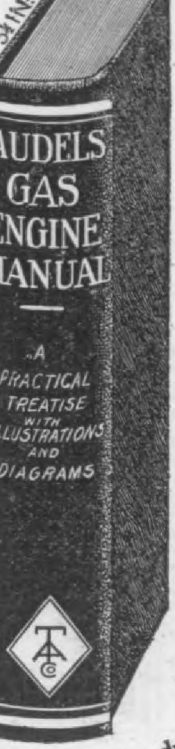

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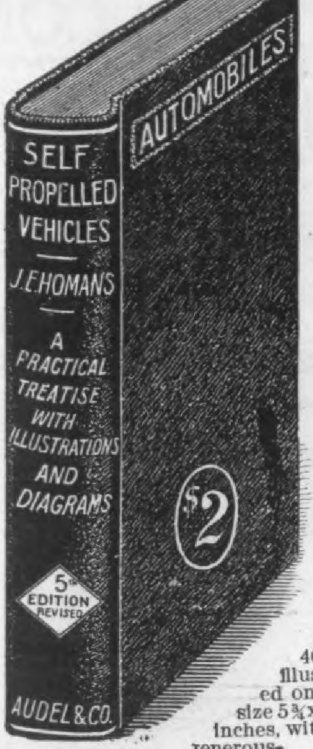

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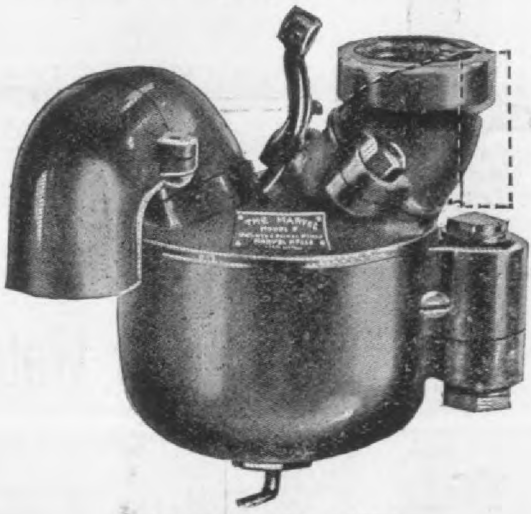

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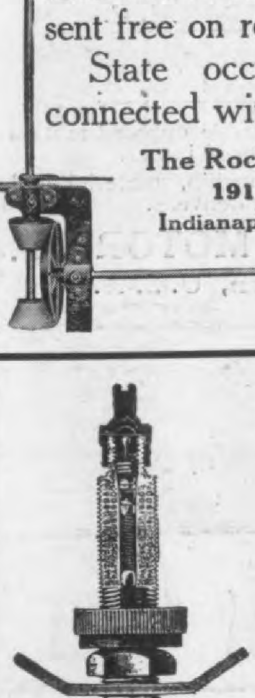

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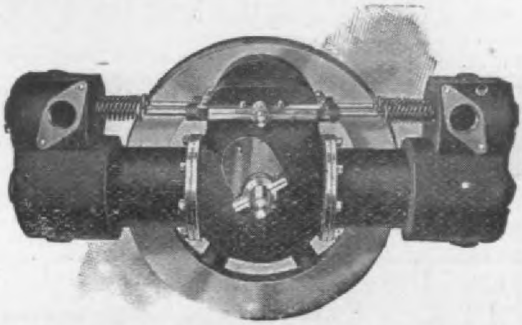

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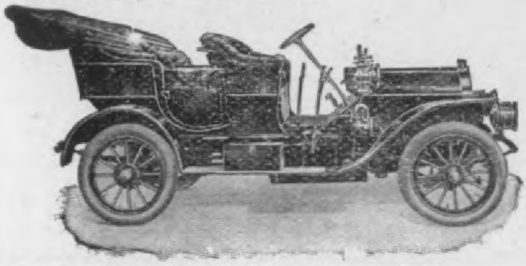

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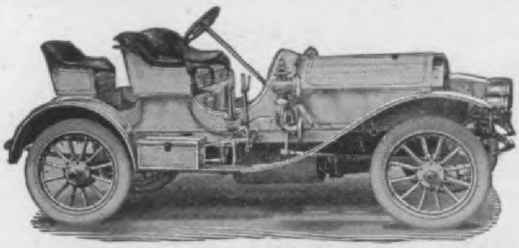

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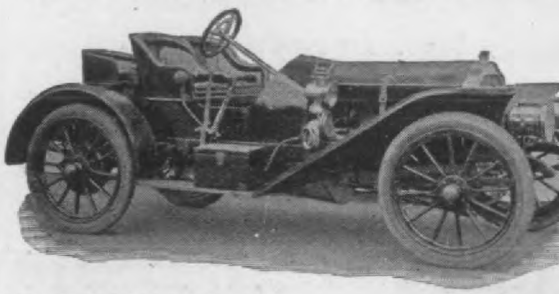

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4 cyl., 40 H P. motor. Double ignition system, battery and magneto. Transmission,—selective type, three speed forward and one reverse. Wheel base 108 in. Speed, 60 to 65 miles per hour

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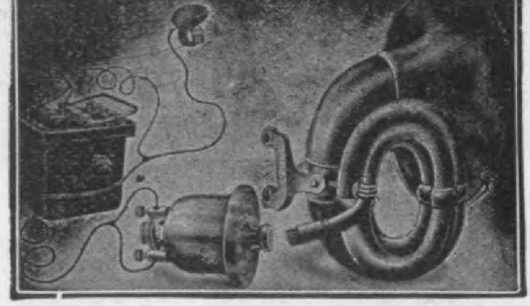

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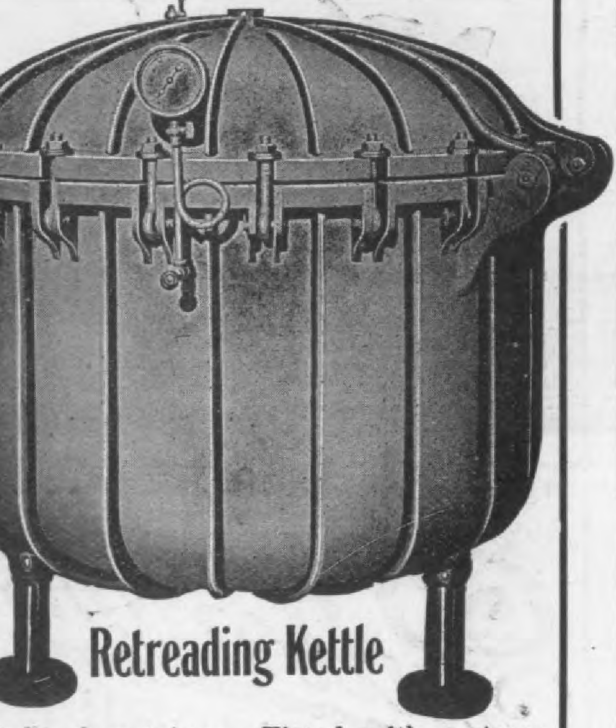

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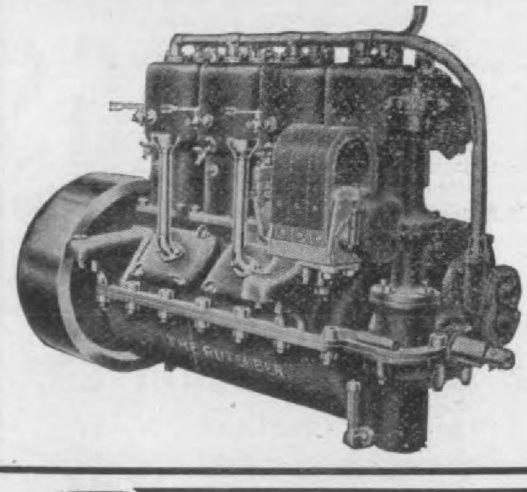

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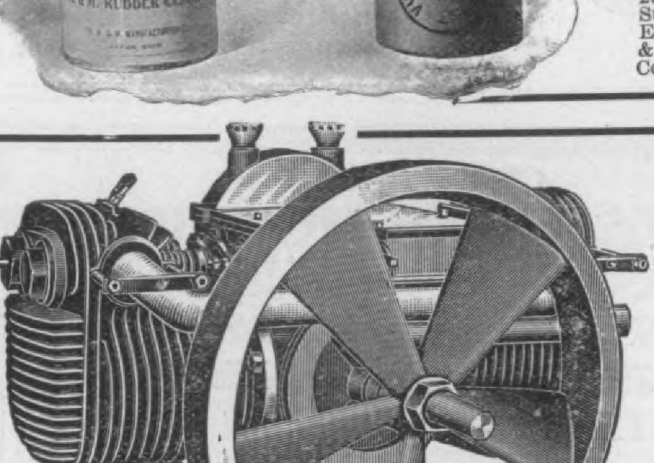

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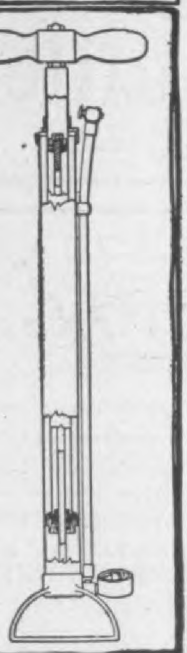

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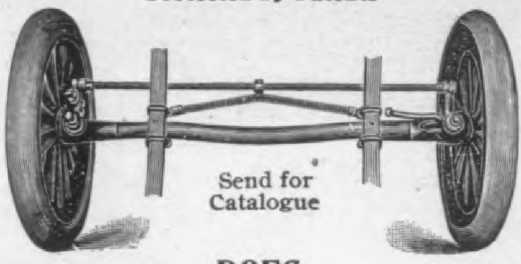

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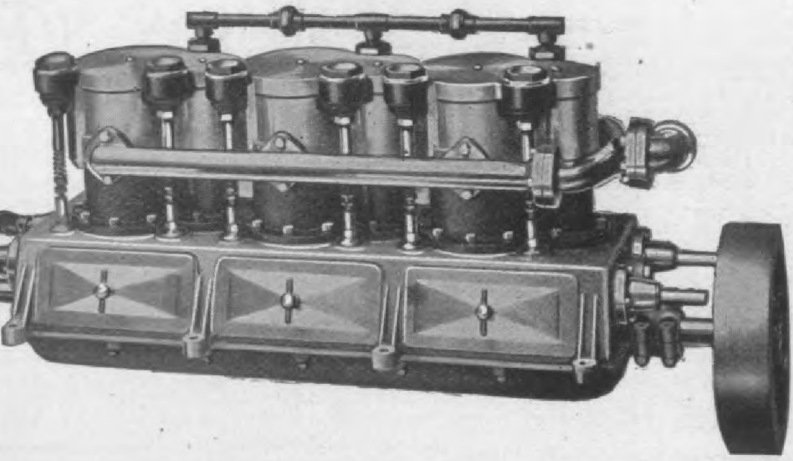

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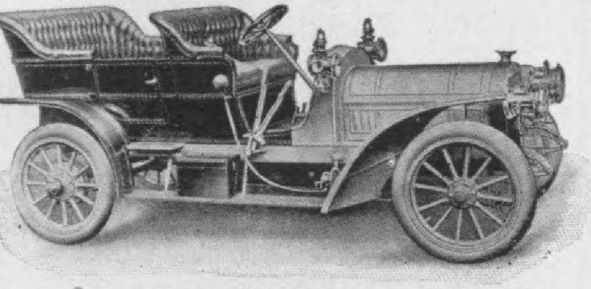

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Includes many features new to the carriage type of motor car. Fifteen horse-power motor under the hood at the front; shaft drive to counter shaft; double chain drive to the rear wheels; sliding gear transmission; two speeds forward and reverse; transmission, bevel gears and differential together in one piece; dust-proof housing; wood frame of ash amply reinforced; rack and pinion steering device, no ropes, belts or pulleys. Tire troubles are abolished, tire maintenance reduced to the minimum. Low in first cost; low in depreciation and longest in service—the car for the man who wants mileage for his money. Four 1908 models, Runabout, Surrey, Coupe, Delivery Wagon.

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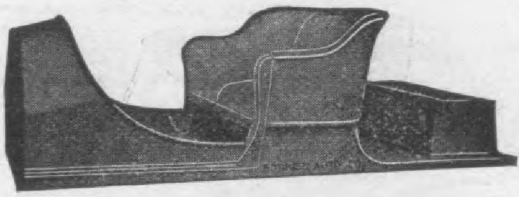

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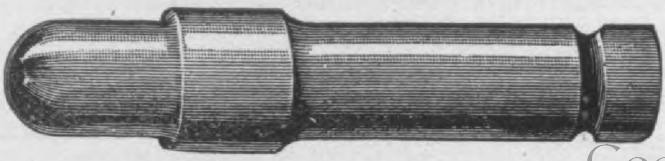

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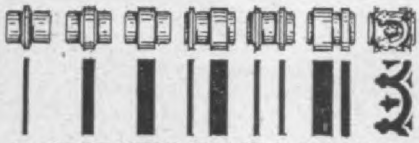

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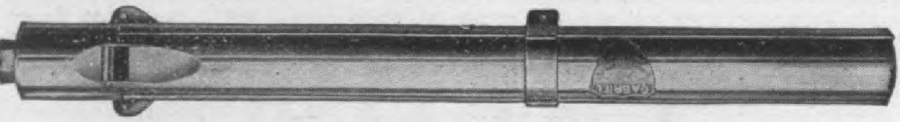

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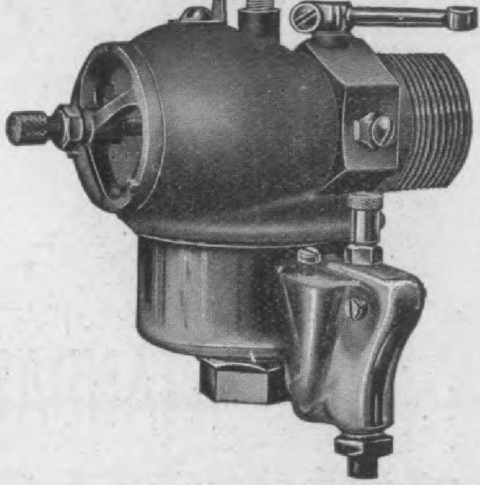

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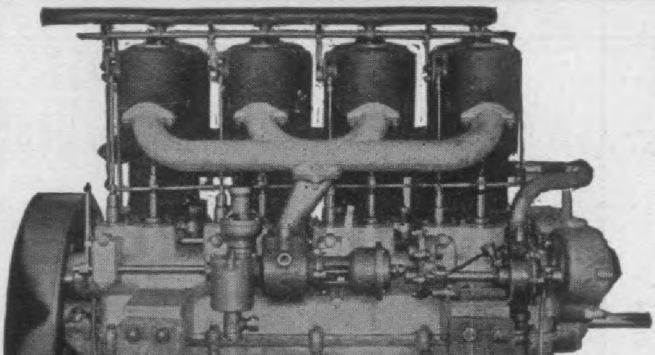

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For Trucks, Automobiles, Boat

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Three Styles: CLINCHER—DUNLOP—FISK
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Wind Shield in the world, the only shield manufactured that has a single or double fold over the hood without the line of vision obstructed across the center of the glass. Folds flat, entirely out of the way when you want it down.

The graceful lines, superb finish, absolute rigidity and simplicity of operation commend its use on the best cars.

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Two Alpha Type Headlights, of heavy brass, open back and front. Condensing lens is finest imported optical crystal. They throw long finding rays essential to fast driving.

Large Touring Generator reinforced. Most reliable type. Holds two pounds carbide.

The usual price of this set is $35 00 to $50.00. Our price for a limited number in sets consisting of two 10 inch lamps, generator and connecting tube is $17 50 (prepaid $1.50 extra). Money back if not satisfied.

No. 11 A. Lamps only, each - - $6.50
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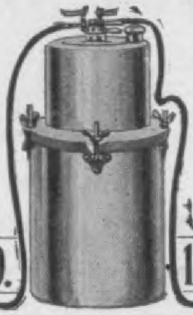
Illustration shows "Alpha" style.



Two seven inch powerful Searchlights with French Mirror Reflectors, copper back and front

High quality double Generator of the latest design. Holds two pounds of carbide.

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DUST AND ODOR PROOF

Auto Trunks

Single, Double Triple and with Inside Grips

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Manufactured by

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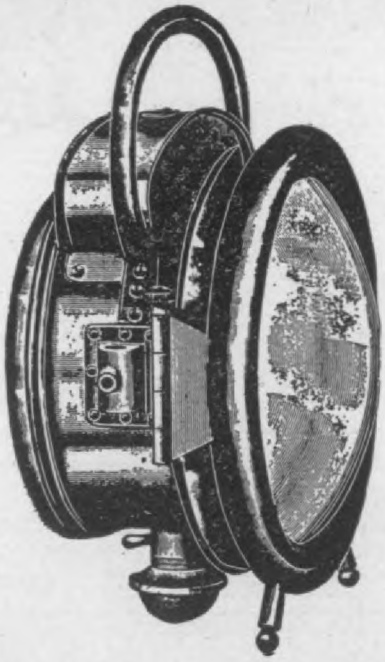

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Structural Steel Garage

A FIRE-PROOF BUILDING

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Shipped knocked down, with all parts perfectly fitted, ready to bolt together. Very easy to erect.

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Price now $1.50 each

If your garage or supply man cannot furnish it, send us $1.50. Delivered free.

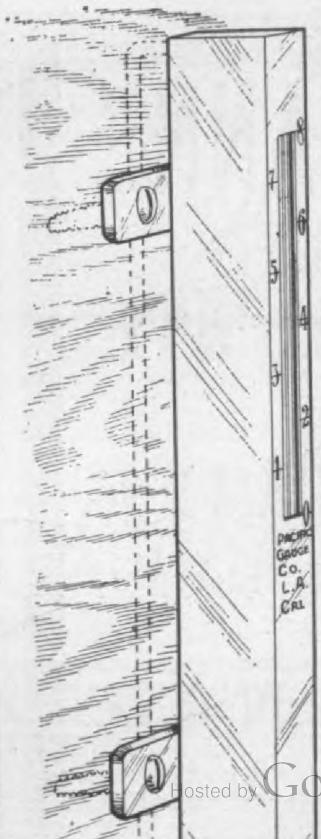
Is the **one tool** for easily and properly setting valves or lugs, and making it easy to get at inner tubes.

Instantly adjustable to all sizes of tires without making any changes.

It does the work well and quickly and **does not injure the casing.**

It should be in every tool kit.

The **PILLINER TIRE TOOL** has been greatly improved, which will insure even greater popularity than ever, after two years successful demon-



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Tells accurately how much Gasoline in your tank as well when going up or down hill as on the level.

Easily attached.

An ornament to the car.

BRASS OR NICKEL FINISH

$5.00 Prepaid

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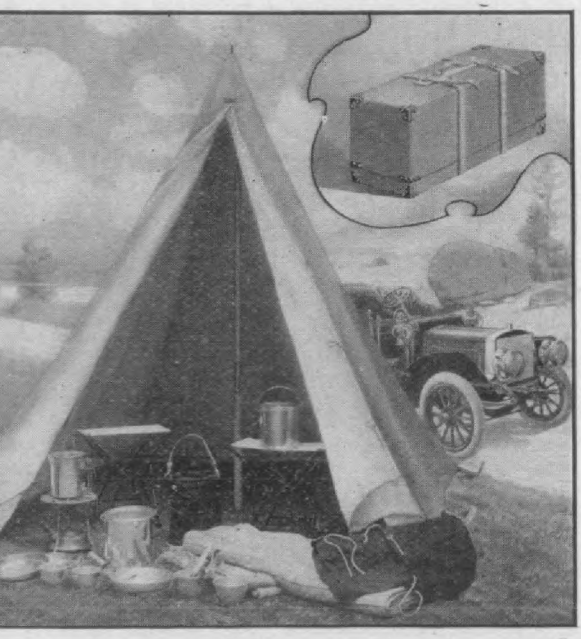

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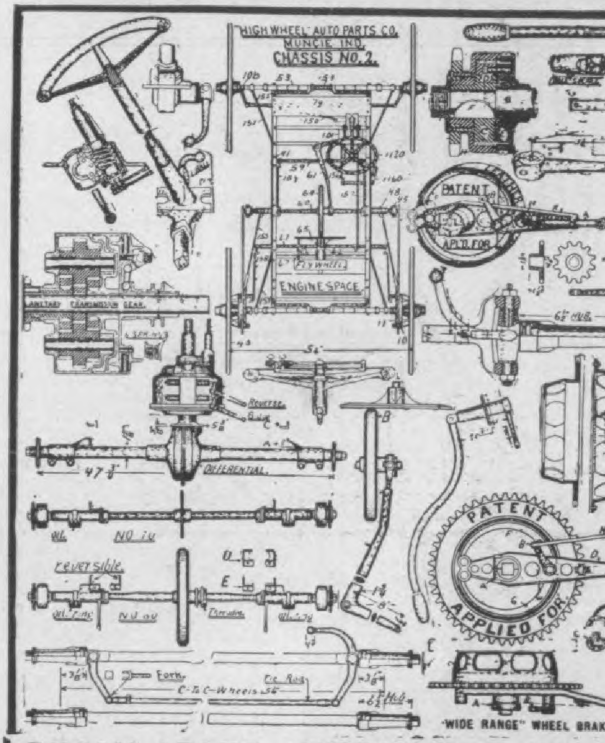

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Complete Counter Shafts, Steering Knuckles, Front 'a Rear Axles, Shelves and Cables, Steering Devices, bo Wheel and Lever Type, Differential and Planetary Tran mission Gears, Rear Wheel Brake Drums and all kinds

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HANDLE.
Also Tire Tool and Hammer

To lower, simply work handle above the level, or turn it over and work below the level.

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The 1908 PEERLESS JAC
IMPROVED

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Made of Malleable Iron. Is strong, compact, light, ra cheap and by far the most popular Automobile Jack on market. The leverage is much easier than on our for makes of these jacks. The handle is 15 inches long. shaped to make one of the best tire tools on the market can also be used as a hammer. The handle socket is c ed, enabling the jack to be worked under any car, and not necessary to get under the car to operate it. Work any angle; can be used for pushing as well as lifting. automatic:—working the handle below the level raises; w ing the handle above the level lowers, or turn handle and work below level. Nothing easier; nothing sim Specify Peerless Jacks for your cars.

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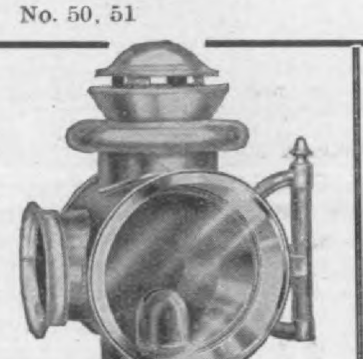

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Is it guaranteed not to blow or jar out? If not, you had better get one that is, as this is just the time of the year when you will need it most, and when you least expect it you are going to get caught, it may be in an accident or it may be otherwise; in either case it will cost you more than the price of a good lamp.

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FROM YOUR SHOULDER TO TIP OF SPOUT

Can't leak or spill. Oil drops only when thum pushes plunger. Works at any angle or wron side up. A big convenience. 5 sizes. Sol brass throughout. Dealers will supply you. not, write us promptly. Catalog free.

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Insist on NEVER-MISS when you ask for a plug.

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Write us for catalog and discount; we have a good proposition for you.

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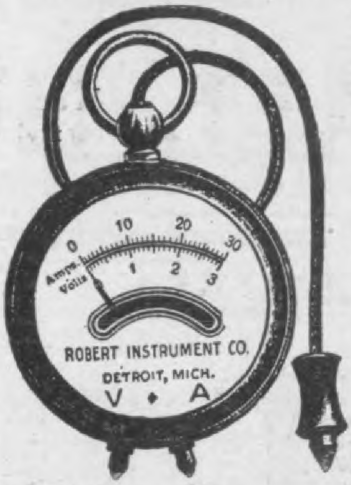

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BEST JACKS

Our 1908 MODELS both Single and Double Acting are provided with a REVERSING LEVER making them the most convenient Jacks on the market to operate. More American Automobiles are equipped with BUCKEYE Jacks than any other. Positively the only Jacks on the market with High Carbon Crucible Steel Drop Forged Racks and Pawls.

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The Buckeye Jack Mfg. Co.
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SEAMLESS BRASS
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COPPER TUBING

Mr. Auto-Maker—We want your Trade.

All sizes from 1″ to 1-32″. Tubing exact t gauge and diameter. Tubes straight and flaw less. Annealed just as you want them. Price as low as the lowest. Immediate deliveries.

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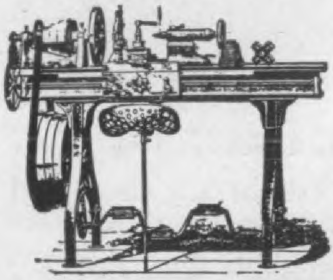

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9 to 13 in. Swing

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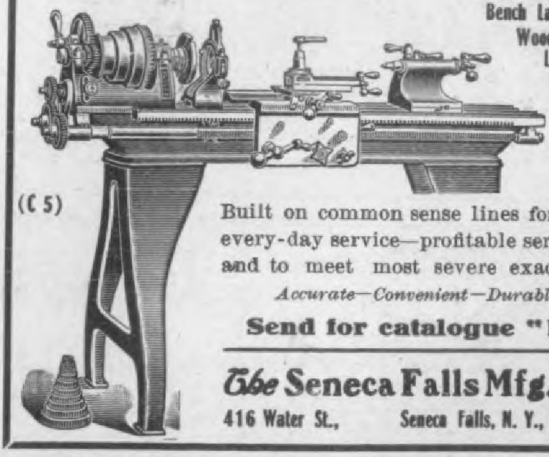

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Built on common sense lines for har every-day service—profitable service and to meet most severe exaction

Accurate—Convenient—Durable

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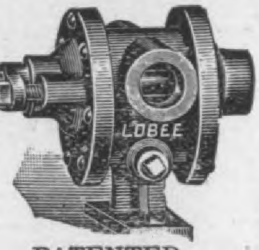

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Lobee Circulating and Bilge Pumps

have a train of satisfied users everywhere. If you want good circulation on your Automobile, Launch or Motor Boat, use a **LOBEE PUMP.**

Write for circular and prices.

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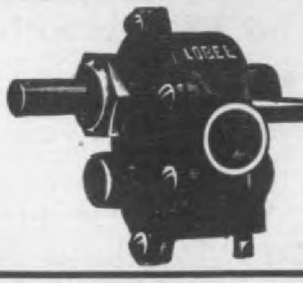

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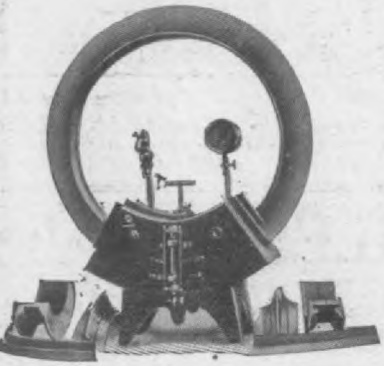

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BALL BEARING, ADJUSTABLE

STEERING GEAR

is the Best. 8000 miles without adjustment and still running on a large National car to date.

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Isn't it just as foolish to use the same oil on EVERY motor?

MONOGRAM OIL

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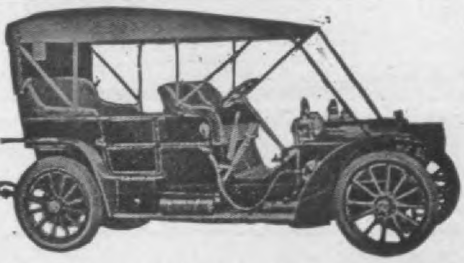

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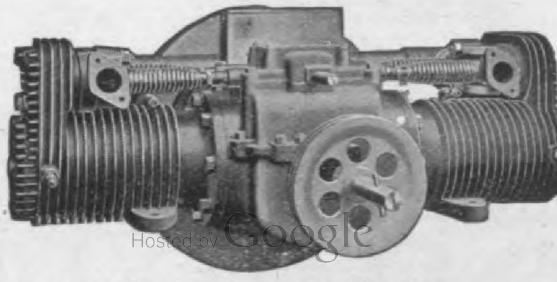

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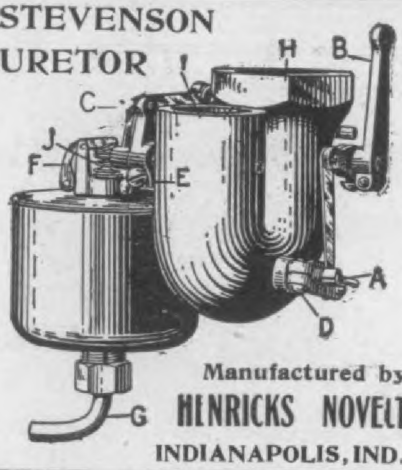

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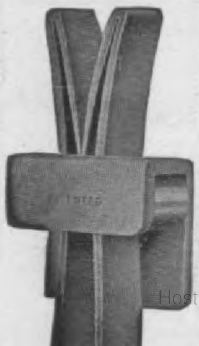

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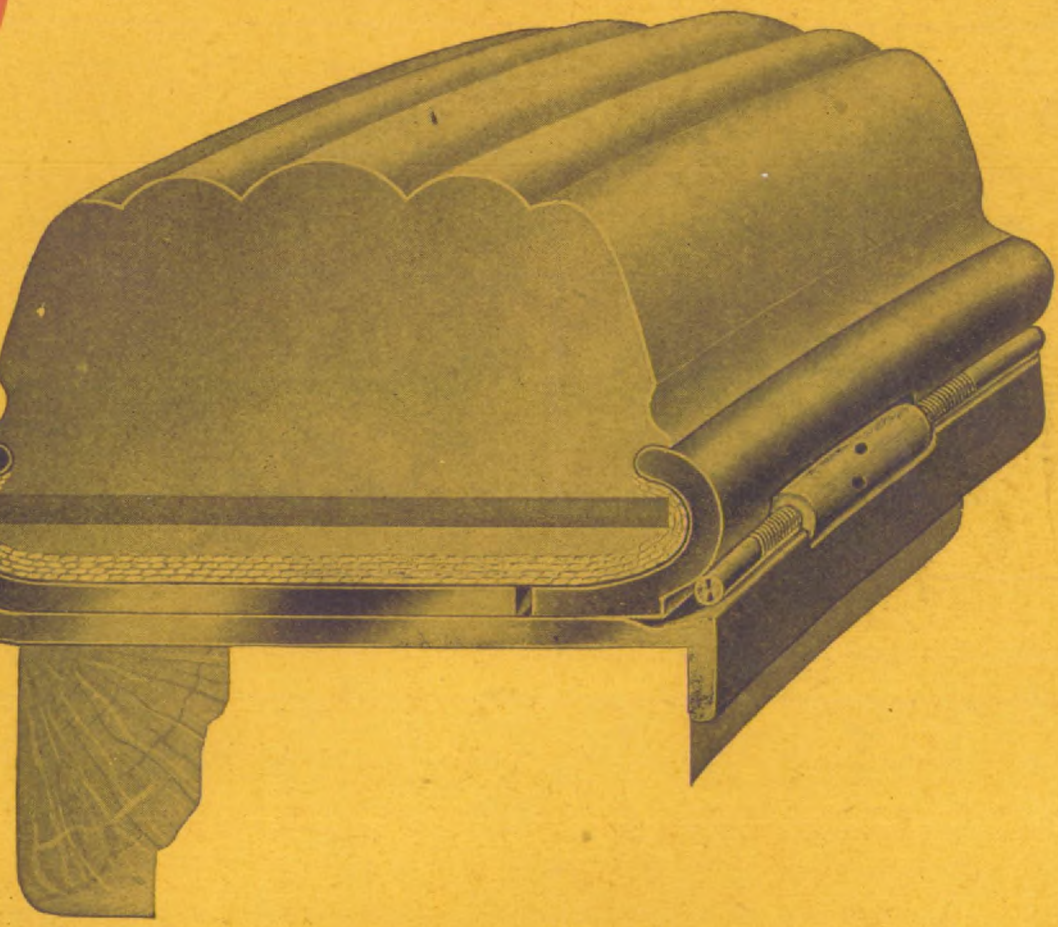

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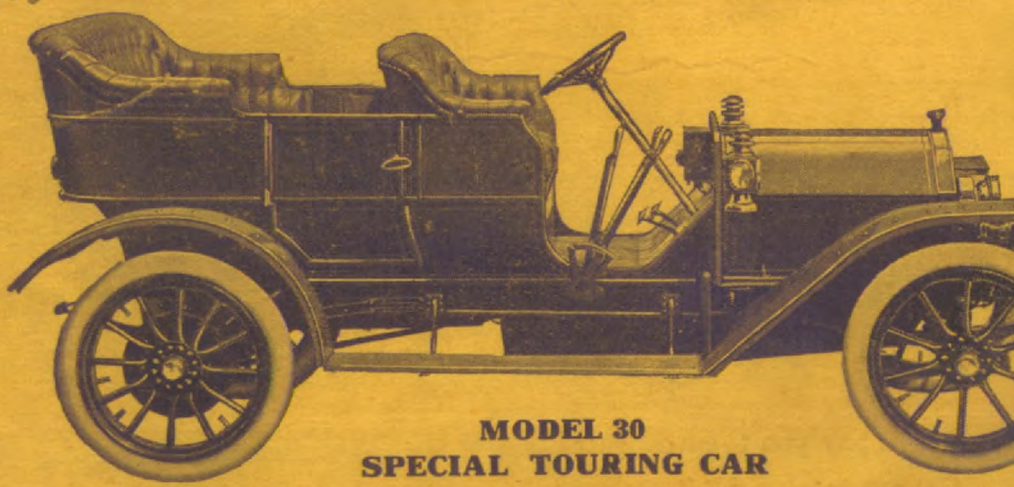

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